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RESIDENT RESEARCH FORUM

Empowering the Next Generation of Researchers: RJRMU's Commitment to Strengthening Future Faculty

***Farah Pervaiz*[1]**

[1] Editor of Resident Journal of Rawalpindi Medical University, Rawalpindi, Pakistan.

Research plays a crucial role in academia, particularly within medical universities, as it underpins the advancement of knowledge and the development of future healthcare professionals. It fosters a culture of inquiry, critical thinking, and problem-solving, which are essential for addressing complex health challenges. The integration of research into medical education not only enhances the learning experience but also contributes to the overall improvement of healthcare practices and outcomes[i]. Research is fundamental for generating new insights and innovations in medical science, which directly impact patient care and treatment methodologies[ii]. Engaging medical students in research is crucial for inspiring academic careers and reversing the decline of medically trained researchers[iii],[iv]

Rawalpindi Medical University is steadfastly committed to enhancing research capacity among its future faculty, recognizing the pivotal role that robust academic inquiry plays in advancing knowledge and societal progress. By fostering a culture of research excellence, RMU aims to equip aspiring educators with the necessary skills and resources to conduct innovative and impactful research. The university provides a comprehensive framework that includes mentorship from seasoned scholars, access to state-of-the-art research facilities, and opportunities for interdisciplinary collaboration. Furthermore, RMU actively encourages participation in national and international conferences, enabling future faculty to engage with global research communities and stay abreast of emerging trends and methodologies.

The Resident Journal of Rawalpindi Medical University (RJRMU) is dedicated to fostering a vibrant academic environment that encourages residents from various specialties to develop and enhance their research skills. The vision of RJRMU is to serve as a premier platform for the dissemination of high-quality research conducted by medical residents, thereby contributing to the advancement of medical knowledge and practice. Its mission is to cultivate a culture of scholarly inquiry and academic excellence among residents by providing them with the tools, guidance, and opportunities necessary to pursue and publish their research endeavors.

RJRMU actively encourages residents to engage in research by offering workshops and training sessions focused on research methodologies, data analysis, and scientific writing. These initiatives are designed to equip residents with the essential skills required to conduct rigorous research and effectively communicate their findings. The journal also provides mentorship programs where experienced faculty members guide residents through the research process, from conceptualization to publication. By creating a supportive and collaborative research environment, RJRMU inspires residents to explore innovative ideas and contribute original research articles to the medical community. Through these efforts, the Resident Journal of Rawalpindi Medical University plays a crucial role in enhancing the research capabilities of its residents and promoting a lifelong commitment to academic inquiry and excellence.

Through these initiatives, RJRMU not only nurtures the intellectual growth of its faculty but also contributes to the broader academic landscape, ensuring that its graduates are well-prepared to address the complex challenges of the modern world.

[i] Vojvodic-Hernández IM. Research in health sciences schools. Horiz Med [Internet]. 27 March 2024 [cited 4 March 2025];24(1)

[ii] Magan D. Importance of Research in Medical Education. J Med Edu. 2018;17(3):e105647. https://doi.org/10.22037/jme.v17i3.22269

[iii] Pallamparthy S, Basavareddy A. Knowledge, attitude, practice, and barriers toward research among medical students: A cross-sectional questionnaire-based survey.

[iv] Pallamparthy S, Basavareddy A. Knowledge, attitude, practice, and barriers toward research among medical students: A cross-sectional questionnaire-based survey.

Original article

Correlation between the Neutrophil-to-Lymphocyte Ratio and the Severity of Acute Pancreatitis

Tayyab Mumtaz Khan[1, *], Tashfeen Farooq[1], Nazan Hassan[1], Iffat Noureen[1], M Rawal Saeed[1], Muhmmad Iqbal[1], Huma Sabir Khan[1], Usman Qureshi[1].

Abstract

Background: Acute pancreatitis (AP) is a potentially lethal condition triggered by various factors, with a poor prognosis if it escalates to severe acute pancreatitis. Traditional methods for evaluating the severity of AP such as the Ranson criteria, the Acute Physiology and Chronic Health Evaluation (APACHE) II score, and the Bedside Index of Severity in Acute Pancreatitis (BISAP) scores, are cumbersome and resource-intensive, requiring costly investigations. To overcome this limitation, this study investigated the relationship between the neutrophil-to-lymphocyte ratio (NLR) and AP severity, exploring the potential of NLR as a simple and more affordable predictive indicator of AP severity.
Methods: This cross-sectional study was conducted at Benazir Bhutto Hospital (BBH) in Rawalpindi, Pakistan, from January 2022 to January 2024, among 210 diagnosed patients of AP. Consecutive sampling and a set of inclusion and exclusion criteria were used to recruit patients. Informed consent was acquired prior to data collection. A self-created form was used to gather data. The severity of AP was assessed using the Ranson criterion score. Based on the severity of their AP (Ranson score), the patients were split into two groups. Descriptive and inferential statistics were used in the Statistical Package for the Social Sciences (SPSS) to analyse the data. P-values below 0.05 were regarded as significant.
Results: From 210 patients, n=136 (64.76%) had non-severe AP while n=74 (35.24%) had severe AP. Significant variations were found in the age, gender, WBC count, serum AST level, blood glucose level, serum LDH level, serum amylase level, serum lipase level, Ranson score, lymphocyte count, neutrophil count, and neutrophil-to-lymphocyte ratio with $p < 0.05$. Pearson's correlation showed that NLR was positively and significantly correlated with the Ranson scores ($r = 0.82$ $p < 0.002$). Linear regression analysis also indicated NLR as a significant predictor of AP severity ($\beta = 3.20$, 95% CI: 1.80-4.70, $p < 0.002$).
Conclusion: In the present study, NLR was found as an efficient indicator of AP severity in patients as a positive and significant association was noted between the NLR and the severity of AP. Higher NLR was correlated with higher Ranson scores, suggesting the increase in severity of AP. This current study findings endorse the use of NLR as a supplementary, cost-effective tool for prompt identification of high-risk AP patients, facilitating timely interventions and improved outcomes, particularly in resource-constrained setting.

Keywords: Heart failure, ECG, Ejection Fraction, Arrhythmia.

[1] Surgical Unit-II, Benazir Bhutto Hospital, Rawalpindi.
*** Corresponding author**: Tayyab Mumtaz Khan (tayyab.mkhan98@gmail.com)
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1. Introduction

Acute pancreatitis (AP) is a sudden and severe pancreatic inflammation, characterized by abdominal pain, nausea, vomiting, and potentially life-threatening complications[1]. Symptoms can vary from mild to severe, including abdominal pain, nausea, vomiting, fever, and jaundice[2]. AP is a significant global health issue, with an estimated annual incidence of 34 cases per 100,000 people worldwide. In the United States, AP accounts for approximately 210,000 hospitalizations annually[3]. In Pakistan, between 13 and 45 incidences of AP are thought to occur annually per 100,000 persons[4].

The pancreas plays a crucial role in digestion and glucose regulation, and any impairment can have devastating consequences. Acute pancreatitis (AP) can be categorized into mild, moderate, and severe forms. Its severity dictating its treatment and prognosis[5]. If untreated, AP can lead to life-threatening complications, including pancreatic necrosis, pseudocysts, fistulas, ascites, splenic vein thrombosis, and progression to chronic pancreatitis[6]. Moreover, AP is linked to a high mortality rate, which can range from 4% to 255%[1, 7].

Acute pancreatitis (AP) has different underlying causes, with gallstones and excessive alcohol consumption being the leading culprits. Additional factors that can trigger AP include elevated triglyceride levels, certain medications, infections, physical trauma, smoking, and genetic predispositions[4, 8].

The diagnosis of acute pancreatitis (AP) relies on a multidisciplinary approach, incorporating clinical symptoms, laboratory results, and imaging findings. Key laboratory tests include measurements of serum

amylase and lipase, complete blood counts, and liver function tests[9, 10]. Additionally, imaging modalities such as CT scans and ultrasound can also help confirm the diagnosis and evaluate the severity of AP[2, 6].

The treatment approach for acute pancreatitis (AP) is tailored to the severity of the condition. Mild AP cases can often be effectively managed with conservative measures, including aggressive fluid replacement, pain control, and nutritional support[11]. On the other hand, more drastic measures like surgery, artificial ventilation, and intensive care unit (ICU) admission might be required for severe AP patients[12].

To evaluate the severity of acute pancreatitis (AP), several scoring systems have been established, including the Ranson criteria, APACHE II score, and BISAP score. While these systems aid clinicians in predicting AP severity and informing treatment decisions, they can be cumbersome to use due to the need for multiple investigations and calculations, which can add complexity to the assessment process[8, 13, 14].

Recently, various biomarkers have become crucial in predicting acute pancreatitis (AP) severity and guiding treatment decisions. Notably, the Neutrophil-to-Lymphocyte Ratio (NLR) has emerged as a promising marker due to its ease of calculation, rapid availability of results, cost-effectiveness, and potential to indicate AP severity. By quantifying the immune response, NLR has shown promise in studies exploring its relationship with AP severity. However, most studies have been limited by small sample sizes or focused on specific patient populations, emphasizing the need for larger, more diverse studies to confirm these findings[15-19].

Despite growing recognition of the Neutrophil-to-Lymphocyte Ratio (NLR) in acute pancreatitis (AP) management around the globe, research in Pakistan on NLR's utility in assessing AP severity is scarce. This study aims to bridge this knowledge gap by exploring NLR's predictive value for AP severity. By doing so, it seeks to contribute to the development of simple, affordable biomarkers for early AP identification and management, particularly in resource-limited settings. The ultimate goal is to facilitate timely treatment, prevent life-threatening complications, and improve outcomes for AP patients in Pakistan.

2. Materials & Methods

Study design and study population: This is cross-sectional study which was conducted at the Department of Emergency at Rawalpindi's Benazir Bhutto Hospital in Pakistan, over a two-year period, starting from January 2022 to January 2024. 210 patients of acute pancreatitis were enrolled through consecutive sampling. The sample size was calculated based on a 15% prevalence of acute pancreatitis from the reference study, with a margin of 5% margin of error and with a confidence interval of 95%[1]. To ensure the study's validity, rigorous inclusion and exclusion criteria were applied.

Inclusion and exclusion criteria: The study included patients of any gender, aged 18 years or older, with complete medical records and a confirmed diagnosis of acute pancreatitis. In contrast, patients under 18 year of age, or those with a history of previous acute biliary pancreatitis, recent antibiotic or steroid use, chemotherapy, radiation therapy, alcohol consumption, or underlying medical conditions such as dyslipidemia, blood disorders, malnutrition, or chronic inflammatory diseases were excluded from the study. Additionally, patients who declined to provide informed consent for participation were also excluded.

Primary Outcome and Secondary Outcomes: This study's primary objective was to explore the relationship between Neutrophil-to-Lymphocyte Ratio (NLR) and acute pancreatitis (AP) severity, using the Ranson criteria. Three secondary objectives were also investigated: identifying AP causes, comparing NLR levels in severe and non-severe acute biliary pancreatitis (ABP) patients, and assessing NLR's prognostic value in predicting ABP severity progression.

Acute Pancreatitis and its Severity Measurement: A diagnosis of acute pancreatitis was made based on the presence of at least two of the following: acute abdominal pain and significantly elevated serum lipase or amylase levels (at least three times the normal upper limit)[1]. The Ranson criteria were then applied to evaluate the severity of acute pancreatitis (AP), with a total score of 2 or less indicating mild AP and a score of 3 or more indicating severe AP[2].

Neutrophil-to-Lymphocyte Ratio: From the peripheral blood sample, the Neutrophil-to-Lymphocyte Ratio (NLR) was measured by dividing the neutrophil count

by the lymphocyte count. Its normal value varies between 0.78 and 3.53 for an adult with good health[22].

Data collection: Data collection for this study was conducted using a specially designed questionnaire, divided into three sections. Section one gathered demographic details (age and gender), medical history, and physical examination results. Section two focused on laboratory test reports. Section three utilized data from the first two sections to calculate the Ranson criteria score and Neutrophil-to-Lymphocyte Ratio (NLR).

Statistical analysis was performed using IBM SPSS Statistics Version 25. Qualitative data were described using frequencies and percentages, while quantitative data were summarized as mean ± standard deviation. The two study groups' numerical and nominal variables were compared using independent t-tests and their nominal variables were compared using chi-squared testing. Analysis of Pearson's correlation was employed to examine the relationship between Ranson scores and Neutrophil-to-Lymphocyte Ratio (NLR). Linear regression model was used to assess the predictive value of NLR for Ranson scores. Statistical significance was set at a p-value of <0.05.

3. Results

From 210 patients, non-severe acute pancreatitis was identified in n=136 (64.76%) patients while severe acute pancreatitis was found in n=74 (35.24%) patients. The main causes of AP in this population were gall stones (n=86, 40.95%), followed by idiopathic etiology (n=75, 35.71%), smoking (n=40, 19.04%), and Post-ERCP (Endoscopic Retrograde Cholangiopancreatography) (n=9, 4.30%).

Table 1: Characteristics of the Study demograph along with Independent t-test and Chi-squared test analysis

Variables Patients with Acute Pancreatitis N=210		Expression of Variables	Severity of Acute Pancreatitis		Chi-Square test/Independent t-test Test Statistics	
			Non-Severe AP Group n=136 (64.76%)	Severe AP Group n=74 (35.24%)	χ^2-value for Chi-Square test/ t-value for Independent-test	p-values
Gender	Male (n) (%)	148 (70.48%)	101 (74.26%)	47 (63.51%)	3.55	0.04
	Female (n) (%)	62 (29.52%)	35 (25.74%)	27 (36.49%)		
Age (Years) Means ± SD		60.94±18.12	56.09±12.62	63.22±11.32	2.43	0.03
White Blood Cell count (cells/mm^3)		15.54±6.65	14.21±4.30	18.64±5.93	3.21	0.02
AST (IU/L)		240.34±130.48	252.32±40.10	289.24±150.07	2.91	0.01
Blood Glucose Level (mg/dL)		230.70±60.46	160.34±.35.99	240.56±50.76	3.51	0.003
LDH (IU/L)		510.56±110.22	380.17±60.99	559.87±140.09	3.42	0.002
Serum Amylase Level (U/L)		430.14±132.48	255.45±130.10	519.33±170.32	5.45	0.003
Serum Lipase Level (U/L)		460.32±160.15	321.72±139.08	560.05±167.41	5.10	0.004
Ranson Score		3.04±1.24	1.39±0.50	3.79±1.10	4.21	0.001
Lymphocytes count (cells/mm^3)		1.30±0.48	1.49±0.40	1.29±0.32	2.81	0.001
Neutrophils count (cells/mm^3)		12.32±5.15	10.72±4.08	15.06±7.41	3.19	0.001
Neutrophil-to-lymphocyte Ratio		9.47±5.24	7.19±4.02	11.67±5.40	3.42	0.002

Table 1 indicates that the study population's demographic and clinical features. It has also demonstrated significant differences between the two study groups (Non-severe AP group and severe AP group) in several primary parameters including age, gender, WBC count, AST level, blood glucose level, serum LDH, serum amylase level, serum lipase level, Ranson score, lymphocyte count, neutrophil count, and neutrophil-to-lymphocyte ratio ($p < 0.05$).

Table 2 shows a statistically significant positive correlation between Neutrophil-to-Lymphocyte Ratio (NLR) values and acute pancreatitis (AP) severity, as determined by Pearson's correlation analysis. This correlation indicates that higher NLR values are associated with increased Ranson scores, suggesting a direct and positive relationship between NLR and AP severity.

Table 3 presents that the simple linear regression model demonstrated an excellent fit ($R^2 = 0.80$, $p < 0.0001$), revealing a statistically significant positive association between Neutrophil-to-Lymphocyte Ratio (NLR) values and Ranson scores. The positive beta coefficient indicates that as NLR values increase, Ranson scores also rise, suggesting a strong correlation between higher NLR values and greater acute pancreatitis (AP) severity.

Table 2: Association between NLR and the severity of AP in the study demograph

Variables N=210	Severity of Acute Pancreatitis		Independent t test		Pearson's Correlation	
			Test Statistics		Test Statistics	
	Non-Severe AP Group	Severe AP Group	t-value	p-value	Correlation Coefficient (r)	p-value
Ranson Score Means ± SD	1.39±0.50	3.79±1.10	4.21	0.001	0.82	0.002
Neutrophil-to-Lymphocyte Ratio Means ± SD	7.19±4.02	11.67±5.40	3.42	0.002		

Table 3: Assessment of predictive value of NLR for severity of AP via simple linear regression model

Variable	Test Statistics for Simple Linear Regression Model				
	Unstandardised Regression Coefficient (β)	95% CI	p-value	R^2 value	p-value of F test
Neutrophil-to-Lymphocyte Ratio	3.20	1.80 to 4.70	0.002	0.80 (80.00%)	0.0001

4. Discussion

Acute pancreatitis is a fatal condition that poses a substantial global healthcare burden, necessitating early identification and prompt management to improve survival rates and prevent complications[1, 2]. This study provides valuable insights into the correlation between Neutrophil-to-Lymphocyte Ratio (NLR) and AP severity, shedding light on a critical aspect of AP management. Furthermore, the study undertakes a comprehensive comparison of key parameters, including age, serum biomarkers, and NLR, between patients with non-severe and severe AP, offering a nuanced understanding of the differences between these two patient groups.

The correlation between Neutrophil-to-Lymphocyte Ratio (NLR) and acute pancreatitis (AP) with sepsis is rooted in the complex interplay between neutrophil and lymphocyte reactions. When the pancreas becomes inflamed, neutrophils are activated, leading to an elevated NLR, which reflects the severity of the inflammatory response. Neutrophils contribute to tissue damage and organ dysfunction, while lymphocytes play a crucial role in resolving inflammation and promoting immune homeostasis. An increased NLR indicates an imbalance between these immune responses, predicting poor outcomes due to unchecked inflammation, tissue damage, and organ dysfunction[18-21].

In this study, 64.76% (n=136) of patients had non-severe acute pancreatitis (AP), while 35.24% (n=74) had severe AP. These findings are similar to a Turkish study[2], but differ from a South Korean study[16], which conveyed a lesser frequency of severe AP and a greater frequency of non-severe AP. The variation in AP severity across studies may be attributed to differences in etiology, patient presentation, environmental factors, and comorbidities between populations.

The main causes of AP in the current study population were gall stones, followed by idiopathic etiology, smoking, and Post-ERCP. In literature, several studies have been highlighted alike etiologies of AP[1, 15].

The demographic characteristics of patients played a significant role in determining the severity of acute pancreatitis (AP). Notably, male patients and older individuals were more likely to experience severe AP. These findings are consistent with previous studies, which have also highlighted the influence of

demographics on AP severity, thereby validating the results of the present study[4, 7].

A statistically significant difference was found between patients with non-severe and severe acute pancreatitis (AP) in various study variables, including serum AST level and serum LDH level, serum blood glucose level, WBC count, serum amylase level, serum lipase level, Ranson score, neutrophil and lymphocyte counts, and Neutrophil-to-Lymphocyte Ratio (NLR). These findings are consistent with previous studies that have used Ranson score and NLR to assess AP severity, highlighting the importance of these factors in determining the severity of AP[19, 20].

In the current study, NLR was positively and significantly associated with the AP severity as patients with raised severity of AP had raised NLR. This primary finding of this study was consistent with many past studies that were carried out in different parts of the world. A study from India has also indicated the function of NLR as a significant and cost-efficient predictor of AP severity[15]. Another study has also reported that NLR raise with the increase in the severity of the AP and high NLR predicts poor prognosis among patients with AP[16]. Similarly, a Turkish study has similar results about the significant correlation between NLR and severity of AP as this present study[17]. A meta-analysis has also shown similar findings regarding NLR and AP severity. It has presented that with the rise in NLR, the severity of AP increases[18]. Another study has also found that patients with higher NLR had more severe AP in contrast to the patients with lower NLR[19]. Another study from Ireland has also observed that the variation in NLR values in the various categories of patients with different severity of AP[21]. The results of this study back the employ of NLR as inaccurate and effective supplementary biomarker for determining the severity of AP and they are in similar with the previous studies.

The results of our study have significant clinical implications. The Neutrophil-to-Lymphocyte Ratio (NLR) can be used as a simple, inexpensive, and readily available biomarker to identify patients at high risk of severe acute pancreatitis and its life-threatening complications. Early detection of these patients enables healthcare providers to initiate timely interventions, leading to improved patient outcomes. Additionally, NLR can be used to monitor disease progression and treatment response, allowing clinicians to adjust their treatment strategies accordingly. Our study's findings also suggest that NLR can become a useful tool for stratifying patients in clinical trials, thereby enhancing the accuracy and reliability of research on acute pancreatitis.

While this study provides very important insights into the predictive value of Neutrophil-to-Lymphocyte Ratio (NLR) in acute pancreatitis (AP), it has some limitations as well. The relatively small sample size, single-centered population, and cross-sectional design may limit the applicability of our findings to broader populations. To build upon our research and confirm the prognostic value of NLR in AP, future studies with larger, more diverse samples and varied study designs are essential to validate and expand our results.

5. Conclusion

This study reveals a strong link between NLR and the severity of AP. The results show that higher NLR values consistently correlate with more severe AP cases. A statistical analysis confirms this direct relationship, suggesting that NLR is a reliable, efficient, and cost-effective predictor of AP severity. Regular monitoring of NLR can help clinicians intervene promptly and improve patient outcomes. The study recommends that clinicians consider NLR alongside other diagnostic tools to assess AP severity comprehensively. By incorporating NLR into clinical practice, healthcare providers may be able to improve treatment outcomes and reduce mortality rates among AP patients, further solidifying NLR's role in managing AP.

References

1. Alam L, Khan RS, Kazmi SK, ud Din R. Outcome of patients with acute severe necrotizing pancreatitis in a dedicated hepato-biliary unit of Pakistan. Pakistan Journal of Medical Sciences. 2021 May;37(3):639.
2. Duru H. Utility of Ranson score, computed tomography severity index, and CRP criteria in risk stratification on the day of hospital admission in patients with acute pancreatitis: a cross-sectional analysis. Turkish Journal of Trauma & Emergency Surgery. 2023 Mar;29(3):350.
3. Petrov MS, Yadav D. Global epidemiology and holistic prevention of pancreatitis. Nature reviews Gastroenterology & hepatology. 2019 Mar;16(3):175-84.
4. Shafiq F, Khan MF, Asghar MA, Shamim F, Sohaib M. Outcome of patients with acute pancreatitis requiring intensive care admission: A retrospective study from a tertiary care center of Pakistan. Pakistan Journal of Medical Sciences. 2018 Sep;34(5):1082.
5. Türkvatan A, Erden A, Türkoğlu MA, Seçil MU, Yüce G. Imaging of acute pancreatitis and its complications. Part 2: complications of acute pancreatitis. Diagnostic and Interventional Imaging. 2015 Feb 1;96(2):161-9.

6. Jaber S, Garnier M, Asehnoune K, Bounes F, Buscail L, Chevaux JB, Dahyot-Fizelier C, Darrivere L, Jabaudon M, Joannes-Boyau O, Launey Y. Guidelines for the management of patients with severe acute pancreatitis, 2021. Anaesthesia Critical Care & Pain Medicine. 2022 Jun 1;41(3):101060.
7. Jain S, Mahapatra SJ, Gupta S, Garg PK. Infected pancreatic necrosis due to multidrug-resistant organisms and persistent organ failure predict mortality in acute pancreatitis. Clinical and translational gastroenterology. 2018 Oct 1;9(10):e190.
8. Mederos MA, Reber HA, Girgis MD. Acute pancreatitis: a review. Jama. 2021 Jan 26;325(4):382-90.
9. Karunarathna I, De Alvis K, Gunasena P, Jayawardana A. Pancreatitis: Current concepts in diagnosis, management, and complications.
10. Walkowska J, Zielinska N, Tubbs RS, Podgórski M, Dłubek-Ruxer J, Olewnik Ł. Diagnosis and treatment of acute pancreatitis. Diagnostics. 2022 Aug 15;12(8):1974.
11. Gliem N, Ammer-Herrmenau C, Ellenrieder V, Neesse A. Management of severe acute pancreatitis: an update. Digestion. 2021 Jul 18;102(4):503-7.
12. Crosignani A, Spina S, Marrazzo F, Cimbanassi S, Malbrain ML, Van Regenmortel N, Fumagalli R, Langer T. Intravenous fluid therapy in patients with severe acute pancreatitis admitted to the intensive care unit: a narrative review. Annals of Intensive care. 2022 Oct 17;12(1):98.
13. Jain V, Nath P, Satpathy SK, Panda B, Patro S. Comparing prognostic scores and inflammatory markers in predicting the severity and mortality of acute pancreatitis. Cureus. 2023 May;15(5).
14. Gupta D, Mandal NS, Arora JK, Soni RK. Comparative Evaluation of Harmless Acute Pancreatitis Score (HAPS) and Bedside Index of Severity in Acute Pancreatitis (BISAP) scoring system in the stratification of prognosis in acute pancreatitis. Cureus. 2022 Dec;14(12).
15. Vincent A, Shashirekha CA. Predicting Severity of Acute Pancreatitis—Evaluation of Neutrophil-to-Lymphocyte Count Ratio as Emerging Biomarker: A Retrospective Analytical Study. Cureus. 2024 Nov 30;16(11).
16. Jeon TJ, Park JY. Clinical significance of the neutrophil-lymphocyte ratio as an early predictive marker for adverse outcomes in patients with acute pancreatitis. World journal of gastroenterology. 2017 Jun 6;23(21):3883.
17. Abaylı B, Gençdal G, Değirmencioğlu Ş. Correlation between neutrophil/lymphocyte ratio and Ranson score in acute pancreatitis. Journal of clinical laboratory analysis. 2018 Jul;32(6):e22437.
18. Kong W, He Y, Bao H, Zhang W, Wang X. Diagnostic value of neutrophil-lymphocyte ratio for predicting the severity of acute pancreatitis: a meta-analysis. Disease Markers. 2020;2020(1):9731854.
19. Kokulu K, Günaydın YK, Akıllı NB, Köylü R, Sert ET, Köylü Ö, Cander B. Relationship between the neutrophil-to-lymphocyte ratio in acute pancreatitis and the severity and systemic complications of the disease. The Turkish Journal of Gastroenterology. 2018 Nov;29(6):684.
20. Cho SK, Jung S, Lee KJ, Kim JW. Neutrophil to lymphocyte ratio and platelet to lymphocyte ratio can predict the severity of gallstone pancreatitis. BMC gastroenterology. 2018 Dec;18:1-6.
21. O'Connell RM, Boland MR, O'Driscoll J, Salih A, Arumugasamy M, Walsh TN, Allen MJ, Beddy DJ. Red cell distribution width and neutrophil to lymphocyte ratio as predictors of outcomes in acute pancreatitis: a retrospective cohort study. International journal of surgery. 2018 Jul 1;55:124-7.
22. Forget P, Khalifa C, Defour JP, Latinne D, Van Pel MC, De Kock M. What is the normal value of the neutrophil-to-lymphocyte ratio?. BMC research notes. 2017 Dec;10:1-4.

Original article

Integration of ALBI Score into Barcelona Clinic Liver Cancer Staging System

*M. Kamran Siddique[1, *], Aftab Raheem[1], Sadia Ahmad[1], Ambreen Badar[2]*

Abstract

Background: The Albumin-Bilirubin (ALBI) grade, which was newly investigated and reported recently, is simpler, more objective, and based on evidence than the Child-Pugh (CP) score in the context of hepatocellular carcinoma (HCC). The reason the design was planned was to determine whether ALBI grade could replace CP score in BCLC for HCC.
Material and Methods: This was a single prospective study (Descriptive study) carried out at Centre for Liver and Digestive Diseases, Holy Family Hospital, Rawalpindi. A total of 93 HCC patients enrolled were recruited in the study. The study comprised participants who met the inclusion criteria and were HCC patients of both sexes. The individuals' CP and ALBI scores were computed using a proforma that was especially created for the research. Data entry and analysis were done using IBM SPSS Statistics version 22.0
Results: Our study involved 93 HCC patients in total, with 72% of the population being male. The average age of the sampled patients was 60, with a minimum age of 41 and a maximum age of 83 years. In present research, 93 patients were evaluated by BCLC/ALBI and BCLC/CTP. Cohen's κ was run to determine if there was agreement between ALBI and CTP scoring on BCLC staging of 93 patients. There was almost perfect agreement between these two scoring systems, $\kappa = 0.97$ ($p<0.001$) showing that the results are 82-100% reliable. Integration of ALBI score into BCLC system improves the HCC staging system, this method is more precise, more accurate and convenient as compared to CTP.
Conclusion: ALBI grading system is a simpler, convenient objective and generalizable algorithm-based model for assessment of HCC patients than CTP score when incorporated in BCLC staging system.

Keywords: Hepatocellular Carcinoma (HCC), Barcelona Clinic Liver Cancer (BCLC) Staging, Albumin-Bilirubin (ALBI) Score.

[1] Gastroenterology, Holy Family Hospital, Rawalpindi
[2] Paediatric surgery, Holy Family Hospital, Rawalpindi
*** Corresponding author**: M. Kamran Siddique (drkamran416@gmail.com)
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1. Introduction

Hepatocellular carcinoma (HCC) is the sixth most incident cancer and the second most incident cancer-related mortality globally in 2012. It is essential to know the tumour load and liver function to decide on the further treatment and prognosis. The Child-Pugh (CP) score is used to quantify the degree of hepatic dysfunction in patients having HCC; it measures five factors qualitatively, consisting of the presence and severity of ascites, hepatic encephalopathy, INR, serum albumin and bilirubin levels[1, 2].

The CP score has therefore been incorporated in most of the HCC staging systems such as BCLC system, CLIP score and the JIS. Presently, the BCLC system is the most acclaimed staging system worldwide which has been endorsed by the American Association for the Study of Liver Diseases (AASLD) and the European Association for the Study of the Liver (EASL)[3-5].

Nevertheless, the following limitations are inherent in CP score: The cut off values used for the parameters are arbitrary. The scoring parameters are equally weighted. The ascites assessment and hepatic encephalopathy grading are subjective[6, 7]. In 2015, a new scoring model used for evaluation of hepatic function in patients with HCC was published, called ALBI score[7].

It reveals comparable or even better prognostic value than the CP class in patients with HCC and eliminates the necessity to evaluate the subjective components of the score, such as ascites or hepatic encephalopathy. However, it is still unknown how ALBI grade is applied into the clinical treatment of patients with HCC in real world[8].

Before the use of ALBI score for all stages of HCC, one of the questions is whether ALBI grade could substitute for the CP class in the current tumour staging system for the prognosis and management of HCC. To this end, a study of patients with HCC was formulated to compare the prediction accuracy of the original CP-based BCLC with an ALBI-based BCLC.

2. Materials & Methods

This was a single prospective study (Descriptive study) carried out at Centre for Liver and Digestive Diseases, Holy Family Hospital, Rawalpindi. A total of 93 HCC patients enrolled were recruited in the study. Written informed consent was taken from all patients who enrolled for the research. All the HCC patients having age from 18 to 85 years regardless of gender diagnosed by Triphasic CT scan irrespective of liver cirrhosis were included in this proposed research study. Patients having Obstructive jaundice, metastatic liver cancer, and chronic kidney disorder and terminally ill patients were excluded from this study.

Score Calculations: The data regarding socioeconomic demographics, clinical laboratory parameters of both CTP scoring system and ALBI grading system were noted on a pre-examined questionnaire. The outcomes of CTP scoring system and newly developed ALBI grading system was compared to evaluate the prognostic values.

Each patient was given the opportunity to provide informed consent before being enrolled. Information about each patient's complete medical history, clinical examination, laboratory investigations, including complete blood counts, liver function tests, serum albumin and bilirubin levels, prothrombin time, and the international normalization ratio, renal function test, -Fetoprotein level, and serum sodium level, was recorded. Furthermore, the people suffering from HCC were recorded on both scoring system (assessment by means of ALBI Scoring system and CTP scoring system) after Triphasic CT abdomen in order to compare the two scoring systems.

CTP score calculation: Using accepted techniques, the Child-Turcotte-Pugh score (CTP score) was determined. Serum bilirubin, serum albumin, quick value, ascites, and hepatic encephalopathy were each given between one and three points depending on their degree or severity. The total score might range between 5 and 15 points as a result of adding the points together. CTP stage A is defined as 5 or 6 total points, CTP stage B as 7 to 9 total points, and CTP stage C as > 9 total points.

ALBI Score: The ALBI score was determined according to Johnson et al. The unit of bilirubin is given in mol/l, the unit of albumin in g/l. The division into the respective ALBI grades was as follows: Grade 1: $x \leq -2.60$; Grade 2: $-2.60 > x \leq -1.39$; Grade 3: $x > -1.39$.

Statistical data was examined by using IBM SPSS Statistics V.22.0. Qualitative (gender, ascites, encephalopathy, CTP class, ALBI grade) and quantitative variables (age, serum albumin, serum bilirubin, PT, AFP, platelets, CTP score, ALBI score) were analyzed for frequency, percentage and mean respectively. The concordance or degree of agreement between ALBI and CP based scoring system was determined by Kappa statistics.

3. Results

Overall Characteristics: The research comprised 93 patients in all, with an average age of 60. Table 1 lists the participant's baseline characteristics.

Table 1: Base-line patient Characteristics

Patient Factors		**n= 93 (%)**
Age	-	60.16 (41, 83)
Gender	Male	67 (72)
	Female	26 (28)
No. of lesions	One	27 (29)
	Two	6 (6.5)
	Three	3 (3.2)
	Multifactorial	57 (61.3)
HCC Treatment	Ablation	9 (9.8)
	Ablation/LT	5 (5.4)
	BSC	16 (17.2)
	Chemoembolization	1 (1.1)
	Radio Frequency ablation	1 (1.1)
	Resection	1 (1.1)
	RFA/LT	2 (2.2)
	Sorafenib	38 (40.86)
	Surgical resection/Ablation	1 (1.1)
	TACE	19 (20.4)
Vascular invasion/Extra hepatic spread	Present	46 (49.5)
	Absent	47 (50.5)

Ascites	None	61 (65.6)
	Mild	15 (16.2)
	Moderate	4 (4.3)
	Severe	13 (14)
Hepatic encephalopathy	None	79 (84.9)
	Mild	1 (1.1)
	Grade 2	11 (11.8)
	Grade 3	1 (1.1)
	Grade 4	1 (1.1)
Serum albumin (g/dl) (mean, range)	-	3.3 (1.10,4.60)
Bilirubin (mg/dl) (mean, range)	-	2.16 (0.28, 21.80)
Alpha-fetoprotein (ng/ml) (mean, range)	-	11820.10 (0.85, 447999)
Platelets (mean, range)	-	175023.44 (9000, 577000)
ALBI Accumulative score (mean, range)	-	-1.85 (-3.46, 0.261)
Comorbid	HCV-CLD	82 (88.2)
	HBV-CLD	3 (3.2)
	HCV-CLD/HBV-CLD	2 (2.2)
	HCV-CLD/T2DM	2 (2.2)
	HCV-CLD/T2DM//HTN	1 (1.1)
	HCV-CLD/HTN	3 (3.2)
ALBI Grade	Grade I	11 (11.8)
	Grade II	65 (69.9)
	Grade III	17 (18.3)
CP Accumulative score (mean, range)	-	6.94 (5, 13)
CTP score	Child Class A	56 (60.2)
	Child Class B	25 (26.9)
	Child Class C	12 (12.9)
BCLC/CTP	Stage 0	18 (19.4)
	Stage A	20 (21.5)
	Stage B	38 (40.9)
	Stage C	16 (17.2)
	Stage D	1 (1.1)
BCLC/ALBI	Stage 0	18 (19.4)
	Stage A	18 (19.4)
	Stage B	39 (41.9)
	Stage C	17 (17.2)
	Stage D	1 (1.1)
ECOG	0	3 (3.2)
	1	32 (34.4)
	2	42 (45.2)
	3	14 (15.1)
	4	2 (2.2)

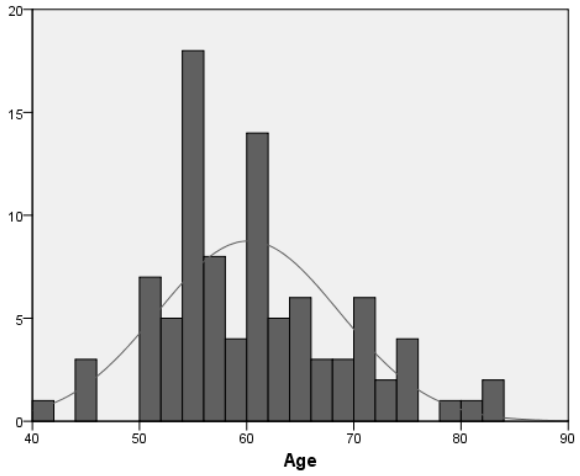

Fig 1: Age Distribution of sampled patient population

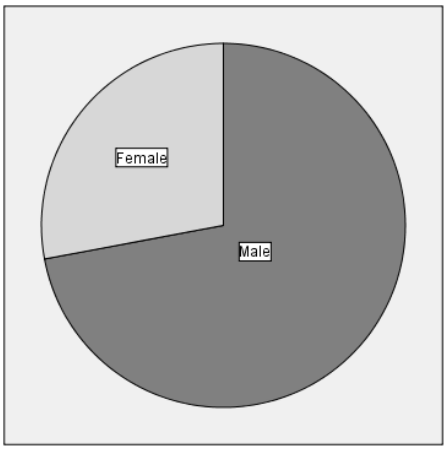

Fig 2: Gender ratio of sampled patient population

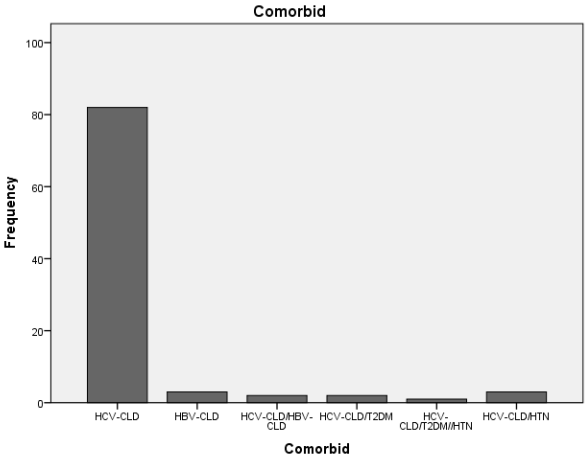

Fig 3: Frequencies of different Comorbid of sampled patient population

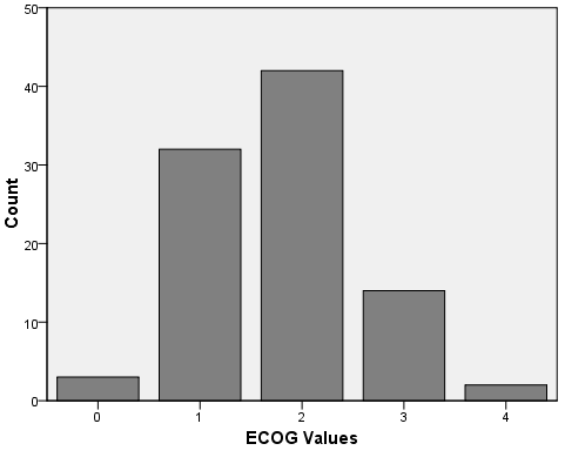

Figure 4: Frequencies of different ECOG status of sampled patient population

ALBI Score and CTP Score alone for HCC patients: The relative agreement between ALBI and CTP score has been illustrated through Figure 5.

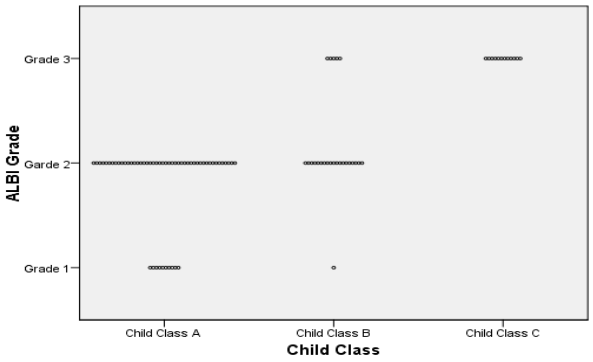

Fig 5: 2D-Dot Plot for ALBI vs. CTP

Degree of agreement between BCLC/ALBI and BCLC/CTP: Kappa statistics were applied on the staging system of 93 patients using SPSS version 22.0. The relative frequencies and degrees of agreement has been shown in Table 2 and explained through Figure 6.

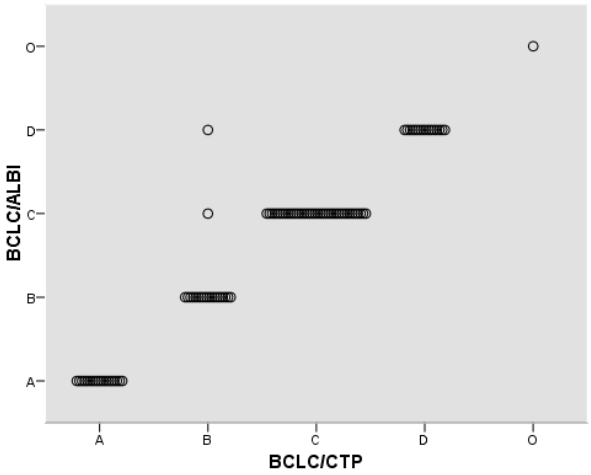

Figure 6: 2D-Dot Plot for BCLC/ALBI vs. BCLC/CTP

Table 2: Relative frequencies of BCLC stages of 93 patients by two scoring systems

		ALBI integration into BCLC							
		Stage 0	Stage A	Stage B	Stage C	Stage D	Total	*Cohen's κ*	*p-value*
CTP integration into BCLC	Stage 0	1	0	0	0	0	1	*0.97*	*<0.001*
	Stage A	0	18	0	0	0	18		
	Stage B	0	0	18	1	1	20		
	Stage C	0	0	0	38	0	38		
	Stage D	0	0	0	0	16	16		
	Total	1	18	18	39	17	93		

4. Discussion

ALBI is widely acknowledged as a useful method for assessing patients with HCC and has been validated using cohorts from China, Japan, the UK, and the US. Unlike CP grade, ALBI only uses serum albumin and bilirubin. Both of these measurements are easy to measure and part of routine blood testing[9-11]. Using albumin and bilirubin as continuous measurements, ALBI accounts for each factor's contribution. However, CP staging converts continuous measurements into catogoric ordinal values. Because of the importance and size of each component (albumin, bilirubin, INR, ascites, and encephalopathy) are condensed into ordinal values between 1 and 3, ordinal values directly reduce the accuracy of data[12].

Additionally, several of these variables (albumin, ascites), which are subjective, are associated with each other and hence redundant (ascites, encephalopathy). As a result, CP has information loss, duplication, and subjectivity issues as opposed to ALBI. Present study has been conducted to show that ALBI score is simple, convenient objective and generalizable algorithm-based model for assessment of HCC patients than CTP score when incorporated in BCLC staging system. A total 93 HCC patients were included in our study, where 72% of the population was male.

The male population is more likely to be diagnosed with HCC than the female population, according to research from Hong Kong, Japan, and the UK, where the male HCC population was 86%, 71%, and 81%, respectively.[10] Johnson et al. has also reported male patients' ratio in a Hepatocellular carcinoma research as 80.5%, 80.7, 82.9%, 71.7%, 85.6%, and 81.7% from Birmingham, Newcastle, Spain, Japan, China and United States respectively[12].

Similarly, in a study conducted by Wang et al., 86.3% of the patients were males where ALBI was compared to CTP score as a better predictor for HCC after liver resection. The higher proportion of males diagnosed with HCC in various global studies may be attributed to a higher prevalence of the disease among men, or it could reflect that men are more likely to participate in questionnaire-based research. However, previous research has shown that sex is one of the statistically significant prognostic variables for liver functioning[13, 14].

The mean age of the sampled patients in our study was 60±8.47 and minimum age 41 while maximum age of the patients participated in the study was 83. Age has also been considered a key indicator of how well the liver functions[12, 15]. It was previously reported that the average age of HCC patients who took part in studies using ALBI scores as a predictor of liver function was 58.9±11.9 from Hong Kong, 67.8±9.4 from Japan, 63.8±11.0 from UK, 64±11 from Birmingham, 68±11 from Newcastle, 62.4±10.9 from Spain, 66.4 ± 8.9 from Japan, 60.1±12.1 from China and 61.3±12.2 from United States. This study of the age range of HCC patients across nations reveals that HCC is more common in the 60–70 age range[10, 12, 16].

Majority of the patients included in this research were suffering from multifactorial lesions (61%) and 50% population reported vascular invasion of tumor spread. Most of the patients (65%) reported no ascites presence and hepatic encephalopathy (84%). The main comorbidity patterns of HCC were long standing viral hepatitis C (88.2%), chronic viral hepatitis B (3.2%) and viral hepatitis C along with hypertension and chronic liver disease (3.2%).

In research from a Japanese individual with long standing hepatitis C virus (HCV) infection (69.9%) had the greatest rate of curative treatment when compared to HCC patients in the UK and Hong Kong. According to research, the extensive dependence on antivirals for HBV and HCV in a more contemporary cohort may help to authenticate the ALBI-BCLC staging method by improving hepatic function and perhaps downgrading tumor stage[12, 15]. According to earlier research, HCV is a major and statistically significant cause of HCC[17, 18].

ECOG status of the most patients (45%) were 2 it means mostly patients included in our study were competent to care for oneself but unable to perform any work-related duties. The 2D plot showed that patients who were considered Grade 2 by ALBI scoring they kept in CP class A by CTP scoring. Similarly, some of the patients that are grade 3 according to ALBI assigned CP class 2 by CTP class. There is great disagreement between these two scales probably due to the difference of nature of scale as ALBI score is a continuous measure while CTP classing system is ordinal scale measure, Kappa statistics due to difference between the nature of measurement could not be possible on these two scales[19].

However, Illustration using 2D dot plot showed a clear difference between the agreement of assigning the patients in different classes. For suggesting a treatment BCLC staging system has been widely used by integrating CTP scores. However, in present research degree of agreement between the BCLC integrating CTP score vs. BCLC integrating ALBI score has been compared to find out the more efficient method in predicting the prognosis for HCC patients. Table 2 showed the degree to which the two raters (i.e. BCLC/ALBI and BCLC/CTP) agreed and disagreed of placing HCC patients in different stages of BCLC.

Table 2 shows that of the 93 patients evaluated by BCLC, 1 patient was assigned BCLC stage 0, 18 patients were assigned BCLC stage A, 18 patients were assigned BCLC stage B, 38 patients were assigned BCLC stage C, and 16 patients were assigned BCLC stage D as agreed by both scoring systems. However, both systems disagreed on the placement of two patients where BCLC/ALBI placed 1 patient in stage C and one in stage D but according to BCLC/CTP both of these patients were placed in Stage B.

Cohen's κ was run to determine if there was agreement between ALBI and CTP scoring on BCLC staging of 93 patients. There was almost perfect agreement between these two scoring systems, $\kappa = 0.97$ ($p < .001$). It means these results are 82-100% reliable[19, 20]. Integration of ALBI score into BCLC system improves the HCC staging system, this method is more precise, more accurate and handier as compared to CTP.

Our results concur with the results of Antkowiak et al[21]. where albumin was reported as a biomarker for HCC patients and ALBI was reported to outperform CP in survival prognosis in Y90 treated patients. Many other studies have been conducted for predicting survival and reported the same result as ALBI is superior to CP[22, 23].

Johnson et al critique the Child-Pugh score on the one hand for including the albumin value twice (once directly and once indirectly in the case of ascites brought on by hypoalbuminemia), whereas Duran et al question the equal weighting of all five parameters[12, 24, 25]. What both critical comments have in common is that they find the calculation of the CTP score problematic, as well as the seemingly arbitrary cutoff values of the parameters. Additionally, the terms "hepatic encephalopathy" and "ascites" are relative ambiguities that vary depending on the particular examiner. It becomes challenging to compare various patients as a result[12].

Our study has its strengths and limitations. One strength of this study is that it includes a homogenous sample of patients who received treatment at the Centre for Liver and Digestive Disease, Holy Family Hospital, Rawalpindi. The data for this study comes from a mature dataset that was developed through the consensus decision of hepatologists, transplant and hepatobiliary surgeons, medical oncologists, and interventional radiologists. Due to the study's perspective character, this dissertation exhibits methodological flaws: It is always possible for so-called disruptive variables, often known as "confounders," to arise in a prospective data analysis. These third factors (unknown) are not included in the study yet have an effect on the outcome.

A ”selection bias," which develops when subjects are chosen in a way that makes them unrepresentative of the intended audience. In the specific case of the present work, there may have been a selection bias, as only patients with all the questions answered or survey which were completely filled were added and all the incomplete survey were discarded before data analysis. This selection bias leads to another drawback of study's tiny sample size only n=93. Due to the reduced test power that occurs, the likelihood of erroneous negative claims is increased. However, minimum sample size needed for the current research was 83, but 93 patients has been included in the study, no data has been manipulated or fake, and has been included in the study with permission of organizational concerned authorities.

Another drawback is that present study was conducted at a single center, which may not be representative of a larger population. The sample size was small, with only one patient diagnosed at BCLC stage 0 and only two patients showing a difference in agreement between the two rating systems. This means that the results of the study may be subject to statistical fluctuations and may not be widely applicable. It is also worth noting that the majority of patients in this study (90%) were positive for HCV, which may limit the generalizability of the results to individuals with other risk factors for HCC.

Given these limitations, it is important to confirm these findings through additional research conducted at multiple centers. Future studies should also focus on assessing overall survival using the ALBI grading

system to determine its utility as a prognostic tool in the management of HCC.

5. Conclusion

The results of this study suggest that the ALBI grading system is a more comprehensive and efficient measure of liver function than the CTP score and may be a superior prognostic tool for HCC patients. These findings have the potential to be beneficial for medical professionals, researchers, and research organizations, and may support the use of the ALBI grading system as a replacement for the CTP score in the Barcelona Clinic Liver Cancer (BCLC) staging system for HCC.

References

1. Ferlay J, Colombet M, Soerjomataram I, Mathers C, Parkin DM, Piñeros M, et al. Estimating the global cancer incidence and mortality in 2018: GLOBOCAN sources and methods. Int J Cancer. 2019;144(8):1941-53.
2. Farinati F, Vitale A, Spolverato G, Pawlik TM, Huo TL, Lee YH, et al. Development and validation of a new prognostic system for patients with hepatocellular carcinoma. PLoS medicine. 2016;13(4):e1002006.
3. Tellapuri S, Sutphin PD, Beg MS, Singal AG, Kalva SP. Staging systems of hepatocellular carcinoma: a review. Indian J Gastroenterol. 2018;37:481-91.
4. Guckenberger M, Lievens Y, Bouma AB, Collette L, Dekker A, Nandita MD, et al. Characterisation and classification of oligometastatic disease: a European Society for Radiotherapy and Oncology and European Organisation for Research and Treatment of Cancer consensus recommendation. Lancet Oncol. 2020;21(1):18-28.
5. Marrero JA, Kulik LM, Sirlin CB, Zhu AX, Finn RS, Abecassis MM, et al. Diagnosis, staging, and management of hepatocellular carcinoma: 2018 practice guidance by the American Association for the Study of Liver Diseases. Hepatology. 2018;68(2):723-50.
6. Fragaki M, Sifaki-Pistolla D, Orfanoudaki E, Kouroumalis E. Comparative evaluation of ALBI, MELD, and Child-Pugh scores in prognosis of cirrhosis: is ALBI the new alternative?. Ann Gastroenterol. 2019;32(6):626.
7. Johnson PJ, Berhane S, Kagebayashi C. Assessment of Liver Function in Patients With Hepatocellular Carcinoma: A New Evidence-Based Approach-The ALBI Grade. J Clin Oncol. 2015;33:550-8.
8. Knox JJ. Addressing the Interplay of Liver Disease and Hepatocellular Carcinoma on Patient Survival: The ALBI Scoring Model. J Clin Oncol. 2015;33:529-31.
9. Hickey R, Mouli S, Kulik L, Desai K, Thornburg B, Ganger D, et al. Independent Analysis of Albumin-Bilirubin Grade in a 765-Patient Cohort Treated with Transarterial Locoregional Therapy for Hepatocellular Carcinoma. Journal of Vascular and Interventional Radiology. 2016;27(6):795–802.
10. Chan AWH, Kumada T, Toyoda H, Tada T, Chong CCN, Mo FKF, et al. Integration of albumin-bilirubin (ALBI) score into Barcelona Clinic Liver Cancer (BCLC) system for hepatocellular carcinoma. J Gastroenterol Hepatol. 2016;31(7):1300–6.
11. Edeline J, Blanc JF, Johnson P, Campillo-Gimenez B, Ross P, Ma YT, et al. A multicentre comparison between Child Pugh and Albumin-Bilirubin scores in patients treated with sorafenib for Hepatocellular Carcinoma. Liver International. 2016;36(12):1821–8.
12. Johnson PJ, Berhane S, Kagebayashi C, Satomura S, Teng M, Reeves HL, et al. Assessment of Liver Function in Patients With Hepatocellular Carcinoma: A New Evidence-Based Approach—The ALBI Grade. Journal of Clinical Oncology. 2015;33(6):550–8.
13. Wang YY, Zhong JH, Su ZY, Huang JF, Lu SD, Xiang BD, et al. Albumin–bilirubin versus Child–Pugh score as a predictor of outcome after liver resection for hepatocellular carcinoma. British Journal of Surgery. 2016 Apr 13;103(6):725–34.
14. Yan K, Chen MH, Yang W, Wang Y bin, Gao W, Hao CY, et al. Radiofrequency ablation of hepatocellular carcinoma: Long-term outcome and prognostic factors. Eur J Radiol. 2008;67(2):336–47.
15. Chan AWH, Kumada T, Toyoda H, Tada T, Chong CCN, Mo FKF, et al. Integration of albumin-bilirubin (ALBI) score into Barcelona Clinic Liver Cancer (BCLC) system for hepatocellular carcinoma. J Gastroenterol Hepatol. 2016;31(7):1300–6.
16. Chan AWH, Chong CCN, Mo FKF, Wong J, Yeo W, Johnson PJ, et al. Incorporating albumin-bilirubin grade into the cancer of the liver Italian program system for hepatocellular carcinoma. J Gastroenterol Hepatol. 2017;32(1):221–8.
17. Nabih HK. The Significance of HCV Viral Load in the Incidence of HCC: a Correlation Between Mir-122 and CCL2. J Gastrointest Cancer. 2020;51(2):412–7.
18. Zhao P, Malik S, Xing S. Epigenetic Mechanisms Involved in HCV-Induced Hepatocellular Carcinoma (HCC). Front Oncol. 2021;11.
19. Warrens MJ. Five ways to look at Cohen's kappa. Journal of Psychology & Psychotherapy. 2015;5.
20. McHugh ML. Interrater reliability: the kappa statistic. Biochem Med (Zagreb). 2012;22(3):276–82.
21. Antkowiak M, Gabr A, Das A, Ali R, Kulik L, Ganger D, et al. Prognostic Role of Albumin, Bilirubin, and ALBI Scores: Analysis of 1000 Patients with Hepatocellular Carcinoma Undergoing Radioembolization. Cancers (Basel). 2019;11(6):879.
22. Ho C, Chiang C, Lee F, Chan J, Yeung C, Choi C, et al. Albumin-bilirubin versus Child-Pugh Grade as a Predictor of Survival after Individualised Hypofractionated Radiotherapy for Hepatocellular Carcinoma. Hong Kong Journal of Radiology. 2020;23(3):185–90.
23. Su TS, Yang HM, Zhou Y, Huang Y, Liang P, Cheng T, et al. Albumin - Bilirubin (ALBI) versus Child-Turcotte-Pugh (CTP) in prognosis of HCC after stereotactic body radiation therapy. Radiation Oncology. 2019;14(1).
24. Durand F, Valla D. Assessment of the prognosis of cirrhosis: Child–Pugh versus MELD. J Hepatol. 2005;42(1):100–7.
25. Durand F, Valla D. Assessment of Prognosis of Cirrhosis. Semin Liver Dis. 2008;28(1):110–22.

Original article

Eustachian Tube Dysfunction and Disease Severity in Patients with Chronic Rhinosinusitis in Rawalpindi, Pakistan

Abdur Rehman[1, *], Sadia Chaudhry[1], Muhammad Arshad[1], Fatima Shahid[1], Farhat Jabeen Malik[1], Shahzaib Maqbool[1]

Abstract

Background: Chronic rhinosinusitis (CRS) is frequently associated with Eustachian tube dysfunction (ETD), exacerbating symptoms such as ear fullness, pressure, and pain. This study examines ETD prevalence in CRS patients undergoing functional endoscopic sinus surgery (FESS) in Rawalpindi, Pakistan—a high-pollution region—and evaluates the impact of FESS on both ETD and CRS symptoms.
Methods: A prospective cohort of 76 adult CRS patients was recruited at a tertiary care center. All participants completed the Eustachian Tube Dysfunction Questionnaire (ETDQ-7) and the 22-item Sino-Nasal Outcome Test (SNOT-22) preoperatively and 3 to 6 months postoperatively. Pearson and Spearman's correlations assessed the relationship between ETDQ-7 and SNOT-22 scores. Statistical significance was determined using paired t-tests.
Results: Preoperatively, 47.6% of patients scored ≥14.5 on ETDQ-7, indicating clinically significant ETD. Postoperative assessments showed significant reductions in both ETDQ-7 (mean preoperative 2.13 to postoperative 1.07, $p < 0.05$) and SNOT-22 scores (mean preoperative 48.0 to postoperative 24.0, $p < 0.05$). Correlation analysis revealed a strong association between ETDQ-7 scores and SNOT-22 ear/facial subdomain (Spearman $r = 0.68$, $p < 0.0001$), underscoring the impact of sinonasal inflammation on ETD.
Conclusion: ETD symptoms are prevalent in CRS patients and substantially improve after FESS, supporting the procedure's role in managing both sinonasal and otologic symptoms. Effective ETD treatment in CRS patients, especially in high-pollution settings, can reduce symptom burden and enhance quality of life. Future studies should explore additional therapies for patients with persistent ETD post-FESS.
Keywords: Rhinosinusitis, chronic; FESS; Eustachian tube dysfunction; quality of life; SNOT-22; ETDQ-7

[1] Department of ENT and Head and Neck Surgery, Benazir Bhutto Hospital, Rawalpindi, Pakistan.
*** Corresponding author**: Abdur Rehman (dr.malik.ar123@gmail.com)
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1. Introduction

Chronic rhinosinusitis (CRS) has been linked to multiple comorbid conditions, including Eustachian tube dysfunction (ETD). ETD, characterized by symptoms such as ear pressure, ear pain, and aural fullness, is increasingly recognized as a common complication in patients with chronic sinonasal inflammation[1]. Studies indicate that CRS-related ETD occurs due to mucosal inflammation and obstructed Eustachian tube function, often exacerbating otologic symptoms in affected patients[2, 3]. Although ETD and CRS are well-studied in various populations, the effect of environmental factors, particularly air pollution, on the prevalence and severity of these conditions has received limited attention[4].

Recent studies, including Wu et al., highlight that nearly half of patients with CRS also experience clinically significant ETD symptoms, as measured by the validated ETDQ-7[5]. This correlation supports that the inflammatory environment characteristic of CRS significantly impairs Eustachian tube function, worsening otologic symptoms such as ear fullness and pain, and contributes to an increased burden on patient quality of life (QOL).

Air quality in urban settings such as Rawalpindi, Pakistan, where levels of pollutants are high, has been linked to respiratory and sinonasal diseases. The presence of high particulate matter (PM2.5) and other pollutants could contribute to more severe CRS symptoms and, subsequently, higher ETD severity[4, 6]. This study aims to examine the prevalence of ETD symptoms in CRS patients undergoing functional endoscopic sinus surgery (FESS) in this region. We hypothesize that the local environmental factors contribute to elevated ETD severity among CRS patients and that these symptoms improve following FESS, as observed in previous studies[7, 8].

2. Materials & Methods

This study was conducted in Rawalpindi, Pakistan, following approval by the local institutional review board. A cohort of adult patients diagnosed with CRS and scheduled for FESS were recruited between May 2023 and August 2024. All patients had previously undergone medical therapy but showed insufficient

improvement, thus meeting the criteria for surgical intervention as outlined by the International Consensus on Rhinosinusitis[8]. Exclusion criteria included incomplete preoperative or postoperative questionnaires, known malignancies, or alternative diagnoses that could independently influence ETD. Written informed consent was obtained from each patient before inclusion in the study. To evaluate ETD severity, the Eustachian Tube Dysfunction Questionnaire (ETDQ-7), a validated 7-item survey assessing symptoms on a scale from 1 to 7, was administered. Clinically significant ETD was identified by a score of ≥14.5[4]. CRS symptom severity was assessed using the 22-item Sino-Nasal Outcome Test (SNOT-22), which includes an ear/facial subdomain relevant to ETD symptoms. Preoperative assessments were conducted immediately before surgery, and postoperative assessments were completed 3 to 6 months post-surgery[7].

Statistical analysis was conducted using the SPSS version 25. Descriptive statistics were used to characterize patient demographics, including age, gender, and CRS subtype prevalence. Pearson and Spearman correlation coefficients were calculated to assess relationships between ETDQ-7 and SNOT-22 scores, as well as between ETDQ-7 scores and SNOT-22 subdomains. Paired t-tests were performed to evaluate the change in ETDQ-7 and SNOT-22 scores pre- and postoperatively, with statistical significance set at $p<0.05$[9].

3. Results

A total of 76 patients with CRS, treated surgically at a tertiary care center in Rawalpindi, Pakistan, were included in the analysis. The mean age of the cohort was 38.3 years (SD = 15.3), with 52.6% male and 47.4% female participants.

In terms of disease presentation, 84.2% of patients presented with CRS and nasal polyps (CRS with NP), while the remaining participants had CRS alone (Table 1). The preoperative ETDQ-7 scores revealed a mean score of 2.13 (SD = 0.9) for the overall cohort, with 47.6% of patients scoring ≥14.5, indicating clinically significant ETD symptoms (Table 2). The preoperative SNOT-22 total score had a mean of 48.0 (SD = 20.1), indicating moderate-to-severe sinonasal symptom severity among participants.

Table 1: Patient demographics and distribution of disease characteristics in the study cohort (n = 19). CRS, chronic rhinosinusitis; NP, nasal polyps.

Variable	Frequency	Percent (%)
Gender		
Male	40	52.6
Female	36	47.4
Ear involvement		
Left ear	4	5.3
Right ear	12	15.8
Both ears	60	78.9
Disease type		
CRS	12	15.8
CRS with nasal polyps (NP)	64	84.2

After 3 to 6 months postoperatively, a significant improvement in ETDQ-7 scores was observed, with a mean postoperative score of 1.07 (SD = 0.9), indicating reduced ETD severity across the cohort ($p < 0.05$). Similarly, the SNOT-22 total scores decreased markedly to a mean of 24.0 (SD = 14.5), reflecting significant improvement in sinonasal symptoms post-FESS ($p < 0.05$).

Table 2: Comparison of mean preoperative and postoperative ETDQ-7 and SNOT-22 scores in CRS patients undergoing functional endoscopic sinus surgery (FESS). ETDQ-7, Eustachian Tube Dysfunction Questionnaire; SNOT-22, 22-item Sino-Nasal Outcome Test.

Measure	Time point	Mean	Standard deviation (sd)
ETDQ-7 score	Preoperative	2.13	0.90
	Postoperative	1.07	0.90
SNOT-22 score	Preoperative	48.00	20.10
	Postoperative	24.00	14.50

Correlation analysis between ETDQ-7 and SNOT-22 scores demonstrated a moderate association preoperatively, with a Pearson correlation coefficient of 0.52 ($p < 0.001$). The strongest correlation was observed between ETDQ-7 scores and the ear/facial subdomain of the SNOT-22, with a Spearman correlation coefficient of 0.68 ($p < 0.0001$), indicating a strong association between CRS severity and otologic symptoms in this population.

4. Discussion

Findings from this study support the high prevalence and significant postoperative improvement of ETD symptoms in CRS patients, aligning with other prospective evaluations that show ET dysfunction is

frequently present among those with CRS and responds well to surgical intervention. Studies like Maniakas et al. highlight that ear symptoms, specifically ear fullness and ear pain, often improve following endoscopic sinus surgery (ESS), with reductions in SNOT-22 scores that are comparable to non-CRS populations post-treatment. The consistency of these outcomes suggests that FESS offers a dual benefit in alleviating both sinonasal and otologic symptoms, underscoring the effectiveness of surgical intervention in comprehensive CRS management[10].

While surgical intervention remains a mainstay treatment for refractory CRS and associated ETD symptoms, some practitioners advocate for a more conservative approach, especially given the risks associated with surgery. Alternative non-surgical therapies, including balloon dilation of the Eustachian tube, have shown promise in patients with ETD alone, though evidence is still evolving for CRS patients with ETD comorbidity[11]. These procedures, less invasive than FESS, may offer symptom relief for ETD-specific complaints, though they may not address the broader range of CRS-related symptoms. Furthermore, medical management of CRS with anti-inflammatory and topical therapies has been shown to provide symptom relief and could serve as an adjunct or alternative to FESS for selected patients[9]. Future studies comparing FESS with these alternatives specifically in populations with CRS and high pollution exposure could yield valuable insights into optimizing patient care.

An important consideration is the psychological and functional burden associated with ETD symptoms in CRS, as chronic ear-related issues often impair social engagement, workplace productivity, and overall quality of life. Studies highlight that symptoms of ear pain and fullness—common in CRS-associated ETD—are linked to increased stress and depressive symptoms when left unaddressed, especially in cases unresponsive to medical therapy. By reducing ET and sinonasal symptoms, FESS can enhance daily functioning and psychological well-being, demonstrating that effective treatment in CRS patients may yield benefits that extend beyond physical symptom relief to substantial improvements in quality of life[12]. Wu et al. further reinforce the role of FESS in alleviating ETD symptoms in CRS patients, showing significant reductions in ETDQ-7 scores postoperatively[5]. Their findings align with our results, indicating that surgical intervention not only addresses sinonasal symptoms but also substantially alleviates ETD, thereby improving overall patient-reported outcomes. The correlation between ETDQ-7 and SNOT-22 scores in their cohort (Spearman $r = 0.51$) is consistent with our observed association, underscoring the interconnectedness of sinonasal and otologic symptomatology in CRS.

Improvement in QOL is a critical metric in the management of CRS and ETD, as these conditions substantially impact mental well-being, social functioning, and productivity. Persistent otologic symptoms, such as ear pressure and pain, coupled with nasal congestion and headaches, have been shown to increase stress and anxiety among patients, potentially leading to depression in chronic cases[2, 3]. The correlation between ETDQ-7 and SNOT-22 scores highlights the interconnectedness of sinonasal and otologic symptoms with overall patient, suggesting that alleviating ETD symptoms can have far-reaching psychological benefits. Enhanced QOL through symptom reduction can also reduce healthcare utilization, as patients with well-managed CRS and ETD symptoms are less likely to seek repeated medical consultations or require ongoing interventions. This improvement reduces the psychological and financial burdens on patients and healthcare systems alike. Studies underscore that patients who experience relief from CRS and ETD symptoms report a greater ability to engage in social activities, improved sleep quality, and enhanced overall life satisfaction[4, 8]. Addressing these psychological dimensions is especially relevant for populations in areas with high pollution, like Rawalpindi, where respiratory conditions are pervasive, and symptom management is essential for maintaining mental and physical health.

The strong association between ETDQ-7 and the ear/facial subdomain of SNOT-22 further supports the value of integrated quality-of-life assessments in CRS care. Understanding and measuring the full range of patient's symptoms, including those affecting social and emotional well-being, enables clinicians to provide holistic care and prioritize treatments that address both physical and psychological needs. By demonstrating significant postoperative improvements, this study highlights the role of FESS in providing enduring QOL benefits, supporting its continued use in managing ETD and CRS together, particularly in areas with

environmental risk factors[7, 13]. This study's findings should be interpreted with caution due to the limited sample size and the absence of a control group. Additionally, the lack of objective ETD measures such as tympanometry means that symptom improvements are based solely on patient-reported outcomes, which could introduce response bias. Future research would benefit from incorporating objective ETD measures to validate these findings further. Investigating long-term QOL outcomes across diverse environmental settings and comparing FESS with non-surgical options, such as Eustachian tube dilation, could expand treatment options for patients with CRS and ETD. Moreover, studies examining the specific impact of air pollution on ETD and CRS symptomatology may offer insights into preventive care strategies for populations in highly polluted regions.

The correlation between ETDQ-7 and the ear/facial subdomain of SNOT-22 strengthens the case for routine QOL assessments in CRS care, as they capture both physical and psychosocial dimensions critical to patient well-being [12]. Future studies incorporating advanced audiometric measures, such as tympanometry, could refine the assessment of ETD in CRS patients, helping to identify those who might benefit from combined therapeutic approaches including both surgical and emerging non-surgical options like balloon dilation.

5. Conclusion

This study demonstrates that ETD symptoms are highly prevalent among CRS patients in Rawalpindi, Pakistan, and that these symptoms significantly improve following FESS. The correlation between ETDQ-7 and SNOT-22 scores highlights the interconnected impact of sinonasal and otologic symptoms on patients' QOL. Given the urban environmental context of high pollution, which may exacerbate CRS and ETD severity, this study underscores the importance of effective intervention strategies. FESS not only reduces symptom burden but also enhances overall QOL by alleviating both physical and psychological discomfort associated with these chronic conditions. Future research should aim to validate these findings with objective ETD measures and explore alternative treatments to optimize patient outcomes across diverse settings.

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References

1. Tangbumrungtham N, Patel VS, Thamboo A, et al. The prevalence of Eustachian tube dysfunction symptoms in patients with chronic rhinosinusitis. Int Forum Allergy Rhinol. 2018;8:620–623.
2. Stoikes NF, Dutton JM. The effect of endoscopic sinus surgery on symptoms of Eustachian tube dysfunction. Am J Rhinol. 2005;19:199–202.
3. Higgins TS, Cappello ZJ, Wu AW, Ting JY, Sindwani R. Predictors of Eustachian tube dysfunction improvement and normalization after endoscopic sinus surgery. Laryngoscope. 2020;130(4):835-841.
4. Juszczak H, Aubin-Pouliot A, Sharon JD, Loftus PA. Sinonasal risk factors for Eustachian tube dysfunction: cross-sectional findings from NHANES 2011-2012. Int Forum Allergy Rhinol. 2019;9(5):466–472.
5. Wu AW, Walgama ES, Higgins TS, Borrelli M, Vardanyan N, Hopp S, Shamsian A, Hopp ML. Eustachian Tube Quality of Life and Severity of Disease in Patients With Chronic Rhinosinusitis. American Journal of Rhinology & Allergy. 2020;0(0):1-5. doi:10.1177/1945892420912366.
6. McCoul ED, Anand VK. Validating the clinical assessment of Eustachian tube dysfunction: the Eustachian Tube Dysfunction Questionnaire (ETDQ-7). Laryngoscope. 2012;122:1137–1141.
7. Hopkins C, Rudmik L, Lund VJ. The predictive value of the preoperative Sinonasal Outcome Test-22 score in patients undergoing endoscopic sinus surgery for chronic rhinosinusitis. Laryngoscope. 2015;125:1779–1784.
8. Orlandi RR, Kingdom TT, Hwang PH, et al. International consensus statement on allergy and rhinology: rhinosinusitis executive summary. Int Forum Allergy Rhinol. 2016;6–S26.
9. Bowles PFD, Agrawal S, Salam MA. Eustachian tube dysfunction in chronic rhinosinusitis: pre- and post-operative results following endoscopic sinus surgery, a prospective study. Rhinology. 2019;57(1):73–77.
10. Maniakas, A, Desrosiers, M, Asmar, MH, Al Falasi, M, Mfuna Endam, L, Hopkins, C, Philpott, C, Erskine, S, Smith, R, Kilty, S. Eustachian tube symptoms are frequent in chronic rhinosinusitis and respond well to endoscopic sinus surgery. Rhinology. 2018;56(2):118–121. doi:10.4193/Rhin17.165.
11. Marino MJ, Ling LC, Yao WC, Luong A, Citardi MJ. Eustachian tube dysfunction symptoms in patients treated in a tertiary rhinology clinic. Int Forum Allergy Rhinol. 2017;7(12):1135–1139.
12. Yang, K.-S.; Chen,W.-C.; Wu, C.-N.; Wee, Y.-S.; Wang, C.-S.; Wu, C.-C.; Luo, S.-D. Endoscopic Sinus Surgery Significantly Reduces Eustachian Tube Dysfunction Symptoms in Patients with Chronic Rhinosinusitis: A Systematic Review and Meta-Analysis. Biomedicines 2024, 12, 2484. https://doi.org/10.3390/biomedicines12112484
13. Newman AC, Omrani K, Higgins TS, et al. The prevalence of Eustachian tube dysfunction symptoms in patients with temporomandibular joint disorder. Laryngoscope. Published online ahead of print July 2, 2019. doi:10.1002/lary.28162.

Original article

A Comparison of Acetic Acid Verses Topical Antibiotics for Otorrhea Resolution in Active CSOM-A Randomized Control Trial

Asif Saif Ullah Khan[1, *]

Abstract

Introduction: Chronic Suppurative Otitis Media (CSOM) is a long -standing middle ear infection causing hearing loss, often in developing countries. Treatment includes aural toilet, topical antibiotics, and antiseptics. Drug resistance and ototoxicity are concerns, with acetic acid as a potential alternative.
Study design: Randomized control trials.
Material and methods: Study was conducted in ENT Department of Rawalpindi Teaching hospital.
Results: A total of 186 patients with tubotympanic type of CSOM were randomly divided into two groups. In group A patients were treated with topical acetic acid while in group B patients were treated with topical Gentamycin ear drops.
Conclusion: This study concluded that both acetic acid and topical gentamicin are effective in resoling otorrhea but acetic acid presented as viable alternative especially for those with concerns about ototoxicity or antibiotics resistance.

Key words: CSOM, Topical Acetic acid, Topical Gentamycin, Otorrhea resolution, tubotympanic type of CSOM.

[1] ENT (ear, nose, throat), Rawalpindi Teaching Hospital
*** Corresponding author**: Asif Saif Ullah Khan
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1. Introduction

CSOM is estimated to have a total disease burden of anywhere between 1% and 46% worldwide, with over 90% cases occurring in Third Word, and it's thought that the prevalence in countries like Pakistan may be as high as 7%[1, 2]. It is among the leading causes of deafness globally that can be prevented, causing individuals to have poor performance at work/school, having direct detrimental effects on cognition, defective or delayed speech and language development[3, 4]. It characterized as long standing infection (greater than 6 weeks) of middle ear cleft which includes Eustachian tube, middle ear, and mastoid antrum, associated with tympanic membrane perforation and ear discharge resulting in the most commonly symptoms of ear discharge and hearing loss[5, 6]. Numerous bacteria including aerobes and anaerobes can cause the disease, among which Pseudomonas aeruginosa and Staphylococcus aureus are the most common pathogenic organism[7]. Hearing loss associated with CSOM is multifactorial. Initially it is conductive as middle ear fills up with discharge produced by infection[8]. Prolonged inflammation results in damage to the cochlea and later on, hearing loss become sensorineural[9].

Various conservative treatment modalities have been used in the treatment of CSOM, which are mostly a combination of aural toilet and various topical antibiotics[10]. Systemic antibiotics may be used in severe cases of CSOM but are rarely required as the combination of aural toilet and topical antibiotics is able to achieve significant higher tissue concentrations[11]. Recent studies have shown that there may be a role for topical antiseptics in the treatment of CSOM, alone or in combination with antibiotics[12, 13]. Topical aminoglycosides, such as gentamycin and tobramycin, are common antibiotics used in the treatment of CSOM, while drug resistance has been a major emerging problem with most of antibiotics. Ear isolates have a sensitivity of up to 94.4% to gentamycin, an aminoglycoside of susceptible bacteria[14, 15]. However, even topical therapy with these drugs is associated with adverse effects, the most important being ototoxicity. Thus medical practitioners are always to lookout for similarly effective but safer alternatives[16]. Acetic acid has been used extensively in wound dressing and infected wound management. It is effective, safe, cheap and readily available, with good activity against resistant organism such as *Pseudomonas aeruginosa*[17, 18]. Adverse effects related to acetic acid therapy use are minimal, and limited to case reports[19]. The objective of this study is to compare topical acetic acid therapy with topical antibiotic therapy in patients with Tubotympanic type of Chronic Suppurative Otitis Media in terms of efficacy.

2. Materials & Methods

The study was carried out in Otorhinolarngology Department of Rawalpindi Teaching Hospital from 1st

March 2024 to 24th September 2024. A total of 186 patients suffering from CSOM was included in this study and divided into two groups randomly. Group A patients underwent treatment with topical acetic acid eardrops and Group B received topical Gentamicin eardrops.

Inclusion criteria:

- Patients age between 18 years to 70 years.
- Patient of all ethnicities.
- Patient of both genders.
- Patient with tubotympanic type of CSOM.
- Patient with an initial ontological score of ≥ 6.

Exclusion criteria:

- Patients with CSOM who have a dry ear or those with underlying cholesteatoma
- Patients who have received topical or oral antibiotics or any other ear drops in the past two weeks
- Patients who have Serous Otitis Media
- Patients who are suffering for the atticoantral type of CSOM
- Patients not giving consents
- Patients who have otomycosis and suffering from vertigo
- Patients with allergies to aminoglycosides or acetic acid
- Patients with documented resistance to aminoglycosides on culture
- Patients who are pregnant or breast feeding
- Patients who are immunocompromised i.e suffering from HIV/AIDS, inherited or acquired immunity defects, concurrent chronic disease of the heart, lung, kidney or liver
- Patients with an initial ontological score of ≤ 5.

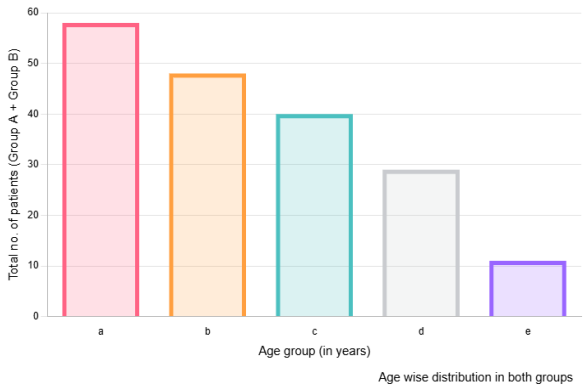

Fig 1: Age wise distribution in both groups

3. Results

In this study Patients included were in between the age group of 15-65 (Figure 1). Maximum numbers of patients were in the age group of 25-35 years. Out of 186, cases 102 were males and 84 were females (Figure 2). In group A, 50 were males and 43 females. In group B, there were 52 males and 41 females. In our study, various symptoms like earache, discharge, TM perforation, were observed. In Acetic acid group and in topical antibiotic group, number of patients suffering from different symptoms are mentioned in Table 3. Pre-treatment and post-treatment Ological Symptoms Score is mentioned in Table 4a and Table 4b.

According to this study, in group A, topical Acetic acid was found to be comparatively better regarding discharge resolution in 92% of the patients with healed perforation in 23% of them. While in group B discharge resolution was seen in 87% of the patients with healed perforation in 17% of the patients but statistically both the topical agents are equally effective.

In our study of 186 patients, in topical antibiotic group consisting of 93 patients, complaints of irritation were observed in 10 patients, ear-ache in 14 patients, bad taste in mouth in 15 patients and vertigo in 3 patients. 51 patients had no complain with topical antibiotic ear drops. Whereas amongst 93 patients in acetic acid group complain of irritation was seen in 18 patients, ear-ache in 11 patients, bad taste in mouth in 17 patients and vertigo in 2 patients. 45 patients had no complain with acetic acid drops instillation.

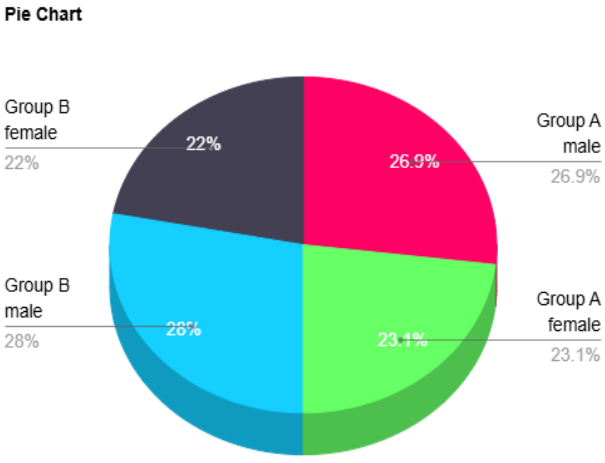

Fig 2: Gender wise distribution in both groups

Table 3: Symptoms wise distribution in both group

Symptoms	No. of patients (Group A) each out of 93	No. of patients (Group B)each out of 93
Earache	23	25
Perforation Right ear	47	42
Perforation Left ear	34	36
Both ear	12	15
Discharge	44	57

Table 4a: Pre-treatment Otological Symptoms Score

Feature	Group A				Group B			
Score	0	1	2	3	0	1	2	3
Discharge Quantity	39	22	18	14	36	24	20	13
Discharge Type	39	16	30	08	36	17	29	11
Congestion Degree	22	55	16	_	25	53	15	_

Table 4b: Post-treatment Otological Symptoms Score

Feature	Group A				Group B			
Score	0	1	2	3	0	1	2	3
Discharge Quantity	68	19	04	02	60	24	06	03
Discharge Type	68	06	16	03	60	09	18	06
Congestion Degree	71	20	02	_	63	24	06	_

Table 5: Side effects in both groups

	Irritation	Earache	Bad taste	Vertigo	None
Group A	18	11	17	02	45
Group B	10	14	15	03	51

4. Discussion

This study examined the efficacy of acetic acid versus topical antibiotics in treating otorrhea associated with chronic suppurative otitis media (CSOM), comparing their effects on symptom relief and side effects among patients. The findings offer critical insights into non-antibiotic alternatives for CSOM management, highlighting acetic acid as a viable treatment option in settings with antibiotic resistance concerns or ototoxicity risks.

The study's findings reveal comparable efficacy between acetic acid and gentamin drops in reducing otorrhea

symptoms, with a slight advantage in patient's comfort favoring gentamicin. The rates of side effects such as irritation, earache, and bad taste were similarly distributed between the two groups, suggesting both treatments' tolerability. However, the slightly higher incidence of irritation among the patients treated with acetic acid, though statistically non-significant, might influence patient's adherence to treatment in long-term management. This supports previous research underscoring acetic acid's effectiveness against resistant organisms, particularly *Pseudomonas aeruginosa*.

Importantly, the study draws attention to the emerging role of antiseptics in CSOM management, especially in resource-limited settings where antibiotic access and resistance are substantial barriers. While antibiotics like gentamicin remains highly effective, acetic acid's affordability, accessibility, and minimal side effects, position it as a valuable alternative, especially when ototoxicity is a concern. This aligns with recent studies promoting antiseptics as a safer, equally effective approach in select CSOM cases.

A study conducted by Gupta et al. in 2015 on 100 patients with CSOM, compared a topical antiseptic with aural toilet versus topical and systemic antibiotics for 3 months. Those patients who were treated with topical antiseptic showed otorrhea resolution in 84% of patients, healed perforation in 26% and a failure rate of 16%. Those who received antibiotics showed discharge cessation in only 58% patients, healed perforation in 14% and failure rate of 32%. The author concluded that perhaps aural toilet in combination of topical antiseptic is a superior choice as compared to oral and topical antibiotics for CSOM[20].

Vishwakarma et al. in 2015 had a similar study format with the same drugs, but the results were very different. As opposed to Gupta et al., which showed that topical antiseptics were vastly superior to topical antibiotics, this study showed that topical antiseptics were not superior, but that the results were comparable. It was that at day 14 both topical acetic acid and topical gentamycin showed and equal effect on the ontological symptom score with a non-significant p= 0.56[21].

The result of the above mentioned study are in contrast to the review conducted by Adriztina et al., which demonstrated that the efficacy of topical antiseptics to be at best variable[22] as well as Macfadyen et al. who reported that topical antibiotics were superior to topical antiseptics[23]. Overall, this study contributes to the ongoing exploration of cost-effective, safer CSOM treatments.

5. Conclusion

The study concludes that both acetic acid and topical gentamicin are effective in resolving otorrhea in patients with chronic suppurative otitis media (CSOM). While gentamicin showed a slight edge in terms of patient comfort, acetic acid presented as a viable alternative, especially for those with concerns about ototoxicity or antibiotic resistance. Given acetic acid's affordability, accessibility, and minimal side effects, it could be an effective option in resource-limited settings or where long-term antibiotic use is a concern. Future research with extended follow -up is suggested to further confirm these findings and evaluate the long-term efficacy and safety of acetic acid in CSOM management.

References

1. Bellad SA, Kavi A, Mudhol RS. Prevalence of Chronic Suppurative Otitis Media Among School Children Residing in Rural Area of Belagavi, South India. Indian J Otolaryngol Head Neck Surg. 2019 Nov; 71 (Suppl 2): 1549-1552. doi: 10. 1007/s12070 -019-016 27-9. Epub 2019 Mar 6. PMID: 31750215; PMCID:PMC6841755.
2. Ali Zaidi SS, Pasha HA, Suhail A, Qureshi TA. Frequency of Sensorineural hearing loss in chronic suppurative otitis media. J Pak Med Assoc. 2016 Oct; 66 (Sup pl 3) (10): S42-S44. PMID: 2789 5351.
3. Muftah S, Mackenzie I, Faragher B, Brabin B. Prevalence of Chronic Suppurative Otitis Media (CSOM) and Associated Hearing Impairment Among School-aged Children in Yemen. Oman Med J. 2015 Sep; 30 (5):358-65. doi: 10.5001/omj.2015.72. PMID: 26421117; PMCID: PMC4576383.
4. De Sousa KC, Swanepoel W, Moore DR, Myburgh HC, Smits C. Improving Sensitivity of the Digits-In-Noise Test Using Antiphasic Stimuli. Ear Hear. 2020 Mar/Apr; 41(2): 4 42-450. doi: 10.109 7/AUD.00000 0000000 0775. PMID: 31425362; PMCID: PMC70 15780.
5. Head K, Chong LY, Bhutta MF, Morris PS, Vijayasekaran S, Burton MJ, Schilder AG, Brennan-Jones CG. Antibiotics versus topical antiseptics for chronic suppurative otitis media. Cochrane Database Syst Rev. 2020 Jan 6; 1 (1): CD013056. doi: 10.1002/14651858. CD013056. pub2. PMID: 31902139; PMCID: PMC6956626.
6. Hiremath B, Mudhol R S, Vagrali MA. Bacteriological Profile and Antimicrobial Susceptibility Pattern in Chronic Suppurative Otitis Media: A 1-Year Cross-Sectional Study. Indian J

Otolaryngol Head Neck Surg. 2019 Nov; 71 (Suppl 2): 1221-1226. doi: 10.1007/s12070-018-1279-6. Epub 2018 Feb 21. PMID: 31750155; PMCID: PMC6841908.

7. Uddén, F., Filipe, M. Reimer, Å. et al. Aerobic bacteria associated with chronic suppurative otitis media in Angola. Infect Dis Poverty 7, 42 (2018). https://doi.org/10.1186/s40249-018-0422-7.
8. Mehboob S, Rafi ST, Ahmed N, Mehjabeen. Association of hearing loss with depression, anxiety and stress in patients suffering from Chronic Suppurative Otitis Media. Pak J Med Sci. 2019 Mar-Apr; 35 (2): 510-514. doi: 10.12669/pjms.35.2.152. PMID: 31086542; PMCID: PMC6500829.
9. Amali A, Hosseinzadeh N, Samadi S, Nasiri S, Zebardast J. Sensorineural hearing loss in patients with chronic suppurative otitis media: Is there a significant correlation? Electron Physician. 2017 Feb 25; 9 (2): 3823-3827. doi: 10.19082/3823. PMID: 28465813; PMC ID: PMC541 0912.
10. Mittal R, Lisi CV, Gerring R, Mittal J, Mathee K, Narasimhan G, Azad RK, Yao Q, Grati M, Yan D, Eshraghi AA, Angeli SI, Telischi FF, Liu XZ. Current concepts in the pathogenesis and treatment of chronic suppurative otitis media. J Med Microbiol. 2015 Oct; 64 (10): 1103-1116. doi: 10.109 9/jmm.0.000155. Epub 2015 Aug 5. PMID: 26248613; PMCID: PMC4835974.
11. Chong LY, Head K, Richmond P, Snelling T, Schilder AGM, Burton MJ, Brennan Jones CG. Topical versus systemic antibiotics for chronic suppurative otitis media. Cochrane Database Syst Rev. 2018 Jun 18; 2018 (6): CD013053. doi: 10.10 02/14651 858. CD013053. PMCID: PM C6513254.
12. Chong LY, Head K, Webster KE, Daw J, Richmond P, Snelling T, Bhutta MF, Schilder AG, Burton MJ, Brennan-Jones CG. Topical versus systemic antibiotics for chronic suppurative otitis media. Cochrane Database Syst Rev. 2021 Feb 9; 2 (2): CD013053. doi: 10.1002/14651858. CD013053.pub2. PMID: 33561891; PMCID: PMC8094403
13. Wigger, C., Leach, A.J., Beissbarth, J. et al. Povidone -iodine ear wash and oral cotrimoxazole for chronic suppurative otitis media in Australian aboriginal children: study protocol for factorial design randomised controlled trial. BMC Pharmacol Toxicol 20, 46 (2019).
14. Vishwanath S, Mukhopadhyay C, Prakash R, Pillai S, Pujary K, Pujary P. Chronic suppurative otitis media: optimizing initial antibiotic therapy in a tertiary care setup. Indian J Otolaryngol Head Neck Surg. 2012 Sep; 64 (3): 285-9. doi: 10.1007/s12070-011-0287-6. Epub 2011 Sep 13. PMID: 2399 8037; PMCID: PMC34315 29.
15. Mahajan T, Dass A, Gupta N, Chander J, Saini V, Pol SA. Bacteriological Profile in Attico-antral type of Chronic Supurative Otitis Media. Indian J Otolaryngol Head Neck Surg. 2019 Nov; 71 (Su ppl 2): 1412 -1421. doi: 10.1007/s12070-018-1486-1. Epub 2018 Sep 4. PMID: 31750187; PMCID: PMC6841772.
16. Huth ME, Ricci AJ, Cheng AG. Mechanisms of amino glycoside ototoxicity and targets of hair cell protection. Int J Otolaryngo l. 2011; 2011: 937861. doi: 10.1155/2 011/93786 1. Epub 2011 Oct 25. PMID: 22121370; PMCID: PMC3202092.
17. Agrawal KS, Sarda AV, Shrotriya R, Bachhav M, Puri V, Nataraj G. Acetic acid dressings: Finding the Holy Grail for infected wound management. Indian J Plast Surg. 2017 Sep-Dec; 50 (3): 273-280. doi: 10.4103/ijps.IJPS_245_16. PMID: 29618862; PMCID: PMC5868106.
18. Madhusudhan VL. Efficacy of 1 % acetic acid in the treatment of chronic wounds infected with Pseudomonas aeruginosa: prospective randomised controlled clinical trial. Int Wound J. 2016 Dec; 13 (6): 1129-1136. doi: 10.1111/iwj.12428. Epub 2015 Apr 8. PMID: 25851059; PMCID: PMC7949569.
19. Doles W, Wilkerson G, Morrison S, Richmond RG. Glacial Acetic Acid Ad verse Events: Case Reports and Review of the Literature. Hosp Pharm. 2015 Apr; 50 (4): 304-9. doi: 10.1310/hpj5004-304. Epub 2015 Apr 8. PMID: 26448660; PMCID: PMC4589881.
20. Gupta C, Agrawal A, Gargav ND. Role of Acetic Acid Irrigation in Medical Management of Chronic Suppurative Otitis Media: A Comparative Study. Indian J Otolaryngol Head Neck Surg. 2015 Sep; 67 (3): 314-8. doi: 10.1007/s12070-014-0815-2. Epub 2014 Dec 4. PMID: 26405670; PMCID: PMC4575668.
21. 21. Vishwakarma, Kirti & Khan, Prof. (Dr.) Farhan & Nizamuddin, Sheikh & Singh , Preeti & Yadav, Lalendra. (2015). Role of Topical Acetic Acid in Comparison to Gentamicin for the Management of Chronic Suppurative Otitis Media. International Archives of BioMedical and Clinical Research.
22. Adriztina I, Adenin LI, Lubis YM. Efficacy of Boric Acid as a Treatment of Choice for Chronic Suppurative Otitis Media and Its Ototoxicity. Korean J Fam Med. 2018 Jan; 39 (1): 2-9. doi: 10.4082/kjfm.2018.39.1.2. Epub 2018 Jan 23. PMID: 29383205; PMCID: PMC5788841.
23. Macfadyen C, Gamble C, Garner P, Macharia I, Mackenzie I, Mugwe P, Oburra H, Otwombe K, Taylor S, Williamson P. Topical quinolone vs. antiseptic for treating chronic suppurative otitis media: a randomized controlled trial. Trop Med Int Health. 2005 Feb; 10 (2): 190-7. doi: 10.1111/j.1365-31 56.2004.01368.x. PMID: 1567 9563.

Original article

Impact of dysnatremia on Mortality in Patients with Acute Kidney Injury at Holy Family Hospital, Rawalpindi: A Cross-Sectional Study

*Muhammad Nabeel[1, *], Asmara Asrar[1], Muhammad Osama[1]*

Abstract

Objective: To determine the frequency of dysnatremia among acute kidney injury (AKI) patients and assess the associated in-hospital mortality during the first 10 days of admission.
Methods: A descriptive cross-sectional study was conducted over six months at Holy Family Hospital, Rawalpindi. Data were collected from 120 AKI patients. Sodium levels were categorized as normal, hyponatremic, or hypernatremic, and mortality rates were tracked. Descriptive statistics were applied using SPSS.
Results: Among 120 patients, 31.7% (n=38) had dysnatremia. In-hospital mortality was 12.5% (n=15), with dysnatremia significantly associated with increased mortality.
Conclusion: Dysnatremia is common in AKI patients and is associated with increased short-term mortality, highlighting the need for careful monitoring of sodium levels in such patients.

Keywords: Dysnatremia, acute kidney injury (AKI)

[1] Nephrology, Holy Family Hospital, Rawalpindi
*** Corresponding author**: Muhammad Nabeel (nabeel_207@yahoo.com)
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1. Introduction

Acute kidney injury (AKI) affects 8-16% of hospitalized patients and up to 50% of patients in intensive care units (ICU). Dysnatremia, particularly hyponatremia and hypernatremia, is common in these patients and has been linked to worsened outcomes, including higher mortality rates. Dysnatremia can affect cellular function, leading to complications such as brain edema (in hyponatremia) or cell shrinkage (in hypernatremia), both of which can have life-threatening consequences. Acute kidney injury (AKI) poses significant challenges for nephrologists, with uncertain etiology in many cases. AKI affects 8-16% of hospitalized patients, with 1 in 7 developing AKI during their stay, and up to 50% in intensive care unit (ICU) settings[1]. Patients with renal impairment are prone to dysnatremias, which are associated with increased morbidity and mortality[2, 3]. Dysnatremias can lead to altered central nervous system function, cellular damage, and mortality[3, 4].

Previous studies have reported significant mortality rates among AKI patients with hyponatremia (20.1-20.3%) and hypernatremia (18.1-32.1%)[5, 6]. The kidney's crucial role in sodium homeostasis makes it a key factor in these disorders. Research has shown that dysnatremias are strongly associated with AKI development and may serve as an early indicator of kidney injury[7]. Despite existing literature, the independent and cumulative prognostic effects of dysnatremias in AKI patients remain poorly understood[7, 8].

Recently, Gao et al. reported higher 90-day mortality rates among AKI patients with hyponatremia or hypernatremia at hospital admission[9]. This study aims to quantify the prevalence of dysnatremia in AKI patients and explore its impact on in-hospital mortality, addressing a gap in the local Pakistani healthcare context.

2. Materials & Methods

A descriptive cross-sectional study conducted in the Nephrology Department, Holy Family Hospital, Rawalpindi.Six months (March 2023 to September 2023). 120 patients, calculated using WHO sample size formula with a 95% confidence interval. Inclusion Criteria included Patients aged 18-60 years & AKI patients with underlying conditions like sepsis, nephrotoxic drug exposure, or ischemic heart disease. Exclusion Criteria included Patients with chronic kidney disease (CKD) & Trauma-related AKI. Data Collection: Data on age, gender, comorbidities (e.g., diabetes, hypertension, sepsis), and sodium levels were collected using hospital records. Sodium levels <135 mmol/L were categorized as hyponatremia, >145 mmol/L as hypernatremia. Mortality was measured within 10 days of admission. SPSS version 23 was used for analysis. Frequencies and percentages were calculated for categorical variables, while continuous variables were expressed as means ± standard deviations. A p-value of ≤ 0.05 was considered significant.

3. Results

Out of 120 AKI patients, 58.3% (n=70) were males and 41.7% (n=50) were females, with a mean age of 50.14 ± 5.28 years. Dysnatremia was present in 31.7% (n=38) of the patients. Coexisting conditions included diabetes (30.8%), hypertension (32.5%), ischemic heart disease (44.2%), and sepsis (10%).

- Hyponatremia: 20% (n=24)
- Hypernatremia: 11.7% (n=14)
- Mortality Rate: 12.5% (n=15) overall, with higher mortality in dysnatremic patients ($p < 0.05$).

Table 1: Demographic Data of Patients (n=120)

Variable	Frequency (%)
Male	58.3%
Female	41.7%
Age (mean ± SD)	50.14 ± 5.28

Table 2: Co-morbidities

Co-morbidity	Frequency (%)
Diabetes	30.8%
Hypertension	32.5%
Ischemic Heart Disease	44.2%
Chronic Liver Disease	34.2%
Sepsis	10.0%
Shock	6.7%

Table 3: Sodium Levels and Mortality

Sodium Level (mmol/L)	Frequency (%)
Normal (135-145)	68.3%
Dysnatremia (<135 or >145)	31.7%
Mortality	12.5%

Dysnatremia was observed in 31.7% of patients, with higher mortality rates compared to those with normal sodium levels. Co-morbid conditions like ischemic heart disease, chronic liver disease, and sepsis were common among patients with dysnatremia.

4. Discussion

Acute kidney injury (AKI) is a significant healthcare concern, affecting up to 30% of hospitalized patients worldwide, with mortality rates reaching 25-50%[10-12]. The combination of AKI, non-solid tumors, and sepsis is particularly ominous, with a reported in-hospital mortality rate of 100%. Survivors are at increased risk of developing chronic kidney disease (CKD)[13, 14].

Recent studies have identified novel AKI biomarkers, including damage markers (e.g., NGAL, KIM-1, L-FABP) and stress markers (e.g., dickkopf-3)[15, 16]. The Acute Disease Quality Initiative Consensus Conference recommendations emphasize the clinical utility of these biomarkers in AKI diagnosis, prediction, and severity assessment[16].

The pathophysiology of dysnatremia in AKI involves impaired sodium regulation due to reduced renal filtration capacity, which can disrupt the body's ability to maintain electrolyte balance. In hypernatremia, excessive free water loss leads to dehydration, while in hyponatremia, water retention may cause cerebral edema, both contributing to higher mortality. Our study investigated the frequency and impact of dysnatremias on mortality in AKI patients. The results show that dysnatremias are common in AKI patients and are associated with increased mortality. This finding is consistent with previous studies[17-23]. Notably, hyponatremia and hypernatremia have been identified as independent predictors of in-hospital mortality and 90-day mortality[19, 21].

The pathophysiological mechanisms underlying dysnatremias in AKI are complex and multifactorial. Our study's findings suggest that dysnatremias may serve as an early indicator of kidney injury and mortality risk. The association between dysnatremias and mortality persisted after adjusting for comorbidities and other potential confounders. The clinical implications of our study are significant. Early recognition and management of dysnatremias may improve outcomes in AKI patients. Future research should focus on developing strategies to prevent and manage dysnatremias in AKI, as well as exploring the underlying mechanisms of this association.

Limitations: The study is limited by its single-center design and small sample size. Further multicentered studies with larger cohorts are needed to validate these findings.

5. Conclusion

Dysnatremia is a frequent and significant contributor to mortality in AKI patients. Early recognition and correction of sodium imbalances could improve outcomes and reduce the risk of death in this vulnerable population.

Limitations: Our study has some limitations, including its retrospective design and relatively small sample size. Further prospective studies are needed to confirm our

findings and elucidate the causal relationships between dysnatremias and mortality in AKI patients.

References

1. Woitok BK, Funk GC, Walter P, Schwarz C, Ravioli S, Lindner G. Dysnatremias in emergency patients with acute kidney injury: A cross-sectional analysis. Am J Emerg Med. 2020 Dec;38(12):2602–6.
2. Lombardi G, Ferraro PM, Naticchia A, Gambaro G. Serum sodium variability and acute kidney injury: a retrospective observational cohort study on a hospitalized population. Intern Emerg Med. 2020 Aug 9;16(3):617–24.
3. Mezones-Holguin E, Niño-Garcia R, Herrera-Añazco P, Taype-Rondan Á, Pacheco-Mendoza J, Hernandez AV. Possible association between dysnatremias and mortality during hospitalization in patients undergoing acute hemodialysis: analysis from a Peruvian retrospective cohort. J Bras Nefrol. 2019 Dec;41(4):501–508.
4. Chávez-Íñiguez JS, Maggiani-Aguilera P, Rondon-Berrios H, Kashani KB, Pérez-Flores C, Michel-González J, et al. Serum sodium trajectory during AKI and mortality risk. J Nephrol. 2022 Jan 21;35(2):697–701.
5. Li Q, Wang Y, Mao Z, Kang H, Zhou F. Serum Sodium Levels Predict Mortality in Elderly Acute Kidney Injury Patients: A Retrospective Observational Study. Int J Gen Med. 2021 Feb; 14:603–12.
6. Lee SW, Baek SH, Ahn SY, Na KY, Chae DW, Chin HJ, et al. The Effects of Pre-Existing Hyponatremia and Subsequent-Developing Acute Kidney Injury on In-Hospital Mortality: A Retrospective Cohort Study. Burdmann EA, editor. PLOS ONE. 2016 Sep 13; 11(9):e0162990.
7. Lombardi G, Ferraro PM, Naticchia A, Gambaro G. Serum sodium variability and acute kidney injury: a retrospective observational cohort study on a hospitalized population. Intern Emerg Med. 2020 Aug 9;16(3):617–24.
8. Turkmen E, Karatas A, Altindal M. Factors affecting prognosis of the patients with severe hyponatremia. Nefrologia. 2022 Mar 1;42(2):196–202.
9. Muroya Y, He X, Fan L, Wang S, Xu R, Fan F, Roman RJ. Enhanced renal ischemia-reperfusion injury in aging and diabetes. Am J Physiol Renal Physiol. 2018 Dec 01;315(6):F1843-F1854.
10. Gao XP, Zheng CF, Liao MQ, He H, Liu YH, Jing CX, et al. Admission serum sodium and potassium levels predict survival among critically ill patients with acute kidney injury: A cohort study. BMC Nephrol. 2019 Aug 8;20(1):1505-9.
11. Thongprayoon C, Cheungpasitporn W, Cheng Z, Qian Q. Chloride alterations in hospitalized patients: Prevalence and outcome significance. PLoS One. 2017;12:e0174430.
12. Boniatti MM, Cardoso PRC, Castilho RK, Vieira SR. Is hyperchloremia associated with mortality in critically ill patients? A prospective cohort study. J Crit Care. 2011;26:175–179.
13. Tani M, Morimatsu H, Takatsu F, Morita K. The incidence and prognostic value of hypochloremia in critically ill patients. ScientificWorld Journal. 2012;2012:474185–474185.
14. McCluskey SA, Karkouti K, Wijeysundera D, Minkovich L, Tait G, Beattie WS. Hyperchloremia after noncardiac surgery is independently associated with increased morbidity and mortality: a propensity-matched cohort study. Anesth Analg. 2013;117:412–421.
15. Bei HZ, You SJ, Zheng D, Zhong CK, Du HP, Zhang Y, et al. Prognostic role of hypochloremia in acute ischemic stroke patients. Acta Neurol Scand. 2017;136:672–679.
16. Hoorn EJ, Zietse R. Hyponatremia and mortality: moving beyond associations. Am J Kidney Dis. 2013;62:139–149.
17. Mendes RS, Soares M, Valente C, Suassuna JH, Rocha E, Maccariello ER. Predialysis hypernatremia is a prognostic marker in acute kidney injury in need of renal replacement therapy. J Crit Care. 2015;30:982–987.
18. Nagami GT. Hyperchloremia - Why and how. Nefrologia. 2016;36:347–353.
19. Peres LA, Wandeur V, Matsuo T. Predictors of acute kidney injury and mortality in an Intensive Care Unit. J Bras Nefrol. 2015;37(1):38–46.
20. Lee SW, Baek SH, Ahn SY, Na KY, Chae DW, Chin HJ, Kim S. The effects of pre-existing hyponatremia and subsequent-developing acute kidney injury on in-hospital mortality: a retrospective cohort study. PLoS One. 2016;11(9):e0162990.
21. Gao XP, Zheng CF, Liao MQ, He H, Liu YH, Jing CX, Zeng FF. et al. Admission serum sodium and potassium levels predict survival among critically ill patients with acute kidney injury: a cohort study. BMC Nephrol. 2019;20(1):311.
22. Woitok BK, Funk GC, Walter P, Schwarz C, Ravioli S, Lindner G. Dysnatremias in emergency patients with acute kidney injury: A cross-sectional analysis. Am J Emerg Med. 2020;38(12):2602–2606.
23. Zhi D, Lin J, Dong L, Ji X, Zhuang H, Liu Z, Liu J. et al. Risk predictive role of hypernatremia for occurrence of sepsis-induced acute kidney injury. Ann Palliat Med. 2021;10(4):4705–4715.

Original article

Estimation of risk of stroke in middle aged and elderly indoor patients of a medical unit in tertiary care hospital of Rawalpindi

*Shahana Ghazal[1, *], Nida Anjum[1], Muhammad Khurram[1]*

Abstract

Background: Stroke is a major cause of disability and mortality worldwide, with South Asian countries, including Pakistan, disproportionately affected. Identifying high-risk patients is critical to enable early intervention and reduce the stroke burden.
Methods: A cross-sectional study was conducted over five months at Medical Unit-II, Holy Family Hospital, Rawalpindi. Seventy-five inpatients aged 45-80 years with stroke risk factors, such as hypertension, diabetes, smoking, atrial fibrillation, dyslipidemia, and a family history of cardiovascular disease, were included. Data collection utilized the American Stroke Association (ASA) Stroke Risk Assessment Tool. Patients were categorized into low (score 1–5), moderate (score 6–9), and high-risk groups (score = 10). Data were analyzed using SPSS version 25.0, with t-tests and Chi-square tests applied to determine significant associations.
Results: The mean age of the study population was 62.8 ± 9.6 years, with nearly equals representation of males (49.3%) and females (50.7%). A sedentary lifestyle (68%) and hypertension (56%) were the most prevalent risk factors. Of the participants, 45.3% were classified as high-risk, with a significant association between age and high-risk score ($p < 0.05$). Older age groups (65–80 years) showed higher frequencies of high stroke risk scores.
Conclusions: This study indicates that a significant proportion of middle-aged and elderly patients with established risk factors are at high risk for stroke. Implementing routine use of the ASA Stroke Risk Assessment Tool in clinical settings may facilitate early risk identification and targeted prevention, potentially reducing stroke incidence.

Keywords: Stroke, ASA Stroke Risk Assessment Tool, risk factors, prevention, hypertension, diabetes, sedentary lifestyle, Pakistan

[1] Medicine, Medical Unit –II Holy Family Hospital, Rawalpindi
*** Corresponding author**: Shahana Ghazal
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1. Introduction

A stroke also called as cerebrovascular accident (CVA), is a neurological deficit resulting from interruption of blood supply to a part of brain. Two types of strokes are widely recognized; Ischemic Stroke which is the clinical event caused by interruption of blood flow to a certain part of brain by either a thrombus or an embolus and Hemorrhagic stroke which is a neurological impairment as a result of rupture of blood vessels supplying oxygen and nutrients to the brain. In both situations, the affected brain tissue undergoes cell death due to hypoxia, inadequate nutrition, and accumulation of waste products[1]. Many researches have established several modifiable and non-modifiable risk factors that significantly increase the likelihood of stroke. Among these advancing age, male gender, smoking habits, uncontrolled hypertension, diabetes, elevated plasma cholesterol levels, ischemic heart disease, and atrial fibrillation are some of the well-established risk factors[2]. Epidemiological data has revealed the global burden of stroke is approximately 15 million per annum, among which 5 million lead to fatalities and another 5 million cases are left with lifelong morbidity. Hence, global incidence of stroke varies from 76 to 119 cases per 100,000 population each year[3]. According to the current statistics, stroke has been recognized as the second leading cause of death after ischemic heart disease[4], with South Asian countries disproportionately bearing 40% of global stroke-related fatalities[5]. Pakistan alone is estimated to have millions of people affected by stroke, reflecting a significant public health challenge[4, 5]. While Western nations have achieved a 42% reduction in stroke incidence over the past two decades, the incidence in Asian countries, including India and China, has risen substantially[6]. The increasing burden of cerebrovascular accidents (CVA) in Pakistan requires urgent emphasis on prevention, early detection, and timely intervention to mitigate these risk factors in general population[7]. The American Stroke Association (ASA) Stroke Risk Assessment Tool, also known as the ASA/ACCF/AHA Stroke Risk Calculator, provides healthcare professionals with a screening mechanism to assess individual stroke risk by accounting for various factors. This tool not only aids clinicians in making informed health management decisions but also can be used to support researchers and public health professionals in

identifying high-risk groups, evaluating existing preventive measures, and designing targeted interventions to lower stroke incidence and promote public health. The significance of assessing stroke risk among the hospitalized patients, particularly those in middle to older age groups with established risk factors, lies in the potential for early intervention. Hospitalized patients present a unique opportunity for clinicians to identify, monitor, and manage modifiable risk factors more closely, which can be challenging in outpatient settings. In healthcare system of countries with limited resources such as Pakistan, utilizing the American Stroke Association (ASA) Stroke Risk Assessment Tool to plan patient-specific preventive strategies will help prioritize high-risk individuals. This can lead to a possible reduction in morbidity, mortality, and healthcare costs associated with stroke. In this study, we employed the ASA Stroke Risk Assessment Tool to estimate stroke risk in middle-aged and elderly patients admitted to Medical Unit-II, Holy Family Hospital, Rawalpindi.

2. Materials & Methods

This cross-sectional study was conducted at Medical Unit-II Holy Family Hospital, Rawalpindi, over five months from June to October 2022. The study included 45 to 80 years old patients managed in Medical Unit-II who were known to have risk factors for stroke like; hypertension, diabetes mellitus, smoking, atrial fibrillation, dyslipidemia, and family history etc. Patients were included by convenience sampling after taking informed consent. Patients using any form of anticoagulation therapy, such as warfarin, direct oral anticoagulants (DOACs), or parenteral anticoagulants, were excluded from the study.

Data collection was performed through structured interviews, using a pre-designed proforma based on the American Stroke Association (ASA) Stroke Risk Assessment Tool. Based on ASA Stroke Risk Assessment Tool each patient's risk was assessed by evaluating specific variables, including age, blood pressure, diabetes status, smoking, atrial fibrillation, body mass index (BMI), cholesterol levels, diet, physical activity, and family history of stroke or cardiovascular disease. Patients were categorized into three risk groups: those with a score between 1 and 5 were classified as low risk, those scoring between 6 and 9 as moderate risk, and those with a score of 10 as high risk.

Data was entered and analyzed using SPSS version 25.0. Quantitative variables, such as age and BMI, were summarized as mean and standard deviation, while qualitative variables, like gender and risk factor presence, were reported as frequencies and percentages. P value was calculated using t-test or Chi square test test where applicable. P value <0.05 was considered significant.

3. Results

Mean age of the patients was 62.8 ± 9.6 years, with an almost equal distribution of males (49.3%) and females (50.7%). The mean Body Mass Index (BMI) was 27.2 ± 2.6 kg/m², indicating a prevalence of overweight status (BMI >25) in over half of the participants (52%). Table I provides details in demographic context. Sedentary lifestyle (68%), and hypertension were commonest risk factors. Details in this regard are given Table II. The association of certain risk factors with high stroke risk scores was statistically significant. For instance, a higher prevalence of hypertension, sedentary lifestyle, and atrial fibrillation were significantly associated with increased stroke risk scores ($p < 0.05$). Table III shows distribution across ASA Tool based grouping. 45.3% of patients were in high-risk category. Most of high-risk patients were found in the older age brackets, specifically those aged 65 and above ($p < 0.05$). Details are given in Table III. High stroke risk scores (score = 10) were distributed across age groups, with older age groups showing a higher frequency of high-risk patients. As shown in Table IV, 26.5% of high-risk patients were aged 65–74, while another 26.5% were aged 75–80 ($p < 0.05$).

Table I: Demographic Characteristics of Study Population (n=75)

Variable	Category	n (%)
Age (years)	Mean ± SD	62.8 ± 9.6
Age Groups	45–54	11 (14.6)
	55–64	15 (20.0)
	65–74	22 (29.3)
	75–80	27 (36.0)
Sex	Male	37 (49.3)
	Female	38 (50.7)
Body Mass Index (kg/m²)	Mean ± SD	27.2 ± 2.6
	BMI >25 (Overweight)	39 (52.0)

Table II: Prevalence of Stroke Risk Factors in Study Population (n=75)

Risk Factor	n (%)
Hypertension	42 (56.0)
Diabetes Mellitus	36 (48.0)
Sedentary Lifestyle	51 (68.0)
Diet Rich in Fats	30 (40.0)
Atrial Fibrillation	31 (41.3)
Smoking	34 (45.3)

Family History of Stroke	39 (52.0)
Elevated Cholesterol (>160 mg/dL)	22 (29.3)

Table III: Stroke Risk Categories Based on ASA Tool (n=75)

Risk Group	Score Range	n (%)
Low Risk	1–5	19 (25.3)
Moderate Risk	6–9	22 (29.3)
High Risk	10	34 (45.3)

Table IV: Age-Wise Distribution of High Stroke Risk Scores (Score = 10, n=34)

Age Group (years)	n (%) of High-Risk Patients
45–54	5 (14.7)
55–64	11 (32.4)
65–74	9 (26.5)
75–80	9 (26.5)

4. Discussion

Majority of our patients with stroke had moderate to high ASA Stroke Assessment Tool score. The prominent risk factors identified were hypertension, diabetes, sedentary lifestyle, and elevated BMI. These findings are consistent with findings from a 2021 meta-analysis, which emphasized these factors as key contributors to stroke globally[8]. Ou r findings suggest urgent need for targeted preventive strategies in Pakistan, where stroke remains a leading cause of disability and mortality.

Unlike countries, where public health initiatives have achieved a notable reduction in stroke incidence, Pakistan continues to face an increasing stroke burden[9]. Limited improvement in managing modifiable risk factors, such as lifestyle changes, blood pressure, and glucose control, likely contributes to this trend. Furthermore, social determinants such as restricted healthcare access, low awareness levels, and cultural norms influencing diet and activity, further contribute to this high prevalence of risk factors of stroke. The findings of our research indicate the need for broader regional data to devise strategies tailored to address local barriers and behaviors.

The use of the ASA Stroke Risk Assessment Tool in this study demonstrated its efficacy for identifying high-risk individuals. This tool's predictive value highlights its applicability in both inpatient and outpatient settings for early risk identification and patient-specific preventive guidance. Early identification through such tools allows for proactive risk factor management, including lifestyle counseling, diet modifications, and physical activity recommendations. Utilizing this tool for routine screenings could enhance healthcare providers' capacity to prioritize preventive care and provide tailored guidance for high-risk patients.

Our findings underscore the value of implementing public health initiatives to increase awareness of stroke risk factors. Community-focused educational programs, emphasizing lifestyle modifications to control hypertension, diabetes, and obesity, could be instrumental in reducing stroke incidence. Training healthcare professionals in effective counseling on stroke prevention could also bridge the gap between risk identification and actionable lifestyle changes, empowering patients to take an active role in managing their health.

This study has limitations, including a relatively small sample size and a single-centered design, which may affect the generalizability of our findings. Additionally, the convenience sampling approach may introduce selection bias. Future research involving larger sample sizes and multi-centered studies is recommended to validate these findings and strengthen the evidence base intervention for targeted stroke prevention in Pakistan.

5. Conclusion

This study reveals that 45.3% of middle-aged and elderly patients with major risk factors like hypertension, diabetes, sedentary lifestyle, and BMI >25 are at high risk for stroke. Routine utilization of the ASA Stroke Risk Assessment Tool in both outpatient and inpatient settings could aid in educating patients about their individual risk profiles, empowering them to make positive lifestyle changes.

References

1. About stroke [Internet]. [cited 2023 May 21]. Available from: https://www.stroke.org/en/about-stroke
2. Boysen, Gudrun, et al. "Stroke incidence and risk factors for stroke in Copenhagen, Denmark." Stroke 19.11 (1988): 1345-1353
3. World Health Organization. The world health report 2002: reducing risks, promoting healthy life. World Health Organization, 2002.
4. Mathers CD, Ma Fat D, Boerma JT. The Global Burden of Disease: 2004 Update. Geneva: World Health Organ; 2008
5. Wasay, Mohammad, Ismail A. Khatri, and Subhash Kaul. "Stroke in south Asian countries." Nature Reviews Neurology10.3 (2014): 135.
6. Li B, Lou Y, Gu H, Long X, Wang T, Wei J, et al. Trends in Incidence of Stroke and Transition of Stroke Subtypes in Rural

Tianjin China: A Population-Based Study from 1992 to 2012. PLoS One. 2015; 10[10]:e0139461.https://doi.org/10.1371/journal.pone.0139461

7. Nomani AZ, Nabi S, Badshah M, Ahmed S. Review of acute ischaemic stroke in Pakistan: progress in management and future perspectives. Stroke and vascular neurology. 2017 Mar 1;2(1).
8. Noubiap JJ, Feteh VF, Middeldorp ME, Fitzgerald JL, Thomas G, Kleinig T, Lau DH, Sanders P. A meta-analysis of clinical risk factors for stroke in anticoagulant-naïve patients with atrial fibrillation. EP Europace. 2021 Oct 1;23(10):1528-38.
9. Nomani AZ, Nabi S, Badshah M, Ahmed S. Review of acute ischaemic stroke in Pakistan: progress in management and future perspectives. Stroke and vascular neurology. 2017 Mar 1;2(1).

Your Voice Matters: Resident Feedback Survey for Quality Improvement of RJRMU

Farah Pervaiz[1], Sarah Rafi[1], Aamir Afzal[1] Dept of R&D, Rawalpindi Medical University

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BACKGROUND

To enhance the quality and relevance of the Resident Journal of Rawalpindi Medical University (RJRMU), we conducted an online survey involving all medical residents at RMU. This initiative aimed to gather valuable feedback on the journal's content, structure, accessibility, and its role in academic and professional development. Resident feedback is crucial in shaping a journal that effectively meets their scholarly needs, promotes research engagement, and reflects the evolving landscape of medical education and practice. By incorporating their insights, we strive to improve the journal's impact, ensuring it serves as a robust platform for knowledge dissemination and academic growth.

METHODOLOGY

To assess and enhance the quality of the Resident Journal of Rawalpindi Medical University (RJRMU), we developed an online survey targeting all medical residents at RMU. The methodology for this survey included three key phases: tool development, dissemination, and data analysis. Tool Development: The survey was designed using a structured questionnaire that focused on key aspects of the journal, including content relevance, readability, accessibility, research support, and overall impact. The questionnaire was developed based on a literature review of best practices in academic publishing and feedback mechanisms. It included both closed-ended and open-ended questions, with a 5-point Likert scale (ranging from "Strongly Disagree" to "Strongly Agree") used to quantify resident perceptions. Dissemination: The survey was distributed through digital platforms, including official university emails, WhatsApp groups, and RMU's online learning portal, ensuring maximum participation. Residents were given one week to complete the survey, with reminders sent periodically to encourage responses. Participation was voluntary and anonymous to promote honest and unbiased feedback. Data Analysis: Responses were collected and analyzed using quantitative and qualitative methods. Likert scale responses were analyzed using descriptive statistics, including mean scores and frequency distributions, to identify trends and areas for improvement. Open-ended responses were thematically analyzed to capture qualitative insights and suggestions from residents. The findings were then compiled into a report highlighting strengths, challenges, and actionable recommendations for improving RJRMU. This systematic approach ensured that the feedback gathered was data-driven and representative, allowing for informed decision-making to enhance the journal's quality and impact.

RESULTS

Table.1 provides the analysis of data of RMU residents with respect residency year distribution, department name, publication history & journal quality ratings among respondents. Most respondents are in their 2nd year (29.3%), followed by 4th year (25.7%) and 3rd year (20.7%). 1st-year residents (11.4%) and 5th-year residents (12.9%) make up the smallest groups. Among department distribution; the largest representation comes from Gynecology (16.4%), Surgery (15%), Medicine (12.1%), and Orthopedics (12.1%). Smaller departments include Urology, Nephrology, Neurology, and Nephrology (each 1.4%). When asked about "Have you published in the RJRMU Journal before?"; majority (81.4%) have not published in the RJRMU Journal before, and only 18.6% have prior publications, suggesting limited engagement with the journal. Similarly, when asked about "How would you rate the overall quality of the RJRMU Journal?" Most respondents rated the journal as "Good" (33.6%), "Satisfactory" (30.7%), or "Neutral" (29.3%). Only 2.9% rated it as "Excellent", while 3.6% rated it as "Poor". The majority perception is positive or neutral, with only a small percentage finding it unsatisfactory.

Fig.1 presents Resident Feedback Analysis regarding RJRMU Journal. When asked about "Perception of Scientific Rigor and Evidence-Based Content"; there were Agree (67 respondents,47.9%) and Neutral (70 respondents, 50%) were the most common responses. A very small percentage (2.1%, 3 respondents) strongly disagreed with the journal being rigorous and evidence-based. Majority opinion suggests that

while a significant proportion of residents agree with the journal's credibility, a considerable portion remains neutral, indicating potential room for improvement. When asked about "Satisfaction with the Manuscript Review Process"; there were Satisfied (117 respondents, 83.6%) was the dominant response. Not satisfied (23 respondents, 16.4%) made up a minority. The overwhelming satisfaction suggests that the journal's review process is perceived positively, but some dissatisfaction exists. Most residents find the journal scientifically credible, though a large neutral segment suggests that some are undecided. The review process is largely well-received, but addressing the concerns of the dissatisfied 16.4% could further enhance the journal's reputation.

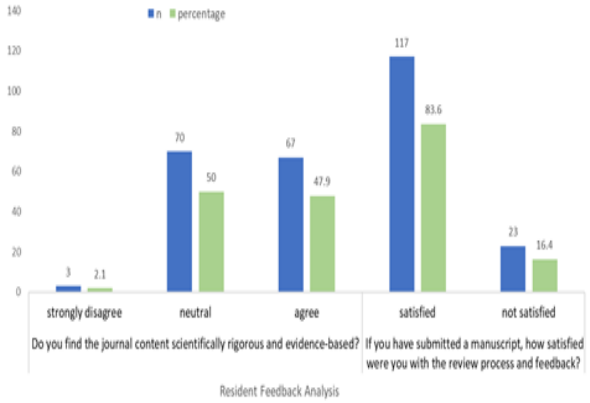

Fig 1. Survey Analysis

Recommendations for Improving the Peer Review and Editorial Process

Ensuring a fast and efficient peer review process is critical to maintaining the journal's relevance and appeal to researchers. Implementing a structured, time-bound review system with a standard timeline of 4–6 weeks for initial reviews and a 2-week window for revisions can help streamline the process. Utilizing online submission and review management platforms will further enhance communication between authors, reviewers, and editors, reducing delays. Additionally, recruiting a diverse pool of reviewers from multiple specialties can help distribute the workload, ensuring prompt and well-rounded feedback. Transparent review policies, such as open peer review or structured review forms, can also enhance credibility and efficiency. Equally important is providing dedicated support for authors in making revisions. Reviewers and editors should offer constructive and detailed feedback, suggesting specific improvements rather than merely identifying flaws. Introducing a mentorship system where early-career researchers or residents receive guidance from senior academics can help them better interpret feedback and refine their manuscripts. Furthermore, offering editorial assistance or writing workshops, especially for authors with limited academic writing experience, can significantly improve the quality of submissions and support a more inclusive research environment.

Table.1 Analysis of Survey

Year of Residency	n	%
1st year	16	11.4
2nd year	41	29.3
3rd year	29	20.7
4th year	36	25.7
5th year	18	12.9
Department Name	**n**	**%**
Anesthesia	8	5.7
Diagnostic radiology	4	3.2
ENT	8	5.7
Gastroenterology	6	4.3
Gyane	23	16.4
Medicine	17	12.1
Nephrology	4	3.2
Neurology	2	1.4
Ophthalmology	3	2.1
Orthopedics	17	12.1
Peads	9	6.4
Plastic surgery	7	5
Psychiatry	9	6.4
Surgery	21	15
Urology	2	1.4
Have you published in the RJRMU Journal before?		
Yes	26	18.6
No	114	81.4
How would you rate the overall quality of the RJRMU Journal?		
poor	5	3.6
satisfactory	43	30.7
neutral	41	29.3
good	47	33.6
excellent	4	2.9

DISCUSSION

Enhancing the peer review process is fundamental to ensuring academic rigor and credibility within RJRMU. Standardizing reviewer training and adopting a double-blind or open peer review system can improve the quality of evaluations, fostering fairness and transparency. Additionally, adhering to international editorial policies, such as COPE guidelines, will strengthen the journal's academic integrity, while periodic reviewer performance assessments will help maintain constructive and timely feedback for authors[1,2]. To expand the journal's reach and relevance, diversifying article submissions is essential. Encouraging contributions from a broad spectrum of medical specialties and actively soliciting papers from international researchers will enhance visibility and credibility beyond national boundaries.

Special issues focused on emerging topics, such as digital health and AI in medicine, can further position the journal as a forward-thinking publication. In terms of strategic growth, initially adopting a high acceptance rate will attract a wider pool of contributors, fostering engagement and interest[3]. As the journal gains traction, a gradual shift toward selective acceptance based on high editorial standards will ensure the publication of rigorously reviewed, high-quality articles, helping the journal achieve indexed status and greater impact.

Moreover, improving the quality of journal writing is crucial for establishing professionalism[4]. Offering writing workshops, editorial support, and guidance on structured abstracts and proper referencing will enhance manuscript clarity and readability. RJRMU's greatest strengths lie in its inclusivity. It provides a unique platform for residents from all specialties to publish their research, fostering interdisciplinary learning and collaboration. The journal is critical in sparking research interest among young scholars, offering them an accessible entry point into academic publishing. As RJRMU continues to evolve, attracting experienced researchers and clinicians to its editorial board will further elevate its standing. By implementing these recommendations, RJRMU can enhance its reputation, increase its impact factor, and establish itself as a reputable and trusted platform for resident research.

REFERENCES

1. Ethical guidelines for peer reviewers | COPE: Committee on Publication Ethics [Internet]. [cited 2025 Mar 5]. Available from: https://publicationethics.org/guidance/guideline/ethical-guidelines-peer-reviewers
2. Ethical guidelines for peer reviewers (English). 2013 Mar 1 [cited 2025 Mar 5]; Available from: https://publicationethics.org/guidance/guideline/ethical-guidelines-peer-reviewers
3. Budhwar P, Malik A, De Silva MTT, Thevisuthan P. Artificial intelligence – challenges and opportunities for international HRM: a review and research agenda. The International Journal of Human Resource Management [Internet]. 2022 [cited 2025 Mar 5];33(6):1065–97. Available from: https://www.tandfonline.com/doi/abs/10.1080/09585192.2022.2035161
4. Connor-Greene PA. Making Connections: Evaluating the Effectiveness of Journal Writing in Enhancing Student Learning. Teaching of Psychology. 2000;27(1):44–6.

Original article

Comparison of Two-Dimensional Shear Wave Elastography Versus Fibrosis-4 Index for Evaluation of Liver Fibrosis in Chronic Hepatitis B Patients

*Umer Farooq[1], Rimsha Shams[1, *], Humaira Riaz[1], Madiha Azam[1], Ghanwa[1], Ayesha[1], Zulaikha[1]*

Abstract

Introduction: In countries like Pakistan, chronic hepatitis B infection is a major public health issue. Accurate assessment of liver fibrosis is crucial for proper medical care. Promising techniques include 2D-SWE and serum-based models like FIB-4. CHB infection contribute to liver fibrosis, cirrhosis, and liver cancer. Accurate assessment of liver fibrosis is crucial for proper care, using non-invasive techniques like 2D-SWE and serum-based fibrosis models like FIB-4.
Objective: To evaluate liver fibrosis among patients with CHB infection, we aim to compare the diagnostic performance of 2D-SWE and FIB-4.
Study Design: This research was a Quasi Experimental study.
Patients and Methods: The study involved a sample of 100 individuals with chronic Hepatitis B infection, selected using a sequential non-probability sampling technique. Eligibility for the study requires patients to demonstrate laboratory indications of chronic hepatitis B infection and provide either hepatic biopsy or fibro-scan results. Exclusion criteria involved patients with congestive cardiac failure, hepatic focal lesions, portal vein thrombosis, history of hepatic interventional procedures, or fibrosis due to other causes. Written informed consent was obtained from participants. The process involved in data collection included; performing 2D-SWE and calculating fibrosis-4 scores using age, platelet count, and serum liver enzyme levels. This information was then documented on a specific proforma.
Results: The research comprised of a sample of 100 patients diagnosed with chronic hepatitis B, yielding diverse findings. The analysis of gender distribution indicated the presence of 67 male and 33 female participants. Descriptive statistics were provided for several variables, encompassing age (with a mean of 37.46, ranging from 30 to 49 years), alanine aminotransferase (ALT) level (with a mean of 76.10, ranging from 25 to 312 IU/L), and aspartate aminotransferase (AST) level (with a mean of 136.98, ranging from 55 to 456 IU/L), platelet count (ranging from 70 to 200 with a mean of 114.43), Fibrosis 4 Index score (ranging from 0.93 to 7.83 with a mean of 2.28), and duration of disease (ranging from 1 to 10 years with a mean of 3.93). The crosstabulation table showed the distribution of Ishak levels based on elastography results. The statistical analysis revealed significant differences in Fibrosis-4 Index across different elastography groups. Post hoc analyses further supported these findings, indicating significant mean differences between specific elastography groups. These results emphasize the importance of elastography in assessing liver fibrosis in chronic hepatitis B patients.
Conclusion: Evaluating liver fibrosis in chronic hepatitis B patients can be done effectively using non-invasive methods like 2D-SWE and FIB-4. However, Standardized protocols and guidelines are needed to integrate non-invasive techniques like 2D-SWE and FIB-4 into clinical care for chronic hepatitis B patients.

Keywords: 2 D Elastography, Fibrosis 4 Index, Chronic Hepatitis B infection

[1] Radiology Department, Benazir Bhutto Hospital, Rawalpindi
*** Corresponding author**: Rimsha Shams (rimshashams42@gmail.com)
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1. Introduction

Hepatitis B virus (HBV) infection is a significant public health issue, especially in developing countries like Pakistan, where about 15% of infected individuals develop chronic hepatitis B (CHB), leading to serious liver complications1. Accurate assessment of liver fibrosis is essential for managing CHB. While liver biopsy is the gold standard, its invasiveness limits its use 2D shear wave elastography (2D-SWE) has emerged as a valuable non-invasive alternative, with a sensitivity of 88% and specificity of 83%.[2]

It is recommended for liver stiffness measurements but requires skilled radiologists3. Additionally, serum fibrosis models like the FIB-4 index, which has high specificity (96%) but lower sensitivity (42%), offer further non-invasive assessment options[4]. A comparative study of the FIB-4 indexes and 2D-SWE is needed to evaluate their diagnostic performance in assessing liver fibrosis in CHB patients, aiding healthcare providers in optimizing patient management.

2. Materials & Methods

It was a Qausi Experimental study conduded in Department of Radiology Benazir Bhutto Hospital, Rawalpindi. The study was conducted from 2nd May 2021 to 2nd October 2021. A total of 100 patients have been calculated using the WHO sample size calculator.

Keeping the confidence interval 95% and margin of error 10%. Non-probability consecutive sampling. Inclusion Criteria: All patients, males and females with chronic hepatitis B infection with proven laboratory evidence on PCR.

All patients with the results of fibrosis index or positive report of hepatic enzymes and raised platelet count. Available hepatic biopsy is appreciated but fibro-scan available results will also be considered.

Exclusion Criteria: Patients with congestive heart failure. Patients with a hepatic focal lesion (benign or malignant). Patients with portal vein thrombosis. Patients have a history of hepatic interventional procedure (ERCP, PTC radiofrequency ablation, or chemoembolization). Patients have fibrosis due to reasons other than CHB infection (primary biliary cirrhosis, primary sclerosing cholangitis, or autoimmune hepatitis).

The data collection procedure was presented in front of the ethical review board of the Rawalpindi Medical University, and it was started after approval from ERB. All patients meeting inclusion criteria were inducted into this study. A total of 100 patients were selected as per sample size.

Written informed consent was taken for participation in the study. A consecutive sampling technique was employed to select patients for the study. This sampling technique was used to minimize selection bias. All patients underwent 2D-SWE and fibrosis-4 score the patients was calculated using their age, platelet count, and serum liver enzymes levels. All the information was recorded under the supervision of a Consultant Radiologist on a proforma attached to this synopsis.

SPSS version 25 is used to collect and analyze data. Gender, as a qualitative variable, was presented in terms of frequency and percentages. Mean ± Standard deviation was used to assess continuous variables, such as age, duration of symptoms, time since hepatitis B diagnosis, ALT levels, AST levels, and platelet count. To compare 2D elastography and Ishak fibrosis levels, the Chi-square test was utilized, while a one-way ANOVA was employed to compare the fibrosis-4 index with 2-D elastography results. A significance level of $p \leq 0.05$ was considered for statistical significance.

3. Results

There are 67 male and 33 female chronic hepatitis B patients in this study. The minimum value of age was 30 years, and the maximum value of age was 49 years. The average age of the respondents was 37.46±5.283 years. The minimum value of ALT was 25 and the maximum value of ALT was 312. Minimum & maximum AST: The minimum value of AST was 55 and the maximum AST value was 456. The mean ALT of the patients was 136.98±74.48IU/L. The minimum platelet count was 70 and the maximum platelet count was 200. The mean platelet count of the patients was 114.43±27.92IU/L. The minimum Fibrosis 4 Index score was 0.93 and the maximum Fibrosis 4 Index score was 7.83.The mean Fibrosis 4 Index score of the patients was 2.28±1.73.The minimum duration of diseasee was 1 year, and the maximum duration of disease was 10 years. The mean duration of disease of the patients was 3.93±2.081.

The p-value associated with the chi-square statistic is 0.000, indicating that the association between "Elastography" and "Ishak level" is statistically significant at a significance level of .05. The analysis revealed a significant main effect of group on Fibrosis 4 index ($F(3, 96) = 82.477$, $p < .001$). The between-groups analysis indicated a significant difference in mean Fibrosis-4 index among the groups ($M = 70.897$). Additionally, the within-groups analysis revealed a smaller mean square value ($M = .860$) compared to the between-groups mean square, suggesting less variation within the groups. These findings suggest that the group variable significantly influences the Fibrosis-4 index, indicating a clear distinction in Fibrosis severity across the different groups. While comparing F3-F4 to F0, F0-F1, and F2-F3, all comparisons revealed significant mean differences.

Table 3 revealed significant differences in mean fibrosis-4 index among the Elastography groups. Comparing Elastography group F0 to F0-F1, there was a non-significant mean difference of -0.38079 (SE = 0.25458, $p = 0.444$), with a confidence interval ranging from -1.0464 to 0.2848. Comparisons between F0 and F2-F3, as well as F0 and F3-F4, yielded significant mean differences of -1.40490 (SE = 0.26379, $p < 0.001$) and -4.67678 (SE = 0.32719, $p < 0.001$), respectively.

The confidence intervals for these comparisons were -2.0946 to -0.7152 and -5.5323 to -3.8213, respectively.

Similarly, when comparing F0-F1 to F0, F2-F3, and F3-F4, significant mean differences were observed. The mean differences were 0.38079 (SE = 0.25458, p = 0.444) for F0-F1 vs. F0, -1.02411 (SE = 0.22920, p < 0.001) for F0-F1 vs. F2-F3, and -4.29598 (SE = 0.30000, p < 0.001) for F0-F1 vs. F3-F4.

The corresponding confidence intervals were -0.2848 to 1.0464, -1.6234 to -0.4249, and -5.0804 to -3.5116, respectively. For the comparison between F2-F3 and F0, F0-F1, and F3-F4, significant mean differences were observed. The mean differences were 1.40490 (SE = 0.26379, p < 0.001) for F2-F3 vs. F0, 1.02411 (SE = 0.22920, p < 0.001) for F2-F3 vs. F0-F1, and -3.27187 (SE = 0.30786, p < 0.001) for F2-F3 vs. F3-F4. The corresponding confidence intervals were 0.7152 to 2.0946, 0.4249 to 1.6234, and -4.0768 to -2.4669, respectively. Lastly, when comparing F3-F4 to F0, F0-F1, and F2-F3, all comparisons revealed significant mean differences.

The mean differences were 4.67678 (SE = 0.32719, p < 0.001) for F3-F4 vs. F0, 4.29598 (SE = 0.30000, p < 0.001) for F3-F4 vs. F0-F1, and 3.27187 (SE = 0.30786, p < 0.001) for F3-F4 vs. F2-F3. The corresponding confidence intervals were 3.8213 to 5.5323, 3.5116 to 5.0804, and 2.4669 to 4.0768, respectively.

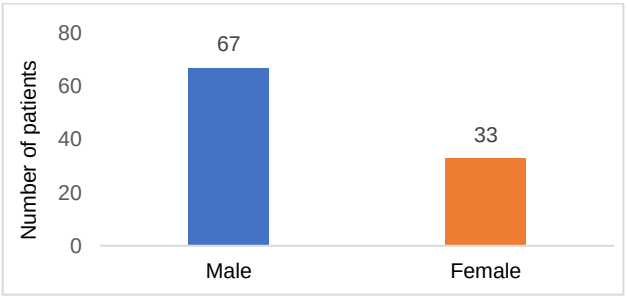

Fig 1: Gender Distribution in Patients

Table 1: Descriptive statistics of all continuous variables

	Min	**Max**	**Mean± SD**
Age (Years)	30	49	37.46±5.28
ALT levels (IU/L)	25	312	76.10±61.08
AST levels (IU/L)	55	456	136.98±74.48
Platelets count (10^3dl/L)	70	200	114.43±27.92
Fibrosis- 4 Index Score	0.93	7.83	2.28±1.73
Duration of Disease (years)	1	10	3.93±2.09

Table 2: Post Hoc Analysis of Fibrosis Scores based on Elastography Groups using the Least Significant Difference (LSD)

(I) Elastography	**(J) Elastography**	**Mean Difference (I-J)**	**Std. Error**	**Sig.**	**95% Confidence Interval**	
					Lower Bound	**Upper Bound**
F0	F0-F1	-.38079	.25458	.138	-.8861	.1245
	F2-F3	-1.40490*	.26379	.000	-1.9285	-.8813
	F3-F4	-4.67678*	.32719	.000	-5.3263	-4.0273
F0-F1	F0	.38079	.25458	.138	-.1245	.8861
	F2-F3	-1.02411*	.22920	.000	-1.4791	-.5692
	F3-F4	-4.29598*	.30000	.000	-4.8915	-3.7005
F2-F3	F0	1.40490*	.26379	.000	.8813	1.9285
	F0-F1	1.02411*	.22920	.000	.5692	1.4791
	F3-F4	-3.27187*	.30786	.000	-3.8830	-2.6608
F3-F4	F0	4.67678*	.32719	.000	4.0273	5.3263
	F0-F1	4.29598*	.30000	.000	3.7005	4.8915
	F2-F3	3.27187*	.30786	.000	2.6608	3.8830

*. The mean difference is significant at the 0.05 level.

Table 3: Post Hoc Analysis of Multiple Comparisons of Fibrosis Scores based on Elastography Groups (Tukey HSD)

(I) Elastography	(J) Elastography	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
F0	F0-F1	-.38079	.25458	.444	-1.0464	.2848
	F2-F3	-1.40490*	.26379	.000	-2.0946	-.7152
	F3-F4	-4.67678*	.32719	.000	-5.5323	-3.8213
F0-F1	F0	.38079	.25458	.444	-.2848	1.0464
	F2-F3	-1.02411*	.22920	.000	-1.6234	-.4249
	F3-F4	-4.29598*	.30000	.000	-5.0804	-3.5116
F2-F3	F0	1.40490*	.26379	.000	.7152	2.0946
	F0-F1	1.02411*	.22920	.000	.4249	1.6234
	F3-F4	-3.27187*	.30786	.000	-4.0768	-2.4669
F3-F4	F0	4.67678*	.32719	.000	3.8213	5.5323
	F0-F1	4.29598*	.30000	.000	3.5116	5.0804
	F2-F3	3.27187*	.30786	.000	2.4669	4.0768
*. The mean difference is significant at the 0.05 level.						

4. Discussion

This research evaluated the diagnostic accuracy of 2D shear-wave elastography (2D-SWE) and the Fibrosis 4 Index in chronic hepatitis B (CHB) patients. The study found a significant correlation between 2D-SWE findings and Ishak fibrosis grading, highlighting elastography's value in assessing liver fibrosis5. AUROCs were 0.906 for significant fibrosis and 0.955 for cirrhosis, with a meta-analysis showing an AUROC of 0.92 for significant fibrosis, reinforcing 2D-SWE's reliability. Comparative studies revealed that 2D-SWE outperformed serum fibrosis models, with AUROCs of 0.851 versus lower values for models like APRI (0.738). Huang et al. reported even higher AUROCs for 2D-SWE in CHB patients: 0.97 for significant fibrosis and 0.98 for cirrhosis6. Variability in serum models' diagnostic capabilities was noted, with AUROCs ranging from below 0.6 to above 0.97. The Fibrosis 4 index and Forns index performed best among these models, though excluding patients with elevated ALT and AST may have impacted accuracy8. Research on 2D-SWE in Pakistan and South Asia is limited9. Studies showed AUROCs of 0.835 and 0.881 for significant fibrosis and cirrhosis, respectively, with higher values in another study (0.914 for significant fibrosis and 0.948 for cirrhosis)10. Optimal cut-off values were identified as 6.95 to 7.90 kPa for significant fibrosis and 10.1 to 11.8 kPa for cirrhosis11. The study found platelet count and ALP independently correlated with 2D-SWE values, while no correlation with ALT was observed, possibly due to population differences12. Limitations include a small sample size, focusing only on significant fibrosis and cirrhosis, and not assessing inflammation stages13. Further research is needed to establish precise cut-off values and confirm 2D-SWE's diagnostic efficacy for liver fibrosis in HCC and CHB patients, as well as its potential in guiding antiviral therapy and predicting postoperative outcomes.

5. Conclusion

In the assessment of liver fibrosis in chronic hepatitis B patients, both 2D-SWE and FIB-4 prove effective as noninvasive methods. Comparatively, previous studies have examined non-invasive techniques for evaluating liver fibrosis. Utilizing 2D-SWE and FIB-4, clinicians can acquire valuable information regarding the severity of fibrosis without the necessity of invasive liver biopsies. To integrate these noninvasive approaches into routine clinical practice for individuals afflicted with chronic hepatitis B infection, additional research and validation are required. As a result, the management of chronic hepatitis B will benefit from the development and implementation of these noninvasive methods, leading to improved patient care and outcomes.

References

1. 1. Areeba Ahsan, Muhammad Daoud Tariq, Mubashir Zafar, Hafiz Muhammad Hamza, Fatima Kaleem, Muhammad Muiz Malik, et al. Analysis of Hematological Profiles in Hepatitis B Patients; Understanding the Interplay Between Viral Infections and Blood Parameters | Opast Publishing Group [Internet]. [cited 2024 Oct 30]. Available from:

https://www.opastpublishers.com/peer-review/analysis-of-hematological-profiles-in-hepatitis-b-patients-understanding-the-interplay-between-viral-infections-and-bloo-7415.html

2. 2. Lai JCT, Liang LY, Lai-Hung Wong G. Noninvasive tests for liver fibrosis in 2024: are there different scales for different diseases? Gastroenterol Rep (Oxf) [Internet]. 2023 Dec 22 [cited 2024 Oct 30];12. Available from: https://dx.doi.org/10.1093/gastro/goae024
3. 3. Boursier J, Decraecker M, Bourlière M, Bureau C, Ganne-Carrié N, de Lédinghen V. Quality criteria for the measurement of liver stiffness. Clin Res Hepatol Gastroenterol. 2022 Jan 1;46(1):101761.
4. 4. Loomba R, Adams LA. Advances in non-invasive assessment of hepatic fibrosis. Gut [Internet]. 2020 Jul 1 [cited 2024 Oct 30];69(7):1343–52. Available from: https://gut.bmj.com/content/69/7/1343
5. 5. Seyrek S, Ayyildiz H, Bulakci M, Salmaslioglu A, Seyrek F, Gultekin B, et al. Comparison of Fibroscan, Shear Wave Elastography, and Shear Wave Dispersion Measurements in Evaluating Fibrosis and Necroinflammation in Patients Who Underwent Liver Biopsy. Ultrasound Q [Internet]. 2024 Mar 17 [cited 2024 Oct 30];40(1):74–81. Available from: https://journals.lww.com/ultrasound-quarterly/fulltext/2024/03000/comparison_of_fibroscan,_shear_wave_elastography,.11.aspx
6. 6. Huang Z, Zheng W, Zhang YJ, Xu L, Chen J Bin, Chen JC, et al. Assessing Hepatic Fibrosis Using 2-D Shear Wave Elastography in Patients with Liver Tumors: A Prospective Single-Center Study. Ultrasound Med Biol [Internet]. 2017 Nov 1 [cited 2024 Oct 30];43(11):2522–9. Available from: https://pubmed.ncbi.nlm.nih.gov/28807448/
7. 7. Garg M, Karpinski M, Matelska D, Middleton L, Burren OS, Hu F, et al. Disease prediction with multi-omics and biomarkers empowers case–control genetic discoveries in the UK Biobank. Nature Genetics 2024 56:9 [Internet]. 2024 Sep 11 [cited 2024 Oct 30];56(9):1821–31. Available from: https://www.nature.com/articles/s41588-024-01898-1
8. 8. Ballestri S, Mantovani A, Baldelli E, Lugari S, Maurantonio M, Nascimbeni F, et al. Liver Fibrosis Biomarkers Accurately Exclude Advanced Fibrosis and Are Associated with Higher Cardiovascular Risk Scores in Patients with NAFLD or Viral Chronic Liver Disease. Diagnostics 2021, Vol 11, Page 98 [Internet]. 2021 Jan 9 [cited 2024 Oct 30];11(1):98. Available from: https://www.mdpi.com/2075-4418/11/1/98/htm
9. 9. Ng KH, Wong JHD, Leong SS. Shear wave elastography in chronic kidney disease – the physics and clinical application. Phys Eng Sci Med [Internet]. 2024 Mar 1 [cited 2024 Oct 30];47(1):17–29. Available from: https://link.springer.com/article/10.1007/s13246-023-01358-w
10. 10. Jia X, Song E, Liu Y, Chen J, Wan P, Hu Y, et al. Identification and multicentric validation of soluble CDCP1 as a robust serological biomarker for risk stratification of NASH in obese Chinese. Cell Rep Med [Internet]. 2023 Nov 21 [cited 2024 Oct 30];4(11). Available from: http://www.cell.com/article/S2666379123004342/fulltext
11. 11. Chen S, Jiang T. Preoperative noninvasive assessment for liver fibrosis in hepatocellular carcinoma patients with chronic hepatitis B: Comparison of two-dimensional shear-wave elastography with serum liver fibrosis models. Eur J Radiol. 2020 Dec 1;133:109386.
12. 12. Huang Z, Zhou J, Lu X, Zhang T, Xu S, Jin J, et al. How does liver steatosis affect diagnostic performance of 2D-SWE.SSI: assessment from aspects of steatosis degree and pathological types. Eur Radiol [Internet]. 2021 May 1 [cited 2024 Oct 30];31(5):3207–15. Available from: https://link.springer.com/article/10.1007/s00330-020-07288-5
13. 13. Venkatesh SK, Torbenson MS. Liver fibrosis quantification. Abdominal Radiology 2022 47:3 [Internet]. 2022 Jan 12 [cited 2024 Oct 30];47(3):1032–52. Available from: https://link.springer.com/article/10.1007/s00261-021-03396-y

Original article

The Microbial Profile and Resistance Pattern in Infected Orthopedic Implants Cases of a Tertiary Care Teaching Hospital

Nadeem Anjum[1], Obaid Ur Rahman[2], Junaid Khan[3]

Abstract

Background. The infected orthopedic implant and their antibiotics susceptibility pattern vary regionally and has changed over the time. The detailed knowledge of the frequency of the causative microorganisms and their antibiotics susceptibility are necessary for better therapeutic outcome. The of this study was to identify the antibiotic resistance and sensitivity pattern in various orthopedic infectious cases.
This study was a cross sectional prospective study that took place over a period of 6 months from August 2022 to March 2023 at a tertiary care hospital. The recommended methods of bacteria culture were performed. The data was analyzed by descriptive statics.
Results. A total of 34 patients (25 males and 09 females) with positive cultures of postoperative orthopedic infected implant were included. The most common causative organism of infection was Staphylococcus aureus, 16 patients (47.05%); Methicillin resistant Staphylococcus Aureus, 02 patients (5.88%); Klebsiella species, 03 patients (8.82%); and Enterococcus species,01 patient(2.94%); Escherichia coli, 07 patients(20.58) and Pseudomonas aeruginosa in 05 patients (14.70%). Data also revealed that gram-positive bacteria were isolated in 19 patients (55.888%), while gram-negative microorganisms were found in 15 patients (44.11%). Among gram positive bacteria the antibiotics with the greatest sensitivity were Fucidic acid, Linezolid, Doxycycline, Cefepime, and Meropenem, while for gram-negative bacteria the antibiotics with greater sensitivity were Amikacin, Ertapenem, Imipenem, Linezolid and Doxycycline.

Keywords: Infected Orthopedic Implant, Antibiotics Susceptibility, Antibiotic Resistance, Bacteria culture.

[1] Orthopedics, Benazir Bhutto Hospital, Rawalpindi Medical University
[2] Paediatric surgery, Holy Family Hospital, Rawalpindi
*** Corresponding author**: Dr Nadeem Anjum (Nadeem_anjum22@hotmail.com)
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1. Introduction

Surgical site infection (SSI) was defined as bacterial contamination of the surgical site within 30 days of a surgical intervention or within 1 year after surgery if an implant was used in a patient (1). Postoperative surgical site infections in orthopedics, are considered catastrophic complications that are associated with significant increase in medical expenses, prolonged hospital stay, and can lead to the loss of the operated limb or even death [2,3]. Orthopedic implants are used in these orthopedics surgeries, which leads to increased risk of infections that can be extremely hard to eradicate due to biofilm formation (3). The medical field was revolutionized by the discovery of antibiotics, including improving orthopedic surgical implant outcomes and have transformed human well-being and health for the better. The fatality rates for *Staphylococcus aureus* (*S.aureus*) bacteremia, before the use of antibiotics were very high and most wound infections were treated by amputation; for instance, in World War I 70% of amputations were result of wound infections (4). The bacterial resistance of pathogens to commonly used antibiotics and the multidrug-resistant bacterial emergence are a worldwide challenge that has increased at an alarming rate, which has to both limited and expensive choices of antibiotic [5].

Despite numerous steps and interventions to tackle antibiotic resistance, global trends show no signs of slowing down [6].In the United State alone, at least 2 million infections are caused by antibiotic resistant bacteria and 23,000 deaths per year and resulting in an economic burden of 55–70 billion dollars per year (7). The aim of this study was to assess the prevalence of orthopedic surgical site infections, to isolate the causative micro biota and perform culture & sensitivity to improve the antibiotic regimen for management of such cases.

2.Materials & Methods

Data was collected from patient medical record and history sheet. The patient history and records were thoroughly reviewed for patients who were admitted in the Department of Orthopedic Surgery, Benazir Bhutto Hospital, Rawalpindi which is a 668 bedded tertiary care government teaching hospital of Rawalpindi medical University. Cases included in the study were those with the presence of surgical site infection, after orthopedic surgery and the used of an implant. All the data was collected for a period of six months from August 2022 to March 2023. These cases were revived mainly to identify the causative micro-organism responsible for orthopedic surgical site infection and also the antibiotic sensitivity pattern of these causative organisms which were obtained from microbiology lab by Kirby-Bauer disc diffusion method. All patient data including demographic details, diagnoses, types of surgical intervention, length of hospital stay and implant used were collected from the patient file. As a standard practice prophylactic intravenous antibiotics were given before the induction of anesthesia in the operating room. The data was categorized and analyzed to identify the common causing microorganism in various orthopedic infections and also the antibiotic sensitivity pattern was done. The infection was assessed by the infective organism and sensitivity of the antibiotics according to the culture sensitivity report.

3.Results

A total of 34 out of 1445 patients who had orthopedic or trauma operations in a six month period contracted an implant related infection.

Table 1 Demographic data

Parameters	**Clinical Characteristic**	**n**	**%**
Gender	M/F	25/9	73.5%
Age(Years)	>50 40-49 30-39 20-29 <20	5 4 11 10 4	14.7% 11.7% 32.3% 29.4% 11.7%
Types of Surgery	Elective Emergency	29 5	85.2% 14.7%

The demographic and clinical characteristics are given in Table 1, and the types of surgeries performed are given in Table 2. The incidence of SSI was 2.35%. There were 25 males and 09 females with positive cultures of postoperative orthopedic infected implant.

Table 2 Type of surgery

	n	**%**
Intramedullary nailing Tibia	10	29.4%
Intramedullary nailing Femur	6	17.6%
Plate and screws Tibia	7	20.5%
Plate and screws Femur	3	8.8%
Plate and screws Radis/Ulna	2	5.8%
Others	6	17.6%

A higher rate of infection was seen in patients who underwent plating or intramedullary nailing of fracture Tibia, 29.4% and 20.5% respectively.

Table 3: Resistance pattern of gram-positive bacteria to common antibiotic agents.

Antibiotics	*Staphylococcus aureus* *n*=16	*Enterococcus* spp. *n*=1	MRSA *n*=2
Amoxicillin	6(37.5)	1(100)	-
Ampicillin	5(31.2)	1(100)	-
Penicillin	9(56.2)	1(100)	-
Ceftriaxone	3(18.7)	-	2(100)
Cefepime	2(12.5)	-	1(50)
Cefotaxime	3(18.7)	-	1(50)
Cefradine	5(31.2)	-	2
Ciprofloxacin	10(62.5)	1(100)	1(50)
Levofloxacin	9(56.2)	-	-
Moxifloxacin	7(43.7)	-	-
Gentamicin	5(31.2)	-	-
Amikacin	3(18.7)	-	-
Imipenem	2(12.5)	-	2(100)
Meropenem	-	-	2(100)
Ertapenem	-	-	2(100)
Tigecycline	3(18.7)	-	-
Piperacillin/tazobactam	4(25)	-	2(100)
Colistin sulfate	2(12.5)	-	-
Co-trimoxazole	8(50)	1(100)	2(100)
Minocycline	3(18.7)	-	2(100)
Linezolid	2(12.5)	-	-
Fcidic Acid	-	-	-
Amoxicillin/clavulanic acid	7(43.7)	1(100)	2(100)
Doxycycline	2(12.5)	1(100)	1(50)

Thirty-two patients (94.11%) cultured a single organism,2 patients (5.88%) had 2 infecting organisms. The most common causative organism of infection was Staphylococcus aureus, 16 patients (47.05%); including Methicillin resistant staphylococcus aureus, 02 patients (5.88%); Klebsiella species, 03 patients (8.82%); and Enterococcus species, 01 patient (2.94%); Escherichia coli, 07 patients (20.58%) and Pseudomonas aeruginosa in 05 patients (14.70%).

Table 4. Resistance pattern of gram-negative bacteria to common antibiotic agents

Antibiotics	E.Coli *n*=7	Psedomonas aeruginosa *n*=5	Klebsiella spp *n*=3
Amoxicillin	1(14.2)	2(40)	2(66.6)
Ampicillin	3(42.8)	3(60)	2(66.6)
Penicillin	2(28.5)	3(60)	1(33.3)
Ceftriaxone	3(42.8)	4(80)	2(66.6)
Cefepime	-	3(60)	1(33.3)
Cefotaxime	4(57.1)	2(40)	2(66.6)
Cefradine	4(57.1)	3(60)	2(66.6)
Ciprofloxacin	3(42.8)	3(60)	2(66.6)
Levofloxacin	2(28.5)	2(40)	1(33.3)
Moxifloxacin	2(28.5)	1(20)	1(33.3)
Gentamicin	1(14.2)	2(40)	2(66.6)
Amikacin	1(14.2)	-	2(66.6)
Imipenem	-	1(20)	-
Meropenem	1(14.2)	1(20)	-
Ertapenem	-	-	-
Tigecycline	2(28.5)	1(20)	-
Piperacillin/ tazobactam	3(42.8)	2(40)	1(33.3)
Colistin sulfate	-	-	-
Co-trimoxazole	4(57.1)	3(60)	2(66.6)
Minocycline	1(14.2)	-	-
Linezolid	1(14.2)	1(20)	-
Fcidic Acid	-	-	-
Amoxicillin/ clavulanic acid	4(57.1)	2(40)	2(66.6)
Doxycycline	-	-	-

Data also revealed that gram-positive bacteria were isolated in 19 patients (55.88%), while gram-negative microorganisms were found in 15 patients (44.11%).

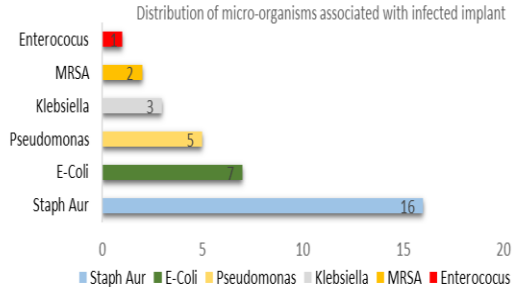


Fig.1 Distribution of micro-organisms associated with infected implant

Among gram positive bacteria the antibiotics with the greatest sensitivity were Fucidic acid, Linezolid, Doxycycline, Cefepime, and Meropenem, while for gram-negative bacteria the antibiotic with greater sensitivity were, Amikacin, Ertapenem, Imipenem, Linezolid and Doxycycline.

4.Discussion

The worldwide incidence of surgical site infections is between 2.6% to 41.9% [8]. In our study the surgical site infections rate was 2.35%, comparable rates were found in our study. Furthermore, the rate of infection was more common in younger patients between 20 to 40 years of age, probably due to high trauma rates associated with road traffic accidents in this age group, and it has been seen that preoperative soft-tissue damage is a leading risk factor for development of surgical site infection [9]. The Tibia with Intramedullary nailing, Plate and screws being the most commonly affected site. The *Staphylococcus Aureus* was the most common bacteria including Methicillin Resistant Staphylococcus Aureus, 16 patients (47.05%) and 02 patients (5.88%) respectively, is comparable with other studies [10]. This finding is in contrast to that reported by Latha et al. where MRSA was the most commonly identified organism in 27.7% of patients [11]. The gram-positive bacteria showed higher resistance to Penicillin, Ciprofloxacin, Levofloxacin, Moxifloxacin, Co-trimoxazole and Amoxicillin/Clavulanic acid. Xie et al. reported that *S. aureus* was resistant to penicillin which is in line with our findings [12]. Shariati et al. showed that *aureus* had higher rates of resistance with vancomycin and tigecycline however, our findings are in contrast with the above-mentioned findings [13].

The tibia is involved more because is commonly hit by bumper in RTA and is lying subcutaneously, making it prone to open fractures. Furthermore, heavy plates like DCP especially in proximal and distal thirds are not well tolerated. Anatomical plates, using minimally invasive periosteal osteosynthesis [MIPO] principles should be used in periarticular region of tibia to prevent further damage to already compromised soft tissue here [14].

Gram negative bacteria E.Coli was second most common cause of infection. Furthermore, gram negative bacteria showed higher resistance to Ceftriaxone, Ampicillin, Co-trimoxazole, Amoxicillin/Clavulanic acid and Gentamicin. Gram negative bacteria have developed a vast variety of mechanisms to counteract the effect of antimicrobials, such as β-lactamase production, minimizing antimicrobial penetration, and alteration of efflux pump and target site [15].

Antibiotic resistance is becoming a major global issue that has led to the 2.8millions patients with antibiotic-resistant infections and 35000 deaths in the United States alone each year. The emergence of this issue has led the Centers for Disease Control and Prevention (CDC) to utilize a list used as a reference in order to identify these pathogens and take appropriate measures to prevent the antimicrobial resistance [16]. The financial burden of surgical site infections is a worldwide huge challenge for the healthcare profession. In the US, it is estimated the third most expensive healthcare-related infection, an estimation of 20785 US dollars to treat it [17].

Our study showed that E. Coli bacteria is increasing their presence in the orthopedic and trauma wards, and this needs to be seen seriously. In addition, the presence of infection before operation is an important reason for early infection after operation; Since, some patients with open fractures who were operated were also included in our study, and probably the cause of these infection thus, it is necessary to screen or treat the occult infection to minimize the gram negative infection. Furthermore, most of the microorganism were sensitive with the Fucidic acid**,** Doxycycline and Linezolid, probably due to less commonly used antibiotics in routine practice and their use in routine practice for patient with infected implant to get better outcome of the patients. This is of prime importance due to the fact that there is no proper regulating system concerned with the proper use and dispensing of antibiotics in Pakistan.

Doxycycline is economical, has less side effects, easy to administer and has acceptable results as showed in our findings.

5. Conclusion

Our study revealed that the postoperative infection rate at Tertiary care hospital in Pakistan is comparable with that of worldwide post-operative orthopedic infection. Furthermore, *S. aureus* was the most common isolated bacteria. We recommend that the antibiotic agents should be carefully selected and need to strictly monitor according to the drug sensitivity and drug resistance patterns to minimize the antibiotic resistance.

6. References

[1]. Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG.CDC definitions of nosocomial surgical site infections, 1992: a modification of CDC definitions of surgical wound infections. Infect Control Hosp Epidemiol 1992;13(10):606–608.

[2] C. Edwards, A. Counsell, C. Boulton, and C. G. Moran, "Early infection after hip fracture surgery," *Journal of Bone and Joint Surgery British Volume*, vol. 90-B, no. 6, pp. 770–777, 2008.

[3] M. S. Khan, R. Saif ur, M. A. Ali, B. Sultan, and S. Sultan,"Infection in orthopedic implant surgery, its risk factors and outcome," *Journal of Ayub Medical College, Abbottabad*, vol. 20, no. 1, pp. 23–25, 2008.

[4]. Hirsch EF. 2008. The treatment of infected wounds, Alexis Carrel's contribution to the care of wounded soldiers during World War I. J Trauma 64:S209–S210.

[5] M. Akova, "Epidemiology of antimicrobial resistance in bloodstream infections," *Virulence*, vol. 7, no. 3, pp. 252–266, 2016.

[6] World Health Organization, *Global Antimicrobial Resistance and Use Surveillance System (GLASS) Report*, World Health Organization, Geneva, Switzerland, 2021

[7] F. Tom, *Antibiotic Resistance rates in the United States*, DIANE Publishing Company, Collingdale, PA, USA, 2013.

[8] Lilani SP, Jangale N, Chowdhary A, Daver GB. Surgical site infection in clean and clean-contaminated cases. Indian J Med Microbiol 2005;23(4):249–252

[9] Bachoura A, Guitton TG, Smith RM, Vrahas MS, Zurakowski D, Ring D. Infirmity and injury complexity are risk factors for surgical-site infection after operative fracture care. Clin Orthop Relat Res 2011;469(9):2621–2630

[10] Elifranji ZO, Haddad B, Salameh A, Alzubaidi S, Yousef N, Al Nawaiseh M, Alkhatib A, Aburumman R, Karam AM, Azzam MI, Alshrouf MA. Microbiological Profile and Drug Resistance Analysis of Postoperative Infections following Orthopedic Surgery: A 5-Year Retrospective Review. Adv Orthop. 2022 Jul

[11] T. Latha, B. Anil, H. Manjunatha et al., "MRSA: the leading pathogen of orthopedic infection in a tertiary care

hospital, South India," African Health Sciences, vol. 19, no. 1, p. 1393, 2019
[12] B.-L. Xie, R.-S. Guo, X.-W. Yang et al., "Epidemiology and drug resistance analysis of mixed infection in orthopedic surgical sites," Surgical Infections, vol. 21, no. 5, pp. 465–471, 2020.
[13] A. Shariati, M. Dadashi, M. T. Moghadam, A. Van Belkum,S. Yaslianifard, and D. Darban-Sarokhalil, "Global prevalenceand distribution of vancomycin resistant, vancomycin intermediate and heterogeneously vancomycin intermediate Staphylococcus aureus clinical isolates: a systematic review and meta-analysis," Scientific Reports, vol. 10, no. 1, 2020
[14] Blick SS, Brumback RJ, Lakatos R et al (1989) Early bone grafting of high-energy tibial fractures. Clin Orthop Relat Res 240:21–41
[15] C. M. Oliphant and K. Eroschenko, "Antibiotic resistance, part 2: gram-negative pathogens," _e Journal for Nurse Practitioners, vol. 11, no. 1, pp. 79–86, 2015
[16] Centers for Disease Control and Prevention, Antibiotic Resistance rates in the United States, CDC, Atlanta, GA, USA, 2019.
[17] M. Monahan, S. Jowett, T. Pinkney et al., "Surgical site infection and costs in low- and middle-income countries: a systematic review of the economic burden," PLoS One, vol. 15, no. 6, Article ID e0232960, 2020.

Identifying leadership skill gaps in obstetrics and gynecology residents: Mixed-method study

Dr Amina Najiullah[1], Dr Sadia Khan, Dr Nighat Naheed, Dr Asima khan

ABSTRACT

Introduction: Leadership development is a critical aspect of residency training, particularly for physicians working in high-pressure environments. This study aims to assess residents' leadership competencies, identify gaps in training, and explore barriers to leadership skill development.

Methods and material: A cross-sectional survey was conducted among 30 gynecology and obstetrics residents at Benazir Bhutto Hospital. Data collection included a structured questionnaire with Likert-scale, multiple-choice, and open-ended questions, as well as semi-structured interviews with a resident and a program director.

Results: Participants reported low-to-moderate confidence in leadership abilities, with 70% rating their skills as "average." Key gaps included the lack of structured workshops (70%) and mentorship programs (63.3%). Time constraints (80%) and insufficient resources (63.3%) were the main barriers. Residents favored workshops (86.7%) and simulation exercises (70%) for leadership training.

Conclusion: The findings highlight significant gaps and barriers in leadership development during residency. Improved training methods, such as structured workshops and mentorship programs, are recommended to enhance leadership competencies among medical resident**s.**

Keywords: Leadership development, residency training, Gynecology and Obstetrics, leadership competencies, curriculum Integration

Correspondence: aminanajiullah@outlook, Received 6 Feb 2025; Accepted 11 March 2025

Introduction:

Leadership entails directing, motivating, and enabling individuals to achieve a shared objective. Within the medical field, physicians serve as essential collaborative leaders, especially in high-stakes scenarios where quick judgment and seamless teamwork are vital for ensuring the best patient outcomes.[1] The Medical Leadership Competency Framework emphasizes leadership as a key competency, defining it as a physician's ability to actively participate in planning, delivering, and transforming healthcare services.[2] Likewise, the Pakistan Medical and Dental Council (PMDC) identifies leadership as one of the fundamental skills required for a medical graduate. Despite its recognized importance, leadership education is often overlooked in medical curricula, with minimal structured training or assessment.[3] Effective clinical leadership is essential for managing diverse healthcare teams, improving patient outcomes, and reducing mortality and morbidity rates. In Pakistan, maternal mortality remains a significant concern, one of the highest rates in South Asia with an MMR of 186 deaths per 100,000 livebirths in 2019, a 32% increase from 2017 (140/100,000 livebirths).[4][5] This study highlights the growing emphasis within the medical profession and among policy makers that, alongside clinical expertise, all doctors must develop management and leadership competencies to ensure they practice effectively and safely.[6][7] Research indicates that physicians trained in leadership skills contribute to better clinical outcomes.[8] Despite this, structured leadership training programs for medical residents remain limited, highlighting the need for formalized education in this critical area.

In high-pressure medical emergencies, residents must cultivate strong leadership skills to effectively manage critical situations, hands-on experience in real-life emergencies helps build the confidence and decision-making abilities necessary for effective leadership.[9] This is particularly crucial for ObGyn residents, as their role directly impacts both maternal

and neonatal outcomes, as well as the overall efficiency of healthcare teams. Obstetric and gynecologic emergencies, such as postpartum hemorrhage, uterine rupture, and eclampsia, require rapid decision-making, clear communication, and coordinated teamwork to prevent severe complications or fatalities.[10] Beyond clinical expertise, leadership in obstetrics and gynecology also involves effective task delegation, fostering collaboration, and ensuring seamless communication among team members.

Postgraduate trainees serve as the primary responders in managing obstetric emergencies in tertiary care hospitals across Pakistan. In public-sector hospitals, postgraduate residents often work under challenging and unpredictable conditions, dealing with emergencies despite limited resources and staffing constraints. A qualitative study conducted in Pakistan highlighted the significant challenges ObGyn residents face, including resource limitations and difficulties in teamwork when managing critical cases. [11] Strengthening their leadership capabilities will not only enhance their ability to handle critical situations but also prepare them for greater responsibilities within the healthcare system.

Recognizing these challenges faced by ObGyn residents, Benazir Bhutto Hospital (BBH) initiated a study to explore residents' perspectives on leadership. The aim was to understand how they define leadership, its significance in their role, and whether their training adequately prepares them for leadership responsibilities. Additionally, the study sought to identify existing gaps in leadership development and explore potential improvements in training methods. By gathering insights from residents and program directors, this research aimed to highlight the need for a structured leadership training framework tailored to the demands of obstetrics and gynecology.

Methodology

Residents from Benazir Bhutto Hospital, a tertiary care hospital, including 30 residents from third year to final year FCPS and MS training programs participated in a cross-sectional survey for 3 weeks. Since this was an assessment-based survey, we included postgraduate trainees both in leadership roles, fourth-year trainees, and trainees from first year to third year; to assess whether they were being trained for the role they were inevitably stepping foot into. Data was collected using a structured, anonymous, self-administered questionnaire using a validated leadership competency framework to assess the participant's perceived skills and satisfaction with existing training. Ethical approval was obtained from the Institutional Review Board (IRB), and informed consent was secured from all participating residents. Semi-structured interviews were also conducted with residents and consultants. The survey conducted at Benazir Bhutto Hospital focused on evaluating leadership training among ObGyn residents by examining both Independent Variables (Factors Affecting Leadership Training) and Dependent Variables (Outcomes Measured in the Study).

The Independent Variables explored in the study included existing leadership training, institutional challenges, training methods, and program directors' perspectives on leadership development. The survey sought to examine key factors such as structured programs, mentorship opportunities, and skill-building exercises to determine their availability and effectiveness. Additionally, it aimed to assess institutional constraints like time limitations, resource availability, and residents' preferences for training methods.

The Dependent Variables examined in the study focused on residents' self-assessed leadership competencies, self-confidence, Communication skills, satisfaction with current training programs, and barriers to leadership development. The survey explored how residents perceive leadership, whether they feel adequately trained, and what improvements they believe are necessary to enhance their leadership education. By gathering these insights, the study intended to assess the effectiveness of current leadership training and identify areas for improvement in ObGyn residency programs.

Development of the questionnaire

In this study, the Leadership Practices Inventory (LPI)[12] and 360-degree Feedback Tools [13]were integrated to assess both the independent and dependent variables, ensuring validity and reliability. The LPI (Leadership Practices Inventory) was utilized to design a self-assessment section for participants, focusing on perceived leadership competency and satisfaction with existing training programs. It included components such as rating scales for leadership behaviors (e.g., mentoring effectiveness or workshop impact) and open-ended

questions about training preferences. The 360-degree Feedback Tools were applied to gather multi-source perspectives on institutional challenges, barriers to leadership development, and gaps in structured programs. This involved designing sections where feedback was collected from program directors, mentors, and residents using structured scales to measure variables such as institutional barriers, acknowledgment of leadership gaps, and satisfaction with available training. Both tools incorporated validated scales and structured formats to ensure reliability, while pilot testing was conducted to refine the questionnaire components further. This approach provided a comprehensive and triangulated assessment of the variables, adhering to rigorous standards.

Data Analysis

Data analysis was done using SPSS 26. The collected data was analyzed using a combination of statistical methods to ensure comprehensive insights into the study variables. Descriptive statistics were employed to summarize demographic information and the distribution of responses across self-perceived leadership competencies and training satisfaction. Pearson's correlation analysis was used to explore relationships between key variables, such as institutional barriers and perceived gaps in leadership training. Comparative analysis, including Independent Samples T-Tests and One-Way ANOVA, identified significant differences in leadership competencies and training gaps across demographic groups, such as year of residency or training program. Chi-square tests were utilized to examine associations between categorical variables, like the availability of mentorship programs and satisfaction with training. Exploratory Factor Analysis (EFA) was conducted to identify underlying factors in Likert scale items, grouping responses into latent constructs such as institutional challenges and training preferences.

Qualitative Analysis Process: Audio recordings from interviews with 6 trainees and 4 consultants were transcribed verbatim, and researchers repeatedly reviewed transcripts to identify preliminary patterns. Using inductive thematic analysis (Braun & Clarke, 2006), initial codes were generated through open coding and clustered into broader themes and sub-themes. Themes were iteratively refined for coherence and alignment with research objectives, with coding discrepancies resolved through team consensus. To ensure trustworthiness, triangulation (cross-validation with survey data), reflexivity (researcher journals), and member checking (participant validation) were employed. NVivo 12 facilitated data organization and visualization of relationships. Final themes were contextualized within the leadership competency framework and aligned with study variables.

Results

Demographic data of the 30 residents surveyed showed, 96.7% were female, with the majority aged between 26 and 30 years. Around 60% of participants were married, and half had 1–2 years of clinical experience before residency. The descriptive analysis of the study data revealed several important trends among the participants. Leadership competencies were self-rated as "average" by 70% of respondents, with the mean confidence score at 3.2 (SD = 0.9). Communication skills received the highest mean rating (3.8, SD = 0.6), while task delegation skills were rated lowest (2.9, SD = 0.7). Dissatisfaction with existing leadership training was evident, with 60% of participants expressing dissatisfaction, and only 23.3% reporting participation in leadership-specific programs. Structured workshops (70%) and mentorship programs (63.3%) emerged as the most significant gaps in leadership training.

Table 1: Demographic characteristics

Variable	Category	%	Frequency (n=30)
Age	26-30 years	60%	18
	31-33 years	40%	12
Gender	Female	96.7%	29
	Male	3.3%	1
Marital status	Married	60%	18
	unmarried	40%	12
Clinical experience	<1years	30%	9
	1-2 years	50%	15
	>3 years	20%	6

Qualitative Findings from Interviews

Thematic analysis of interviews with 6 trainees and 4 consultants revealed four overarching themes, contextualizing the quantitative findings and offering deeper insights into gaps and opportunities in leadership training.

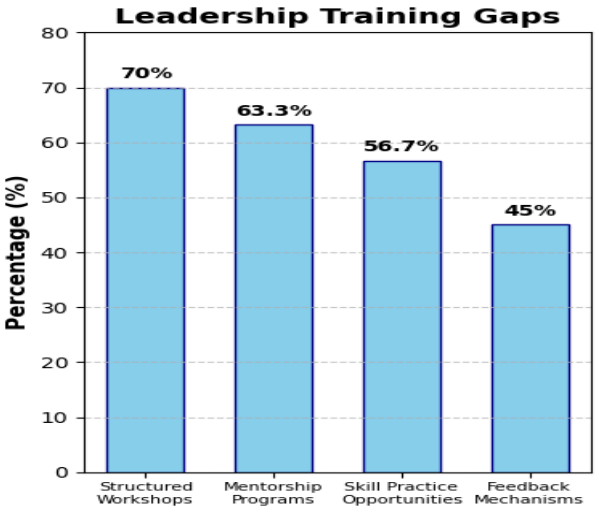
Institutional Barriers to Leadership Development emerged as a dominant theme, with subthemes highlighting time constraints, resource limitations, and lack of structured feedback. One resident (PGY-4) described being "thrown into the deep end" during emergencies without formal training or post-event feedback, citing a mismanaged postpartum hemorrhage case where "no one sat down to discuss what went wrong." A consultant echoed this, noting the hospital's prioritization of clinical duties over leadership development: "Residents work 80-hour weeks—where's the time for workshops? Budgets are tight, and leadership programs are seen as 'non-essential.'"

Gaps in Existing Training Methods were underscored by subthemes such as the absence of mentorship and theoretical vs. practical training. A PGY-3 resident criticized the reliance on a single teamwork lecture as inadequate, advocating for simulations to practice crisis leadership: "Mentorship? My consultant is brilliant clinically, but they've never discussed leadership strategies with me." A consultant acknowledged systemic shortcomings: "*Without* structured mentorship, residents don't learn to delegate tasks or communicate under pressure."

Leadership Exposure in Emergencies revealed how residents learn leadership ad-hoc through crises. A PGY-2 resident recounted coordinating a maternal collapse in the gynae emergency: "It was terrifying but eye-opening. I learned more in that one night than in months of lectures." However, a consultant cautioned that such reactive learning leaves residents unprepared for high-stakes decisions, recalling a trainee who "froze during a neonatal resuscitation" due to inadequate simulation practice. As for correlation analysis the relationships between key variables such as training satisfaction, perceived leadership competency, and institutional barriers were assessed.

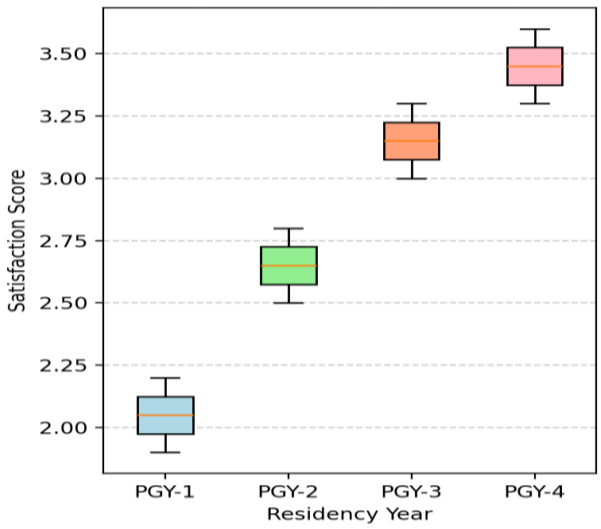
A significant positive correlation was observed between satisfaction with leadership training and perceived leadership competency ($r = 0.48$, $p < 0.01$), indicating that participants who were more satisfied with existing training rated their leadership skills more highly. Conversely, institutional barriers such as time constraints showed a strong negative correlation with training satisfaction ($r = -0.62$, $p < 0.01$), suggesting that these barriers significantly impacted satisfaction

Fig1: Participants identifying specific gaps



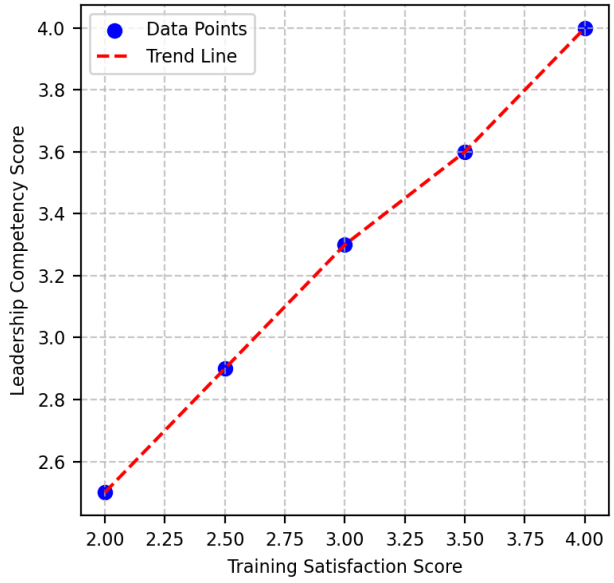
levels. Preferences for workshops and simulation exercises also had a positive correlation with competency improvements ($r = 0.52$, $p < 0.01$ and $r = 0.47$, $p < 0.05$, respectively). Comparisons were made across demographic groups using Independent Samples T-Test and One-Way ANOVA. Married residents rated their confidence in task delegation significantly lower (mean = 3.0, SD = 0.8) than unmarried residents (mean = 3.6, SD = 0.7), $t(28) = -2.1$, $p < 0.05$. When examining differences by year of residency, PGY-1 residents reported significantly lower satisfaction with leadership training (mean = 2.2, SD = 0.7) compared to PGY-4 residents (mean = 3.4, SD = 0.5), $F(3, 26) = 4.6$, $p < 0.01$. These findings highlight variations in satisfaction and competency across different demographic and residency groups.

Figure 2: Training satisfaction by residency



Chi-Square analysis was used to examine the associations between categorical variables such as mentorship availability and training satisfaction. A significant association was found between access to mentorship programs and satisfaction with leadership training ($\chi^2 = 9.8$, $p < 0.01$). Residents who had access to mentorship programs were substantially more likely to express satisfaction (74%) compared to those without mentorship access (35%). Additionally, the presence of structured workshops was significantly associated with perceptions of leadership competency ($\chi^2 = 7.2$, $p < 0.05$).

Fig 3: Training satisfaction VS competency



Exploratory Factor Analysis (EFA) was conducted to group Likert-scale items into latent constructs. Two key factors emerged:

1. Institutional Challenges (eigenvalue = 2.9): This factor included items such as time constraints, resource limitations, and lack of structured programs, with high loadings (e.g., time constraints = 0.78, resource limitations = 0.75).
2. Training Opportunities (eigenvalue = 2.4): This factor encompassed items related to mentorship programs, simulation exercises, and workshops, with strong loadings (e.g., mentorship programs = 0.72, workshops = 0.74).

The total variance explained by these two factors was 58.5%, demonstrating the underlying dimensions of leadership training and barriers. The remaining 41.5% of variance may be influenced by unique, unmeasured individual and contextual factors. These include personal attributes like learning style and previous experiences, external influences such as organizational culture and available resources, and even random measurement errors. Additionally, variable-specific nuances and interactions not captured by the two main factors can also contribute to the unexplained variance

Table2: KeyFindings and Trends

Category	Key Findings	Statistical Significance/ Details
Demographics	- 96.7% female; 60% aged 26–30; 60% married; 50% with 1–2 years of experience.	*N/A (descriptive statistics)*
Leadership Competencies	-Self-confidence: Mean = 3.2 (SD = 0.9). -Communication skills rated highest (3.8), task delegation lowest (2.9). -70% rated competencies as "average."	*SD values reflect variability.*
Training Satisfaction	-60% dissatisfied; 23.3% participated in leadership programs.	*Mean satisfaction = 2.5 (SD = 1.0).*
Training Gaps	-Structured workshops (70%) and mentorship (63.3%) identified as major gaps.	*Top barriers: time constraints (80%), resources (63.3%).*
Preferred Training Methods	-Workshops (86.7%), simulation exercises (70%), mentorship (66.7%).	*Strong preference for interactive methods.*
Correlations	-Satisfaction ↔ Competency: r = 0.48 ($p < 0.01$).	*Significant relationships.*

	-Barriers ↔ Satisfaction: r = -0.62 ($p < 0.01$). - Workshops ↔ Competency: r = 0.52 ($p < 0.01$).	
Group Comparisons	- Married residents: Lower confidence (mean = 3.0 vs. 3.6, unmarried). - PGY-1 satisfaction lower (2.2) vs. PGY-4 (3.4).	$t(28) = -2.1$, $p < 0.05$; $F(3,26) = 4.6$, $p < 0.01$.
Mentorship Impact	- Mentorship access linked to higher satisfaction (74% vs. 35% without).	$\chi^2 = 9.8$, $p < 0.01$.
Factor Analysis	-Factor 1: Institutional challenges (eigenvalue = 2.9).- **Factor 2**: Training opportunities (eigenvalue = 2.4).	Total variance explained = 58.5%.

Discussion

This study underscores the critical role of leadership development in medical residency programs, particularly within high-pressure specialties like obstetrics and gynecology, where effective leadership directly impacts maternal and neonatal outcomes.

Our findings align with global evidence emphasizing that leadership competencies—such as communication, decision-making, and resource management—are vital for optimizing teamwork and patient safety. However, the self-rated "average" leadership competency among participants (mean = 3.2) and the pronounced dissatisfaction with existing training (60%) highlight systemic gaps in current medical education frameworks. These gaps are particularly concerning in Pakistan's resource-constrained healthcare system, where maternal mortality rates remain alarmingly high.

The disconnect between recognized leadership importance and practical training is evident. While international studies have explored attributes like communication and emotional intelligence, our results reveal unique contextual challenges, such as time constraints (reported by 80%) and resource scarcity (63.3%), which compound the difficulties faced by residents. These institutional barriers showed a strong negative correlation with training satisfaction ($r = -0.62$, $p < 0.01$), underscoring how systemic inefficiencies hinder leadership development.

Participants unanimously acknowledged that leading teams enhanced their clinical, communication, and managerial skills—a finding consistent with studies linking leadership training to improved patient outcomes. However, the low self-ratings in task delegation (mean = 2.9) and the disparity between married and unmarried residents in delegation confidence ($t(28) = -2.1$, $p < 0.05$) suggest nuanced challenges requiring tailored interventions. The strong preference for structured workshops (86.7%) and simulation exercises (70%) aligns with evidence that experiential learning bridges theoretical knowledge and practical application. Furthermore, the significant association between mentorship access and training satisfaction ($\chi^2 = 9.8$, $p < 0.01$) highlights mentorship's role in reinforcing leadership growth—a component often overlooked in existing programs.

Our regression model (Adjusted $R^2 = 0.58$) identified training satisfaction ($\beta = 0.55$, $p < 0.01$) and simulation-based learning ($\beta = 0.32$, $p < 0.05$) as key predictors of leadership competency, reinforcing the need for multimodal training frameworks. The factor analysis further distilled these insights, identifying "Institutional Challenges" (e.g., time/resource constraints) and "Training Opportunities" (e.g., workshops, mentorship) as critical dimensions shaping leadership development. These findings resonate with PMDC's emphasis on leadership as a core medical competency yet expose the inadequacy of current curricula in addressing these domains.

Implications for Practice and Policy

To foster leadership development within residency programs, institutions should implement structured, continuous training programs that combine hands-on workshops, scenario-based simulations, and guided mentorship—elements strongly endorsed by participants as pivotal for skill enhancement. Concurrently, systemic changes—such as optimizing workloads and equitably allocating resources—are imperative to dismantle institutional obstacles. In Pakistan's strained healthcare environment, such reforms could alleviate burnout among providers and elevate the quality of care, especially in critical-care

environments such as emergency departments and operating theaters

Strength and limitation.

This study's strengths lie in its mixed-methods design, combining quantitative surveys and qualitative interviews to holistically assess leadership gaps, supported by validated tools like the Leadership Practices Inventory (LPI) and 360-degree feedback for reliability. Advanced statistical analyses (e.g., regression, factor analysis) identified key predictors of competency and systemic barriers, while its focus on Pakistan's resource-limited healthcare system offers context-specific insights. Practical recommendations, such as workshops and mentorship, align with trainee preferences, and ethical adherence (IRB approval, informed consent) bolsters credibility.

Limitations include a small, single-institution sample (*n=30*) and an overrepresentation of females (96.7%), limiting generalizability. Self-reported data risks bias and the cross-sectional design precludes causal or longitudinal conclusions. Cultural specificity and unexplained variance (41.5% in factor analysis) highlight unmeasured variables. Potential non-response bias further limits sample representativeness. Despite these constraints, the study provides actionable insights for leadership training reforms in low-resource settings.

Conclusion

This study underscores the urgent need to bridge leadership training gaps in obstetrics and gynecology residency programs, particularly in resource-constrained settings like Pakistan. Despite recognizing leadership as critical for maternal care, residents reported low confidence in skills like task delegation and highlighted systemic barriers—time constraints, scarce resources, and insufficient structured training. The disconnect between institutional capacity and residents' needs, coupled with a strong preference for workshops, simulations, and mentorship, calls for immediate curriculum reforms. Integrating these evidence-based, experiential methods into residency training can empower future physicians to navigate high-pressure environments, improve teamwork, and ultimately reduce maternal mortality. Addressing these gaps is not merely an educational priority but a public health imperative to strengthen healthcare systems and save lives.

References

1. Välimäki, M., Hu, S., Lantta, T. *et al.* The impact of evidence-based nursing leadership in healthcare settings: a mixed methods systematic review. *BMC Nurs* 23, 452 (2024). https://doi.org/10.1186/s12912-024-02096-4
2. The Medical Leadership Competency Framework: https://www.nwpgmd.nhs.uk/content/national-context-medical-leadership-competency-framework
3. Pakistan Medical Commission. National Medical & Dental Undergraduate Curriculum. Islamabad: PMC; 2021 https://dhsprogram.com/pubs/pdf/FR354/FR354.pdf
4. National Institute of population studies. https://nips.org.pk/publication/pakistan-maternal-mortality-survey-pmms-2019-main-report
5. Shaeen SK, Tharwani ZH, Bilal W, Islam Z, Essar MY. Maternal mortality in Pakistan: Challenges, efforts, and recommendations. Ann Med Surg (Lond). 2022 Aug 18;81:104380. doi: 10.1016/j.amsu.2022.104380. PMID: 36042926; PMCID: PMC9420499.
6. Warren OJ, Carnall R. Medical leadership: why it's important, what is required, and how we develop it. Postgrad Med J. 2011 Jan;87(1023):27-32. doi: 10.1136/pgmj.2009.093807. Epub 2010 Oct 10. PMID: 20935344.
7. Berghout, M.A., Oldenhof, L., van der Scheer, W.K. and Hilders, C.G.J.M. (2020), From context to contexting: professional identity un/doing in a medical leadership development programme. Sociol Health Illn, 42: 359-378. https://doi.org/10.1111/1467-9566.13007
8. Kirkpatrick, I., Altanlar, A., & Veronesi, G. (2023). Doctors in leadership roles: consequences for quality and safety. *Public Money & Management*, *44*(6), 515–522. https://doi.org/10.1080/09540962.2023.2217344
9. Abrams, Z. (2020, July 1). Leadership in times of crisis. *Monitor on Psychology*, *51*(5). https://www.apa.org/monitor/2020/07/leadership-crisis
10. A. Paxton, D. Maine, L. Freedman, D. Fry, S. Lobis, The evidence for emergency obstetric care, International Journal of Gynecology & Obstetrics, Volume 88, Issue 2, 2005, Pages 181-193, ISSN 0020-7292, https://doi.org/10.1016/j.ijgo.2004.11.026.
11. Younas S, Khanum S, Qamar AH. Decision making among residents in training of obstetrics and gynecology: A qualitative exploration in Pakistani context. PLoS One. 2023 Nov 2;18(11):e0287592. doi: 10.1371/journal. pone.0287592. PMID: 37917601; PMCID: PMC10621809.
12. Posner, Barry. (2016). Investigating the Reliability and Validity of the Leadership Practices Inventory. Administrative Sciences. 6. 17. 10.3390/admsci6040017.
13. Emam, S.M., Fakhry, S.F. & Abdrabou, H.M. Leaders development program by 360 degree feedback: reflection on head nurses' leadership practices. *BMC Nurs* 23, 772 (2024). https://doi.org/10.1186/s12912-024-02395-w
14. Carr, T., Rosas, S., Noble, C. *et al.* Strengthening healthcare providers' leadership capabilities, interprofessional collaboration, and systems thinking: a conceptualization of the Clinical Scholars program impact. *BMC Med Educ* 24, 1277 (2024). https://doi.org/10.1186/s 12909-024-06240-1

Joint Collaborative Academic Program for Gaza Medical Students at Rawalpindi Medical University

***Farah Pervaiz*[1]**

[1] Editor of Resident Journal of Rawalpindi Medical University, Rawalpindi, Pakistan.

Background:

The ongoing conflict in Gaza disrupted the education of Al-Azhar University medical students, necessitating an academic collaboration between Rawalpindi Medical University (RMU) and Al-Azhar University to ensure their continued medical training. RMU provided a structured one-year academic integration program to facilitate their adaptation and academic progress. Medical examination psychological examination and previous academic assessment was carried out upon integration into RMU. One-week foundation module of basics sciences was conducted after initial assessments of basic sciences

Program objectives

Enhanced academic skills	•Ensure seamless transition of Al Azhar University students into RMU's academic and clinical system
Skill development	•Foster the development of clinical,academic and professional competencies
Psychological support	•Address the psychological and emotional needs of Al Azhar University students

Program Structure:

- The program includes lectures, clinical clerkships, research sessions, and mentorship to ensure a smooth transition.
- They have Internal Medicine and Surgery as major need and Cardiology, Orthopedics, urology Medical imaging, Dermatology, Community Medicine, ENT, Health Economics, Gynecology and Obstetrics, Vascular and Cardiothoracic Surgery, Pediatric Surgery, Endocrinology and Metabolic Disorders, Forensic Medicine, Neurology, Neurosurgery Psychiatry and Behavioral Sciences
- Holy Family Hospital Rawalpindi is declared as hospital for clinical rotations in clinical sciences

Student Demographics: Initially there were 44 students whose names arrived for RMU. They were issued RMU registration numbers. However, 34 students actually joined RMU. There are currently under academic training

Category	Details
Total Students	38
Gender distribution	Male 17 Female 19
Age range	21-27 years
Year of study	4th year
RMU registration numbers	Issued

Committees & Faculty Involvement:

Patron-in-Chief	Professor Dr Muhammad Umar Vice Chancellor RMU
Guidance	Professor Jahngair Sarwar Khan Principal RMU
Academic oversight Professor in charge	Professor Dr Nasir Khan Dean Diagnostics
Coordinator	Dr Mehwish Riaz Assistant Professor Community Medicine
DME coordinator	Dr Omaima Asif

Summary plan for Al Azhar -RMU students

Academic year	Total weeks	Teaching weeks	Preparatory leave weeks	Examination leaves	End-of-year leaves	Dates of year 4 (including examination and prep leaves)
4th year	41	31 weeks	4 weeks	4 weeks	2 weeks	11/11/2024 to 13/9/2025
5th year	42	33 weeks	3 weeks	4 weeks	2 weeks	15/9/2025 to 12/7/2026
6th year	27	20 weeks	3 weeks	4 weeks		13/7/2026 to 24/1/2027

4th-year Academic Calendar

Courses		Start date	End date	Weeks per subject	Assessments	Total weeks
Community Medicine ENT		11/11/24	7/12/24	2 2	End-of-course End-of-year	4
Medicine		9/12/24	15/2/25	10	End-of-course End-of-year	8
Medicine & Allied	Cardiology Radiology Dermatology	17/2/25 3/3/25 17/3/25	28/2/25 15/3/25 21/3/2025	1 2 2	End-of-course End-of-year	5
Ramadan and Eid ul Fitar Holidays		24/3/25	2/4/25			
Surgery		3/4/25	31/5/25	8	End-of-course End-of-year	8
Surgery & Allied	Orthopedics Urology Eid Ul Adha Break (6/6/25 to 9/6/25)	3/6/25 17/6/25	14/6/25 29/6/25	2 2	End-of-course End-of-year	4

Summer Course Health Economics Family Medicine	30/6/25	12/7/25	2	End-of-course End-of-year	2
Exam Preparation	14/7/25	2/8/25	4	----	4
Annual Professional Assessment	4/8/25	30/8/25	4	Written (to be conducted by Al Azhar University) OSCE (static & Dynamic to be conducted by RMU)	4
End of year break	31/8/2025	16 /9/2025	2		
Total weeks					41

5th year Academic Calendar

Courses	Start date	End date	Weeks per subject	Assessments	Total weeks
Gynae/Obstetrics	15/9/25	24/10/25	6	End-of-course End-of-year	6
Pediatrics	27/10/25	5/12/25	6	End-of-course End-of-year	6
Psychiatry & Behavior Disorders	8/12/25	2/1/26	4	End-of-course End-of-year	4
Neurology	5/1/26	23/1/26	3	End-of-course End-of-year	3
Neurosurgery	26/1/26	6/2/25	2	End-of-course End-of-year	2
Forensic Medicine & Toxicology	9/2/26	20/2/26	2	End-of-course End-of-year	2
Plastic surgery	23/3/26	6/3/26	2	End-of-course End-of-year	2
Vascular & Cardiothoracic Surgery	9/3/26	20/3/26	2	End-of-course End-of-year	2
Hematology & Oncology	23/2/26	3/4/26	2	End-of-course End-of-year	2
Endocrinology & Metabolic Disorders	6/4/26	17/4/26	2	End-of-course End-of-year	2
Ophthalmology	20/4/26	1/5/26	2	End-of-year End-of-course	2
Exam Preparation Time	4/5/26	29/5/26	4	--	3
Annual Professional Exam	1/6/26	26/6/26	4	Written (to be conducted by Al Azhar University) OSCE (static & Dynamic to be conducted by RMU)	4
End of year leaves	29/6/25	12/7/26	2		
Total weeks					40

6th year Academic Calendar

Courses	Start date	End date	Weeks per subject	Assessments	Total weeks
Internal Medicine	13/7/26	7/8/26	4	End-of- course End-of-year	4
General Surgery	10/8/26	4/9/26	4	End-of-course End-of-year	4
Gynae/Obstetrics	7/9/26	2/10/26	4	End-of-course End-of-year	4
Pediatrics	5/10/26	30/10/26	4	End-of-course End-of-year	4
Anesthesia	2/11/26	13/11/26	2	End-of-course End-of-year	2
Emergency	16/11/26	27/11/26	2	End-of-course End-of-year	2
Exam Preparation	30/11/26	25/12/26	4	----	2
Annual Professional Assessment	26/12/26	24/1/27	4	Written (to be conducted by Al Azhar University) OSCE (static & Dynamic to be conducted by RMU)	4
Total weeks					26

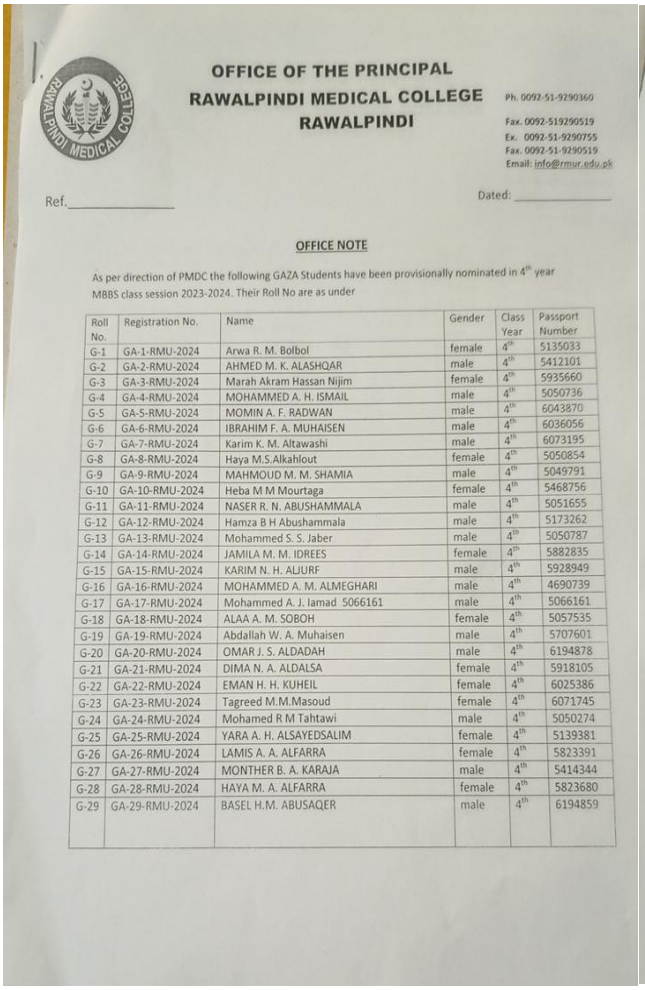
Extracurricular activities

The extracurricular activities are arranged for Al Azhar University students joining Rawalpindi Medical University (RMU) every Saturday to support their overall well-being, offering a break from their academic responsibilities while encouraging physical health and teamwork. Joint extracurricular activities are planned for students from Gaza who have joined PIMS, FUSH, and STMU. The objectives of these activities are

- Physical Fitness: Encourage students to engage in regular physical exercise.
- Team Building: Foster teamwork and collaboration through group sports.
- Stress Relief: Provide an opportunity for students to unwind and reduce academic stress.
- Cultural Exchange: Encourage interaction among students from different backgrounds, fostering a sense of community.

Outcome & Conclusion:

The RMU-Al Azhar collaboration successfully ensured academic continuity for displaced Gaza students, integrating them into RMU's curriculum while providing essential psychological and social support. The initiative demonstrates the power of global academic solidarity in times of crisis and sets a model for future educational collaborations.



OFFICE OF THE PRINCIPAL
RAWALPINDI MEDICAL COLLEGE
RAWALPINDI

Ph. 0092-51-9290360
Fax. 0092-519290519
Ex. 0092-51-9290755
Fax. 0092-51-9290519
Email: info@rmur.edu.pk

Ref._____ Dated: _____

OFFICE NOTE

As per direction of PMDC the following GAZA Students have been provisionally nominated in 4th year MBBS class session 2023-2024. Their Roll No are as under

Roll No.	Registration No.	Name	Gender	Class Year	Passport Number
G-1	GA-1-RMU-2024	Arwa R. M. Bolbol	female	4th	5135033
G-2	GA-2-RMU-2024	AHMED M. K. ALASHQAR	male	4th	5412101
G-3	GA-3-RMU-2024	Marah Akram Hassan Nijim	female	4th	5935660
G-4	GA-4-RMU-2024	MOHAMMED A. H. ISMAIL	male	4th	5050736
G-5	GA-5-RMU-2024	MOMIN A. F. RADWAN	male	4th	6043870
G-6	GA-6-RMU-2024	IBRAHIM F. A. MUHAISEN	male	4th	6036056
G-7	GA-7-RMU-2024	Karim K. M. Altawashi	male	4th	6073195
G-8	GA-8-RMU-2024	Haya M.S.Alkahlout	female	4th	5050854
G-9	GA-9-RMU-2024	MAHMOUD M. M. SHAMIA	male	4th	5049791
G-10	GA-10-RMU-2024	Heba M M Mourtaga	female	4th	5468756
G-11	GA-11-RMU-2024	NASER R. N. ABUSHAMMALA	male	4th	5051655
G-12	GA-12-RMU-2024	Hamza B H Abushammala	male	4th	5173262
G-13	GA-13-RMU-2024	Mohammed S. S. Jaber	male	4th	5050787
G-14	GA-14-RMU-2024	JAMILA M. M. IDREES	female	4th	5882835
G-15	GA-15-RMU-2024	KARIM N. H. ALJURF	male	4th	5928949
G-16	GA-16-RMU-2024	MOHAMMED A. M. ALMEGHARI	male	4th	4690739
G-17	GA-17-RMU-2024	Mohammed A. J. Iamad 5066161	male	4th	5066161
G-18	GA-18-RMU-2024	ALAA A. M. SOBOH	female	4th	5057535
G-19	GA-19-RMU-2024	Abdallah W. A. Muhaisen	male	4th	5707601
G-20	GA-20-RMU-2024	OMAR J. S. ALDADAH	male	4th	6194878
G-21	GA-21-RMU-2024	DIMA N. A. ALDALSA	female	4th	5918105
G-22	GA-22-RMU-2024	EMAN H. H. KUHEIL	female	4th	6025386
G-23	GA-23-RMU-2024	Tagreed M.M.Masoud	female	4th	6071745
G-24	GA-24-RMU-2024	Mohamed R M Tahtawi	male	4th	5050274
G-25	GA-25-RMU-2024	YARA A. H. ALSAYEDSALIM	female	4th	5139381
G-26	GA-26-RMU-2024	LAMIS A. A. ALFARRA	female	4th	5823391
G-27	GA-27-RMU-2024	MONTHER B. A. KARAJA	male	4th	5414344
G-28	GA-28-RMU-2024	HAYA M. A. ALFARRA	female	4th	5823680
G-29	GA-29-RMU-2024	BASEL H.M. ABUSAQER	male	4th	6194859
G-30	GA-30-RMU-2024	MOHAMMED K S ZREID	male	4th	5952480
G-31	GA-31-RMU-2024	BISAN M.S.SAED	female	4th	6179294
G-32	GA-32-RMU-2024	HADEEL I.R.HAMADA	female	4th	5054760
G-33	GA-33-RMU-2024	Hanan m.s.aldanaf	female	4th	4898703
G-34	GA-34-RMU-2024	OSAMA Y.A ALDERDESAWY	male	4th	5926968
G-35	GA-35-RMU-2024	Hammam M S Helassa	male	4th	5051858
G-36	GA-36-RMU-2024	Asmaa Zakria Ahmad Alnajjar	female	4th	5926618
G-37	GA-37-RMU-2024	NOUR T. M. DIAB	female	4th	5952888
G-38	GA-38-RMU-2024	ABDULLA W A DAOUD	male	4th	5057769
G-39	GA-39-RMU-2024	TAREQ J. Y. ELEYAN	male	4th	4684297
G-40	GA-40-RMU-2024	Ghaith	male	4th	5864694
G-41	GA-41-RMU-2024	RAZAN A. F. ELJLA	female	4th	5921676
G-42	GA-42-RMU-2024	Ahmed M. S. Abukhatro	male	4th	6078658
G-43	GA-43-RMU-2024	Alaa Omar AbedAlaqalek ALajjouri	female	4th	6173136
G-44	GA-44-RMU-2024	ROBA A E SALEMDAWOD	female	4th	5942662

Principal
Rawalpindi Medical College
Rawalpindi

Vice Chancellor
Rawalpindi Medical University
Rawalpindi

Case report

Challenges Beyond Calot's triangle: Post Cholecystectomy Right Hepatic Artery Aneurysm

*Muhammad Bilal[1, *], Muzna Iftikhar[1], Anis Ahmed[1], Momna Ashraf[1], Syeda Qumreen Ahmed[1]*

Abstract

Cholecystectomy is a very common surgical procedure with approximately increase from 55,31,860 to 71,61,339 cholecystectomies in South Asian region per year (from 2019 to 2022)[1]. Given this, despite development of rules to address safety of this frequented procedure, there are outliers where difficulties maybe faced both intra and post operatively. We present such a case of open cholecystectomy with intraoperative variant anatomy followed by the development of right hepatic artery aneurysm post operatively. Intrahepatic pseudo-aneurysm is a rare but potentially life-threatening complication following cholecystectomy. It is crucial for both surgeons and radiologists to recognize its symptoms promptly. Currently, the preferred treatment approach is minimally invasive, radiology-guided procedures, with trans-arterial embolization being the most effective therapeutic option.

Keywords: Cholecystectomy, Calot's triangle, Hepatic Artery Aneurysm.

[1] Surgical Unit-I, Benazir Bhutto Hospital, Rawalpindi.
*** Corresponding author:** Muhammad Bilal (drmbilal1998@gmail.com)
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1. Introduction

Cholecystectomy is a very common procedure in general surgery operating rooms, reflecting its significant disease burden[1]. This involves removing the gallbladder safely from the liver bed after careful dissection in the Calot's triangle. Despite protocols to reduce both intraoperative and post-operative complications, aberrant vascular and ductal anatomy poses challenges beyond the Calot's triangle[2].

These challenges may develop both intra and post-operatively. Vascular compromise may occur in 0.8% of the time[3]. This is brought upon by physical trauma or electrocautery[4]. Of these, a drastic complication may be hepatic artery pseudo aneurysm. According to literature, it is usually unreported after surgery and manifests later[5]. Hemobilia may be a sign of its occurrence. Vascular problems linked with biliary injury may occur in 25% of the cases[6]; however, an incidence of post cholecystectomy pseudo aneurysm with hemobilia is a rare finding in literature[7].

2. Case Presentation

Our case is of a 65 year male, known hypertensive, who was electively admitted for cholecystectomy. He underwent an open cholecystectomy. As a routine for the procedure, cystic duct and artery were identified in Calot's triangle and clipped. However, while removing gall bladder from the liver bed, bleeding was observed from aberrant vessel, which was intraoperatively suspected to arise from right hepatic artery. This was controlled by hemostatic suture. Bile leak was observed for which T-tube was placed in CBD with a plan of post-operative T-tube cholangiogram.

Post-operative course was uneventful till the 10th day when he showed apprehension and in agitation attempted to pull his tubes. Massive bleeding from T-tube site and sub-hepatic drain was noted. Subsequently he went into hypovolemic shock with drop in Hb (from 10g/dl to 7g/dl) and was resuscitated. T-tube output showed blood tinged picture for the next 5 days. Ultrasound abdomen revealed hypo-echoic area measuring 5ml at porta hepatis. To further investigate this, doppler ultrasound was performed that showed mixed arteriovenous flow on CDI around the catheter in gall bladder fossa. CT angiography incidentally displayed a variant anatomy (replaced right hepatic artery from the celiac trunk). There was a large intrahepatic pseudo-aneurysm noted in this vessel (26.7X26.8X24 mm^3). Another episode of bleed within the T-tube and around the insertion site resulted in a significant drop in Hb. Patient was vitally stabilized and urgent intervention by trans-arterial embolization via coiling was done.

Interventional radiologist passed a 4 Fr C2 catheter via Right femoral access. Wire was advanced into the distal right hepatic artery and embolization was done with a long 6mm coils distally and proximally.

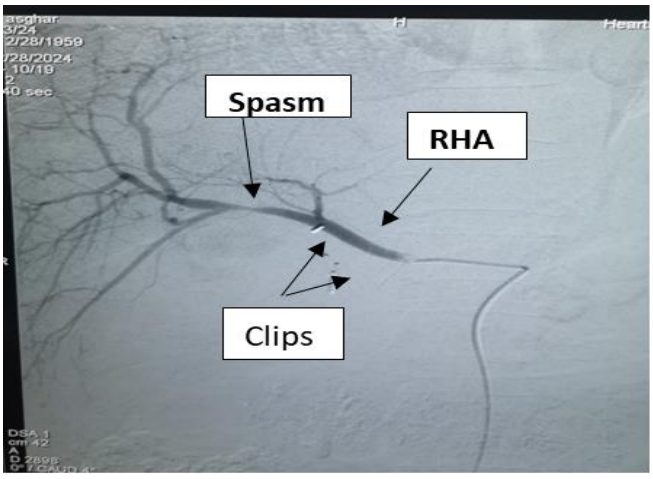

Figure 1. Pre embolization angiogram of the right hepatic artery shows focal spasm of the RHA at the site of the pseudo aneurysm.

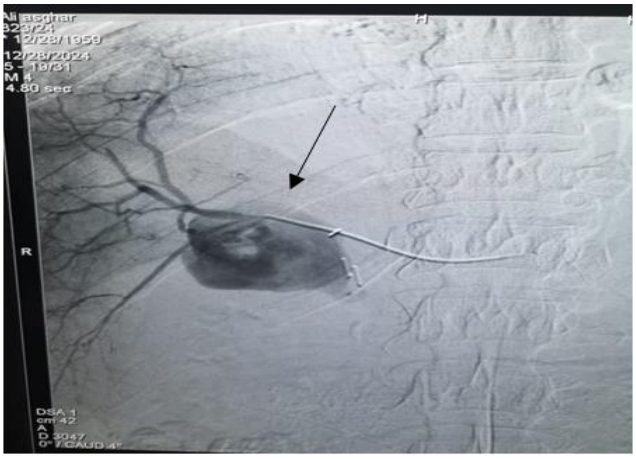

Figure 2. The pseudo aneurysm filling up with contrast.

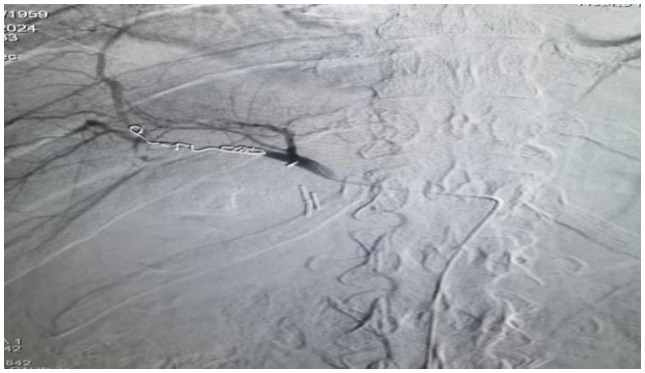

Figure 3. Post embolization angiogram shows no filling of the pseudo aneurysm with filling of the distal right hepatic artery branches via collaterals. Coiling was done, distal and proximal to the neck of the pseudo aneurysm.

Post procedure course was uneventful and a subsequent improvement in his liver function was noted. T-tube was removed after an unremarkable cholangiogram. Patient was discharged and no complaints were noted on his 1 month follow up.

3. Discussion

Hepatic artery pseudo-aneurysms are uncommon but a possibly fatal consequence. It is frequently linked to iatrogenic trauma, vascular damage, and cholecystectomy[8]. A locally contained heamatoma that develops following vascular damage is known as a false aneurysm and is held in place by the surrounding tissue of the damaged vessel. It differs from a real aneurysm, which includes dissecting and sub adventitial aneurysms and is contained by the vessel wall or one of its layers. Occlusion, transections, lacerations, and false aneurysms are examples of vascular problems[9].

A case of right hepatic artery pseudo aneurysm after open cholecystectomy is presented in this report which is a rare occurrence in literature. It can develop in the right hepatic artery, common hepatic artery and cystic artery[10]. The symptoms and indicators vary including discomfort in the abdomen, anemia, jaundice, bleeding, and there have been reports of acute abdomen[11]. In 90% of the cases, hemobilia may manifest as upper gastrointestinal hemorrhage and melena, in 70% as abdominal pain and 60% as Jaundice[11], but in our case it appeared as heamorrage in T-tube placed in common bile duct. The devastating effects of impending rupture involving right hepatic artery pseudoaneurysm, mandate urgent and lifesaving intervention. It was attempted with multidisciplinary facilitation to the best of our ability within and outside our institution.

The diagnosis of the bleeding aneurysm can be made by directly observing bleeding from the ampulla of vater using endoscopic retrograde cholangiopancreatography or endoscopic inspection[12]. The pulsatile aneurysm with bleeding into the biliary tracts can be found using Doppler ultrasonography[13, 14].

Additionally, the CT scan can be used to delineate the celio-mesenteric tree, to identify the arterial pseudo aneurysm and its rupture in the presence of a high density of surrounding tissue[14]. Davies and colleagues saw a dense region next to the metallic clips on CT scans and they decided to do angiographic procedure through trans femoral route to confirm the diagnosis and permit embolization in the same location[15]. The possible progression of pseudo aneurysms towards rupture necessitates prompt and flexible therapy. In this indication, interventional radiology has taken the place of surgery. Coils are used for embolization of the

pseudo aneurysm, if selective endovascular catheterization is feasible[15]. Our case is also treated via trans-femoral artery embolization of RHA by coiling distally and proximally.

A direct trans hepatic access to the pseudo aneurysm under the guidance of ultrasound or fluoroscopy enables its embolization with thrombin or coils if endovascular approach is unsuccessful[16]. The distant and intrahepatic nature of the fake aneurysm here limits complications associated with the endovascular use of this embolic agent[16]. According to the published research, the rate of recanalization of splanchnic aneurysms treated by radiological intervention ranges from 1% to 15%[4]. In this case, four weeks follow up was mandatory.

4. Conclusion

A rare but potentially dangerous side effect of cholecystectomy is intrahepatic pseudo aneurysm. Surgeons and radiologists should be aware of its symptoms. Our case study emphasizes the value of early diagnosis using imaging methods such as IV-contrast CT angiography. Nowadays, the standard of care is minimally invasive procedures guided by radiology, since trans-arterial embolization is the most effective therapeutic option.

References

1. Li, Z.-Z.; Guan, L.-J.; Ouyang, R.; Chen, Z.-X.; Ouyang, G.-Q.; Jiang, H.-X., Global, regional, and national burden of gallbladder and biliary diseases from 1990 to 2019. World Journal of Gastrointestinal Surgery 2023, 15 (11), 2564.
2. Islam, S. M. R., Rationale to achieve Critical View of Safety in Laparoscopic Cholecystectomy. The Journal of Ad-din Women's Medical College 2023, 11 (1), 61-63.
3. Finley, D. S.; Hinojosa, M. W.; Paya, M.; Imagawa, D. K., Hepatic artery pseudoaneurysm: a report of seven cases and a review of the literature. Surgery today 2005, 35, 543-547.
4. Milburn, J.; Hussey, J.; Bachoo, P.; Gunn, I., Right hepatic artery pseudoaneurysm thirteen months following laparoscopic cholecystectomy. EJVES Extra 2007, 13 (1), 1-3.
5. Hewes, J.; Baroni, M.; Krissat, J.; Bhattacharya, S., An unusual presentation of hepatic aneurysm as a complication of laparoscopic cholecystectomy. The European journal of surgery 2002, 168 (10), 566-568.
6. Yelle, J.-D.; Fairfull-Smith, R.; Rasuli, P.; Lorimer, J. W., Hemobilia complicating elective laparoscopic cholecystectomy: a case report. Canadian journal of surgery 1996, 39 (3), 240.
7. Tessier, D. J.; Fowl, R. J.; Stone, W. M.; McKusick, M. A.; Abbas, M. A.; Sarr, M. G.; Nagorney, D. M.; Cherry, K. J.; Gloviczki, P., Iatrogenic hepatic artery pseudoaneurysms: an uncommon complication after hepatic, biliary, and pancreatic procedures. Annals of vascular surgery 2003, 17, 663-669.
8. Lampropoulos, C.; Markopoulos, G.; Tsochatzis, S.; Bellou, A.; Amanatidis, T.; Kehagias, D.; Papadopoulos, G.; Kehagias, I., Symptomatic pseudoaneurysms following laparoscopic cholecystectomy: Focus on an unusual and dangerous complication. Journal of Minimal Access Surgery 2021, 17 (4), 450-457.
9. Rivitz, S. M.; Waltman, A. C.; Kelsey, P. B., Embolization of an hepatic artery pseudoaneurysm following laparoscopic cholecystectomy. Cardiovascular and interventional radiology 1996, 19, 43-46.
10. Nakase, Y.; Takagi, T.; Fukumoto, K.; Kassai, K.; Yamagami, T.; Itani, K.; Miyagaki, T., Hemobilia and cystic artery stump pseudoaneurysm associated with liver abscess after a laparoscopic cholecystectomy: report of a case. Surgery Today 2008, 38, 567-571.
11. Sansonna, F.; Boati, S.; Sguinzi, R.; Migliorisi, C.; Pugliese, F.; Pugliese, R., Severe hemobilia from hepatic artery pseudoaneurysm. Case Reports in Gastrointestinal Medicine 2011, 2011 (1), 925142.
12. Hendriks, M. P.; Wanten, G. J.; Drenth, J. P., Management of hemobilia and pancreatitis after liver biopsy: a key role for endoscopic retrograde cholangiopancreaticography. Liver transplantation 2009, 15 (11), 1653-1654.
13. Falkoff, G. E.; Taylor, K.; Morse, S., Hepatic artery pseudoaneurysm: diagnosis with real-time and pulsed Doppler US. Radiology 1986, 158 (1), 55-56.
14. Diani, A.; Raboua, M.; Elhajjami, A.; Boutakiout, B.; Ouali, M. I.; Ganouni, N. C. I., Hepatic Artery Pseudo Aneurysm as Complication of Cholecystectomy: A Case Report. Sch J Med Case Rep 2023, 5, 797-800.
15. Davies, O.; Batt, J.; Bethune, R.; Courtney, E., Hepatic artery pseudoaneurysm post laparoscopic cholecystectomy. JSM Clin Case Rep 2014, 2 (5), 1050.
16. Slaba, S.; Nassar, J.; El Murr, T.; Saba, M.; Ghayad, E., Distal glue embolization in a patient with gastrointestinal hemorrhage. Journal de Radiologie 2002, 83 (5), 656-658.

Case report

Peripheral Ulcerative Keratitis (PUK) in a Post-Cataract Surgery Patient

*Aiza Ansari[1, *], Mamnat Arshad[1], Sidra Jabeen[1]*

Abstract

Background: Peripheral Ulcerative Keratitis (PUK) is a serious ocular manifestation of systemic inflammatory diseases, particularly rheumatoid arthritis (RA). This case report presents a rare instance of corneal thinning secondary to RA following cataract surgery.

Case Presentation: A 50-year-old patient with a history of hepatitis C and RA underwent cataract surgery on the left eye in 2021. Three years later, the patient developed sudden-onset foreign body sensation, photophobia, and blurry vision. Examination revealed corneal thinning at the phacoemulsification incision site, with associated scleritis and hypopyon. Laboratory investigations confirmed elevated inflammatory markers and a positive rheumatoid factor, leading to a diagnosis of rheumatoid vasculitis with secondary PUK.

Management and Outcome: The patient received topical antibiotics, lubricants, oral steroids, and systemic immunosuppression with methotrexate. Surgical interventions, including conjunctival resection and peripheral tectonic keratoplasty, were performed to stabilize corneal thinning. Regular follow-ups showed improvement, with no further progression of corneal ulceration.

Conclusion: This case highlights the importance of early diagnosis and multidisciplinary management in PUK associated with RA. Systemic immunosuppressive therapy, combined with surgical interventions, plays a crucial role in preventing severe ocular morbidity and preserving vision.

Keywords: Peripheral Ulcerative Keratitis, Post-Cataract Surgery

[1] Ophthalmology department, Holy Family Hospital, Rawalpindi
*** Corresponding author:** Aiza Ansari (aiza.ansari@hotmail.com)
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1. Introduction

A 50-year-old patient, with a history of treated hepatitis C, underwent cataract surgery elsewhere on the right eye in 2018. History taken from patient shows that the surgery itself was uneventful, but unknown post-operative complications in late postoperative period led to the loss of eye and a permanent tarsorrhaphy.

In 2021, the patient underwent cataract surgery for the left eye, achieving a post-operative visual acuity of 6/6. However, three years later, the patient presented with a sudden onset of foreign body sensation, photophobia, and blurry vision in the left eye.

Examination revealed corneal thinning at the site of the phacoemulsification main incision and hypopyon in the anterior chamber. Initial treatment included topical antibiotics, lubricants, and oral steroids, while laboratory investigations were sent.

Systemic evaluation showed elevated inflammatory markers and positive RA factor. A comprehensive rheumatological assessment confirmed the diagnosis of rheumatoid vasculitis. The patient was subsequently diagnosed with peripheral ulcerative keratitis (PUK) secondary to rheumatoid arthritis (RA).

2. Case Presentation

The patient presented with symptoms including sudden onset of foreign body sensation, photophobia, and blurry vision in the left eye. Examination findings included mild diffuse conjunctival congestion, scleritis and limbitis adjacent to the site of corneal thinning, corneal thinning about 4mmx 2.5mm at the phacoemulsification main incision site, 1 mm hypopyon in the anterior chamber, absence of vitritis and normal retinal examination findings.

Key findings from the diagnostic workup included erythrocyte sedimentation rate (ESR): 96 mm/hr (normal: <30 mm/hr), C-reactive protein (CRP): elevated and Rheumatoid Factor (RA Factor): 20.2 IU (normal: <10 IU). Other tests, including complete blood count, liver and renal function tests, antibody screening, X-rays, ultrasounds, and urine R/E, were normal. Differential diagnosis showed lupus vasculitis, rheumatoid vasculitis, rhupus syndrome (Overlap of RA and SLE) and rheumatoid arthritis with secondary Sjögren's syndrome.

Management included ocular treatment and systemic treatment. Ocular Treatment was carried out through surgical interventions and medications. Surgical interventions included conjunctival resection which is

surgical removal of inflamed conjunctiva over the affected area. Peripheral Tectonic Keratoplasty was performed one week later to restore corneal integrity and prevent perforation. Medications included topical therapy where antibiotics were given to prevent secondary infection and lubricants were prescribed to maintain ocular hydration and promote epithelial healing.

Systemic treatment was carried out in the form of immunosuppression where methotrexate was given to address the autoimmune pathology of rheumatoid vasculitis. Pulsed steroid therapy in the form of intermittent high-dose steroids was also given to control systemic inflammation. Tetracycline was given for its anti-inflammatory and collagen-stabilizing properties. Vitamin C was suggested to enhance collagen synthesis and corneal wound healing.

Outcome and Follow-Up: The patient was monitored regularly. Following conjunctival resection and peripheral tectonic keratoplasty, corneal thinning stabilized. Maintenance therapy with ocular lubricants continues, and systemic immunosuppressive therapy is ongoing in collaboration with the rheumatology team.

3. Discussion

Peripheral ulcerative keratitis (PUK) is a serious ocular complication of long-standing, seropositive rheumatoid arthritis.[1] Although PUK is typically associated with systemic inflammatory diseases, its presentation post-cataract surgery is rare[2].

A literature search revealed no prior reports of spontaneous corneal perforation post-cataract surgery in RA patients[3]. In previously reported cases of rheumatoid keratolysis, the mean RA duration at presentation was 15 years, with the majority of ulcers being peripheral. Surgical interventions such as penetrating keratoplasty, combined with systemic immunosuppression, have shown promise in preserving ocular integrity despite a poor visual prognosis[4].

This is an unusual case of corneal thinning secondary to rheumatoid arthritis post routine phacoemulification procedure. The primary goals of treatment in PUK are to promote epithelial healing, halt any further stromal lysis by minimizing inflammation, and prevent superinfections The current case highlights the critical role of early diagnosis and the multidisciplinary management of PUK to prevent severe ocular morbidity[5].

4. Conclusion

A rare but potentially dangerous side effect of cholecystectomy is intrahepatic pseudo aneurysm. Surgeons and radiologists should be aware of its symptoms. Our case study emphasizes the value of early diagnosis using imaging methods such as IV-contrast CT angiography. Nowadays, the standard of care is minimally invasive procedures guided by radiology, since trans-arterial embolization is the most effective therapeutic option.

References

1. Li, Z.-Z.; Guan, L.-J.; Ouyang, R.; Chen, Z.-X.; Ouyang, G.-Q.; Jiang, H.-X., Global, regional, and national burden of gallbladder and biliary diseases from 1990 to 2019. World Journal of Gastrointestinal Surgery 2023, 15 (11), 2564.
2. Islam, S. M. R., Rationale to achieve Critical View of Safety in Laparoscopic Cholecystectomy. The Journal of Ad-din Women's Medical College 2023, 11 (1), 61-63.
3. Finley, D. S.; Hinojosa, M. W.; Paya, M.; Imagawa, D. K., Hepatic artery pseudoaneurysm: a report of seven cases and a review of the literature. Surgery today 2005, 35, 543-547.
4. Milburn, J.; Hussey, J.; Bachoo, P.; Gunn, I., Right hepatic artery pseudoaneurysm thirteen months following laparoscopic cholecystectomy. EJVES Extra 2007, 13 (1), 1-3.
5. Hewes, J.; Baroni, M.; Krissat, J.; Bhattacharya, S., An unusual presentation of hepatic aneurysm as a complication of laparoscopic cholecystectomy. The European journal of surgery 2002, 168 (10), 566-568.
6. Yelle, J.-D.; Fairfull-Smith, R.; Rasuli, P.; Lorimer, J. W., Hemobilia complicating elective laparoscopic cholecystectomy: a case report. Canadian journal of surgery 1996, 39 (3), 240.
7. Tessier, D. J.; Fowl, R. J.; Stone, W. M.; McKusick, M. A.; Abbas, M. A.; Sarr, M. G.; Nagorney, D. M.; Cherry, K. J.; Gloviczki, P., Iatrogenic hepatic artery pseudoaneurysms: an uncommon complication after hepatic, biliary, and pancreatic procedures. Annals of vascular surgery 2003, 17, 663-669.
8. Lampropoulos, C.; Markopoulos, G.; Tsochatzis, S.; Bellou, A.; Amanatidis, T.; Kehagias, D.; Papadopoulos, G.; Kehagias, I., Symptomatic pseudoaneurysms following laparoscopic cholecystectomy: Focus on an unusual and dangerous complication. Journal of Minimal Access Surgery 2021, 17 (4), 450-457.
9. Rivitz, S. M.; Waltman, A. C.; Kelsey, P. B., Embolization of an hepatic artery pseudoaneurysm following laparoscopic cholecystectomy. Cardiovascular and interventional radiology 1996, 19, 43-46.
10. Nakase, Y.; Takagi, T.; Fukumoto, K.; Kassai, K.; Yamagami, T.; Itani, K.; Miyagaki, T., Hemobilia and cystic artery stump pseudoaneurysm associated with liver abscess after a

laparoscopic cholecystectomy: report of a case. Surgery Today 2008, 38, 567-571.
11. Sansonna, F.; Boati, S.; Sguinzi, R.; Migliorisi, C.; Pugliese, F.; Pugliese, R., Severe hemobilia from hepatic artery pseudoaneurysm. Case Reports in Gastrointestinal Medicine 2011, 2011 (1), 925142.
12. Hendriks, M. P.; Wanten, G. J.; Drenth, J. P., Management of hemobilia and pancreatitis after liver biopsy: a key role for endoscopic retrograde cholangiopancreaticography. Liver transplantation 2009, 15 (11), 1653-1654.
13. Falkoff, G. E.; Taylor, K.; Morse, S., Hepatic artery pseudoaneurysm: diagnosis with real-time and pulsed Doppler US. Radiology 1986, 158 (1), 55-56.
14. Diani, A.; Raboua, M.; Elhajjami, A.; Boutakiout, B.; Ouali, M. I.; Ganouni, N. C. I., Hepatic Artery Pseudo Aneurysm as Complication of Cholecystectomy: A Case Report. Sch J Med Case Rep 2023, 5, 797-800.
15. Davies, O.; Batt, J.; Bethune, R.; Courtney, E., Hepatic artery pseudoaneurysm post laparoscopic cholecystectomy. JSM Clin Case Rep 2014, 2 (5), 1050.
16. Slaba, S.; Nassar, J.; El Murr, T.; Saba, M.; Ghayad, E., Distal glue embolization in a patient with gastrointestinal hemorrhage. Journal de Radiologie 2002, 83 (5), 656-658.

Case report

A Rare Case of Acral Lentiginous Melanoma: A Rare Variant with Unique Diagnostic Challenges and Management

*Siraj Ul Haq[1], Shawana Sharif[1], Zainab[1], Farwa Younis[1, *], Muhammad Zul Hasnain Falak[1], Ghanwa, Uzma Hayat[1], Rimsha Fatima[1]*

Abstract

Acral lentiginous melanoma (ALM) is so called because of the location and histological orientation of the tumor. It can develop on the sole, palm or subungal surface. Lesions on the palms, soles or nails typically accompany this rare type of melanoma. Although it is uncommon, it is the most frequently found subtype of melanoma in people who are not Caucasian, such as Latinos, Africans, Chinese, and Koreans. The diagnosis is most commonly made in the 60s or 70s of life.

Keywords: Acral lentiginous melanoma (ALM), subungal, lesions.

[1] Dermatology, Benazir Bhutto Hospital, Rawalpindi
*** Corresponding author:** Farwa Younis (farwaayounis@gmail.com)
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1. Introduction

Palms, soles and under nails can be home to the uncommon ALM subtype. Study done on ALM shows that majority of the cases were Black suggesting that this type of melanoma is more commonly seen in this ethnic group[1]. Based on adjustments for age, the incidence rate for ALM patients was 2.0 per million person-years[2]. There are a number of factors that can lead to a delay in diagnosis including a variety of clinical presentations, variant dermoscopy findings, a high rate of amelanosis and low awareness[3]. The genetic predisposition and pathophysiology of melanoma's clinical subtypes vary; ALM in particular has a dismal prognosis when compared to melanoma's other histologic subtypes and anatomical sites. Important prognostic markers in ALM include tumor thickness, tumor spread, age, ulceration, and tumor location at diagnosis[4].

2. Case Presentation

A 63-year-old male farmer presented to the Benazir Bhutto Hospital's Dermatology Outpatient Department (OPD) complaining of a small, discrete, blackish lesion on the left foot's heel that had been there for the previous two years and had an unclear border. Ulcer forms as lesion worsens over time; fluid containing blood occasionally expelled. Aside from a lack of itching, the patient reported no discomfort related to the lesion. Diabetes mellitus and hypertension were not present in the patient's medical history. There is no history of any skin malignancy in the family. In addition to denying pruritis, the patient denied experiencing any systemic symptoms such as fever, cough, loss of weight, or headache. There was no evidence of pallor, cyanosis, icterus, edema or lymphadenopathy on the patient's general physical examination and all vital signs were within normal limits. The results of the systemic evaluation were similarly within the typical range. During the physical examination, a crusted deep ulcer measuring 3x2.5 cm^2 was seen on the left heel. The lesion was nontender and had an uneven border. The discharge from the ulcer contained blood and the surrounding skin was hyperkeratoric and black coloured.

Figure 1. Discrete black lesion measuring 3x2.5cm on left heal with surrounding hyperkeratotic skin.

Management: To conduct the histological examination, a wedge biopsy was taken from the patient's left heel using an incisional technique.

Dermoscopy: The 10-mm lesion showed asymmetrical pattern, irregular diffuse pigmentation and irregular fibrillar pattern

Histopathology: The incisional fragment from the left heel showed hyperkeratosis, acanthosis, and one fragment showed surface ulceration, acute and chronic inflammation and infiltration by atypical cell in the form sheet and nest. These cells had abundant melanin pigment and pleomorphic hyperchromatic nuclei with eosinophilic nucleoli and moderate cytoplasm. The surrounding tissue showed necrosis and dense inflammatory infiltrate.

Imaging study (Contrast enhanced computed tomography result): Multiple variable sized sub-pleural and intra-pleural, soft tissue nodules were seen. Multiple bilateral inguinal lymph nodes were also seen which were suggestive of most likely secondary metastasis, making stage T4N2M1.

Treatment: As having stage 4 ALM, our patient was counselled in details. He was advised sun protection and all his family members were counselled to do regular skin examination. Patient was instructed for regular visit in Dermatology OPD for palliative care which was offered in liaison with oncology department.

3. Discussion

All racial and ethnic groups have a similar frequency of ALM, but darker-skinned individuals have a greater percentage of ALM melanomas. In contrast to other types of melanoma, where UVB exposure is known to increase the risk of development, ALM lesions commonly appear on sun-protected locations; this finding could be the result of a distinct pathophysiology of ALM[5].

Although there are more and better ways to treat cutaneous melanomas, the prognosis for plantar melanomas is often dismal. Among the many possible causes, the fact that the patients of non-Caucasian ethnicities often have more advanced tumors when they come in for treatment is a major one. This can be due to a lack of awareness about the need of preventative screenings or to the widespread belief that people having dark colour skin are immune to skin cancer. Similar to how cutaneous melanoma is managed, localised ALM is also managed. At first, the diagnosis will be confirmed and the disease stage, surgical resection extent and sentinel lymph node (SLN) therapy will be determined by biopsy and histological testing[6].

In our patient, palliative care was provided. Adjuvant treatment with immunotherapeutic drugs such as pembrolizumab or nivolumab for one year is advised for higher-stage localised illness (> Stage IIB). Another possibility is adjuvant treatment with BRAF/MEK inhibitors like trametinib or dabrafenib if a BRAF/MEK mutation is found. Drugs targeting KIT mutations, such as imatinib have been investigated in metastatic situations and the frequency of positive cases is higher in acral lentiginous melanoma. We do not yet know their function in adjuvant treatment[7]. A more favourable prognosis and shorter time to diagnosis for ALM might be achieved through public awareness initiatives, patient education and physician training that targets all ethnic groups[8].

4. Conclusion

Although it is more common in persons with dark skin, acral lentiginous melanoma is still a very rare subtype of malignant melanoma. Genetic abnormalities such as mutations in the BRAF, NRAS, and KIT genes, have been linked to the disease although the exact mechanism is still unclear. It is believed that delay and misdiagnosis contribute to the advanced stage of presentation in acral lentiginous melanoma which in turn leads to a particularly bad prognosis. In order to improve survival results for melanoma in African and Asian communities, there has to be more awareness, comprehensive physical examinations, patient education and early screenings.

Additional Information

Disclosures

Human subject: Participants in this study either provided their informed consent or chose not to provide it.

Conflicts of interest: This work's authors have made the following declarations in accordance with the ICMJE uniform disclosure form: Payment/services info: The authors have all verified that they did not receive any funding to produce this work.

Financial relationships: The authors have all stated that they do not have any financial ties to any organisations that could be interested in the submitted work either now or in the past three years.

Other relationships: The authors have all stated that they are not involved in any other relationships or

activities that could be seen as influencing the work that was submitted.

References

1. Teramoto Y, Martinez-Said H, Guo J, Garbe C. Acral Lentiginous Melanoma. Cutaneous Melanoma. 2020:897-924. doi:10.1001/archderm.1980.01640310043015
2. Huang K, Fan J, Misra S. Acral lentiginous melanoma: incidence and survival in the United States, 2006-2015, an analysis of the SEER registry. Journal of Surgical Research. 2020 Jul 1;251:329-39.
3. Soham M, Yash K, Shubham C, Bhushan M, Sugat J. A Rare Case of Acral Lentiginous Melanoma. Cureus. 2023;15(5). DOI:10.7759/cureus.38926
4. Csanyi I., Houshmand N, Szucs M, Ocsai H, Kemeny L, Olah J, Baltas E, Acral lentiginous melanoma: a single centre retrospective review of four decades in East Central Europe. Journal of the European Academy of Dermatology and Venereology. 2020 Sep; 34(9):2004-10.
5. Garbe C, Bauer J. Types of primary melanomas. Dermatology (4th ed). Bolognia J (ed): Elsevier, Philadelphia, PA. 2018.
6. Curti BD, Faries MB. Recent advances in the treatment of melanoma. New England Journal of Medicine. 2021 Jun 10;384(23):2229-40. DOI: 10.1056/NEJMra2034861
7. Mangla A. Dissecting the need for adjuvant therapy in patients with early-stage melanoma with micrometastases. Journal of Clinical Oncology. 2023 Feb 20;41(6):1324-5.
8. Griffiths CEM, Barker JNWN, Bleiker TO, Chalmers RJ, Creamer D, editors. Rook's Textbook of Dermatology. 10th ed. Hoboken (NJ): Wiley-Blackwell; 2022.

Case report

Eyes as Windows: Ocular Manifestations Paving the Path to Sarcoidosis Diagnosis

*Munazza Kanwal Ahmed[1, *], Laila tul Bushra[1], Nida Hafeez[1], Muhammad Ali Khalid[1], Wajeeha Rasool[1], Fuad Khan Niazi[1], Ambreen Gul[1], Maria Zubair[1]*

Abstract

A 32-year-old male presented with sudden, painless vision loss in both eyes. Examination revealed impaired visual acuity, vitreous inflammation, and macular edema. Systemic investigations showed elevated inflammatory markers and angiotensin-converting enzyme (ACE) levels, suggesting granulomatous disease. Tuberculosis was excluded, and a diagnosis of ocular sarcoidosis was established. Treatment with corticosteroids led to significant improvement in visual acuity. Ocular sarcoidosis is a common manifestation of systemic sarcoidosis, a multisystem disease characterized by noncaseating granulomas. Ocular involvement occurs in 12-76% of systemic sarcoidosis cases, with uveitis and conjunctival nodules being common findings. High suspicion and adherence to IWOS criteria are crucial for diagnosis.

Keywords: Ocular Sarcoidosis, Uveitis, Mutton fat KPs, Auto-immune disease

[1] Ophthalmology Department, Benazir Bhutto Hospital, Rawalpindi (BBH)
*** Corresponding author:** Munazza Kanwal Ahmed
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1. Introduction

Ocular sarcoidosis is a significant manifestation of sarcoidosis, a systemic granulomatous disease characterized by the formation of non-caseating granulomas. This condition affects approximately 25% of patients with sarcoidosis, leading to potentially severe ocular complications that can significantly impair vision and quality of life. The most common form of ocular involvement is uveitis, particularly posterior uveitis and panuveitis, which can present with symptoms such as blurred vision, eye pain, photophobia, and redness[1]. Understanding the etiology, diagnosis, treatment options, and prognosis of ocular sarcoidosis is essential for effective management. The clinical presentation of ocular sarcoidosis can be diverse. Uveitis, an inflammation of the uveal tract, is the most frequently observed condition, manifesting in various forms, including anterior, intermediate, and posterior uveitis. Symptoms may vary from mild irritation to severe pain and vision loss[2]. In addition to uveitis, patients may experience other ocular complications, such as conjunctival granulomas, retinal involvement, and optic nerve damage. Complications like glaucoma, cataracts, and retinal detachment can occur, particularly in cases where inflammation is inadequately controlled. Diagnosing ocular sarcoidosis involves a comprehensive clinical assessment, typically conducted by an ophthalmologist[3]. The International Workshop on Ocular Sarcoidosis (IWOS) has established diagnostic criteria that emphasize the necessity of uveitis, compatible systemic findings, and the exclusion of other potential causes of ocular inflammation[4]. A detailed patient history is crucial, along with a thorough physical examination. Systemic symptoms, including respiratory issues, skin lesions, or lymphadenopathy, often accompany ocular manifestations and can guide the diagnostic process.

Imaging techniques, such as chest X-rays or high-resolution computed tomography (CT) scans, are often utilized to assess for pulmonary involvement, a common finding in sarcoidosis[5]. Laboratory tests may include serum angiotensin-converting enzyme (ACE) levels, which can be elevated in sarcoidosis, although this marker is not definitive[6]. Ocular sarcoidosis treatment involves corticosteroids, which can be administered topically, systemically, or via intravitreal injections. Immununosuppressive agents like methotrexate or biologics may be considered for non-responsive or severe cases, under medical supervision[3, 8]. Regular follow-up is essential to monitor for complications and assess the effectiveness of treatment.

In addition to pharmacological interventions, supportive care, including patient education and monitoring for complications, plays a critical role in managing ocular sarcoidosis. Multidisciplinary

collaboration between ophthalmologists, pulmonologists, and other specialists is often necessary to provide comprehensive care[9].

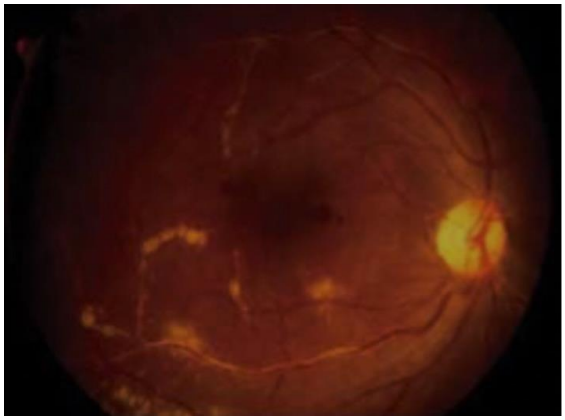
The prognosis for ocular sarcoidosis varies widely. Some patients may experience a self-limiting course, while others may face recurrent episodes that require ongoing management[10]. Long-term follow-up is crucial to monitor for chronic complications and to tailor treatment strategies based on individual patient's responses. Studies have indicated that early intervention can significantly improve visual outcomes and overall quality of life for patients with ocular sarcoidosis[11].

Ocular sarcoidosis requires a multidisciplinary approach for effective management. Early diagnosis and timely intervention are crucial to preserving vision and quality of life. Adhering to International Workshop on Ocular Sacroidosis, (IWOS) guidelines can refine treatment protocols and improve patient outcomes significantly.

2. Case Presentation

A 32-year-old married male, resident of Rawalpindi, presented to the outpatient department (OPD) in January 2023. The patient reported a sudden onset of painless decreased vision in both eyes that had developed one week prior to his visit. Notably, there was no associated ocular pain, floaters, or flashes of light. His past medical and surgical histories were unremarkable, and he had no significant past ocular history. The family history did not reveal any hereditary eye conditions. The patient is a non-smoker and does not use any addictive substances, identifying as part of a middle-income group.

On Examination, Visual acuity was counting fingers at 3 meters in right eye and 6/36 in left eye. External examination showed normal eyelids without edema or lesions, and the conjunctiva appeared clear with no signs of inflammation. The sclera was also normal, and the cornea was clear without opacities. Intraocular pressure was measured at 15 mmHg in both eyes. The anterior segment examination demonstrated an unremarkable iris with no granulomas, round and reactive pupils, and normally formed anterior chamber. AC was clear without cells or flare. In right eye, vitreous revealed vitritis, vitreous cell +3, vitreous strings & Snow balls in inferior vitreous and no such finding in left eye. Fundoscopic examination revealed Mild Macular Edema, Sub-retinal macular solitary infiltrate temporal to fovea, Peripheral vasculitis, perivenous sheathing, candle wax drippings along inferior vascular arcade, a normal optic nerve head, while fundus examination of left eye showed Mild subretinal infiltrates with macular edema. Special tests, including fluorescein angiography and optical coherence tomography (OCT), were conducted, revealing Macular edema along with vitreous inflammation in right eye and mild macular edema in left eye.



(a)

(b)

Figure 1: Fundus photographs of both eyes of patient (a, b).

Following a comprehensive evaluation by a multidisciplinary team of medical specialists, the diagnosis of ocular sarcoidosis was further substantiated. On physical examination, he appeared to be of average height and build, with normal vital signs: blood pressure was 120/80 mmHg, pulse rate was 80 beats per minute, respiratory rate was 18 breaths per

minute, temperature was 98.6°F, and oxygen saturation was 96% on room air. There were no signs of pallor, koilonychia, or clubbing. Thyroid and lymph nodes were not palpable. The systemic investigations demonstrated a normal complete blood count (CBC), indicating no significant hematological issues. However, the erythrocyte sedimentation rate (ESR) was elevated at 39 mm, and C-reactive protein (CRP) levels were also raised at 25 mg/L, suggesting an ongoing inflammatory process. Renal function tests (RFT) were within normal limits, indicating no renal impairment. Notably, the angiotensin-converting enzyme (ACE) level was elevated at 94 U/L (normal range: 9-67 U/L), Both prothrombin time (PT) and activated partial thromboplastin time (APTT) were normal, ruling out significant coagulation issues. The Quantiferon TB Gold test was negative, with a result of 0.01 IU/ml, effectively excluding active tuberculosis. Serum calcium levels were normal at 2.61 mmol/L. Imaging studies, including high-resolution computed tomography (HRCT) and X-ray of the sacroiliac (SI) joints, returned normal findings. These results collectively support the suspicion of ocular sarcoidosis while excluding other potential causes. Three ocular signs and two positive laboratory test, confirmed the diagnosis of ocular sarcoidosis was according to IWOS criteria. The patient was treated with a posterior sub-Tenon injection of triamcinolone acetonide in the right eye, administering 1 ml of a 40 mg/ml solution to reduce inflammation. Additionally, oral prednisolone was prescribed at a dosage of 1 mg/kg in divided doses for three weeks, followed by a gradual tapering over the subsequent month along with proton pump inhibitors for gastric protection. The patient is on close follow-up and has shown significant improvement. Currently, he is asymptomatic, with bilateral visual acuity measured at 6/6, indicating excellent recovery and stabilization of his ocular condition.

3. Discussion

Ocular sarcoidosis is a significant manifestation of systemic sarcoidosis, affecting approximately 25% of the patients. This case highlights a typical presentation in a 32-year-old male who experienced sudden, painless vision loss, a common symptom associated with this condition. The elevated inflammatory markers, specifically the erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP), along with an increased angiotensin-converting enzyme (ACE) level, are indicative of the underlying inflammatory process characteristic of sarcoidosis[12, 13].

The negative result from the Quantiferon TB Gold test was crucial in excluding active tuberculosis, a common differential diagnosis given the overlap in ocular manifestations. This differentiation is vital, as both conditions can present with similar symptoms, including uveitis and vision changes[14]. Normal serum calcium levels further exclude hypercalcemia, which can be associated with sarcoidosis but was not evident in this patient[15]. Imaging studies, such as high-resolution computed tomography (HRCT) and X-ray of the sacroiliac joints, did not reveal any significant abnormalities, indicating that ocular symptoms were the primary concern at the time of presentation[16].

The management of ocular sarcoidosis typically involves corticosteroids to control inflammation. In this case, a posterior sub-Tenon injection of triamcinolone acetonide was administered, which is a well-accepted approach for localized inflammation. This method allows for targeted delivery of steroids to the affected area, minimizing systemic side effects[17]. Additionally, the patient was placed on oral prednisolone at a tapering dose, following standard treatment protocols for managing sarcoidosis[18]. The introduction of omeprazole to protect against gastrointestinal side effects from prolonged corticosteroid use demonstrates a comprehensive approach to care, addressing potential complications associated with steroid therapy[19]. The patient's follow-up results have been encouraging, with a current bilateral visual acuity of 6/6 and an asymptomatic status. This positive outcome underscores the effectiveness of the treatment regimen in managing ocular sarcoidosis and preventing complications such as vision loss[20, 21, 22].

4. Conclusion

In conclusion, this case illustrates the importance of early diagnosis and appropriate management strategies for ocular sarcoidosis. Continuous monitoring and follow-up are essential to ensure the long-term stability of the patient's condition and to address any potential recurrences of symptoms. Future research should focus on optimizing treatment protocols and exploring long-term outcomes in patients with ocular sarcoidosis to enhance management strategies further.

References

1. Uyama M. Uveitis in sarcoidosis. Int Ophthalmol Clin. 2002 Winter;42(1):143-50. doi: 10.1097/00004397-200201000-00018. PMID: 12189610.
2. Suzuki K, Ishihara M, Namba K, Ohno S, Goto H, Takase H, Kawano S, Shibuya E, Hase K, Iwata D, Mizuuchi K, Kitaichi N, Mizuki N, Ishida S. Clinical features of ocular sarcoidosis: severe, refractory, and prolonged inflammation. Jpn J Ophthalmol. 2022 Sep; 66(5):447-454. doi: 10.1007/s10384-022-00927-y. Epub 2022 Jun 21. PMID: 35727483.
3. McCluskey P, et al. "The role of immunosuppressive therapy in ocular sarcoidosis." Ophthalmology. 2017; 124(6): 952-961.
4. Mochizuki M, Smith JR, Takase H, Kaburaki T, Acharya NR, Rao NA; International Workshop on Ocular Sarcoidosis Study Group. Revised criteria of International Workshop on Ocular Sarcoidosis (IWOS) for the diagnosis of ocular sarcoidosis. Br J Ophthalmol. 2019 Oct; 103(10):1418-1422. doi: 10.1136/bjophthalmol-2018-313356. Epub 2019 Feb 23. PMID: 30798264.
5. Valeyre D, Prasse A, Nunes H, Uzunhan Y, Brillet PY, Müller-Quernheim J. Sarcoidosis. Lancet. 2014 Mar 29;383(9923):1155-67. doi: 10.1016/S0140-6736(13)60680-7. Epub 2013 Oct 1. PMID: 24090799.
6. Iannuzzi MC, Rybicki BA, Teirstein AS. Sarcoidosis. N Engl J Med. 2007 Nov 22;357(21):2153-65. doi: 10.1056/NEJMra071714. PMID: 18032765.
7. Sève P, Pacheco Y, Durupt F, Jamilloux Y, Gerfaud-Valentin M, Isaac S, Boussel L, Calender A, Androdias G, Valeyre D, El Jammal T. Sarcoidosis: A Clinical Overview from Symptoms to Diagnosis. Cells. 2021 Mar 31;10(4):766. doi: 10.3390/cells10040766. PMID: 33807303; PMCID: PMC8066110.
8. Matsou, A., & Tsaousis, K. T. (2018). Management of chronic ocular sarcoidosis: challenges and solutions. Clinical Ophthalmology, 12, 519–532. https://doi.org/10.2147/OPTH.S128949
9. Aoki T, Yokoi N, Nagata K, Deguchi H, Sekiyama Y, Sotozono C. Investigation of the relationship between ocular sarcoidosis and dry eye. Sci Rep. 2022 Mar 2;12(1):3469. doi: 10.1038/s41598-022-07435-6. PMID: 35236907; PMCID: PMC8891351.
10. Sharma OP. Cutaneous sarcoidosis: clinical features and management. Chest. 1972 Apr;61(4):320-5. doi: 10.1378/chest.61.4.320. PMID: 5020251.
11. Smith, J.R. Management of uveitis. Clin Exp Med 4, 21–29 (2004). https://doi.org/10.1007/s10238-004-0034-3
12. Fahim, Ahmed, and Jonathan S. Mann. "Pulmonary sarcoidosis: diagnostic and treatment update." Expert Review of Respiratory Medicine 8, no. 4 (2014): 493-501.
13. Baughman RP, Valeyre D, Korsten P, Mathioudakis AG, Wuyts WA, Wells A, Rottoli P, Nunes H, Lower EE, Judson MA, Israel-Biet D. ERS clinical practice guidelines on treatment of sarcoidosis. European Respiratory Journal. 2021 Dec 16;58(6).
14. Valeyre D, Brauner M, Bernaudin JF, Carbonnelle E, Duchemann B, Rotenberg C, Berger I, Martin A, Nunes H, Naccache JM, Jeny F. Differential diagnosis of pulmonary sarcoidosis: A review. Frontiers in medicine. 2023 May 12;10:1150751.
15. Conron M, Young C, Beynon HL. Calcium metabolism in sarcoidosis and its clinical implications. Rheumatology. 2000 Jul 1;39(7):707-13.
16. Silva M, Nunes H, Valeyre D, Sverzellati N. Imaging of Sarcoidosis. Clin Rev Allergy Immunol. 2015 Aug;49(1):45-53. doi: 10.1007/s12016-015-8478-7. PMID: 25726413.
17. Grutters JC, Van den Bosch JM. Corticosteroid treatment in sarcoidosis. European Respiratory Journal. 2006 Aug 31;28(3):627-36.
18. Obi ON, Saketkoo LA, Russell AM, Baughman RP. Sarcoidosis: Updates on therapeutic drug trials and novel treatment approaches. Frontiers in medicine. 2022 Oct 12;9:991783.
19. Schoenfeld, Kimmey, Scheiman, Bjorkman, Laine. nonsteroidal anti-inflammatory drug-associated gastrointestinal complications—guidelines for prevention and treatment. Alimentary pharmacology & therapeutics. 1999 Oct;13(10):1273-85.
20. Samalia PD, Lim LL, Niederer RL. Insights into the diagnosis and management of sarcoid uveitis: A review. Clinical & Experimental Ophthalmology. 2024 Apr;52(3):294-316.
21. Melani AS, Simona A, Armati M, d'Alessandro M, Bargagli E. A comprehensive review of sarcoidosis diagnosis and monitoring for the pulmonologist. Pulmonary Therapy. 2021 Jun 6:1-6.
22. Baughman RP, Lower EE, Ingledue R, Kaufman AH. Management of ocular sarcoidosis. Sarcoidosis, vasculitis, and diffuse lung diseases: official journal of WASOG. 2012 Mar 1;29(1):26-33.

Case report

Dissociative or Epileptic Seizures: A Diagnostic Dilemma

*Mashal Ilyas Khan[1, *], Muhammad Ibrahim Rashid[1], Sadia Yasir[1], Asad Tamizuddin Nizami[1], Mominah Ambreen[1]*

Abstract

Dissociative Neurological Symptom Disorder (DNSS) often presents with symptoms mimicking epileptic seizures, termed Dissociative Seizures or Psychogenic Non-Epileptic Seizures (PNES). This case report details a 34-year-old male who experienced jerky movements followed by unconsciousness. He had been treated for epilepsy for the past two years. Admission for his detailed history and examination raised the suspicion of Dissociative Neurological Symptom Disorder in the background of Recurrent Depressive Disorder. He was treated on the lines of Recurrent Depressive Disorder with Dissociative Neurological Symptom Disorder, resulting in notable clinical improvement in his symptoms. This case underscores the need for accurate differentiation between epileptic and dissociative seizures to avoid unnecessary treatments and improve the patient's prognosis. Effective liaison between neurologists and psychiatrists is the key to accurate diagnosis and management of such cases.

Keywords: Dissociative Disorder, Differential Diagnosis, Psychotherapy, Epileptic Fits

[1] Psychiatry, Benazir Bhutto Hospital, Rawalpindi.
*** Corresponding author:** Mashal Ilyas Khan
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1. Introduction

Dissociative Neurological Symptom Disorder has a wide range of presentations and can lead to involuntary movements and/or loss of consciousness mimicking seizures, generally referred to as Dissociative Seizures or Functional/ Psychogenic Nonepileptic seizures (PNES)[1]. Epilepsy, syncope, and dissociative seizures are the three most common causes of Transient Loss of Consciousness and the misdiagnosis rate between them is around 20% (2-71%); leading to undue investigations, mismanagement, unwanted side effects, diagnostic delay, adverse outcomes, the burden on the healthcare system and overall poor quality of life[2].

Literature shows that 11% of patients presenting in an emergency with seizures, are dissociative but are often misdiagnosed by emergency physicians (88%) and neurologists (38-48%) at first visit[3]. This case is of special interest because of the patient's unique presentation and changing pattern of symptoms. In addition, he had been to multiple psychiatrists and neurologists in the last two years, but he did not improve.

2. Case Presentation

A 34-year-old male, married, a father of three, and a lecturer by profession with an MPhil in Biochemistry, a resident of Rawalpindi was brought to OPD by his father. He presented with jerky movements of the body and loss of consciousness lasting 3 to 4 hours following a stressful telephonic conversation with his father-in-law which left him notably irritable where he collapsed in front of his mother, prompting immediate medical attention. This episode lasted for almost 11 hours and included periods where the patient was able to use the washroom and smoke cigarettes indicating some level of functional awareness during the episode. Upon presentation, the patient was already diagnosed and being treated on the lines of epilepsy with no improvement in his symptoms with antiepileptic medication despite good compliance with the medication. During his stay at the hospital, he exhibited intense, jerky movements of the head, shoulders, and legs, lasting 2-3 minutes followed by a forceful fall and collapsing on the floor. The period of unconsciousness lasted for 2 to 3 hours. These occurred both in bed and while seated, however, no remarkable physical injuries were reported, suggesting a level of control over his actions. The episodes often coincided with morning rounds, pointing to possible environmental triggers. Additionally, discussions about his potential discharge from the hospital consistently triggered an episode, suggesting a psychological benefit from his hospitalization.

The patient's medical history revealed that since October 2022, he had been prescribed antiepileptic medication for similar symptoms. A comprehensive CNS examination conducted during his current hospital stay showed no remarkable findings, and no typical

symptoms of epileptic seizures such as uprolling of eyes, tongue biting, or urinary incontinence were reported. Baseline investigations returned unremarkable results except for a noted low platelet count. A urine test confirmed the absence of substance use.

He reported a persistently low mood, reduced appetite, loss of pleasure in daily activities, and experienced suicidal ideation accompanied by anxiety symptoms, which varied throughout the day. He maintained functionality in self-care and family interactions but his occupational engagement was significantly impaired, leading to frequent work absences.

Exploring his personal history, the patient had achieved all developmental milestones at appropriate ages and described a stressful family environment with strained dynamics with his parents. His pre-morbid personality was marked by emotional instability, impulsivity, and sensitivity to criticism, with few confiding friendships. He had a history of breakup that led to an attempted overdose, underscoring his emotional vulnerability. Currently, his marriage was described as satisfactory, and he had three young daughters.

The patient had a two-year history of opioid use, for which he underwent three months of rehabilitation. He was currently a heavy smoker, consuming one pack of cigarettes per day. He had been under psychiatric care since 2022, initially treated with Sertraline and Mirtazapine, later switching to Venlafaxine and Levetiracetam. However, his compliance with psychotropic medication was reported to be poor and with antiepiletic medication was adequate.

The initial challenge was differentiating epilepsy from Dissociative Neurological Symptom Disorder due to the patient's presentation of jerky movements, risky falls, and periods of unconsciousness. Further exploration of his symptoms confirmed the diagnosis of Dissociative Neurological Symptom Disorder with Recurrent Depressive Disorder, severe, without psychotic symptoms. His treatment regimen included Sertraline, initially at 50mg and increased to 150mg, Olanzapine 5mg, and Alprazolam 0.5 mg for anxiety divided into two doses of 0.25 mg. His initial Hamilton Depression Rating Scale (HAM-D) score was 28, indicative of severe depression.

A detailed psychological work-up was conducted to assess the patient's symptoms, triggers, and underlying stressors. Psychoeducation was provided to explain the nature of Dissociative Neurological Symptom Disorder, differentiating it from epilepsy, and emphasizing the role of stress and emotional triggers. This helped the patient gain insight into his condition, reducing fear and confusion, and motivating him to actively engage in his treatment plan. Reassurance was provided to make him comfortable and relaxation techniques, and coping strategies were introduced to address acute stress and dissociative episodes. By the fifth day, there was a notable improvement in his mood, and his HAM-D score decreased significantly. After an eight-day hospital stay, he was discharged with a comprehensive follow-up plan that included continuing the prescribed medication and regular psychological sessions. Two weeks post-discharge, he returned for a follow-up and reported significant improvement in his overall condition. Despite experiencing 2-3 shorter episodes of dissociative fits during this period, he remained optimistic about his recovery progress.

3. Discussion

The exact etiology of Dissociative fits is unknown, but several risk factors have been identified. Among these are emotional neglect in childhood, parental conflicts, unstable relationships, attachment issues, stressful life events, depression, anxiety, personality traits especially borderline including emotional instability, impulsivity, sensitivity to criticism, and poor stress coping, all of which were present in this patient and would explain the development of dissociative fits in him[1].

It is crucial to differentiate between true epilepsy and dissociative fits, as being labeled and treated for epilepsy can have disastrous physical, mental, and social implications such as stigmatization, serious side effects of antiepileptic medications, depression, and suicidal ideation.[4] Stigmatization alone is a major concern for patients in Pakistan and involves fear of being marginalized, and discriminated against, in terms of education, employment and marriage, contributing to not only depression and anxiety but also poor quality of life and their delay in seeking treatment[5]. Similarly, in our case report, the stigmatization faced by our patient and his lack of awareness could be the possible reasons

to delay in seeking proper psychiatric consultations for this matter.

Another thing to be kept in mind is that generally the organic diseases and their outcomes are deemed more grievous but the harms of missing/misdiagnosing a functional disorder ought not be undermined by unneeded investigations, treatment, their psychological and economic burdens[6]. This was also the case in our study, where the main focus of investigation and management was Epilepsy, an organic disorder.

However, early diagnosis of dissociative seizures is critical and is the most important prognostic factor, as prolonged dissociations are difficult to break and are linked with negative outcomes[7]. Still, differentiating between dissociative seizures and epilepsy poses a great challenge due to various types and manifestations of epilepsy, and because the two diseases can coexist in up to 54% of cases[8]. Diagnosis is mainly clinical. Electroencephalography (EEG) can assist but cannot confirm the diagnosis. Therefore, it lies upon the physician to explore the characteristics of seizure episodes, history of stressor, psychiatric illness and associated risk factors to reach an accurate diagnosis[9, 10]. The average delay in its diagnosis is 7.2 years which is in contrast to our study, where the diagnosis was made within 2 years saving the patient from a long list of afore-mentioned ill effects. However, this study was conducted in 2003 and unfortunately, no recent data is available for more apt comparison[11].

Antiepileptic medications are ineffective except in case of coexisting epilepsy; thus, treatment is mainly psychological and involves Cognitive Behavioral Therapy, group therapy, addressing underlying problems and stressors, patient education, family education and optimization of other comorbids[5, 6]. Our patient was taking Levetiracetam for the last two years which was tapered off. Anxiolytics and antidepressants were added to address his mood and anxiety symptoms. Simultaneously, he was initiated on psychotherapy to which he showed an optimistic response. This favors the diagnosis of Dissociative fits rather than epileptic fits or coexistence of the two.

4. Conclusion

Dissociative and Epileptic fits can have a very similar presentation and distinguishing between them can be a tedious task. However, early diagnosis and correct management are imperative for safeguarding the patient's physical, mental, and social health. This calls for a collaborative effort by Neurologists and Psychiatrists for the provision of optimum patient care and to improve disease outcomes as much as possible.

Informed Consent: Informed consent was obtained from the patient and his family for the publication of this report. The patient and has family reviewed the report and agreed to its content and publication.

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References

1. Popkirov S, Asadi-Pooya AA, Duncan R, Gigineishvili D, Hingray C, Miguel Kanner A, LaFrance WC, Pretorius C, Reuber M, ILAE PNES Task Force. The aetiology of psychogenic non-epileptic seizures: risk factors and comorbidities. Epileptic disorders. 2019 Dec;21(6):529-47.
2. Xu Y, Nguyen D, Mohamed A, Carcel C, Li Q, Kutlubaev MA, Anderson CS, Hackett ML. Frequency of a false positive diagnosis of epilepsy: a systematic review of observational studies. Seizure. 2016 Oct 1;41:167-74.
3. Cengiz O, Jungilligens J, Michaelis R, Wellmer J, Popkirov S. Dissociative seizures in the emergency room: room for improvement. Journal of Neurology, Neurosurgery & Psychiatry. 2024 Apr 1;95(4):294-9.
4. Mutanana N, Tsvere M, Chiweshe MK. General side effects and challenges associated with anti-epilepsy medication: A review of related literature. Afr J Prim Health Care Fam Med. 2020 Jun 30;12(1):e1-e5. doi: 10.4102/phcfm.v12i1.2162. PMID: 32634006; PMCID: PMC7343956.
5. Malik NI, Fatima R, Ullah I, Atta M, Awan A, Nashwan AJ, Ahmed S. Perceived stigma, discrimination and psychological problems among patients with epilepsy. Frontiers in psychiatry. 2022 Nov 9;13:1000870.
6. Walzl, D., Carson, A.J. & Stone, J. The misdiagnosis of functional disorders as other neurological conditions. J Neurol 266, 2018–2026 (2019). https://doi.org/10.1007/s00415-019-09356-3
7. Asadi-Pooya AA, Bahrami Z, Homayoun M. Natural history of patients with psychogenic nonepileptic seizures. Seizure. 2019 Mar 1;66:22-5.
8. Yon MI, Azman F, Tezer FI, Saygi S. The coexistence of psychogenic nonepileptic and epileptic seizures in the same patient is more frequent than expected: Is there any clinical feature for defining these patients?. Epilepsy & Behavior. 2020 Apr 1;105:106940.

9. Ali S, Jabeen S, Arain A, Wassef T, Ibrahim A. How to use your clinical judgment to screen for and diagnose psychogenic nonepileptic seizures without video electroencephalogram. Innovations in clinical neuroscience. 2011 Jan 1;8(1):36.
10. Banks EM, Plattes MM. A case report of psychogenic non-epileptic seizures in a 29-year-old male with schizophrenia. Cureus. 2023 Apr;15(4).
11. Reuber M, Elger CE. Psychogenic nonepileptic seizures: review and update. Epilepsy & Behavior. 2003 Jun 1;4(3):205-16.

Picture of The Issue

Showing the Tape Worm in Duodenum found Incidentally During ERCP Procedure performed by Professor Dr Muhammad Umar, Vice Chancellor RMU

A 50-year-old male presented with jaundice, abdominal pain, and fever. Liver function tests showed cholestatic pattern, and ultrasound revealed biliary obstruction. Endoscopic Retrograde Cholangiopancreatography (ERCP) detected a long, segmented tapeworm in the common bile duct. The worm was extracted using a balloon. The patient was treated with albendazole and praziquantel to prevent recurrence. He improved symptomatically and was discharged with follow-up. Tapeworm infestation, though rare, should be considered in endemic areas. Early ERCP intervention and antiparasitic treatment are essential to prevent complications like recurrent cholangitis and pancreatitis.

Resident Research Forum at the 7th International Scientific Conference of Rawalpindi Medical University

Event Overview:

The Resident Research Forum (RRF), a synergy for nurturing research and academic acumen among residents, played a central role in the 7th International Scientific Conference of Rawalpindi Medical University (RMU). Conducted on **December 20, 2024**, Friday, this session exhibited four topic centered symposia and a comprehensive poster presentation session, seamlessly aligning with the conference's theme, **"Reshaping the Medical Education Landscape: The RMU Model."**

Innovative Leadership: The central theme and framework of the conference were formulated and directed by **Vice Chancellor Rawalpindi Medical University, Professor Dr. Muhammad Umer**, whose relentless dedication and unyielding commitment built a strong foundation for the success of the event. His ideation of revolutionizing healthcare education by merging innovation with medical expertise, was reverberated across the whole conference, inspiring residents and faculty alike.

Leadership and Organization:
The session was thoroughly guided by the esteemed patrons of RRF:

- Dr. Asad Tamizzudin (Patron-in-Chief RRF)
- Dr. Farrah Pervaiz (Patron In-Charge RRF)
- Dr. Sarah Rafi (Forum Coordinator RRF)

The RRF symposia and poster presentations were strategically planned and executed at the leadership of:

- Dr. Jamila Bibi (President, RRF)
- Dr. Tashfeen Farooq (President, RRF)
- Dr. Momina Amanullah (Vice President, RRF)
  Dr. Muhammad Shoaib Ali (Secretary, Benazir Bhutto Hospital)
- Dr. Kinza Shaista (Secretary, Holy Family Hospital)
- Dr. Madiha Liaqat (Secretary, Rawalpindi Teaching Hospital)

Their mentorship played a fundamental role in preparing residents to demonstrate quality research performance, hence ensuring the academic depth and rigor of the sessions.

Symposia Details: A total of 46 oral presentations were delivered across four symposia, which were held in Lecture Theatres 1 and 2 of the Old Teaching Block, RMU. Moderators for these sessions included prominent RRF members, ensuring intensive scholarly approach and enlightening discussions. Each symposium hosted distinguished panels of experts, graded the presentations, founded on a single structured evaluation criteria to avoid assessment bias.

Symposium	Time	Venue	Panel of Experts	Winners
Symposium 1	9:00am-10:30am	LTC-1	Prof. Dr. Faryal Azhar, Dr. Shehzad Manzoor, et al.	Dr. Naila Shaukat (Gynae Unit 2 HFH) Dr. Zeeshan (Gynae BBH),
Symposium 2	9:00am-10:30am	LTC-2	Dr. Zein-el-Amir, Dr. Rai Asghar, et al.	Dr. Ameena (Gynae Obs BBH)
Symposium 3	11:00am-12:30am	LTC-1	Prof. Dr. Tallat Farkhanda, Dr. Saima Ambreen, et al.	Dr. Ambreen (Gynae)
Symposium 4	11:00am-12:30am	LTC-2	Prof. Dr. Sadia, Prof. Dr. Fuad Niazi, et al.	Dr. Maimoona (ENT HFH)

Poster Presentations: The poster presentation session exhibited **70 posters**. Posters were displayed in Courtyard of Old Teaching Block, demonstrating a diversity across medical domains with a special focus on medical education. The results were as follows:

Positions	Name of PGT	Department/Hospital
1st (Shared)	Dr. Kainat Zafar Dr. Ayesha Raza	Obstetrics and Gynaecology, Unit 2, HFH Surgical Unit 2, BBH
2nd	Dr. Shahzad	Urology, BBH
3rd	Dr. Umara Naseem	Emergency Medicine, HFH

Key Highlights:

1. The session successfully illustrated the RMU model of integrating research with medical practice, thereby empowering residents to pursue clinically validated medical practice
2. The theme of the session emphasized quality enhancement, innovative strategies in medical education, and refinement of clinical practices.
3. The session highlighted a notable participation of residents from all 3 RMU allied hospitals, demonstrating a collaborative approach across all the specialties.
4. Acknowledgments: The remarkable success of the RRF sessions is credited to the farsighted leadership of Vice Chancellor RMU, Professor Dr. Muhammad Umer, whose relentless efforts paved the way for this groundbreaking session. The resolute dedication and commitment of the residents, the empowering mentorship of patrons, and the logistical support provided by RMU had a pivotal role in the success of the event. The RRF remains focused on nurturing an intellectual research culture among residents and strengthening the academic status of Rawalpindi Medical University.

Conclusion:

The Resident Research Forum at the 7th Annual Scientific Conference not only featured the research expertise of RMU residents but alss established a standard for future academic and research initiatives. The synergistic efforts of faculty and residents contributed towards shaping the next generation of healthcare professionals, and was aligned with the RMU vision of reshaping medical education.