



#### BLOOD AND IMMUNITY MODULE SKILL LAB /PHYSIOLOGY PRACTICAL FIRST YEAR MBBS (BATCH 50) DETERMINATION OF BLEEDING TIME (BT)

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#### TRUTA MARCICAL POR

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#### Motto

#### Vision; The Dream/Tomorrow



- To impart evidence based research oriented medical education
- To provide best possible patient care
- To inculcate the values of mutual respect and ethical practice of medicine







#### **BLOOM'S TAXONOMY : DOMAINS OF LEARNING**

Sr. #	Domain of learning	Abbreviat ion	Levels of the domain	Meaning
1	cognition	С	C1	Recall / Remembering
2			C2	Understanding
3			C3	Applying / Problem solving
4	Psychomotor	Ρ	P1	Imitation / copying
5			P2	Manipulation / Follows instructions
6			Р3	Precision / Can perform accurately
7	Attitude	А	A1	Receiving / Learning
8			A2	Respond / Starts responding to the learned attitude
9			A3	Valuing / starts behaving according to the learned attitude

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### **Diagrammatic Representation of Blooms Taxonomy**





#### **LEARNING OBJECTIVES**

Sr. #	Learning Objectives	Domain of Learning
1	To define bleeding time and its normal value	C1
2	To perform step by step the determination of bleeding time.	P3/A3
3	To explain different methods to determine bleeding time.	C2
4	To correlate clinically with different clotting and bleeding disorders.	C3
5	To explain corelation between bleeding time(BT) and clotting time(CT)	C2

### **BLEEDING TIME**

 It is the time taken for stoppage of bleeding from a bleeding site as a result of Platelet plug formation.(Normal bleeding time 1-5 minutes by DUKE" Method)

#### **HEMOSTASIS:**

- This term refers to the process of stoppage of bleeding after blood vessels are punctured, cut or otherwise damaged.
- It is a homeostatic mechanism to prevent blood loss.



Core Concept/ Vertical Integration with Internal Medicine

### **RELEVANCE:**

- Bleeding after injury is a common experience for most of us but bleeding stops automatically within a few minutes.
- Frequent and prolong bleeding with minor injuries such as cutting nails, fall on the knees, shaving may be related to the pathology.
- Also there may be spontaneous bleeding (without trauma) in skin, gums, muscles and into joints.
- These should be investigated by various tests.





#### PHYSIOLOGICAL BASIS OF BLEEDING DISORDERS:

Excessive and prolonged bleeding with small injuries or spontaneous bleeding may result from defects of :

- 1. Platelets
- 2. Blood vessel walls
- 3. Coagulation of Blood

#### Platelets





Cluster of developing erythrocytes

Clusters of platelets shedding off

IFigure 11-10 A megakaryocyte forming platelets.

Reference: Sherwood Human Physiology 9<sup>th</sup> edition page no.395

### Blood vessel wall



Reference: Silverthorn Human Physiology 6<sup>th</sup> edition page no.559

Core Concept/Horizontal Integration (Biochemistry)

#### CONTD..



Reference: Sherwood Human Physiology 9<sup>th</sup> edition Page no.396

Core Concept/ Horizontal Integration (Biochemistry)



#### CONTD..



**FIGURE 31–11 Summary of reactions involved in hemostasis.** Injury to a blood vessel exposes collagen and thromboplastin, recruiting platelets to the site of injury to form a temporary plug. Platelets release 5-hydroxytryptamine, among other factors, resulting in smooth muscle contraction and vasoconstriction. Activation of the clotting cascade in response to collagen and thromboplastin activates thrombin, which converts circulating fibrinogen to fibrin monomers. Fibrin monomers polymerize and are cross-linked and accumulate with platelets at the site of injury to form the definitive clot.

Reference: Ganong's Review of Medical Physiology 26<sup>th</sup> edition Chapter 31



### **Coagulation Of Blood**

#### PLATELET PLUG FORMATION

Platelets will not adhere to intact endothelium. Damage triggers platelet plug formation where collagen has been exposed.



**Fig. 16.9** 

Reference: Silver thorn Human Physiology 6<sup>th</sup> edition page no.560



# Methods For Determination Of Bleeding Time

- 1.DUKE" Bleeding Time.
- 2.IVY Bleeding Time.

#### Materials:

- 1. Sterile and disposable blood lancet
- 2. Filter papers
- 3. Glass capillary tubes with a uniform bore
- 4. Stopwatch
- 5. Sterile blade
- 6. Blood pressure cuff
- 7. Alcohol swab



### DUKE" Bleeding Time:

 This test is simple and quiet reliable inspite of the fact that the depth of wound cannot be controlled.

PRINCIPLE:

- Skin of the finger tip is quite thick in some persons. A small cut in the skin of the ear lobe with the edge of the sterile blade gives better results.
- The EAR LOBE METHOD is the original duke" method for BT.



#### Procedure

- 1. Get a deep finger prick or ear lobule under aseptic conditions to get free-flowing blood.
- 2. Start the stop watch as bleeding starts and note the time.
- 3. Absorb the punctured site blood with filter paper without pressing and squeezing the wound every 30 seconds.
- 4. Number the blood spots 1 onwards.
- 5. Note the time when bleeding stops i.e. no trace of blood on filter paper.
- 6. Encircle the spot and number it as well. This is the end point.
- 7. Count the number of blood spots and express your results in minutes and seconds.

#### NORMAL BLEEDING TIME= 1-5 MINUTES BY THIS METHOD.



### METHOD:



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### METHOD:





### Precautions

- 1. The skin site chosen should be scrubbed well with alcohol to increase the blood flows.
- Skin should be dry and puncture should be 3-4mm deep to give free flowing blood.
- 3. Do not squeeze puncture site.

Core Concept

4. Do not press the filter paper on the puncture site.



### IVY BLEEDING TIME:

- This test is MORE reliable than the DUKE" Method.
- However, it requires some practice to apply the Blood Pressure Cuff and maintain the pressure.



### Procedure

- 1. Clean the skin over the front of the forearm with 70% alcohol.
- 2. Apply the blood pressure cuff on the upper arm, Raise pressure to 40mmHg and maintain it till the end of the experiment.
- 3. Clean the skin area once again.

**Core Concept** 

- 4. Grasp the underside of the forearm tightly, make a 1-3mm deep skin puncture,5-6cm below the cubital fossa and note the time.
- 5. Absorb the punctured site blood with filter paper by gently touching the wound every 30 seconds, till the bleeding stops. This is the end point.
- 6. Remove the cuff and clean the punctured area.
- 7. Note this time and enter the result in the notebook.

#### **NORMAL BLEEDING TIME= up to 9 MINUTES BY THIS METHOD.**



### Factors Related With Bleeding Time:

- 1.Breadth and depth of the wound.
- 2.Degree of hyperemia of the skin puncture site.
- 3.Number of platelets and their functional status.
- 4.Functional status of the blood vessel.
- 5.Temperature:

(Low temperature promotes vasoconstriction and thus shortens bleeding time)



### THROMBOEMBOLIC CONDITIONS:

- Causes:
- Any roughened endothelial surface of a vessel as may be caused by arteriosclerosis, infection, or trauma is likely to initiate the clotting process.
- Blood often clots when it flows very slowly through blood vessels, where small quantities of thrombin and other procoagulants are always being formed.



## **Bioethics**



#### **The Four Principles Of Beauchamp and Childress**



 The four principles of Beauchamp and Childress have been extremely influential in the field of medical ethics, and are fundamental for understanding the current approach to ethical assessment in health care.



#### Lesson Of The Day JUSTICE

- Justice in a medical context relates to the fair treatment of all patients cared for by medical practitioners. This prevents the discrimination of any patient for any reason, ensuring that all decisions are made based on the health benefits of the patient or the patient's own Autonomy
- Medical justice also relates to ethical decisions that affect the society around the patient, as well as their own safety and the safety of their colleagues. For example, life-saving support would still need to be provided to someone suspected to be dangerous.







### Suggested Research Article



Clinical Neurology and Neurosurgery Volume 217, June 2022, 107258



Determination of bleeding time by hounsfield unit values in computed tomography scans of patients diagnosed with intracranial hemorrhage: Evaluation results of computed tomography scans of 666 patients 🛠

<u>Asan Ziya</u> 오 🖂

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https://doi.org/10.1016/j.clineuro.2022.107258 🦻

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#### Abstract

#### Objective

Determining the bleeding time in <u>intracranial hemorrhage patients</u> is one of the most critical parameters in determining the surgical or medical treatment method. Since these are trauma <u>patients</u>, they are essential patients in <u>forensic medicine</u>. In <u>patients</u> where the bleeding time cannot be determined, HU value measurements in <u>CT</u> scans can provide quantitative data. In the radiological follow-up of the patients, only the follow-up of the bleeding volume may be misleading.



Promoting IT and Research Culture

#### **How To Access Digital Library**

- Steps to Access HEC Digital Library
- 1. Go to the website of HEC National Digital Library.
- 2. On Home Page, click on the INSTITUTES.
- 3. A page will appear showing the universities from Public and Private Sector and other Institutes which have access to HEC National Digital Library HNDL.
- 4. Select your desired Institute.
- 5. A page will appear showing the resources of the institution
- 6. Journals and Researches will appear

7. You can find a Journal by clicking on JOURNALS AND DATABASE and enter a keyword to search for your desired journal.



## Brainstorming



### Structured Essay Question related to Topic

**Q.NO.1**: A 35 years male presented with complaints of high grade fever, severe abdominal pain, and rash along with severe headache and bodyaches, loss of appetite. His examination revealed pallor, increased heart rate & difficulty in breathing. CBC was done which depicted decreased hemoglobin(8g/dI), raised WBCs (14,000/ul) and highly decreased Platelets (50,000/ul). What would be the likely diagnosis?



#### **ANSWER**

#### **ANSWER : DENGUE FEVER**

## Q.NO.2: What investigations you would like to do further in this patient?



- Coagulation Profile:
- 1. Bleeding time (BT) (prolonged)
- 2. Prothrombin time (PT) (prolonged)
- Activated Partial Thromboplastin Time(APTT) (prolonged)
- International normalized ratio (INR) (deranged)
- Dengue serology



### Structured Essay Question related to Topic

**Q.NO.3:** A 2 years boy brought by his mother to the peadiatric emergency department with the history of fall 20 minutes ago followed by oozing of blood from his mouth. He had a history of prolonged bleeding from immunization sites. No history of bruising and hematomas or family history of bleeding disorder. On investigations his APTT and Bleeding time was prolonged along with decreased serum levels of factor VIII And Ristocetin cofactor assay. The patient is suffering from which condition?



#### Answer

• Von Willebrand disease

#### **REFERENCES**

#### 1. Books:

- •Guyton And Hall textbook of Medical Physiology 14<sup>th</sup> Edition
- •Ganong's Review of Medical Physiology 25<sup>th</sup> Edition
- •Sherwood, 9<sup>th</sup> edition.
- •Silverthorn Physiology,6<sup>th</sup> edition
- •Vander's Human Physiology,14<sup>th</sup> edition
- •Google images.

#### 2.Medical Journal articles:

 Determination of bleeding time by hounsfield unit values in computed tomography scans of patients diagnosed with intracranial hemorrhage: Evaluation results of computed tomography scans of 666 patients

https://doi.org/10.1016/j.clineuro.2022.107258

#### 3.Video link /youtube:

https://youtu.be/P9czuMQzpBc



