



BLOOD MODULE SKILL LAB /Physiology PRACTICAL FIRST-YEAR MBBS BATCH 50 Clinical Examination Of Precordium



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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	Abbreviation	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			P3	Precision / Can perform accurately
7	Attitude	itude A	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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BLOOM'S TAXONOMY OF THE COGNITIVE DOMAIN





LEARNING OBJECTIVES

Sr. #	Learning Objective	Domain of Learning
1	To define Precordium and its clinical significance.	C1
2	To identify the anatomical landmarks used for Precordium examination	C2
3	To describe the various components of examination of precordium	C1
4	To explain the rationale behind positioning the patient at a specific angle for precordium examination.	C2
5	To understand the relationship between the sternal angle and the precordium examination.	C2
6	To apply knowledge of precordium examination in a clinical context to assist in making diagnostic decisions	A3, P3, C3



Horizontal integration With Anatomy

Horizontal Integration with Anatomy



Different Anatomical Lines



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Horizontal Integration with Anatomy





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Horizontal Integration with Anatomy





Horizontal Integration with Anatomy



Location of Heart Valves



tricuspid area (fourth and fifth ICS just to the left of

- = Aortic valve
- = Pulmonary valve
 - = Mitral valve
 - = Tricuspid valve
- 1 Right atrium
- 2 Right atrial appendage
- 3 Left atrial appendage
- 4 Atrioventricular groove
- 5 Right ventricle
- 6 Left ventricle
- 7 Apex of the heart
- 8 Anterior interventricular groove



Core Concept



Examination of the Precordium

- Precordium is the area of the chest wall lying in front of the heart.
- \checkmark Inspection
- ✓ Palpation
- ✓ Percussion
- Auscultation
- The subject should be examined in the recumbent and sitting position, and in good light.



Inspection

- ✓ Inspection for Chest wall abnormalities
- ✓ Inspection for Position of trachea
- ✓ Inspection for Apex beat
- ✓ Inspection for Other pulsations
- Inspection for Dilated and engorged veins
- ✓ Inspection for Surgical or any Scars



Core Concept & Vertical Integration with Cardiology



Chest wall(Skeletal) abnormalities

✓ Precordial Bulging
✓ Pectus excavatum (funnel chest)
✓ Pectus carinatum (pigeon chest)
✓ Kyphosis (forward bending of spine)
✓ Scoliosis (sideward bending of spine)
may displace the heart and affect palpation and auscultation





Apex beat

Lowest and the Outermost point of definite cardiac impulse can be palpated.





Other pulsations

i.Arterial pulsations in the neck may be visible in hyperdynamic circulation, as in—anxiety, hyperthyroidism, aortic regurgitation, and hypertension.

ii.Pulsations to the right or left of the upper sternum may be due to aortic aneurysm.

iii.Enlargement of the right ventricle, or enlarged left atrium due to severe mitral regurgitation may cause pulsations in the left upper parasternal region.

iv.Pulsations in the epigastrium are most commonly due to pulsations of abdominal aorta increased by emotional excitement in thin individuals, or enlargement of the right ventricle, or due to hepatic pulsations from tricuspid regurgitation.

v.Pulsations in the superficial arteries of thorax may be visible in coarctation of aorta.



Core Concept & Vertical Integration with Cardiology

Dilated and engorged veins

✓ SVC or IVC obstruction✓ Coarctation of aorta





Palpation

- Palpation for Apex Beat (Position and Character)
- ✓ Palpation for Position of trachea
- ✓ Palpation for Parasternal Heave
- ✓ Palpation for Thrills
- ✓ Palpation for Direction of flow in veins
- ✓ Palpation for Tender points



Apex beat

✓ Position

- Normally in the fifth left intercostal space half inch medial to, the midclavicular line
- Enlargement of the heart due to hypertrophy or dilatation may shift the apex beat.
- Pulling or pushing of the mediastinum due to lung disease may shift the position of the apex beat.

✓Character

- ➤ A normal apical impulse briefly lifts your fingers and is localized.
- Diffuse, sustained and more forceful thrust indicates left ventricular hypertrophy or hyperkinetic circulation.
- ≻ A "tapping" apex beat may be seen in mitral stenosis



Apex beat

The apex beat may not be palpable in some normal persons because:

- i. It may be located behind a rib.
- ii. The chest wall may be thick due to fat or muscle.
- iii.The emphysematous lung may cover part of the heart.
- iv. Plural effusion, pericardial effusion
- v. Dextrocardia

Ask patient to lean forward if apex beat not palpable



Parasternal Heave

- ✓ Palpate with ulnar border of your hand
- ✓ Over left parasternal line
- ✓ Present in RVH

Thrills

- ✓ A thrill is a palpable murmur,
- ✓ produced when blood passes through a narrowed valve, or when there is abnormal blood flow, as in congenital defects, or if the blood flow is rapid.

Direction of flow in veins

SVC obstruction – Above Downwards IVC obstruction – Below Upwards



Rules of Percussion

- ✓ Place the palm of your left hand on the chest, with your fingers slightly separated.
- ✓ Press the middle finger of your left hand firmly against the chest,
- ✓ aligned with the underlying ribs(ICS) over the area to be percussed.
- ✓ Strike the center of the middle phalanx of your left middle finger with the tip of your right middle finger
- \checkmark swinging movement of the wrist and not the forearm.
- ✓ Remove the percussing finger quickly.
- ✓ Resonant to dull
- ✓Hear for the Note (Dull, Resonant or Tympanic)



Percussion

✓ Percussion for Borders of the Heart





Percussion

Right border of the heart, which is formed by the right atrium, lies behind the sternum

Left border of the heart:

The position of the apex beat is first located. Percussion is done in the 5th, 4th, and 3rd intercostal spaces, starting in the left midaxillary line and going towards the heart till the notes change from resonance to dullness.

The area of cardiac dullness increases in pericardial effusion, while it may be decreased in emphysema



✓ Auscultation for Heart Sounds

First sound (S1)

This corresponds to mitral and tricuspid valve closure at the onset of systole.

Second sound (S2)

This corresponds to aortic and pulmonary valve closure following ventricular ejection.





Listen with your stethoscope diaphragm:

- \checkmark At each site identify the S1 and S2 sounds.
- ✓Assess their character and intensity; note any splitting of the S2.
- ✓ Palpate the carotid pulse to time.
- The S1 barely precedes the upstroke of the carotid pulsation, while the S2 is clearly out of phase with it.



First heart sound (S1), 'lub',

- ✓ is caused by closure of the mitral and tricuspid valves
- ✓ at the onset of ventricular systole.
- \checkmark It is best heard at the apex.
- ✓ Prolonged (0.15 sec),
- ✓ low pitch (20–40 Hz)
- Normally splitting not heard

Abnormalitie heart sound	es of intensity of the first
Quiet	
Low cardiac outputLong P–R interval (first- degree heart block)Poor left ventricular function Rheumatic mitral regurgitationLong P–R interval (first- degree heart block)	
Loud	
Increased cardiac output Large stroke volume Mitral stenosis	Short P–R interval Atrial myxoma (rare)
Variable	
Atrial fibrillation Extrasystoles	Complete heart block





Second heart sound (S2), 'dup',

- ✓ is caused by closure of the pulmonary and aortic valves
- ✓ at the end of ventricular systole and is
- ✓ best heard at the left sternal edge.
- ✓ Shorter(0.12sec) and higherpitched(50Hz) than the S1

\mathcal{S}	Abnormalities of the second heart sound
Quiet	
Low cardi Calcific ad Aortic reg	ac output ortic stenosis urgitation
Loud	
Systemic Pulmonar	hypertension (aortic component) / hypertension (pulmonary component)
Split	
Widens in	inspiration (enhanced physiological splitting):
Right bun Pulmonar Pulmonar Ventricula	dle branch block / stenosis / hypertension r septal defect
Fixed spli	tting (unaffected by respiration):
Atrial sep	al defect
Widens in	expiration (reversed splitting):
Aortic ste Hypertrop Left bund Ventricula	nosis hic cardiomyopathy e branch block r pacing





Physiological splitting of S2 occurs because

- ✓ left ventricular contraction slightly precedes that of the right ventricle
- ✓ so that the aortic valve closes before the pulmonary valve.
- ✓ This splitting increases at endinspiration because increased venous filling of the right ventricle further delays pulmonary valve closure.
- This separation disappears on expiration.
- ✓ Splitting of S2 is best heard at the left sternal edge.
- ✓ On auscultation, you hear 'lub d/dub' (inspiration) 'lub-dub' (expiration)



Normal and pathological splitting of the second heart sound.



Third and fourth sounds (S3, S4)

- Rapid filling occurs early in diastole (S3) following atrioventricular valve opening,
- ✓ late in diastole (S4) due to atrial contraction.

A triple rhythm

- ✓ (gallop rhythm when the heart rate is above 100/min) may be present. triple rhythm which is produced by the addition of 3rd or 4th heart sounds to the normal 1st and 2nd sounds
- ✓ When either of these(S3 or S4) are prominent and audible, they produce a triple rhythm, as in left ventricular failure
- ✓ Splitting of heart sounds must be differentiated from triple rhythm

Causes of a thi	rd heart sound
Physiological	
Healthy young adultsAthletes	 Pregnancy Fever
Pathological	
 Large, poorly contracting left ventricle 	Mitral regurgitation

Core Concept & Vertical Integration with Cardiology

TRUTH TRUTH

Auscultation

Added sounds

- ✓ opening snap
- ✓ Ejection clicks
- \checkmark Mid-systolic clicks
- ✓ Pericardial rub (friction rub)
- ✓ pleuro-pericardial rub



Murmurs

Heart murmurs are produced by turbulent flow across an abnormal valve, septal defect or outflow obstruction.

- ✓ Timing
- \checkmark Duration
- \checkmark Character and pitch
- ✓ Intensity
- ✓ Location
- ✓ Radiation



Vertical integration with Clinical & Paraclinical Sciences

Vertical Integration with Cardiology

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Vertical Integration with Cardiology



Constrictive pericarditis

Pathophysiological Abnormalities of Constrictive Pericarditis







Constrictive Pericarditis Pericardial Knock

Sound resulting from sudden cessation of ventricular filling by the rigid pericardium



High pitched, early diastolic sound (similar to S3 timing) Best heard in left lateral decubitus position

Syed, F., Schaff, H. & Oh, J. Constrictive pericarditis—a curable diastolic heart failure. *Nat Rev Cardiol* **11**, 530–544 (2014). https://doi.org/10.1038/nrcardio.2014.100

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Understanding Biomedical Ethics

Biomedical Ethics

4 PILLARS OF MEDICAL ETHICS

THE PILLAR OF BENEFICENCE



THE PILLAR OF NON-MALEFICENCE



THE PILLAR OF

THE PILLAR OF





Non-maleficence (Lesson of the day)

- The principle of non-maleficence holds that there is an obligation not to inflict harm on others.
- Example: stopping a medication known to be harmful or refusing to give a medication to a patient if it has not been proven to be effective.





Brain Storming Question & Answer



QUESTIONS

QUESTION 1:-

Define central venous pressure?



Ans: The mean (average) right atrial pressure that equals right ventricular end-diastolic pressure (the amount of pressure at the end of diastole-filling)



QUESTIONS

Question 2: Why do we examine jugular veins? Give two reasons.



Answer

- 1. To estimate the amount of central venous pressure
- 2. To monitor pressure fluctuations in the right atrium during the cardiac cycle.



QUESTIONS

Question 3: What is the main determinant of right ventricular preload?



Answer

The mean right atrial pressure which equals right ventricular end-diastolic pressure - central venous pressure



Suggested Research Article

Promoting Research Culture



Related Research Article



Cardiovascular Research (2022) 118, 3272–3287 European Society https://doi.org/10.1093/cvr/cvac013 of Cardiology

INVITED REVIEW

Global burden of heart failure: a comprehensive and updated review of epidemiology

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Abstract

Heart Failure (HF) is a multi-faceted and life-threatening syndrome characterized by significant morbidity and mortality, poor functional capacity and quality of life, and high costs. HF affects more than 64 million people worldwide. Therefore, attempts to decrease its social and economic burden have become a major global public health priority. While the incidence of HF has stabilized and seems to be declining in industrialized countries, the prevalence is increasing due to the ageing of the population, improved treatment of and survival with ischaemic heart disease, and the availability of effective evidence-based therapies prolonging life in patients with HF. There are geographical variations in HF epidemiology. There is substantial lack of data from developing countries, where HF exhibits different features compared with that observed in the Western world. In this review, we provide a contemporary overview on the global burden of HF, providing updated estimates on prevalence, incidence, outcomes, and costs worldwide.

https://doi.org/10.1093/cvr/cvac013

Promoting IT & **Research Culture**



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

Link: https://www.topstudyworld.com/2020/05/access-hec-digitallibrary.html?m=1

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2	Text book	Boron WF, Boulpaep EL. Medical Physiology: A Cellular and Molecular Approach. 3rd ed. Philadelphia, PA: Elsevier; 2017.
3	Text book	Sherwood L. Human Physiology: From Cells to Systems. 10th ed. Boston, MA: Cengage Learning; 2020.
4	Text book	Widmaier EP, Raff H, Strang KT. Vander's Human Physiology: The Mechanisms of Body Function. 16th ed. New York, NY: McGraw-Hill Education; 2021.
5	Text book	Costanzo LS. Physiology. 7th ed. Philadelphia, PA: Saunders; 2021.
6	Research papers	https://doi.org/10.1016/S0140-6736(09)61925-5 https://doi.org/10.3390/jcdd9110402
7	YouTube Video	https://www.youtube.com/watch?v=baxNxWIWdK8&ab_channel=AMBOSS %3AMedicalKnowledgeDistilled



Thank You