OSCE TEAM
MED434

جامعة الملك سعود
King Saud University

CARDIOVASCULAR EXAMINATION

Color index

Important

Further explanation

Editing link

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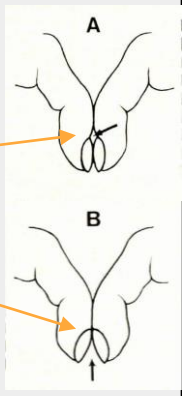
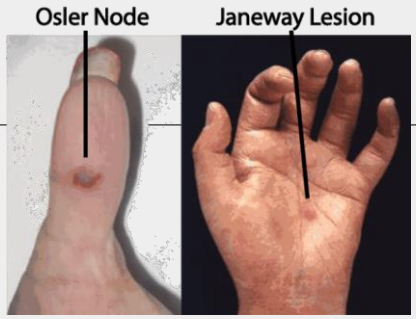
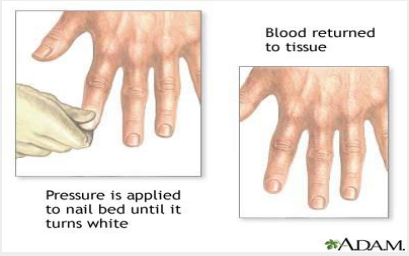
Imp. points Before starting the examination:

- **Confirm patient's details**
- **Explain the examination**
- **Do WIPE:**
  - ✓ Wash your hands
  - ✓ Introduce yourself
  - ✓ Ask for Permission\ensure Privacy\Position the patient at 45°[1]
  - ✓ Expose the patient's chest
- **Ask if the patient has any pain anywhere before you begin!**
- **Remember: always examine the patient from the right side.**

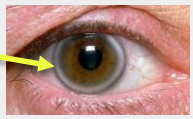
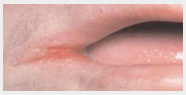
What to do	What to look for
1.General inspection: **connections**	**e.g. nasogastric tube, oxygen mask or IV line**
Comfortable at rest?	✓ **Does he look ill, in pain, has SOB** ✓ **Cachectic** due to malignancy or severe HF ✓ syndromes that are associated with specific cardiac disease + could be recognized by the patient's appearance: -**Marfan's syndrome** -**Down's syndrome** -**Turner's syndrome**
Inspect chest	**Scars**, **visible pulsations, Pectus excavatum or Pectus carinatum**
Inspect legs	Scars**, peripheral edema,** missing limbs or toes
2.Hnads: *Hands out + palms facing downwards* **Look for clubbing**	-Ask the patient to place the nails of their index fingers back to back: ▪ if **healthy** you should be able to observe a small diamond shaped window (Schamroth's window) ▪ When **finger clubbing is present** this window is lost (Schamroth's sign) -causes of CLUBBING: ✓ Cyanotic congenital heart disease ✓ Lung abscess ✓ Ulcerative colitis & chron's disease ✓ Bronchiectasis ✓ Bronchogenic carcinoma ✓ Infective endocarditis ✓ Nothing ✓ Graves 

1.Why 45 for cardiac examination? Because it's the usual position in which the jugular venous pressure (JVP) is assessed + if the patient has PE and was laid flat, it might increase and impede breathing.

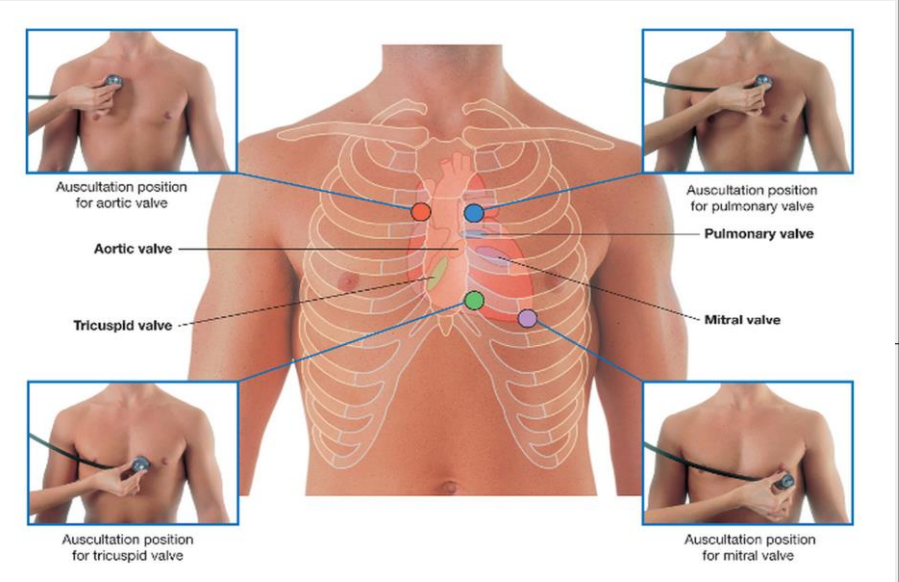
What to do	What to look for
2.Hands cont.. **Look for:** **Splinter haemorrhages**	-linear haemorrhages lying parallel to the long axis of the nail. -causes: ✓ bacterial endocarditis ✓ rheumatoid arthritis ✓ polyarteritis nodosa 
Hands out + palms facing upwards: **Colour**	dusky bluish discoloration (cyanosis) suggests hypoxia 
Temperature	cool peripheries may suggest poor cardiac output
Sweaty	can be associated with acute coronary syndromes
Janeway lesions	non-tender maculopapular erythematous palm pulp lesions – Infective endocarditis 
Osler's nodes	tender red nodules on finger pulps / thenar eminence – Infective endocarditis
Capillary refill	normal is <2 seconds – if prolonged may suggest hypovolemia 
Xanthomata	yellow or orange deposits of lipid in the tendons caused by hyperlipidemia 

What to do	What to look for
3.Pulses **Radial pulse** **Brachial & carotid pulses** **Check:** **Rate**	 Medial to the radius, using forefinger & middle finger pulps, <u>to assess rate & rhythm</u> <u>To assess volume & character</u>  Normal, tachycardia or bradycardia? Pulse deficit[1]? Afib.
RHYTHM	-**Regular**? -**Irregularly irregular or chaotic rhythm**? ✓ NO pattern detected, e.g. A fib. -**regularly irregular**? Sinus arrhythmia (normal slowing of the pulse with expiration) -**Bigeminal rhythm?** -**Trigeminal rhythm?**  
Radio-radial delay: Palpate both radial pulses simultaneously should occur at the same time in a healthy adult.	A delay is usually due to arterial occlusion by an <u>atherosclerotic plaque</u> or <u>Aortic dissection</u>
Radio-femoral delay: While palpating the radial pulse, place the fingers of your other hand over the femoral pulse	A delay in the arrival of the femoral pulse wave suggests the diagnosis of <u>coarctation of the aorta</u> just distal to the origin of the subclavian artery
Collapsing (Waterhammer) pulse: First ensure the patient has no shoulder pain>> Palpate the radial pulse>>Raise the arm above the head briskly>>Feel for a tapping impulse through the muscle bulk of the arm as blood empties from the arm very quickly in diastole, resulting in the palpable sensation	associated with high stroke volume (high systolic bp) & low diastolic bp i.e. blood is returning to the LV very quickly (aortic regurgitation) -could be normal (*fever/pregnancy*), or in cardiac lesions (*e.g PDA*) or high output states (*e.g anaemia / AV fistula / thyrotoxicosis*)
Blood pressure: Often you won't be expected to do it due to time restraints but make sure to mention that you'd ideally like to measure blood pressure in both arms.	-**HTN? Hypotension**? Low bp is considered normal in pregnancy, desirable in diabetics -**Narrow pulse pressure** is associated with <u>Aortic Stenosis</u> **Wide pulse pressure** is associated with <u>Aortic Regurgitation</u>

1.heart rate counted by the stethoscope is higher than that observed at the periphery, because there are beats where diastole is short for adequate filling>> too small volume of blood is ejected during systole>>pulse is not felt at the wrist

What to do	What to look for
4. Face **Look for:** **jaundice**	Could be due to: -CHF>hepatic congestion -prosthetic valve>hemolysis
Corneal arcus **Xanthelasma** 	hyperlipidemia>which increase the risk of cardiovascular insult
Central cyanosis	bluish discolouration of lips + underneath tongue
Angular stomatitis	iron deficiency anemia 
5.neck **Carotid pulse:** often advised to auscultate for a bruit before palpating as theoretically palpation might dislodge a plaque>> a stroke.	-Assess character & volume. e.g. slow rising character in aortic stenosis -*Never palpate both carotid arteries simultaneously* because it may compromise the brain blood flow
Jugular venous pressure: ✓ patient is positioned at 45° ✓ Ask patient to turn their head away from you ✓ Observe the neck for the JVP (located inline with the sternocleidomastoid) ✓ Measure the JVP: number of cm from sternal angle to the upper border of pulsation	Raised JVP (>3cm above sternal angle) may indicate: • Fluid overload • Right ventricular failure • Tricuspid regurgitation • constrictive pericarditis • Cardiac tamponade 
Hepatojugular reflux: ✓ Press firmly with the palm over the middle of the abdomen for 10 sec ✓ Observe the JVP for a rise ✓ In healthy individuals this should last no longer than 1-2 cardiac cycles (it should then fall)	Positive result (the rise in JVP is sustained & ≥4cm) suggest: -Right ventricular failure -elevated left atrial pressures are (left ventricular failure) -Tricuspid regurgitation
Large a waves:	a wave is caused by the right atrial pressure transmitted to the jugular veins during right atrial systole, causes of large a wave include: • complete heart block (right atrium contracting against the closed tricuspid valve) • tricuspid stenosis • right ventricle hypertrophy • pulmonary valve stenosis

What to do	What to look for
6.Praecordium ❖ **INSPECTION** **Scars:**	position of the scar can be a clue to the type of lesion: • Sternotomy: *CABG / valve surgery* • Clavicular: *Pacemaker* • lateral thoracotomy scars: *closed mitral valvotomy*
Chest wall deformities	 pectus carinatum pectus excavatum 
Visible pulsations apex beat. Its normal position is in the fifth left intercostal space, 1cm medial to the midclavicular line	forceful apex beat may be visible – *hypertension/ventricular hypertrophy*
❖ **PALPATION** ✓ Localize the apex beat ✓ Use firm pressure with the tips of your fingers ✓ Lift the heel of your hand off the patient's sternum The character, but not the position, of the apex beat may be more easily assessed when the patient lies on the left side.	The normal apex beat gently lifts the palpating fingers. -There are a number of types of abnormal apex beats: ✓ **pressure loaded (heaving):** apex beat is a forceful ✓ and sustained impulse, ventricular hypertrophy e.g. AS or HTN. ✓ **volume loaded:** beat is displaced, diffuse, non-sustained impulse, ventricular dilatation e.g. MR ✓ **dyskinetic apex beat:** uncoordinated impulse, left ventricular dysfunction e.g. MI ✓ **double impulse apex beat:** hypertrophic cardiomyopathy **The tapping apex beat:** when the first heart sound is actually palpable mitral or tricuspid stenosis. -**Displaced laterally or inferiorly**, or both, this usually indicates enlargement **-Non-palpaple apex beat** due to a thick chest wall, emphysema, pericardial effusion, shock (or death) and dextrocardia (the heart is located on the right side)
Heaves A parasternal impulse felt when the heel of the hand is rested just to the left of the sternum with the fingers lifted slightly off the chest	Normally no impulse or a slight inward impulse is felt In case of LVH & severe left atrial enlargement the heel of the hand is lifted off the chest wall with each systole
Thrills	palpable murmurs felt over aortic valve & apex beat caused by turbulent blood flow

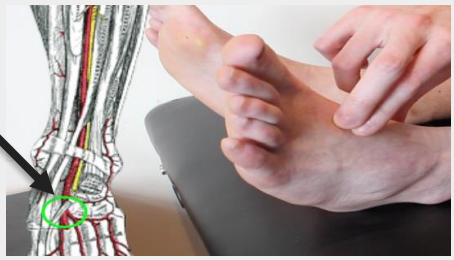
What to do	What to look for
6.Praecordium ❖ **PERCUSSION** Can be done to define the cardiac outline and detect cardiomegaly but not usually used.	
❖ **AUSCULTATION** ➢ **Aortic valve** – 2nd intercostal space – right sternal edge ➢ **Pulmonary valve** – 2nd intercostal space – left sternal edge ➢ **Tricuspid valve** – 5th intercostal space – lower left sternal edge ➢ **Mitral valve** – 5th intercostal space – midclavicular line (apex beat) It Starts in the mitral area with the bell of the stethoscope>then turn it to the diaphragm and listen>next go to the Tricuspid >Pulmonary >Aortic. Listening carefully in each position with the diaphragm.	
First heart sound: -has two components corresponding to mitral and tricuspid valve closure, but usually only **one sound** is audible. S1 indicates the **beginning of ventricular systole** + occurs just before or coincident with the upstroke of the carotid pulse (so any murmur detected with the pulse is systolic murmur)	➢ **LOUD S1**: ✓ when the mitral or tricuspid valve cusps remain wide open to the end of diastole and shut forcefully with systole (normal mitral valve cusps approach each other at the end of diastole as the filling slows down) ✓ e.g. MS: narrowed valve orifice limits the filling, so the filling doesn't slow towards the end of diastole>the valves don't approach each other>shut forcefully ✓ Other causes of a loud S1 is tachycardia reduced diastolic filling time. ➢ **SOFT S1:** occurs with ✓ first-degree heart block>Prolonged diastolic filling time ✓ Left BBB>delayed onset of left ventricular systole ✓ mitral regurgitation>failure of the leaflets to close normally
second heart sound: -softer, shorter and at a slightly higher pitch than S1 + marks the end of systole.	-Aortic valve (A2) closing slightly before the pulmonary valve (P2), and this **splitting** more prominent with inspiration due to increased RV stroke volume ➢ **Loud aortic component (A2):** systemic HTN + AS ➢ **loud pulmonary component (P2):** pulmonary HTN ➢ **soft A2:** aortic regurgitation

What to do	What to look for
6.Praecordium ❖ **AUSCULTATION** **Second heart sound: cont**	➢**Splitting:** best detected in the pulmonary area occurs when there is any delay in right ventricular emptying E.g. Right bundle branch block, pulmonary stenosis , VSD (increased right ventricular volume load) and mitral regurgitation (more rapid left ventricular emptying>earlier aortic valve closure). ✓ **fixed splitting (**no respiratory variation**):** ASD (increased venous return>blood escape to left atrium>no or slight increase in RV stroke volume) ✓ **Paradoxical (Reversed) Splitting:** when P2 before A2 in expiration, causes: Left BBB (delayed left ventricular depolarization), aortic stenosis, coarctation of the aorta (delayed left ventricular emptying) or large patent ductus arteriosus (increased LV volume load)
• **ADDED SOUNDS** **Third heart sound** best heard at the apex + the patient in the left lateral decubitus position + at end expiration	-low-pitched + best heard with the bell of the stethoscope -audible during the rapid entry of blood from the atrium to the ventricle -Occurs in **volume-loaded conditions** or in a ventricle that is **already stretched and overfilled** owing to **systolic dysfunction** ✓ HF (Systolic and/or diastolic ventricular dysfunction) ✓ Ischemic heart disease ✓ Hyperkinetic states - Anemia, fever, pregnancy, thyrotoxicosis, AV fistula ✓ MR or TR ✓ Could be heard in healthy young (a thin chest wall to permit the easy transmission of S3)
Fourth heart sound best heard at the apex + the patient in the left lateral decubitus position + at end expiration	--low-pitched + best heard with the bell of the stethoscope -generated by **sudden deceleration** of the jet of blood as it enters a **ventricle with decreased compliance.** ✓ Ventricular hypertrophy - LV hypertrophy (systemic hypertension, hypertrophic cardiomyopathy, AS); RV hypertrophy (pulmonary hypertension, pulmonary stenosis [PS]) ✓ Ischemic heart disease
opening snap	high-pitched diastolic sound produced by rapid opening of the mitral valve in MS & best heard at the apex
systolic ejection click	high-pitched, in congenital aortic or pulmonary stenosis where the valve remains mobile
non-ejection systolic click	high-pitched, mid-systolic click from mitral valve prolapse

What to do	What to look for
6.Praecordium ❖ **AUSCULTATION** **MURMURS** results from turbulent flow across valves	Characteristics helps with the diagnosis ➢ **Timing:** **Systolic murmurs:** may be pansystolic, midsystolic (ejection systolic) or late systolic. ✓ *pansystolic murmur:* extends throughout Systole, its loudness and pitch do not vary during systole EXAMPLE: mitral regurgitation, VSD. ✓ *midsystolic ejection murmur:* does not begin right at the first heart sound; its intensity is greatest in midsystole EXAMPLE: *crescendo–decrescendo* murmur in AS ✓ *late systolic:* MVP **Diastolic murmurs:** ✓ *early diastolic murmur:* decrescendo murmur in AR (loudest early because this is when aortic artery pressure is highest) ✓ *mid-diastolic murmur:* MS & atrial myxoma (the tumour mass obstructs the valve orifice) **PreSystolic murmur:** It's an extension of the mid-diastolic murmurs of mitral stenosis due to atrial contraction before systole. **continuous murmurs:** extend throughout systole and diastole, produced when a communication exists between two parts of the circulation with a permanent pressure gradient so that blood flow occurs continuously. Causes: PDA, Coronary arteriovenous fistula in Haemodialysis patients **pericardial friction rub:** caused by movement of inflamed pericardial surfaces; it is a result of pericarditis. louder when the patient is sitting up and breathing out. It tends to come and go, ➢ **Area of greatest intensity:** the place on the praecordium where murmur is heard most easily is a guide to its origin. But some may radiate e.g. MR tend to radiate towards the axillae & Aortic stenosis murmur radiate to the carotid arteries ➢ **Loudness and pitch** loudness and harshness of the murmur (and the presence of a thrill) correlate with the severity ➢ **Dynamic manoeuvres & murmurs**

	HOCM	MVP	AS	MR
Valsalva or standing (decreases preload)	↑	↑	↓	↓
Squatting, leg raise or lying down (increases preload)	↓	↓	↑	↑
Hand grip (increases afterload)	↓	↓	↓	↑

What to do	What to look for
6.Praecordium ❖ **AUSCULTATION** **Auscultation of the neck** Ask the patient to stop breathing and talking for a brief period to remove the competing noise. **use the bell**.	➢**Systolic Bruits**: murmurs of aortic stenosis, soft carotid bruit sometimes audible with severe MR or pulmonary stenosis. A bruit due to carotid stenosis. To make sure that it's from the carotids, Move the stethoscope from point to point onto the chest wall; if the bruit disappears, it is likely the sound arises from the carotid
7.The back -Percussion and auscultation of the *lung bases.* -While the patient is sitting up, feel for *pitting oedema* of the sacrum,	➢inspiratory crackles, pleural effusion or scral edema: Signs of Heart failure or valvar diseases
8.The abdomen	➢**Splenomegaly, ascites or enlarged tender liver:** Heart failure, hepatic veins congestion and Distension of the liver capsule is said to be the cause of liver tenderness. ➢ **liver is pulsatile:** Tricuspid regurgitation. Right ventricular systolic pressure wave is transmitted to the hepatic veins
10.Lower limb Inspect check the pulse-go proximal to distal. check the sensation	➢**EDEMA, Scars, pallor or ulcers.** ✓ **FEMORAL PULSE** (mid inguinal point is located halfway between the ASIS & the pubic symphysis) ✓ **POPLITEAL PULSE** (inferior region of the popliteal fossa) ✓ **POSTERIOR TIBIAL PULSE** (posterior to the medial malleolus of the tibia) ✓ **DORSALIS PEDIS PULSE** ➢**paresthesia** acute limb ischaemia.



FINALLY:
Thank the patient
Wash hands
Summaries the findings