

Lecture Notes

Examining the Cardiac System

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Main Symptoms

Dyspnoea

Orthopnoea

Paroxysmal Nocturnal Dyspnoea

Chest Pain

Cough/Haemoptysis

Oedema

Palpitations

Syncope

Dyspnoea: Types

Dyspnoea: *at rest or on effort*

Orthopnoea: *dyspnoea on lying flat, pt needs extra pillows*

Paroxysmal nocturnal dyspnoea (PND):
dyspnoea which wakes pt from sleep at night, pt sits on edge of bed or goes to window, often described as feeling of suffocation

Dyspnoea

Severity/Grading: mild, moderate, severe

Pattern: exertion, continuous/intermittent, rest/sleep

Time course: onset, duration, progression

Variability: diurnal, aggravating *or* relieving factors

Associated symptoms: cough, chest pain

Cardiac Pain 1

Site: central & retrosternal

Character: tightness , heaviness, discomfort

Radiation: either arm, wrist, hand, throat,
jaw, back or epigastrium

Cardiac Pain 2

Severity: suggests myocardial infarction

Time course: angina short: *mins*, infarct: *hours*

Duration: days, weeks, months & years

Agg factors: exertion, excitement, exercise, meal, cold

Relieving factors: rest, glycerol trinitrate

Other factors: dyspnoea, sweating, nausea, vomiting, syncope & past history of similar pain

Cough Characteristics

Productive/non productive: *sputum or not*

Pattern: *continuous/intermittent, night/day*

Associated features: *pain, dyspnoea*

Time Course

Onset: *sudden or gradual*

Duration: *when started, how long it's going on*

Progression: *getting worse or better*

Sputum

Type: white, yellow, green, rusty, pink, frothy, bloodstained, purulent, plugs

Amount: a little *or* a lot

Smell/Taste: odourless/foul

Oedema: Ankle Swelling

Can be: a *symptom or a sign*

Occurs: *in heart failure but* also in other conditions

Time course: *onset, duration, progression*

Variability: *diurnal; worse in pms & better in ams*

Associated symptoms: *dyspnoea, cough, (chest pain)*

Palpitations

Definition: **subjective awareness heart beating in chest**

Can be due to: **normal *or* irregular heart beats**

Terms used: **thumping, pounding, racing, fluttering, dropped *or* missed beat**

Patient can usually: **tap out sensation experienced**

Time course: **onset, frequency, duration & regularity**

Cardiac Syncope

Definition: **loss of consciousness of cardiac origin**

Presyncope: **feeling of dizziness *or* impending syncope**

Main Causes

- Arrhythmias: **heart block & tachy-arrhythmias**
- Outflow obstruction: **aortic stenosis, cardiomyopathy**
- Drugs: **beta-blockers, alpha-blockers, hypotensives**

Key Points

- History very important for cardiac diagnosis
- Pts with significant disease may be asymptomatic
- PND is most often caused by pulmonary oedema
- Oedema mostly caused by congestive cardiac failure
- Ask what the patient means by palpitations

Past Medical History

Illnesses, Hospitalizations, Operations: **month/year**
active or inactive, treatment or not

Cardiac Diseases:

Congestive Cardiac Failure (CCF)

Rheumatic heart disease/Rheumatic fever

Hypertension

Diabetes (DM)

Kidney disease

Family History

Heart Disease: CCF, Ischaemic, Hypertension

Inherited & Acquired Risk: lipidaemia, DM,
shared lifestyle, passive smoking

Social History

Cigarettes: 20 cigs/day/30 yrs = 30 pack yrs

Alcohol: type, quantity & duration

Occupation: workplace exposure

Lifestyle: food & calorie intake, exercise, sports

The Cardiac Examination

Undress: **to waist**

Position: **at 45 degrees *or* sitting**

Inspection: **from side & front/end of bed**

General Inspection

Patient is well or unwell: *e.g. dyspnoea, cyanosis, pain*

Breathing pattern: *normal or abnormal*

Abnormal:

dyspnoea: *using accessory muscles of respiration*

tachypnoea: *>18/min (n = 14-18/min)*

Cyanosis: *peripheral and/or central*

Examination

Peripheral examination

Hands & legs

Pulses

BP

Head & Face

Abdomen

Cardiac examination

Peripheral Examination

Hands/Fingers: clubbing, cyanosis, anaemia, temperature, sweating, splinter haemorrhages

Pulses palpate: radials, brachial, carotid, femoral, popliteal, dorsalis pedis & post tibial

Head/face examine:

conjunctiva for *anaemia*

lips for cyanosis: *peripheral*

tongue for cyanosis: *central*

The Peripheries

Blood pressure (BP): record BP lying & standing (if necessary)

Abdomen examine for: hepatomegaly & ascites

Oedema check: legs & sacrum

The Pulse

Rate

Rhythm

Volume

Character

Other radial present

Radial pulse



The Pulse

Rate N = 60-100/min: >100 = tachycardia, <60 = bradycardia

Normal increase on insp & decrease on exp: sinus arrhythmia

Volume & Character: use carotid artery (*but radial will do in most cases*)

Know normal before being able to recognize abnormal

The Pulse: Rhythm

Rhythm is either: *regular or irregular*

Irregular pulse can be: *regular or irregular*

Regular irregularity: *1 in 4 dropped beats in 2nd degree ht block or 1 in 2 in Pulsus Bigemini*

Irregular irregularity: *e.g* atrial fibrillation, ectopics

The Pulse: Volume 1

Volume is the movement imparted to finger & felt when gently palpating the pulse

Corresponds to left ventricular stroke volume: *may be normal, increased or decreased*

Increased: *high output states e.g. fever, anaemia, thyrotoxicosis & aortic incompetence*

Decreased: *shock, heart failure, aortic & mitral stenosis*

The Pulse: **Volume 2**

Pulsus alternans (PA): when alternate or every second pulse volume is weak; occurs in *severe heart failure*

Pulsus paradoxus (PP): exaggeration of usual decrease in pulse volume which occurs during inspiration ($n < 15$ mm Hg)

PP confirmed by measuring BP: a decrease of BP during inspiration of >15 mm Hg is pathological; occurs in *severe asthma, pericardial effusion & tamponade*

The Pulse: Character

The character is what gives a pulse its distinctiveness on palpation

Typically caused by valvular heart disease

Abnormal Character Types

Anacrotic: **slow rising pulse; occurs in aortic stenosis (AS)**

Collapsing: **in aortic incompetence (AI)**

Bisferiens: **double impulse palpable on each pulse: occurs in combination of AS/AI**

The Jugular Venous Pulse 1

Inspect the patient lying: **at 45 degrees**

Look for a pulsation at the root of the neck

Inspect between the two heads of sternomastoid for the: **internal jugular vein**

Alternately you may use the **external jugular vein** but only if you can demonstrate that it's open *or* patent

External jugular vein: **drops at a right angle (90°) from angle of jaw/mandible**

The Jugular Venous Pulse 2

Method: *start first with inspection of JVP followed by palpation*

Inspect the root of the neck for a visible pulsation

If a pulsation is present the following characteristics will help you to differentiate a venous from an arterial pulsation (*see following slide*)

Is Neck Pulsation from *Vein or Artery?*

- **VEIN**

- INSPECTION**

- diffuse

- multiple wave form (**AcV**)

- varies with respiration

- PALPATION**

- you can occlude it by

- pressing finger horizontally

- @ root of neck

- positive hepatojugular reflux

- **ARTERY**

- INSPECTION**

- localised

- single wave form

- no variation with respiration

- PALPATION**

- you can't occlude it by

- pressing finger horizontally

- @ root of neck

- negative hepatojugular reflux

Palpating jugular venous pulse



Hepatojugular reflux



The Heart

Inspection

Palpation

Percussion

Auscultation

Apex Beat

Apex beat: defined as the outermost & downermost point of maximum cardiac pulsation

Apex Beat: lies normally in the 5th intercostal space (IS) within the mid clavicular line (MCL)

Palpating the apex beat



Valve Areas

Aortic area: *lies in 2nd IS just to right of sternum*

Pulmonary area: *lies in 2rd IS just to left of sternum*

Mitral area: *lies over the apex in 5th IS within MCL*

Tricuspid area: *lies in 5th IS just to left of sternum*

The Heart

Inspection

Palpation

Percussion

Auscultation

Inspection

Inspect anterior chest: **from side & the front**

Look for abnormalities of shape or lesions of chest wall: **kyphosis, pectus carinatum/excavatum**

Observe for: **pulsations over the precordium**

Localize the site: **of the apex beat**

The Heart

Inspection

Palpation

Percussion

Auscultation

Palpation

Carry out in cardiac position: sitting at 45°

Localize apex beat: by placing two fingers over visible pulsation, *(may be necessary to check in lying position)*

Check for thrills *and/or* heaves: by placing flat or palm of hand over following precordial areas:

base of heart

left parasternal area

apical area

The Apex Beat

Site

Localized *or* diffuse

Character: forceful, tapping, heaving, thrills

Any other quality that strikes you

Palpation: Thrills

Thrill is a palpable murmur: indicates disease

Palpated best: in expiration and when chest wall is thin

Palpating for thrill at left sternal edge



Palpating for thrill at apex



Palpating for thrill at base of heart



Palpation: Thrills

Thrills at base of heart over AA & PA are: *systolic*

Thrills at left parasternal edge (2nd-4th IS) are:
usually systolic: congenital heart disease (VSD)

Apical thrills: *usually diastolic: mitral stenosis (MS)*

Proto systolic & diastolic thrills are: *usually due to Patent ductus arteriosus (PDA)*

The Heart

Inspection

Palpation

Percussion

Auscultation

Percussion

Percussion is not done routinely

Indication: **suspected cardiac enlargement due to a pericardial effusion**

Method: percuss perpendicular to the 3 borders of heart:

right border

left or oblique border

inferior border

Percussing the inferior border



Percussing the oblique border



Percussing the right border



The Heart

Inspection

Palpation

Percussion

Auscultation

Auscultation

Use diaphragm *or* flat part for: **high pitched murmurs;**
mitral incompetence

Use bell for: **low pitched murmurs;** *mitral stenosis*

Student should concentrate on: **listening to *the heart sounds first before*** turning attention to murmurs

Interpret auscultation findings in combination with findings obtained: **on inspection & palpation**

Normal Heart Sounds

First heart sound (*closure of mitral & tricuspid valves*) is heard best in mitral area. **The loudest sound there is *always* the 1st heart sound**

Second heart sound (*closure of aortic & pulmonary valves*) is heard best in aortic & pulmonary areas. **The loudest sound there is *always* 2nd heart sound**

2nd heart sound may be split into two sounds: **A2P2**

Listening

Listen in the mitral area: **identify the first (loudest) heart sound**

Listen in the aortic area & pulmonary areas: **identify the loudest *or* second (loudest) heart sound & its splitting**

Can I hear: **added sounds *or* murmurs?**

Auscultation at mitral area



Auscultation at aortic area



Added Heart Sounds

3rd & 4th

3rd HS occurs in diastole when ventricle is filling passively; **can be normal: *young adults, pregnancy***

found in **severe heart failure** when accompanied by a tachycardia **and heard as a *gallop rhythm***

4th HS occurs in late diastole as a result of atrial contraction; occurs in ***heart failure*** secondary to ***left ventricular hypertrophy & aortic stenosis***

Added Heart Sounds

Opening Snap

Occurs in mitral stenosis due to opening of tight mitral valve

Heard best at apex with bell and with pt lying in left lateral position

Occurs after 2nd heart sound early in diastole

Associated with a loud S1 & mid diastolic rumble

Added Heart Sounds

Pericardial Friction Rub

heard best with diaphragm at left lower sternal edge

best heard with pt breathing out & leaning forward

occurs in pericardial inflammation

It is superficial scratchy sound often occurring in both systole & diastole: may vary with time & pt position

Listening for pericardial rub



Murmurs

Caused by turbulent blood flow due to either:

Abnormal valve/hole *e.g. rheumatic valve disease or congenital heart disease*

or

Increased blood flow through a normal valve
e.g. anaemia, pregnancy, athletes

General Features

Location/Site

Timing/Duration

Loudness

Character

Radiation

Characteristics

Location/Site: **where the murmur is heard best**

Timing of the murmur: **systolic, diastolic or both**

Direction *or* radiation: **in which the murmur is heard best *or* conducted**

How to Time Murmurs

Timing of murmurs is done in two ways:

Synchronous *palpation* of carotid (systolic) pulsation & murmur auscultation together

or

localizing & correct identification of the heart sounds by: *auscultation*

Timing of heart murmurs by carotid palpation and auscultation



Auscultation 1

Systole starts with 1st heart sound (HS) i.e. closure of mitral & tricuspid valves and ends with 2nd HS i.e. closure of aortic & pulmonary valves.

Any murmur occurring in between 1st & 2nd HS is **systolic in timing**

Diastole is the interval between the 2nd & 1st heart sounds. **Any murmur occurring in between 2nd & 1st HS is **diastolic** in timing**

Auscultation 2

Apex: It follows that if a murmur occurs *after* the loudest sound (1st HS) at the **apex** (mitral area) then it is likely **systolic in timing**, if it occurs *before* the loudest sound it is likely **diastolic in timing**

Base of heart: If a murmur occurs *before* the loudest sound (2nd HS) in the **AA** or **PA** then it is likely **systolic in timing**, if it occurs *after* the loudest sound it is likely **diastolic in timing**

Character

Character of a murmur is hard to define

Murmurs are often described as:

soft or harsh

ejection

blowing

musical

high *or* low pitched

rumbling & machinery

Character: Examples

Mitral incompetence: blowing

Mitral stenosis: rumbling

Aortic incompetent: soft and decrescendo

Aortic stenosis: harsh ejection

Patent ductus arteriosus: machinery

Loudness: Six grades

Grade 1 barely heard: in optimum conditions

Grade 2 barely heard: in routine conditions

Grade 3 easily heard: no thrill

Grade 4 a loud murmur: thrill present

Grade 5 a very loud murmur: over precordium and thrill

Grade 6 extremely loud: heard without stethoscope

Key Points

- Apex beat displacement due to cardiac enlargement *or* mediastinal shift
- Use diaphragm for high pitched murmurs & bell for low pitched
- Third heart sound can be physiological but a 4th heart sound is always pathological
- Loudness of murmur is not always an index of disease severity
- **Position is important:** mitral stenosis is best heard in left lateral position & aortic incompetence with holding breath in expiration & leaning forward