CARDIOVASCULAR SYSTEM

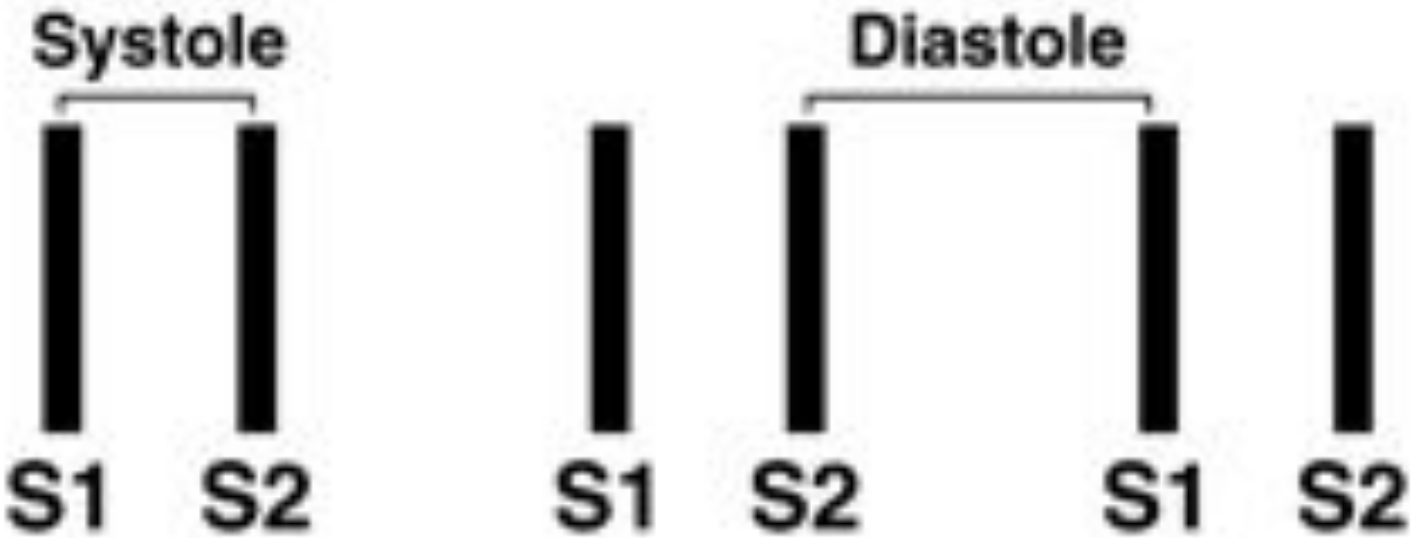
Heart auscultation

Lecture 2/5

The Goals of Auscultation

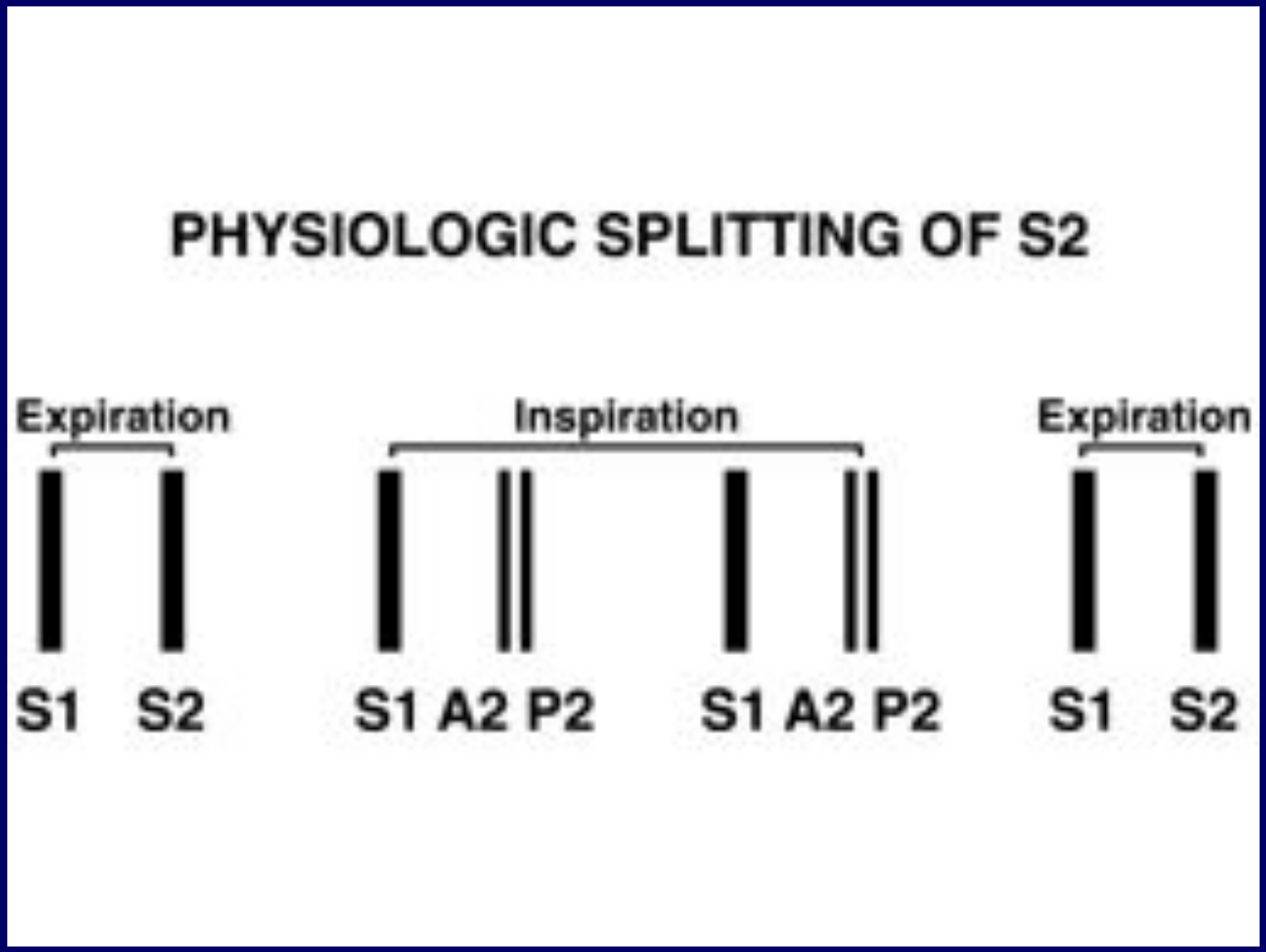
- The intensity of S_1 in all areas
- The intensity of S_2 in all areas
- The characterization of any systolic sounds
- The characterization of any diastolic sounds

NORMAL CARDIAC CYCLE



Normal heart sounds

- In younger patients physiologic splitting of S2. is possible
  - S2 is made up of 2 components, aortic (A2) and pulmonic (P2) valve closure.
  - On inspiration, venous return to the heart is augmented and pulmonic valve closure is delayed, allowing you to hear first A2 and then P2.
  - On expiration, the two sounds occur closer together and are detected as a single S2.
- The two components of S1 (mitral and tricuspid valve closure) occur so close together that splitting is not appreciated.


PHYSIOLOGIC SPLITTING OF S2
Expiration
Inspiration
Expiration
S1 S2
S1 A2 P2
S1 A2 P2
S1 S2

Extra heart sounds

- While present in normal subjects up to the ages of 20-30, they represent pathology in older patients.
- An S3 is most commonly associated with left ventricular failure and is caused by blood from the left atrium slamming into an already overfilled ventricle during early diastolic filling.
- The S4 is a sound created by blood trying to enter a stiff, non-compliant left ventricle during atrial contraction. It's most frequently associated with left ventricular hypertrophy that is the result of long standing hypertension.
- Positioning the patient on their left side while you listen may improve the yield of this exam.
- The presence of both an S3 and S4 simultaneously is referred to as a summation gallop.

EXTRA HEART SOUNDS - S3

EXTRA HEART SOUNDS - S4

EXTRA HEART SOUNDS - S3 AND S4

Summation Gallop

Factors that may influence the intensity of the heart sounds: first sound

Loud first sound

- Hyperdinamic circulation
- Mitral stenosis
- Atril myxoma (rare)

Soft first sound

- Low cardiac output (rest, heart failure)
- Tachycardia
- Severe mitral reflux (caused by destruction of valve)

Variable intensity of first sound

- Atrial fillibration
- Complete hart block

Factors that may influence the intensity of the heart sounds: second sound

Loud aortic component of second sound

- Systemic hypertension
- Dilated aortic root

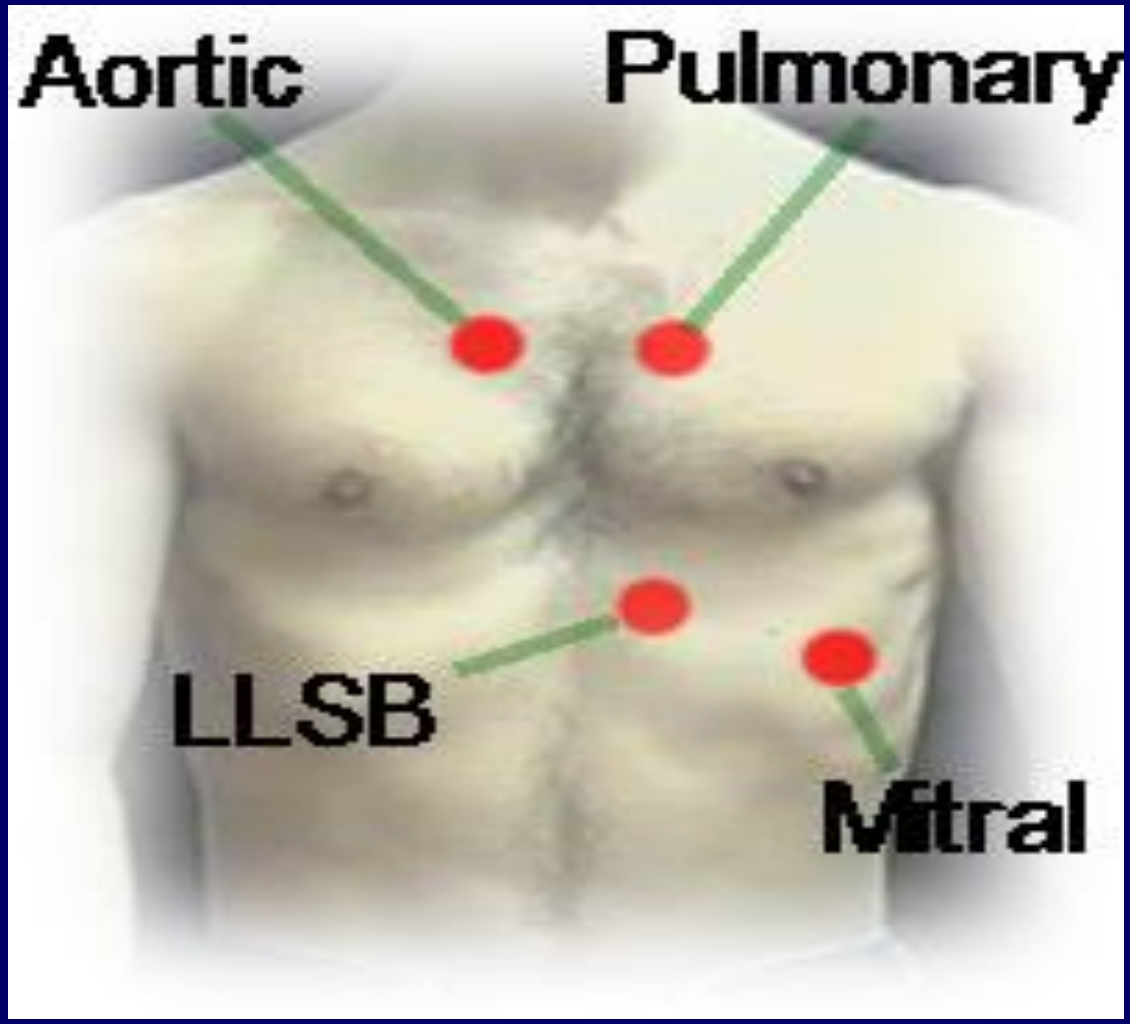
Soft aortic component of second sound

- Calcific aortic stenosis

Loud pulmonary component of second sound

- Pulmonary hypertension

Points for auscultation



Any Murmurs Describtion

- Timing in the cardiac circle
- Location
- Radiation
- Duration
- Intensity
- Pitch
- Quality
- Relationship to respiration
- Relationship to body position

Systolic murmurs

	Aortic Stenosis	Mitral Regurgitation
Location	Aortic area	Apex
Radiation	Neck	Axilla
Shape	Diamond	Holosystolic
Pitch	Medium	High
Quality	Harsh	Blowing
Associated signs	Decreased A_2 Ejection click S_4 Narrow pulse pressure Show rising and delayed pulse	Decreased S_1 S_3 Laterally displaced diffuse PMI

Differentials of systolic murmurs

Ejection systolic

- Innocent systolic murmur
- Aortic stenosis
- Pulmonary stenosis
- Hypertrophic cardiomyopathy
- Flow murmurs
  - atrial septal defect
  - fever
  - athlete's heart

Pansystolic

- Tricuspid
- Mitral reflux
- Ventricular septal defect

Diastolic murmurs

	Mitral Stenosis	Aortic Regurgitation
Location	Apex	Aortic area
Radiation	No	No
Shape	Decrescendo	Decrescendo
Pitch	Low	High
Quality	Rumbling	Blowing
Associated signs	Increased S1 Opening snap PV rock§ Presystolic accentuation	Laterally displaced PMI Wide pulse pressure* Bounding pulses Austin Flint murmur† Systolic ejection murmur‡

Grading the intensity of murmurs

- Grade 1 just audible with a good stethoscope in a quiet room
- Grade 2 quiet but readily audible with a stethoscope
- Grade 3 easily heard with a stethoscope
- Grade 4 a loud, obvious murmur
- Grade 5 very loud, heard not only over the precordium but elsewhere in the body

Behaviour of murmurs in respiration

Louder immediately on inspiration

- Pulmonary stenosis
- Pulmonary valve flow murmurs

Quieter immediately on inspiration (may become louder later)

- Mitral regurgitation
- Aortic stenosis

Louder during Valsalva manoeuvre

- Hypertrophic obstructive cardiomyopathy
- The murmur of mitral prolapse may become louder or softer during inspiration