

Heart Murmurs



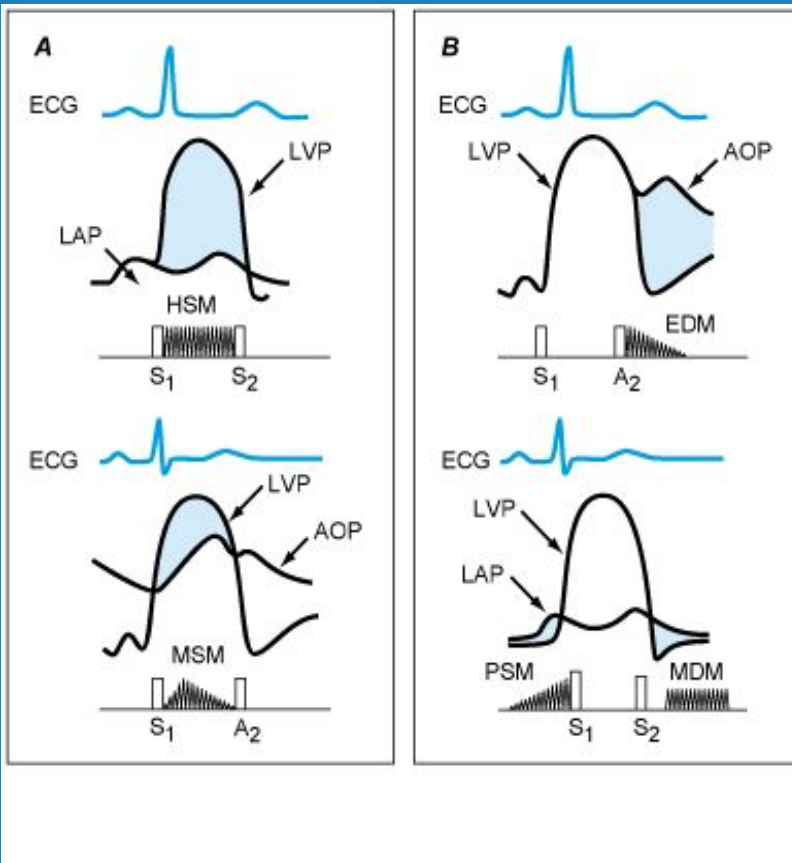
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Outline

- I. Basic Pathophysiology
- II. Describing murmurs
- III. Systolic murmurs
- IV. Diastolic murmurs
- V. Continuous murmurs
- VI. Summary

Basic Pathophysiology



Murmurs = Math

$$Q = V * A$$

$$Q = P/R$$

$$N_R = d * D * V/n$$

Therefore:

Inc. P \Rightarrow Inc. V \Rightarrow Inc. N_R

Systolic Diastolic



Describing a heart murmur

1. Timing

- murmurs are longer than heart sounds
- HS can distinguished by simultaneous palpation of the carotid arterial pulse
- systolic, diastolic, continuous

2. Shape

- crescendo (grows louder), decrescendo, crescendo-decrescendo, plateau

3. Location of maximum intensity

- is determined by the site where the murmur originates
- e.g. A, P, T, M listening areas

Describing a heart murmur con't:

4. Radiation

- reflects the intensity of the murmur and the direction of blood flow

5. Intensity

- graded on a 6 point scale
 - Grade 1 = very faint
 - Grade 2 = quiet but heard immediately
 - Grade 3 = moderately loud
 - Grade 4 = loud
 - Grade 5 = heard with stethoscope partly off the chest
 - Grade 6 = no stethoscope needed

*Note: Thrills are assoc. with murmurs of grades 4 - 6

Describing a heart murmur con't:

6. Pitch

- high, medium, low

7. Quality

- blowing, harsh, rumbling, and musical

8. Others:

i. Variation with respiration

- Right sided murmurs change more than left sided

ii. Variation with position of the patient

iii. Variation with special maneuvers

- Valsalva/Standing => Murmurs decrease in length and intensity

EXCEPT: Hypertrophic cardiomyopathy and Mitral valve prolapse



Systolic Murmurs

- Derived from increased turbulence associated with:
 1. Increased flow across normal SL valve or into a dilated great vessel
 2. Flow across an abnormal SL valve or narrowed ventricular outflow tract - e.g. aortic stenosis
 3. Flow across an incompetent AV valve - e.g. mitral regurg.
 4. Flow across the interventricular septum

Early Systolic murmurs

1. Acute severe mitral regurgitation
 - decrescendo murmur
 - best heard at apical impulse
 - Caused by:
 - i. Papillary muscle rupture
 - ii. Infective endocarditis
 - iii. Rupture of the chordae tendineae
 - iv. Blunt chest wall trauma
2. Congenital, small muscular septal defect
3. Tricuspid regurg. with normal PA pressures



Midsystolic (ejection) murmurs

- Are the most common kind of heart murmur
- Are usually crescendo-decrescendo
- They may be:
 1. Innocent
 - common in children and young adults
 2. Physiologic
 - can be detected in hyperdynamic states
 - e.g. anemia, pregnancy, fever, and hyperthyroidism
 3. Pathologic
 - are secondary to structural CV abnormalities
 - e.g. Aortic stenosis, Hypertrophic cardiomyopathy, Pulmonic stenosis

Aortic stenosis


- Loudest in aortic area; radiates along the carotid arteries
- Intensity varies directly with CO
- A2 decreases as the stenosis worsens
- Other conditions which may mimic the murmur of aortic stenosis w/o obstructing flow:
 1. Aortic sclerosis
 2. Bicuspid aortic valve
 3. Dilated aorta
 4. Increased flow across the valve during systole



Hypertrophic cardiomyopathy

- Loudest b/t left sternal edge and apex; Grade 2-3/6
- Does NOT radiate into neck; carotid upstrokes are brisk and may be bifid
- Intensity increases w/ maneuvers that decrease LV volume

Pansystolic (Holosystolic) Murmurs

- Are pathologic
 - Murmur begins immediately with S1 and continues up to S2
1. **Mitral valve regurgitation** 
 - Loudest at the left ventricular apex
 - Radiation reflects the direction of the regurgitant jet
 - i. To the base of the heart = anterosuperior jet (flail posterior leaflet)
 - ii. To the axilla and back = posterior jet (flail anterior leaflet)
 - Also usually associated with a **systolic thrill**, a **soft S3**, and a short **diastolic rumbling** (best heard in left lateral decubitus)
 2. **Tricuspid valve regurgitation**
 3. **Ventricular septal defect**

Diastolic Murmurs

- Almost always indicate heart disease
- **Two basic types:**
 1. Early decrescendo diastolic murmurs
 - signify regurgitant flow through an incompetent semilunar valve
 - e.g. aortic regurgitation
 2. Rumbling diastolic murmurs in mid- or late diastole
 - suggest stenosis of an AV valve
 - e.g. mitral stenosis

Aortic Regurgitation

- Best heard in the 2nd ICS at the left sternal edge
- High pitched, decrescendo
- Blowing quality => may be mistaken for breath sounds
- Radiation:
 - i. Left sternal border = assoc. with primary valvular pathology;
 - ii. Right sternal edge = assoc. w/ primary aortic root pathology
- Other associated murmurs:
 - i. Midsystolic murmur
 - ii. Austin Flint murmur



Mitral Stenosis

- Two components:
 1. Middiastolic - during rapid ventricular filling
 2. Presystolic - during atrial contraction; therefore, it disappears if atrial fibrillation develops
- Is low-pitched and best heard over the apex (w/ the bell)
- Little or no radiation
- Murmur begins after an Opening Snap; S1 is accentuated



Continuous Murmurs

- Begin in systole, peak near s2, and continue into all or part of diastole.
 1. Cervical venous hum
 - Audible in kids; can be abolished by compression over the IJV
 2. Mammary souffle
 - Represents augmented arterial flow through engorged breasts
 - Becomes audible during late 3rd trimester and lactation
 3. Patent Ductus Arteriosus
 - Has a harsh, machinery-like quality
 4. Pericardial friction rub
 - Has scratchy, scraping quality

Back to the Basics

1. When does it occur - systole or diastole
2. Where is it loudest - A, P, T, M

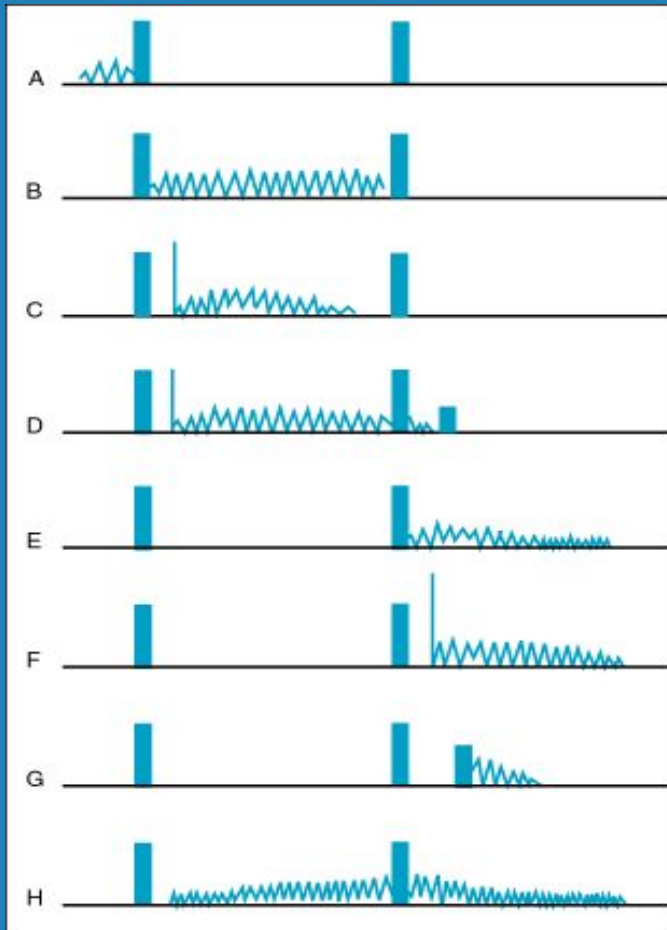
I. Systolic Murmurs:

1. Aortic stenosis - ejection type
2. Mitral regurgitation - holosystolic
3. Mitral valve prolapse - late systole

II. Diastolic Murmurs:

1. Aortic regurgitation - early diastole
2. Mitral stenosis - mid to late diastole

Summary



- A. Presystolic murmur
 - Mitral/Tricuspid stenosis
- B. Mitral/Tricuspid regurg.
- C. Aortic ejection murmur
- D. Pulmonic stenosis (spilling through S20)
- E. Aortic/Pulm. diastolic murmur
- F. Mitral stenosis w/ Opening snap
- G. Mid-diastolic inflow murmur
- H. Continuous murmur of PDA