Abnormal Heart Sounds and Murmurs

Jennifer Eames DHSc, PA-C
Hardin-Simmons University PA Program Director

Objectives

1) Review the normal physiology of the cardiac cycle
2) Review different types of congenital and acquired heart murmurs
3) Discuss memorization tools to quickly recall murmur descriptors for testing and clinical practice documentation

The Cardiovascular System: Examining the Heart and Blood Vessels

Overview

- Anatomy of the heart and great vessels
- The heart as a pump
- Chest wall and apical impulse/PMI
- Auscultation: S1 and S2, S3 and S4
- Auscultation: Describing Cardiac Murmurs & Abnormal Sounds
Know Your Surface Landmarks

• Count interspaces
  • Identify your...
    ○ Midsternal line
    ○ Midclavicular line
    ○ Anterior axillary line
    ○ Midaxillary line
The Heart as a Pump: Key Points for Examining the Heart

* Note the heart chambers and valves and the forward flow of blood from the right side of the heart through the pulmonary arteries and veins to the left side of the heart
* Combine this knowledge with careful examination and systematic clinical reasoning
  * This will lead you to correct identification of valvular heart disease
  * Helpful More for Boards than practical due to Echo

The Heart as a Pump: The Cardiac Cycle of Systole and Diastole

* **Systole:** the ventricles contract
  * The right ventricle pumps blood into the pulmonary arteries (pulmonic valve is open)
  * The left ventricle pumps blood into the aorta (aortic valve is open)
* **Diastole:** the ventricles relax
  * Blood flows from the right atrium \(\rightarrow\) right ventricle (tricuspid valve is open)
  * Blood flows from the left atrium \(\rightarrow\) left ventricle (mitral valve is open)

Palpating the Chest Wall

* Using the finger pads, palpate for heaves or lifts from abnormal ventricular movements
* Using the ball of the hand, palpate for thrills, or turbulence transmitted to the chest wall surface by a damaged heart valve
  * Palpate the chest wall in the aortic, pulmonic, left parasternal, and apical areas
Areas of the Cardiac Exam

- Aortic
- Pulmonic
- Tricuspic
- Mitral
- Memorization tools

Listening to the Heart — Auscultation

- Listen in all listening areas for S1 and S2 using the diaphragm of the stethoscope
- Then listen at the apex with the bell
- The diaphragm and the bell...
  - The diaphragm is best for detecting high-pitched sounds like S1, S2, and also S4 and most murmurs
  - The bell is best for detecting low-pitched sounds like S3 and the rumble of mitral stenosis

Rubs

- Friction Rubs
Muffled Heart Sounds

http://upennanesthesiology.typepad.com/upenn_anesthesiology/cardiac_tamponade/

Cardiac Cycle

- Systole vs. Diastole
  - Systole = ventricular contraction
  - Diastole = ventricular relaxation

- What valves are open when?

- Splitting of heart sounds

- Mirror image

S1 and S2

- S1 = closing of the mitral valve
  - Systole \rightarrow

- S2 = closing of the aortic valve
  - Diastole \rightarrow
**S2 splitting**

- Due to Aortic and Pulmonic valves not closing together
- Heard best during Inspiration
- Think about anatomy and why this happens

**S3**

- Period of rapid ventricular filling as blood flows in early diastole
- LA to LV
- Children/young adults = rapid deceleration of the column of blood against the ventricular wall
- Water faucet

**S4**

- Atrial contraction
- Immediately precedes S1
- Diastole
Opening Snap

- Very early Diastolic sound
- Opening of a stenotic mitral valve

Mid-Systolic Click

- MVP
- Chordae tendineae
- At Risk Groups
- Symptoms
- Complications – MR
- Treatments

Describing Heart Murmurs: Timing and Duration

- Identify and describe any murmurs
- Timing: are the murmurs systolic or diastolic?
  - Tip: palpate the carotid upstroke (occurs in systole) as you listen
  - If the murmur coincides with the carotid upstroke, it is systolic
- Duration
  - Early / mid / or late systolic
  - Early / mid / or late diastolic
Grading of Murmurs

<table>
<thead>
<tr>
<th>Murmur Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very faint, heard only after listener has &quot;tuned in&quot;; may not be heard in all positions</td>
</tr>
<tr>
<td>2</td>
<td>Quiet, but heard immediately after placing the stethoscope on the chest</td>
</tr>
<tr>
<td>3</td>
<td>Moderately loud</td>
</tr>
<tr>
<td>4</td>
<td>Loud, with palpable thrill</td>
</tr>
<tr>
<td>5</td>
<td>Very loud, with thrill. May be heard when the stethoscope is partly off the chest</td>
</tr>
<tr>
<td>6</td>
<td>Very loud, with thrill. May be heard with stethoscope entirely off the chest</td>
</tr>
</tbody>
</table>

Describing Heart Murmurs: Quality, Pitch, and Location

• Quality
  - Apply terms like harsh, musical, soft, blowing, or rumbling

• Pitch
  - Apply terms like high-, medium-, or low-pitched

• Examples
  - Harsh 2/6 medium-pitched holosystolic murmur best heard at the apex describes mitral regurgitation
  - Soft, blowing 3/6 decrescendo diastolic murmur best heard at the lower left sternal border describes aortic regurgitation

Types

- Midsystolic
- Holosystolic
- Late systolic
- Diastolic
Describing Heart Murmurs: Shape and Intensity

- **Shape**
  - Crescendo, decrescendo, or both (sometimes called diamond-shaped)
  - **Example**, crescendo-decrescendo systolic murmur of aortic stenosis

Describing Heart Murmurs: Shape and Intensity (cont.)

- **Shape**
  - Plateau ... machinery
  - **Example**, holosystolic murmur of mitral regurgitation
- **Intensity**: grade the murmur on a scale of 1 to 6
  - Grades 4 through 6 must have accompanying thrill

Murmurs

- What we hear that represents physiology/pathology
- Must memorize!
- Boards
- Regurg = insufficiency
- Stenosis= stenosis
MR. AS/MS. AR

- MR. AS lives only in systole with TRaPS
- MS. AR lives only in Diastole with T.SiPR

Shapes

- Blowing/Plateau
- Cresendo-Decresendo
- Cresendo
- Decresendo

MR AS / MS AR
Mitral Regurg.

- Blowing Holosystolic
- Relationship to MVP
- Rupture
- Symptoms
- Course/Monitoring
- Treatment
- Complications

Aortic Stenosis

- Crescendo-Decresendo
- Narrowed
- Epidemiology
- Symptoms
- Management Options
- Pearls

Mitral Stenosis

- Crescendo?
- Thickened, stiffened leaflets of mitral valve
- Often from rheumatic fever
- Diastolic
- Management
Aortic Regurg

- Decresendo
- Leaflets of aortic valve fail to close completely
- Blood regurgitates from the aorta to LV

Symptoms

Management

PDA

- Fails to close
- Shortly after birth
- Bounding pulse
- Fast breathing
- Poor feeding habits
- Shortness of breath
- Sweating while feeding
- Tiring very easily
- Poor growth

Coarctation of the Aorta

- The pulse in the femoral area or feet will be weaker than the pulse in the arms or the carotid. Sometimes, the femoral pulse may not be felt at all.
- The blood pressure in your legs is usually weaker than in the arms.
- Harsh Murmur may radiate to back
VSD

- Early Peak Diamond
- Harsh
- S4 Gallop in Diastole
- S1 Increased/S2 Single (not split)

HOCM

- Early Peak Diamond
- Harsh
- S4 Gallop in Diastole
- S1 Increased/S2 Single (not split)

“Innocent Murmur”

- Recommend imaging vs. second opinion
- Pregnancy, Thyroid, Anemia when corrected – disappear
- Pulmonic area
- Systolic
- Increases with Inspiration
- Bell or Diaphragm
What is louder When...

- You squat?
- You stand or strain?
- You lie on your left side?
- You lean forward?

Memorization tool

<table>
<thead>
<tr>
<th></th>
<th>Mitral Valve Prolapse</th>
<th>Hypertrophic Cardiomyopathy</th>
<th>Aortic Stenosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing; Strain</td>
<td>↑</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Squatting; Release of Valsalva</td>
<td>↓</td>
<td>↓</td>
<td>↑</td>
</tr>
</tbody>
</table>

A fib.

- Irregularly Irregular
- Atrial chamber of the heart
- Bag of worms appearance
- Multiple foci
- Anticoagulate
Additional Websites with sounds

- http://www.wilkes.med.ucla.edu/inex.htm
- http://www.easyauscultation.com/

Questions?

Thank you!!

References


* LWW Resources