Building Blocks of Clinical Practice

Helping Athletic Trainers Build a Strong Foundation

Issue #7: Cardiac Assessment: Basic Cardiac Auscultation Part 2 of 2

AUSCULTATION

Indications for Cardiac Auscultation

- History of syncope, dizziness
- Chest pain, pressure or dyspnea during or after activity / exercise
- Possible indication of hypertrophic cardiomyopathy
- Sensations of heart palpitations
- Tachycardia or bradycardia
- Sustained hypertension and/or hypercholesterolemia
- History of heart murmur or heart infection
- Noted cyanosis
- Trauma to the chest
- Signs of Marfan's syndrome
    - * Enlarged or bulging aorta
    - * Ectomorphic, scoliosis or kyphosis, pectus excavatum or pectus carinatum
    - * Severe myopia

Stethoscope

- Diaphragm – best for hearing high pitched sounds
- Bell – best for hearing low pitched sounds
- Ideally, auscultate directly on skin, not over clothes

Adult Rate

- > 100 bpm = tachycardia
- 60-100 bpm = normal (60-95 for children 6-12 years old)
- < 60 bpm = bradycardia

Rhythm

- Regular
- Irregular – regularly irregular or "irregularly" irregular

Auscultation Sites / Valvular Positions (see part 1 of 2 for more information)

- Aortic: 2nd right intercostal space
- Pulmonic: 2nd left intercostal space
- Tricuspid: 4th left intercostal space
- Mitral: Apex, 5th intercostal space (mid-clavicular line)

Auscultate at each valvular area with bell and diaphragm and assess the following:

- Cardiac rhythm – regular or irregular
- Heart sounds – note the quality
- Murmurs – valvular locations
- Extra-Cardiac Sounds – clicks, snaps and rubs

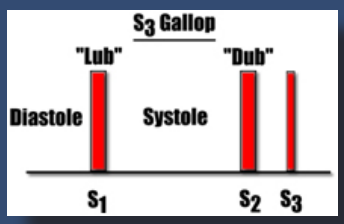
Issue #6: Cardiac Assessment: Basic Cardiac Auscultation Part 2 of 2

BASIC CARDIAC CYCLE

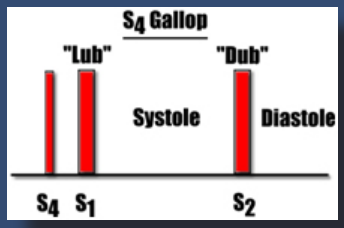
Systole – active phase of ventricles
- Ventricles contracting
- S1: first heart sound ("Lub")
- Closing of mitral and tricuspid valves after ventricles contract
- Left side of heart has grater strength of contraction, more dynamic, blood leaves ventricles faster and with greater pressure
- Loudest at the apex of the heart over mitral area
- Can be split – heard with inspiration at (L) 4th intercostal space over the tricuspid valve
- First component: mitral closure (audible)
- Second component: tricuspid closure (if audible)

Diastole – resting phase of ventricles
- Ventricles filling
- S2: second heart sound ("Dub")
- Atrial contraction occurs at the end of diastole, the aortic and pulmonic valves close at the beginning of diastole
- Left side has grater pressure, more dynamic
- Loudest at the base of the heart over the aortic area
- Splits - normal with inspiration at (L) 2nd intercostal space over the pulmonic valve
- Maximal at the end of inspiration
- Heard best at pulmonic area
- Abnormal to hear during expiration (red flag)
- First component: aortic closure
- Second component: pulmonic closure

S3: Ventricular Gallop
- Normal in young athletic patient or during pregnancy
- Usually pathologic in > 20 years of age
- EARLY diastolic sound
- Best heard at apex (mitral valve) with patient left side lying (left decubitus position)
- Low pitched – use BELL of stethoscope over apex
- Common in children and young athletic adults due to rapid refilling of ventricle
- Normal variant in populations mentioned above
- "Kentucky" "lub-dub-ta"



S4: Atrial Gallop
- Precedes S1
- Results from increased arterial contraction to compensate for abnormally elevated left ventricular pressure
- LATE diastolic sound; just before systole
- Almost always pathologic
- Listen with bell at apex (mitral valve)
- May occur in several condition, i.e. Long standing hypertension
- "Tennessee" "ta-lub-dub"



Auscultate at each valvular area a nd assess the following:
- Cardiac rhythm
- Heart sounds
- Murmurs
- Extra-Cardiac Sounds

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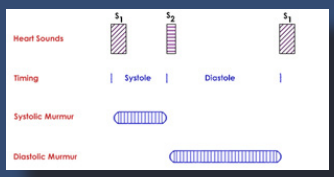
Identify S1 and S2

- When auscultating over the base of the heart at the aortic and pulmonic valves: S2 ("DUB") is louder than S1 ("lub") – "lub DUB"
- When auscultating over the apex at the mitral area: S1 ("LUB") is louder than S2 ("dub") – "LUB dub"
- Palpate the carotid artery to determine S1 and S2
- S1 is just before the carotid pulse.
  - If a murmur is heard simultaneously with carotid pulse, it is a **systolic murmur (between S1 and S2)**
  - If a murmur is heard after the carotid pulse, then it is a **diastolic murmur and is more significant (between S2 and S1)**

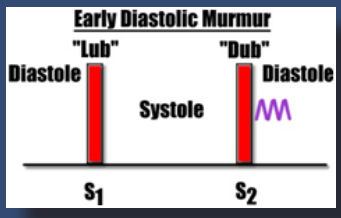
MURMURS

- Result of turbulent blood flow through either a narrowed valve (stenosis) or a leaking valve (regurgitation)
- **Timing**
  - Systolic murmurs: early, mid, late, holo (throughout)
    - Examples: pulmonary and aortic valve stenosis, mitral and tricuspid valve regurgitation, mitral valve prolapse
  - Diastolic murmurs: early, mid, late (presystolic)
    - Examples: mitral and tricuspid valve stenosis, pulmonary and aortic valve regurgitation



www.vetgo.com/cardio/concepts/concsect.php?conceptkey=45

- **Pitch:** high, medium, low: determined whether it can be auscultated using the diaphragm or bell of the stethoscope.
- **Grade / Intensity:** refers to the loudness of the murmur
  - Grade 1 – very faint
  - Grade 2 – quiet
  - Grade 3 – moderately loud
  - Grade 4 – loud with palpable thrill
  - Grade 5 – very loud, thrill easily palpable
  - Grade 6 – very loud, audible with stethoscope off chest
- **Pattern:** crescendo, decrescendo
- **Quality:** blowing, harsh, rumbling
- **Location:** anatomical landmarks where murmur is auscultated best (e.g. 2nd left intercostal space)



References:

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- *Preparticipation Physical Evaluation, 3rd Edition. American Academy of Pediatrics. The Physician and Sportsmedicine; A Division of The McGraw-Hill Companies, 2005. ISBN: 0-07-144636-2*
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- *Karnuth B, Thorton W. Auscultation of the Heart. Hospital Physician, September 2002, pp. 39-43.*

Pictures obtained from:
http://darwin.unmc.edu/hnp/m1/heartsounds.htm

Useful website:
www.cocukkalbi.net/oskultasyon.html

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