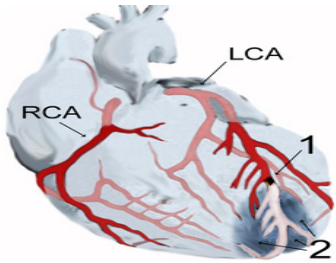


The Cardiovascular System: Ischemic Heart Disease



www.commonswiki.org/wiki/Myocardial_ischemia

Ischemic Heart Disease

- Angina (stable)
- ACS (Acute Coronary Syndromes)
 - Unstable Angina
 - Prinzmetal's Angina
- Acute MI
 - STEMI/non-STEMI
 - Q-wave/non Q-wave

IHD – Risk Factors (major)

- Age
- Tobacco - #1 preventable worldwide
- DM
- HTN
- Lipids: high LDL, low HDL,
? triglycerides



IHD – Risk Factors (minor)

- Sedentary lifestyle
- Obesity (BMI > 30)/high abdominal girth (waist >40”M / 35”F)
- High stress
- Family history
- Gender (male > female)



IHD – Risk Factors (other)

- Homocysteine
- Serum lipoprotein (a)
- Triglycerides
- C-reactive protein (hs CRP)



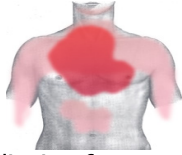
Stable Angina/Angina Pectoris

- Precipitated by stress/exertion
- Relieved by rest/nitrates



Stable Angina: History = dx

- Character
- Location
- Radiation
- Duration
- Precipitating or relieving factors
- Dyspnea = anginal equivalent



www.commonswikiimedia.org/wiki/File:Myocardial_ischemia



Stable Angina – Physical Exam

- Commonly normal or non-specific
- May find: ↑ BP, S₃, arrhythmias
- DM-associated findings
- Hyperlipidemia-associated findings



Stable Angina - DDX

- MSS: bone, muscle, tissue injury/pain
- Neuro: intercostal neuritis: zoster, DM
- GI: GERD, PUD, esophageal spasm
- Respiratory: pneumo, aorta dissection
- Other Cardiac: pericarditis, MVP, MI



Stable Angina - Evaluation

Labs

- CBC: anemia
- Lytes: glucose (DM); arrhythmias
- Lipids: cardiac risk
- Cardiac Markers: C(P)K-MB, Troponin I
- PT/INR: prepare for anticoagulation
- CMP/LFTs: assess renal/hepatic function



Stable Angina - Evaluation

EKG:

- 25% are normal
- Classic: ST segment horizontal or down-sloping depression which resolves after pain subsides
- T-wave flattening or inversion *may* occur



Stable Angina - Evaluation

Exercise Stress Test: most useful, non-invasive procedure

- Contraindication: Aortic Stenosis (AS)
- Stop with: drop in BP, arrhythmia, increasing angina, >3-4mm ST-seg depression

Pharmacologic Stress Test: (when ambulation is difficult/impossible) use adenosine, dobutamine or dipyridamole



Stable Angina - Evaluation

Nuclear Stress Test

- Thallium or sestamibi to show perfusion defects
- Add ECHO to show wall motion defects, LV global and regional function
- SPECT or PET for questionable results



Stable Angina – Evaluation

CT: Ultrafast CT/EBCT: used to detect and differentiate soft or calcified plaques (aka calcium scoring)

MRI: High resolution images *without* radiation. Still slow, but stay tuned . . .



Stable Angina - Evaluation

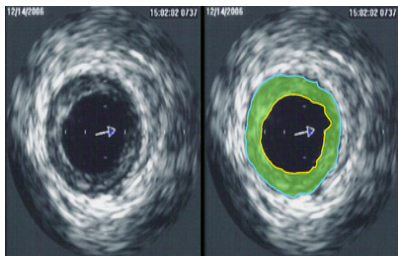
- Holter Monitor: 24 hour ambulatory EKG
- Event Recorder: long-term patient-activated ambulatory EKG
- Either/both useful in patients with "silent ischemia" (eg diabetics)

Stable Angina - Evaluation

Coronary Angiography: definitive diagnostic test for CAD

- Can be diagnostic and curative during one admission
- Invasive and expensive
- Used for CAD/Angina patients who have failed medical treatments to prepare for intervention
- Intravascular ultrasound (IVUS) helpful for Left Main lesions

Intravascular Ultrasound (IVUS)



www.commonswikiimedia.org/wiki/IVUS

Stable Angina - Treatment

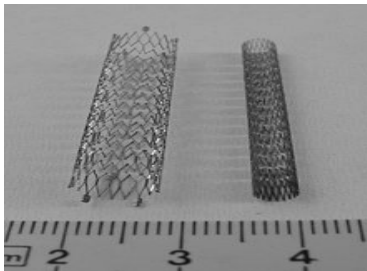
Nitroglycerin: drug of choice

- Sublingual acts in 1-2 min (spray ok)
- Decreases vascular tone, pre-load and after-load, and O₂ demand
- Long-acting: isosorbide di/mononitrates and transdermal patch
- Side effects: headache, nausea, ↓BP

Angina – Treatments, cont.

- PCI: PTCA (percutaneous transluminal coronary angioplasty, aka “balloon”), **stents/DES** (drug-eluting stents)
 - Less invasive
 - Faster recovery
 - Clopidogrel for 1 year post stenting

Two types of coronary artery stents



www.commonswiki.org/wiki/Stent

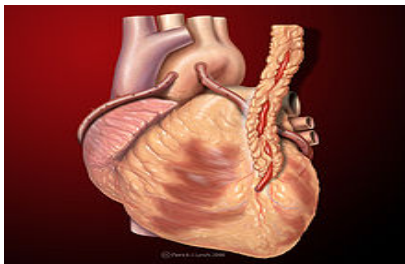
Angina – Treatments, cont.

- PCI: PTCA (percutaneous transluminal coronary angioplasty, aka “balloon”), **stents/DES** (drug-eluting stents)
 - Less invasive
 - Faster recovery
 - Clopidogrel for 1 year post stenting

Angina Treatment – cont.

- Surgery: CABG (coronary artery bypass graft)
 - Best results in DM
 - Better for multivessel disease
 - Often used in large Left Main occlusion

CABG (single) utilizing saphenous vein graft



www.commonswikiimedia.org/wiki/coronary_artery_bypass_grafting

Stable Angina - Prevention

- Avoid provocative factors – cold, stress
- Beta blockers – Proven to prolong life in post MI patients
- CCBs – Both act to decrease O₂ demand and allow for vasodilation
- Long Acting Nitrates – as discussed
- ASA or clopidogrel – antiplatelet drugs
- Risk reduction !



Prinzmetal's/Variant Angina

- Chest pain occurring *without* usual precipitating factors: often AM, F>M, associated with arrhythmias
- EKG shows ST segment elevation
- Results from coronary vasospasm w/or w/out obstructive coronary disease
- May be induced by cocaine



Unstable Angina

- Now frequently grouped with "Acute Coronary Syndromes"
- Presents as ST- elevation (STEMI) vs. Non ST- elevation (Non-STEMI)
- Results of CK-MB and Troponin help determine if acute MI is present or not
- If negative, XST and discharge pt.



Acute Coronary Syndromes

General Measures

- Hospitalization
- Bed rest
- Telemetry monitoring
- Supplemental O2 and sedation prn



Acute Coronary Syndrome

Thrombosis treatment

- ASA (81-325 mg) and heparin (UF or LMWH) STAT
- B-blocker
- Clopidogrel or prasugrel (new/faster)
- Glycoprotein IIb/IIIa inhibitors



Acute Coronary Syndrome

Nitroglycerin

- First-line anti-ischemic therapy
- May use morphine if BP drops too low

B-blockers

- +/- Avoid in patients with HF

Statins

- Start within hours/day(s) of ACS



Acute Coronary Syndrome

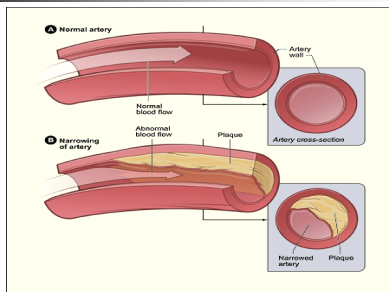
Catheterization and PCI for high-risk:

- Recurrent angina at rest
- Elevated troponin
- Low EF
- Hemodynamic instability
- Sustained VT
- Recent PCI or prior CABG

Acute Myocardial Infarction/MI

- Sudden chest pain > 30 min.
- EKG shows ST elevation (STEMI) or depression, and +/- evolving Qs
- Elevated CK-MB and Troponin
- Segmental wall motion abnormalities via ECHO at ED bedside

A Common Cause of acute MI



www.commonswikimedia.org/wiki/Coronary_artery_bypass_grafting

Acute MI - Symptoms

- Chest pain: early AM, at rest, NTG ineffective
- Dyspnea, diaphoresis, n/v, lightheaded
- Painless (1/3 of all MIs): women, elderly, diabetics
- Sudden death (50% occur before hospitalization): due to V-Fib



Acute MI - Signs

- General: anxiety and diaphoresis, possible low grade fever after 12 hours
- Lungs: Tachypnea, rales
- Heart: displaced PMI, JVD, S4/atrial gallop, tachy/brady, hyper or hypotensive
- Extremities: possible cool/cyanotic indicating low cardiac output

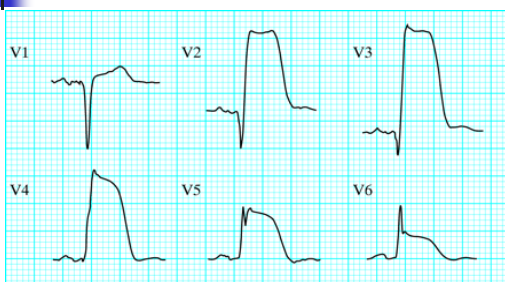


Acute MI - diagnostics

- Labs: CK-MB, Troponin I and T
-both positive in 4-6 hours; troponin stays elevated 5-7 days
- EKG: hyperacute T wave to ST-elev. to Q wave to T wave inversion
- CXR: CHF findings later; r/o aortic dissection via mediastinal widening



Classic "tombstoning" ST-elevations



Sadley, personal file



Acute MI - diagnostics

- ECHO: look for wall motion abnormalities – best for MR and VSD
- Scintigraphic Studies: technetium, thallium, radionuclide injection of traceable radioactive substances



Acute MI - treatment

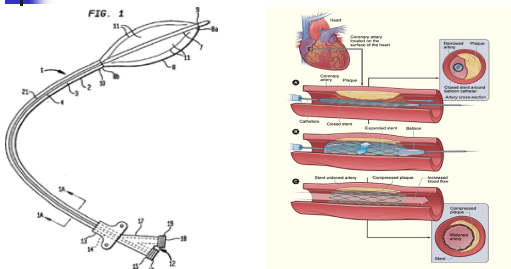
- ASA – (1/2 or whole) 325 mg chewed
- Clopidogrel (if ASA allergic) or also
- Thrombolytics: best used within 3 hrs of STEMI or with LBBB (eg t-PA, alteplase, reteplase, tenecteplase)
- Thrombolytics NOT recommended for non-STEMIs.
- Heparin



Acute MI - Treatment

- Immediate coronary angiography
- Percutaneous Coronary Intervention
- #1 today = PTCA and (drug-eluting) stenting (to maintain patency of vessel)
- CABG in some cases/problems; internal mammary art., saphenous vein or radial artery are grafts

Percutaneous Transluminal Coronary Angioplasty = PTCA



www.wikimedia.org/wiki/Heart
www.wikimedia.org/wiki/Angioplasty

Acute MI - hospitalization

- CCU/telemetry with O₂ 24-72 hours
- Pain relief with NTG or morphine
- Beta blockade
- ACE-I especially with low EF and CHF
- Antiarrhythmics: only with sustained VT
- d/c with ASA, B-blocker, statin

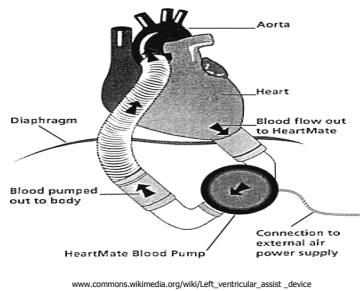
Acute MI - complications

- Ischemia: medical tx then cath/PCI
- Arrhythmias: medical therapy or pacemakers for conduction blocks
- LV Failure: O₂, diuretics, morphine, NTG; monitor patient

AMI – severe complications

- Hypotension/shock: fluids, hemodynamic monitoring via PAC; may try IABC (intra-aortic balloon counterpulsation)
- Dopamine – best pressor agent
- Surgically implanted LVAD (LV assist device)

Left ventricular assist device (LVAD)



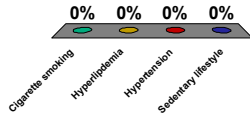
AMI – severe complications

- Papillary muscle rupture: AMI or IWMI, 3-7 days post MI; new systolic murmur
- Myocardial rupture: anterior wall, older females; 2-7 days post MI = death
- LV aneurysm: ST elevations persisting beyond 4-8 weeks post MI
- Pericarditis: findings 2-7 days post MI; Dressler's syndrome up to 3 mos. post MI – tx with NSAIDs or steroids



Worldwide, what is the most prevalent cardiac risk factor?

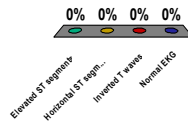
- ✓ 1. Cigarette smoking
- 2. Hyperlipdemia
- 3. Hypertension
- 4. Sedentary lifestyle





A 64 y/o female presents with exertional chest pain, relieved with rest, occurring several times per week x 1 month. What would you expect to see on her resting EKG?

- 1. Elevated ST segments
- 2. Horizontal ST segment depression
- 3. Inverted T waves
- ✓ 4. Normal EKG

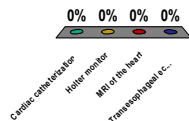


0 of 120



A 52 y/o male with a h/o worsening angina, underwent a Thallium stress test that revealed 3 mm ST segment depressions in II, III, AVF. What test should be performed next?

- ✓ 1. Cardiac catheterization
- 2. Holter monitor
- 3. MRI of the heart
- 4. Transesophageal echocardiogram





Sources:

- Bickley, Lynn S., *Bates Guide to Physical Examination and History Taking*, 10th Ed., Philadelphia, PA; LWW, 2010
- McPhee, S. Papadakis, M. Tierney, Jr., L., *Current Medical Diagnosis & Treatment 2010*, 49th ed., USA; McGraw-Hill Co., 2010
- www.healcentral.org
- www.commonswikimedia.org



" The Switch "



Scott Palfreyman

Carol Sadley



Endocarditis, Pericarditis & Effusion

- ♥ **Infective Endocarditis**
- ♥ **Acute Pericarditis**
- ♥ **Pericardial Effusion**
- ♥ **Cardiac Tamponade**

Infective Endocarditis

- ♥ Preexisting Heart Lesion (Valvular)
- ♥ Fever ($>38^{\circ}\text{C}$)
- ♥ New Heart Murmur
- ♥ Positive Blood Cultures
- ♥ Evidence of Septic Emboli
- ♥ Echocardiography w/ Vegetation

Infective Endocarditis

Classic Signs:

- ♥ Petechia - palate, conjunctiva, subungual
- ♥ Subungual splinter hemorrhages
- ♥ Osler node: (painful lesion- finger/toes/feet)
- ♥ Janeway lesion: painless red lesion palm/sole
- ♥ Roth spot: exudative retinal lesion (25%)

Which Lesion is painful?

Osler

Janeway

Osler = Ouch

Acute Infective Endocarditis

Acute bacterial infection typically ***Staph. aureus***.

- ♥ Rapid onset of high fevers, rigors
- ♥ New regurgitant murmur
- ♥ Labs: leukocytosis & positive blood cultures
- ♥ Sx: 2^o to emboli to lungs, kidneys, joints, bones:
cough, CP, back/flank pain, arthritis
- ♥ Rapid deterioration with CHF (70%)

Subacute Infective Endocarditis

Slow insidious bacterial infection of heart valve

- ♥ Typically ***Strep. viridans***
- ♥ Patients have weeks of constitutional Sx
 - ♥ nausea, vomiting, fatigue, and malaise
 - ♥ (-) fever: w/ elderly, CHF or renal patients
- ♥ Regurgitant murmur
- ♥ Labs: anemia of chronic dz, normal WBC

Infective Endocarditis

Prosthetic Valve Disease

- ♥ Fever or Prolonged Constitutional Sx
- ♥ Agent = (early) soon after valve implant
 - ♥ Staph, Gram neg., Fungi
- ♥ Agent = (late) after 2 months
 - ♥ Strep and Staph
- ♥ Treatment = 6 weeks of treatment
 - ♥ Staph = 6wk Vaco + Rifampin + 2wkGent

Infective Endocarditis

Injection Drug Users

- ♥ All febrile IDU's should be evaluated for IE
- ♥ Agent = 60% Staph aureus
 - ♥ Also enterococci/Streptococci
- ♥ Treatment = 2-4 wk Depends on the Agent

Infective Endocarditis

Bug Specific Treatment

- ♥ Empiric = Vancomycin + Ceftriaxone
- ♥ Strep. viridans
 - 4 wk PenG or 2 wk PenG + Gent
 - 4 wk Ceftriaxone or Vancomycin
- ♥ Staph. aureus
 - 6 wk Nafcillin or Oxacillin
 - 6 wk Vancomycin
- ♥ HACEK - *Haemophilus, Actinobacillus, Cardiobacterium, Eikenella, Kingella*
 - 4-6 wk Ceftriaxone

Infective Endocarditis

Lesions Requiring Prophylaxis

High Risk

- Prosthetic Valves
- Prior Infective Endocarditis
- Cyanotic Congenital Heart Disease

Moderate Risk

- Rheumatic (or other acquired) valve disease
- Hypertrophic Cardiomyopathy
- Mitral valve prolapse WITH regurgitation

Infected Endocarditis

Lesions NOT Requiring Prophylaxis

- ASD/ VSD/ PDA- post repair
- CABG
- MVP without regurgitation
- Rheumatic fever without valve dysfunction
- Previous Kawasaki's/ Pacemakers/ AICD, Defibrillators

Infected Endocarditis

Procedures Requiring Prophylaxis

- Dental: Extraction/ Root Canal/ Tonsillectomy
- GI: Surgery/ ERCP/ Colonoscopy w/ Biopsy
- GU: Prostate surgery/ cystoscopy

Infected Endocarditis

Procedures NOT Requiring Prophylaxis

- Respiratory: Flexible Bronchoscopy*
- GI: Endoscopy w/ Biopsy*
- GU: Hysterectomy, C-section/ Vaginal delivery*
- Dental fillings/ local injection/ fluoride/ orthodontic adjustment
- Respiratory: flex bronchoscopy/ tympanostomy/ ETTube
- CV: TEE, angioplasty

Infective Endocarditis

Major Criteria

- ♥ Two (+) Blood Cultures with typical agent
- ♥ TEE Demonstrates Endocarditis
- ♥ New Murmur

Minor Criteria

- ♥ Fever >38C
- ♥ Vascular phenomena
- ♥ Immunologic phenomena
- ♥ (+) Blood Culture

Infective Endocarditis

Modified Dukes Criteria

- **Definitive Dx:** 2 major OR 5 minor OR 1 major + 3 minor
- **Possible Dx:** 1 major + 1 minor OR 3 minor

Infective Endocarditis

Complications

- ♥ Depend on organism, valve and time to Dx
- ♥ Staph aureus = more valve damage, more abscesses and emboli
- ♥ Aortic valve = embolization to brain/ myocardium
embolization to spleen/ kidneys
- ♥ Tricuspid = septic pulmonary emboli
- ♥ Damage leads to rapid deterioration with CHF

Infective Endocarditis

Prognosis

♥ Medical treatment usually effective

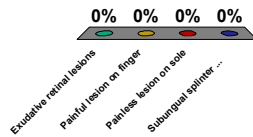
♥ Valve replacement surgery indicated

if:

- Valve regurgitation with CHF
- Infections not responding to ABX
- Recurrent infection with same agent
- Fungal endocarditis
- +/- continued embolization

A patient with a diagnosis of infective endocarditis tells you that they have a history of Janeway lesions. What will most likely be found on physical exam?

1. Exudative retinal lesions
- ★ 2. Painful lesion on finger
3. Painless lesion on sole
4. Subungual splinter hemorrhages



Myocarditis

Myocardial Inflammation (Focal or Diffuse)

- ♥ Sudden onset Heart Failure
- ♥ Sx: SOB/ pleuritic chest pain
- ♥ PE: Edema/ S3 gallop
- ♥ EKG: Nonspecific ST changes w/ conduction delay
- ♥ Echocardiogram > Dilated Cardiomyopathy
- ♥ Dx: Myocardial biopsy = gold standard

Myocarditis

Myocardial Inflammation (Focal or Diffuse)

- 1° = viral Infection or immune response
 - Coxsackie B (measles/ influenza/ varicella)
 - Kawasaki's
- 2° = Bacteria/ Toxins/ Systemic illness
 - Lyme/ RMS fever/ Syphilis/ Chagas
 - Radiation/ doxorubicin/ cocaine
 - Lupus

Pericarditis

Localized inflammation of anterior, lateral and inferior walls may cause ST elevations in multiple areas

Acute Pericarditis

Common: Viral/ often post URI

- Coxsackie B (echo/ influenza/ varicella)
- Men under 50 most common (post URI)
- Pleuritic/ positional chest pain
- Pericardial friction rub
- Treatment - ASA/ indomethacin/ NSAID
- <5% develop tamponade

Acute Pericarditis

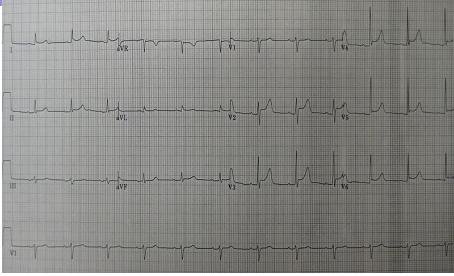
Pericardial Inflammation

- ♥ Uremia → need dialysis
- ♥ Post cardiac surgery
- ♥ 2-5 days Post MI / Dressler's Syndrome

Often with associated Myocarditis

- ♥ Lyme/ Lupus/ radiation/ cancer/ RA/ drugs
- ♥ Hypothyroid (myxedema)

Disease: Pericarditis



<http://commons.wikimedia.org/wiki/File:PericarditisECG.JPG>

Pericardial Effusion

Accumulation of fluid in pericardium

- ♥ Rapid accumulation = tamponade
- ♥ Fluid 2^o to inflammatory process = painful
- ♥ Slow accumulation (neoplasia/uremia)= no pain
- ♥ Large effusion >1000cc w/ neoplasia

Pericardial Effusion

Diagnostic Studies

- ♥ PE: JVD/ muffled sounds/ paradoxical pulse
- ♥ CXR: enlarged/ globular cardiac silhouette
- ♥ EKG: low voltage/ T-wave Δ's,
 - ♥ maybe electrical alternans
- ♥ Echo: Primary method for detecting effusion

Pericardial Effusion

- **Paradoxical pulse** – exaggeration of the normal variation in the pulse during respiration, in which the pulse becomes weaker as one inhales and stronger as one exhales; it is characteristic of constrictive pericarditis or pericardial effusion.
- **Electrical alternans** - describes alternate-beat variation in the direction, amplitude, and duration of any component of the ECG waveform

Cardiac Tamponade

↑ Intra-pericardial pressure

↓ venous return and ↓ ventricle filling

- Stroke volume falls > BP falls > Shock > Death
- Dyspnea and cough
- Tachycardia
- Narrow pulse pressure
- Paradoxical pulse

Pericardial Effusion

Treatment

Tamponade:

- Urgent pericardiocentesis
- Sub-xiphoid with echocardiography

Small effusions:

- Follow clinically (JVD) and serial echo

Large effusions:

- Pericardial window



" The Last Switch "



Scott Palfreyman

Carol Sadley





The Cardiovascular System:

- Vascular Disease



Vascular Disease

- Acute rheumatic fever
- Aortic aneurysm/dissection
- Arterial embolism or thrombosis
- Chronic/acute arterial occlusion
- Giant cell arteritis
- Peripheral vascular disease
- Phlebitis/thrombophlebitis
- Venous thrombosis
- Varicose veins



Acute Rheumatic Fever

- Systemic immune process
- Sequella to B-hemolytic strep (pharynx)
- Peak ages 5-15 y/o; rare <4 or >40 y/o
- Lesion: perivascular granulomatous reaction with vasculitis
- Mitral valve (>75%); Aortic valve (20%); Tricuspid valve (<5%)



Acute Rheumatic Fever

- Jones criteria needed to make diagnosis:
 - Two major or:
 - One major and two minor



Jones Criteria for RF

- Major
 - Carditis: pericarditis, cardiomegaly, CHF, mitral/aortic regurgitation murmurs; other
 - Erythema marginatum (ring-shaped macules) & sub Q nodules (children only)
 - Sydenham's chorea: face, tongue, UE
 - Polyarthritis: migratory, large joints



Subcutaneous nodules of RF



www.healcentral.org/content/1164/image/jpeg/nodules.jpg



Jones Criteria - RF

- Minor Criteria
 - Fever
 - Polyarthralgias
 - Prolongation of the PR interval
 - Rapid ESR or elevated CRP
- Supporting evidence = + throat culture or rapid strep antigen and elevated antibody titer



Acute Rheumatic Fever - labs

- High or increasing titers of antistreptococcal antibodies confirm diagnosis in 90% of cases
 - Antistreptolysin O
 - Anti-DNase



Rheumatic Fever - treatment

- Strict bed rest
- ASA (to reduce fever and pain)
- Penicillin (erythromycin ok)
- Corticosteroids: to help with fever and joint symptoms—not shown to reduce cardiac involvement

RF – Prevention & Prognosis

- Early tx of strep pharyngitis
- Recurrences most common in children and when carditis is present
- PCN prophylaxis is important
- Severe results are uncommon, but 30% mortality associated in children
- Rheumatic Heart Disease results from single or repeated attacks

Abdominal Aortic Aneurysm

- AAA most common (90%)
- 90% of these originate below the renal arteries
- Aortic diameter >3 cm (normal = 2cm)
- Most aneurysms are asymptomatic

Abdominal Aortic Aneurysm (infrarenal)



www.commonswikimedia.org/wiki/Abdominal_aortic_aneurysm



AAA – signs/symptoms

- Asymptomatic – routine PE/incidentally
- Often associated with LE aneurysms or LE occlusive disease (25%)
- Severe abd/low back pain, pulsatile mass & hypotension = rupture



AAA - diagnosis

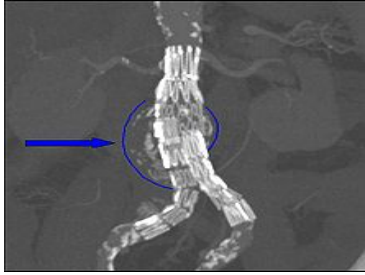
- Labs: EKG, creatinine, H&H, X-match
- Imaging: Abd US = screening study of choice
- Annual US for aneurysms > 3.5 cm
- Contrast-enhanced CT best prior to sx
- May use MRI if contrast is prohibited
- Aortography preferred with occlusive dz



AAA – treatment & prognosis

- B-blockade pre-op to reduce cardio complications
- Elective sx > 5 cm; poor risk > 6 cm
- Endovascular repair with “stent grafts” is best surgical procedure
- 1-5% mortality post-op

Endovascular repair of AAA



www.commons.wikimedia.org/wiki/Abdominal_aortic_aneurysm

Aortic Dissection

- Most common aortic catastrophe!
- Cause = intimal tear → false lumen between media and adventitia
- >95% occur in ascending aorta
- Risks = HTN (80%), Marfan's, pregnancy, bicuspid aortic valve
- 90% mortality at 1 month

Aortic Dissection – s/s

- Sudden, excruciating, ripping pain in the chest or upper back (85%)
- Pain may radiate to abd, neck, groin
- HTN at presentation
- PE: peripheral pulses and BP may be diminished or unequal
- AR diastolic murmur possible



Aortic Dissection: diagnosis

- EKG: normal or LVH
- CXR: widened mediastinum
- TEE, CT, Angiography, MRI all okay, but TEE fast, sensitive, and specific (best)



Aortic Dissection -- treatment

- Aggressive BP control (nitroprusside IV)
- Beta blockade to slow HR
- SURGERY !!!



Arterial Embolism/Thrombosis

- Acute limb ischemia: embolic, thrombotic, or traumatic
- Most emboli arise from the heart (e.g. A-fib.)
- S/S related to location, duration of ischemia, and collateral flow present
- PE should focus on pulses, motor, and sensory systems

Peripheral arterial disease



www.commons.wikimedia.org/wiki/Peripheral_artery_occlusive_disease

Arterial Embolism – s/s

- Six "Ps" of acute ischemia:
 - Pain (early)
 - Paresthesias (early)
 - Pallor
 - Pulselessness
 - Poikilothermia (aka varying temperature)
 - Paralysis

Arterial Embolism - treatment

- Heparin
- Emergent embolectomy via balloon catheter
- Beware compartment syndrome (sx >6 hours after initial symptoms)
- Foot drop = most common neuro deficit (due to peroneal nerve ischemia)
- Lifelong anticoagulation



Arterial Thrombosis

- Most commonly results from chronic, atherosclerotic occlusive disease
- Polycythemia, dehydration, hypercoag. states increase risk of thrombus
- Treat with thrombolysis (alteplase) first
- Surgical interventions: angioplasty, endarterectomy, bypass grafting



Arterial Occlusion

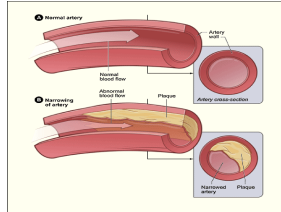
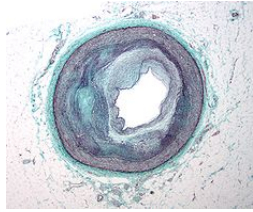
- Most common cause = atherosclerosis
- Systemic disease commonly found in arteries with turbulent flow and low shear stress
 - Carotid bifurcation
 - Infrarenal aortic
 - Iliac, superficial femoral, tibial in LE



Arterial Occlusion - Carotid

- Carotid stenosis = 25% of strokes
- TIA: complete neuro resolution < 24hr
- S/sx: weakness, aphasia, vision loss
- Dx: Duplex u/s; MRI if details needed
- Tx: medical: ASA and clopidogrel
surgical: heparin and endarterectomy or angioplasty/stenting via percutaneous route

Carotid Endarterectomy



www.commonswikimedia.org/wiki/atherosclerosis

Carotid Dissection

- Carotid dissection (classic triad):
 - CVA or TIA
 - Unilateral neck pain or h/a
 - Horner's syndrome (miosis & ptosis only)
- Tx: drug therapy (coumadin) then sx

Arterial Occlusion - Other

- Chronic/Acute Intestinal Ischemia
- Mesenteric Vein Occlusion
- Ischemic Colitis
- Renal Artery Stenosis
- Acute Limb Ischemia

Other Arteriopathies

- Buerger's (thromboangiitis obliterans): men, < 40, smokers; extremity vessels
- Pulseless Disease (Takayasu): Asian women, < 40; aortic arch disease
- Raynaud's: digital color change (w/b/r)
- Reflex Sympathetic Dystrophy: burning or aching pain disproportionate to cause

Classic red, white, blue of Raynaud's



www.commonswikiimedia.org/wiki/Raynaud%27s_disease

Giant Cell (temporal) Arteritis

- Affects medium and large vessels
- Associated with polymyalgia rheumatica
- Age > 50



Giant Cell Arteritis – s/s

- H/A, jaw claudication, scalp tenderness, visual symptoms
- Blindness may result (ophthalmic artery affected)
- UE asymmetric pulses; AR murmur; subclavian bruit
- (Elderly) Fever with normal WBCs



Giant Cell Arteritis – Dx & Tx

- ESR > 50 mm/h; often > 100 (CRP, Interleukin-6)
- Biopsy of temporal artery
- Urgent to reduce blindness
- Prednisone 60 mg/d po X 1 month
- ? ASA 81 mg (may reduce visual loss)



Polymyalgia Rheumatica

- Pain & stiffness of shoulders/pelvis
- Frequently associated with fever, malaise and weight loss
- Often with anemia and elevated ESR
- Tx with prednisone 10-20 mg/d po
- If no improvement in 72 hours reconsider diagnosis



Peripheral Vascular Disease

- Lower extremities affected by atherosclerotic disease
- Risks include: male, increasing age, DM, HTN, smoking
- Highly associated with cerebrovascular and CAD



PVD/PAD – s/s

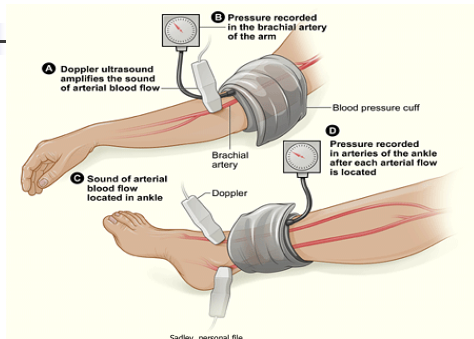
- Erectile dysfunction (iliac arteries)
- Claudication: fatigue/pain/weakness w/ walking & relieved by rest
- Ischemic rest pain: nocturnal foot pain
- Gangrene: implies impending limb loss
- Leriche's syndrome: b/l hip & buttock claudication, ED, and absent femoral pulses



PVD/PAD – P.E. and Imaging

- Pulses, +/- bruits
- Ankle-brachial index:
 - 1= normal; <0.8 = claudication
- Atrophy of skin, coolness, hair loss, ulcers
- Image via angiography or MRA prior to surgery or percutaneous treatment

Ankle-brachial index



PVD/PAD -- Treatment

- Identify and control risk factors: exercise, smoking cessation, lipid lowering
- Cilostazol/Pletal, ASA, ginkgo biloba
- Stent angioplasty
- Open bypass grafting (synthetic)

Phlebitis/Thrombophlebitis

- Superficial veins involved (long saphenous most common)
- Risks include: varicosities, pregnancy or postpartum, Behcet's syn., trauma, abdominal cancer (Trousseau's synd.)
- Assoc. with occult DVT in 20% cases



Phlebitis – s/s

- Dull pain
- Redness, induration, tenderness in linear distribution
- No edema (deep vein involvement)
- Chills/fever suggest septic cause (eg IV)
- Differentiate from cellulitis by linear distribution pattern (vs. round)



Phlebitis – Treatment

- NSAIDs, heat, elevation x 7-10 days
- Encourage ambulation
- Vein excision with complications
- Septic causes require abx



Deep Vein Thrombophlebitis

- Virchow's Triad (stasis, vascular injury, hypercoagulability) = cause
- Risks: CHF, recent surgery or trauma, neoplasia, OC use, sedentary/travel
- 50% of patients are asymptomatic !
- Main/serious complication is pulmonary embolism (PE)



DVT – signs and symptoms

- Dull ache, tightness, calf/leg pain especially with walking
- Slight edema, palpable cord
- Low grade fever
- Tachycardia
- Homan's sign = only 50% positive



DVT – Diagnosis & Prevention

- Duplex US is diagnostic !
- May use MR venography (gadolinium)
- D-dimer test helps with (?) US

- Early ambulation, SCDs, foot board
- Anticoagulation: LMWH, heparin, warfarin or prophylactic vena caval filter



Chronic Venous Insufficiency

- History of phlebitis or leg injury
- Chronic elevation in venous pressure
- Ankle edema is earliest sign
- Late signs: stasis pigmentation, dermatitis, induration, varicosities, ulceration
- Ulcers: painless, large, irregular

Chronic Venous Insufficiency ulcer



www.commonswiki.org/wiki/venous_ulcer

CVI -- Management

- Bed rest, leg elevation, graded compression stockings, exercise
- Wet saline compresses for weeping dermatitis
- Unna boot, Ace wrap, wet-to-dry saline dressings for ulcer tx
- Abx and antifungals when indicated

Varicose Veins

- Dilated, tortuous, superficial veins in LE
- Seen in 15% of adults
- Risk factors: female, pregnancy, fam. hx., standing, h/o phlebitis
- Long saphenous vein most common

Varicose Veins



www.commonswiki.org/wiki/Varicose_veins

Varicose Veins – s/s

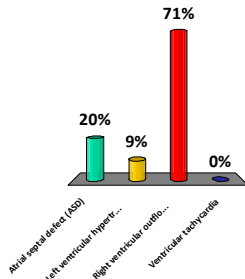
- Dull, achy, heaviness, fatigue in LE
- Dilated, tortuous, elongated veins
- Smaller, flat, blue/green veins, and spider veins provide evidence
- Signs of chronic venous insufficiency
- Test valve competence with Trendelenburg test

Varicose Veins - Treatment

- Non-sx = daytime stockings, exercise
- Surgery after Doppler US using radio frequency ablation and/or stab avulsion surgery
- Compression sclerotherapy useful for spiders, telangiectasias, and small varicosities

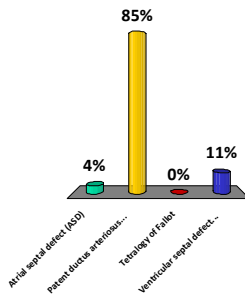
Which of the following is one of the four classic features of Tetralogy of Fallot?

1. Atrial septal defect (ASD)
2. Left ventricular hypertrophy (LVH)
3. Right ventricular outflow obstruction
4. Ventricular tachycardia



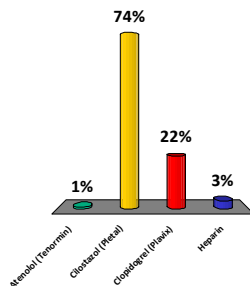
Cardiac auscultation of a 34 y/o male reveals a continuous, rough, "machinery-like" murmur, heard best in the first and second interspaces of the LSB. What is the most likely diagnosis?

1. Atrial septal defect (ASD)
2. Patent ductus arteriosus (PDA)
3. Tetralogy of Fallot
4. Ventricular septal defect (VSD)



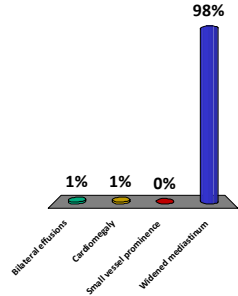
A 62 y/o male smoker presents for evaluation of lower extremity intermittent claudication. His ankle-brachial index is reduced to 0.7. Which medication should be used to treat this finding?

1. Atenolol (Tenormin)
2. Cilostazol (Pletal)
3. Clopidogrel (Plavix)
4. Heparin



A 78 y/o male presents to the ED c/o a sudden onset of searing chest pain, radiating to his back and neck. BP is noted at 220/108 mmHg. What would you expect on CXR?

1. Bilateral effusions
2. Cardiomegaly
3. Small vessel prominence
4. Widened mediastinum



Sources:

- Bickley, Lynn S., *Bates Guide to Physical Examination and History Taking*, 10th Ed., Philadelphia, PA; LWW, 2010
- McPhee, S. Papadakis, M. Tierney, Jr., L., *Current Medical Diagnosis & Treatment 2010*, 49th Ed., USA; McGraw-Hill Co., 2010
- Scheidt, S., *Basic Electrocardiography*, Vol. 36, Summit, NJ; CIBA-GEIGY Corp., 1996
- www.commonswikimedia.org
- www.healcentral.org

Thank you for your attention
and Good Luck!