Cardiac Infections	
Myocarditis	
Presentation	**Range**: asymptomatic → chest pain, palpitations, syncope, CHF w/ DOE and fatigue. Exam w/ fever, tachycardia, ventricular arrhythmias, new murmur or cardiogenic shock (poor pulses, hypotension, cool extremities)
Pathophys	Usually due to viruses (coxsackie B, adenovirus and enterovirus, and more recently HHV6 virus and parvovirus B19, measles, mumps, rubella, CMV, HIV, arboviruses, parvovirus, and influenza) or inflammatory conditions (Kawasaki disease, ARF)
Workup	**Lab workup**: CBC, inflammatory markers, cardiac enzymes, viral serologies and may include rheumatologic screening if a systemic inflammatory process is suspected **CXR**: may show cardiomegaly and pulmonary vascular congestion/edema. **EKG**: non-specific and may show sinus tachycardia, arrhythmia, heart block, prolonged QT-interval, bundle branch blocks, abnormal QRS axis, diffusely low voltage QRS complexes (<5 mm in full standard across the limb leads), non-specific ST-T changes and diffuse ST elevations w/ PR depression if there is coincident pericarditis. **Echo**: is useful for evaluating cardiac function and ruling out other causes of cardiac dysfunction, but cannot definitively diagnosis myocarditis. Gadolinium-enhanced cardiac MRI which shows late gadolinium enhancement is suggestive of myocarditis, though is somewhat nonspecific. Endomyocardial biopsy via right heart cath may be diagnostic, but has low sensitivity.
Treatment	Largely supportive. Tx CHF w/ diuretics, ACE inhibitors +/- milrinone (can worsen hypotension), dobutamine, antiarrhythmic, anticoagulant. IVIG used but data is limited
Endocarditis	
Presentation	Subacute → low-grade fevers, myalgias, fatigue, weight loss, exercise intolerance or acute→ Rapid, fulminant, high fevers, toxic appearance (usually Staph aureus). Exam w/ tachycardia, new murur, splenomegaly, **Roth spots** (retinal lesion), **Janeway lesions** (palms/soles), **Osler nodes** (painful fingers and toes), **splinter hemorrhages**
Pathophys	Bacteria (usually **S. Aureus, viridans strep, coag neg staph**) that damage endothelium and set off clotting cascade leading to fibrin deposition over valve
Workup	**Labs**: Draw blood culture x 3 initially, then daily if persistently febrile. CBC w/ elevated WBC, +/- anemia. Elevated ESR and CRP. Microscopic hematuria due to renal emboli. **CXR**: May show evidence of CHF or septic emboli. **ECG**: May show AV conduction defects if vegetation involves conduction system. **Echocardiogram**: TTE is adequate in most kids. TEE indicated only if TTE inadequate. Abscence of echocardiographic vegetations does not exclude a clinical dx of endocarditis.
Modified Duke Criteria	**Pathologic Criteria**: (1) Pathologic lesions on histology (vegetation/abscess w/ active IE) or (2) microorganism identified on histology or culture of vegetation/abscess. **Clinical Criteria** (Modified Duke Criteria): 2 major or 1 major + 3 minor or5 minor. **Major Criteria**: (1) ≥2 blood cultures w/ typical organisms (or persistently positive); (2) Endocardial involvement (vegetation, abscess, new valvular regurgitation). **Minor Criteria**: (1) predisposition, (2) fever, (3) vascular phenomena (septic emboli, mycotic aneurysm, ICH, Roth spots, Janeway lesion), (4) immunologic phenomena (GN, RF+, Osler nodes).
Treatment	Antibiotics→ empiric coverage should cover **Staph, Strep, and Enterococci** (e.g. vancomycin)--> tailor based on sensitivities. Generally 4-6 weeks. Surgery→ if persistent bacteremia despite therapy, heart failure, progressive valvular dysfunction, conduction tissue involvement or large lesion at high risk of embolizing.
Complications	Heart failure (most common indication for surgery), perivalvular abscess (suspect if new conduction abnormality or persistent bacteremia), pericarditis, septic emboli, metastatic abscess, embolic stroke, renal infarction

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