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CME

Multimodality Imaging of Aortitis

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CME Objective for This Article: At the end of this activity the reader should be able to: 1) state the importance of incorporating the entire clinical picture including risk factors, symptoms, and signs suggestive of infectious and noninfectious aortitis and the value of selecting the proper imaging test for the right patient; 2) identify clinical characteristics that may favor the diagnositic utility of imaging for extent of disease activity versus extent of anatomical changes to the arterial wall and lumen; 3) summarize the diagnoses and clinical scenarios in which routine screening or serial imaging examination of aortitis disease activity may provide benefit; 4) describe potential vascular complications of aortitis, and define which imaging tests are appropriate for accurate identification; 5) summarize how to differentiate aortitis from intramural hematoma on computed tomography and magnetic resonance imaging; 6) recognize that aortitis patients are at high risk for development of aortic aneurysm and may benefit from screening for early detection, however, providers need to be cognizant of the potential for cumulative radiation and aware of nonradiating alternatives; and 7) discuss the complementary value of dedicated cardiac examinations such as coronary computed tomography angiography, cardiac magnetic resonance, and echocardiography in aortitis with cardiac symptoms or signs such as angina, heart failure, or cardiac murmurs.

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Multimodality Imaging of Aortitis

Multimodality imaging of aortitis is useful for identification of acute and chronic mural changes due to inflammation, edema, and fibrosis, as well as characterization of structural luminal changes including aneurysm and stenosis or occlusion. Identification of related complications such as dissection, hematoma, ulceration, rupture, and thrombosis is also important. Imaging is often vital for obtaining specific diagnoses (i.e., Takayasu arteritis) or is used adjunctively in atypical cases (i.e., giant cell arteritis). The extent of disease is established at baseline, with associated therapeutic and prognostic implications. Imaging of aortitis may be useful for screening, routine follow up, and evaluation of treatment response in certain clinical settings. Localization of disease activity and structural abnormality is useful for guiding biopsy or surgical revascularization or repair. In this review, we discuss the available imaging modalities for diagnosis and management of the spectrum of aortitis disorders that cardiovascular physicians should be familiar with for facilitating optimal patient care. (J Am Coll Cardiol Img 2014;7:605–19) © 2014 by the American College of Cardiology Foundation

Aortitis is a pathologic term for the presence of inflammatory changes of the aortic wall. Aortic wall inflammation may be of infectious etiology, but is more commonly of noninfectious origin (1). The classification of aortitis and clinical findings of conditions frequently associated with aortitis can be found in Tables 1 and 2. Patients with noninfectious aortitis related to large-vessel vasculitis may present with symptoms of arterial insufficiency in the case of Takayasu arteritis or a characteristic headache with giant cell arteritis. Incidental vascular findings may be identified in patients presenting with a rash or arthralgias suggestive of collagen vascular disorders, such as rheumatoid arthritis, systemic lupus erythematous, and ankylosing spondylitis. Not uncommonly, aortitis is an unsuspected finding in patients being evaluated for unexplained fever or chest, abdominal, or back pain. Infectious aortitis is associated with various bacterial and viral pathogens, and patients may present with classic risk factors such as exposure history, high-risk behavior, immunosuppression, and recent surgical instrumentation. Both clinical and imaging features, including the pattern of aortic involvement, help distinguish between noninfectious and infectious causes. There is significant overlap of imaging characteristics among aortitis etiologies, and the importance of integrating the entire clinical picture with imaging findings cannot be overstated.

Table 1. Classification of Aortitis

Noninfectious aortitis
Large-vessel vasculitides
Giant cell arteritis
Takayasu arteritis
HLA B27-associated spondyloarthropathies
Ankylosing spondylitis
Reiter syndrome
Immunoglobulin G4–related aortitis
Variable-vessel vasculitides
Behcet's disease
Cogan's syndrome
Relapsing polychondritis
Rheumatoid arthritis
Systemic lupus erythematosus
ANCA-associated
Wegener arteritis
Polyarteritis nodosa
Sarcoidosis
Neoplastic
Other
Idiopathic aortitis
Inflammatory aortic aneurysm
Idiopathic retroperitoneal fibrosis (periaortitis)
Radiation-induced aortitis
Infectious aortitis
Bacterial (e.g., *Salmonella* or *Staphylococcus*)
Luetic (syphilis)
Mycobacterial (e.g., *Mycobacterium tuberculosis or Nocardia*)
Viral (e.g., hepatitis B, hepatitis C, and human immunodeficiency virus)

ANCA = anti-neutrophil cytoplasmic antibody.

Imaging Aortitis

Multiple imaging modalities are used in the evaluation of both inflammatory and noninflammatory aortic diseases (2). Nuclear imaging with