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Techniques in Vascular and Interventional Radiology

Managing Mesenteric Vasculitis

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Mesenteric vasculitis is a rare diagnosis, but it comprises a group of disorders that may have devastating manifestations. It is often difficult to diagnose using clinical symptoms and biomarkers. Vascular imaging often provides the best opportunity for the noninvasive diagnosis of vasculitis and obviates the need for performing a biopsy. The medical management of vasculitis involves controlling the inflammatory process with the use of steroids or other immunosuppressants, but medical therapy does not consistently provide regression of the vascular changes (ie, aneurysms or vascular occlusions) seen at the time of the initial diagnosis. Operative management remains the mainstay of therapy for focal occlusive or aneurysms, but the treatment options for multifocal disease remain challenging. Endovascular treatment is increasingly being used as a first line of treatment for symptomatic vasculitis. Interventionalists should be familiar with the indications and outcomes associated with the various therapeutic options for mesenteric vasculitis–associated occlusive disease and aneurysms.

KEYWORDS Mesenteric vasculitis, ischemia, angioplasty

Clinical Evaluation

Vasculitis is a broad group of noninfectious disorders that cause inflammation of vessels. These disorders are systemic disorders that predominately target large and medium-sized arteries, but small vessel disorders may lead to organ ischemia or infarction predominating the clinical and imaging manifestations. Mesenteric vasculitis is a rare diagnosis with protean manifestations.[1] The most common abdominal symptoms include abdominal pain, pain after eating, fear of food, abdominal tenderness, nausea, vomiting, diarrhea, and gastrointestinal or intraperitoneal or retroperitoneal hemorrhage.[2] Less common clinical signs include jaundice and intestinal obstruction. Mesenteric vasculitides are often asymptomatic and incidentally discovered by endoscopy or cross-sectional imaging.

Vasculitis involving the mesenteric circulation can be subdivided into small, medium, and large vessel disease (Table). The vascular manifestations of a vasculitis include arterial stenoses, aneurysms, dissections, and thrombosis.[3]

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The most common vasculitides involving the mesenteric arteries are Takayasu arteritis, giant cell arteritis, systemic lupus erythematosus, polyarteritis nodosa (PAN), and 2 additional disorders closely related to PAN—segmental arterial mediolysis and hepatitis associated vasculitis (Table).[4,5] The differential diagnosis for visceral aneurysms includes atherosclerotic disease, mycotic aneurysms, drug-induced aneurysms, posttraumatic aneurysms, fibromuscular dysplasia, and flow-related aneurysms (ie, aneurysms of the pancreaticoduodenal arteries that develop from a hyperdynamic flow state owing to increase flow via collaterals due to occlusive disease of the celiac artery).

Vascular Imaging

Computed tomographic angiography (CTA) or magnetic resonance angiography have become popular screening tools and often define the anatomical findings to suggest a diagnosis (Fig. 1).[6-9] For operative or endovascular treatment of focal disease or medical management of diffuse disease, a CTA/magnetic resonance angiography may be all the imaging assessment that is needed.[10] Positron emission tomography has an increasing role in the differentiation of vasculitis from atherosclerosis, assessing disease activity, and in identifying the extent of involvement from head to toe.[11] Catheter-based angiography is still an essential tool for diagnostic purposes for the assessment of small arteries for entities such as PAN, and in preparation for possible

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Table Mesenteric Vasculitis[4,25]

Vessel Size	Diagnosis
Large vessel	Giant cell arteritis Takayasu arteritis
Medium vasculitis	Hepatitis B–associated polyarteritis nodosa Polyarteritis nodosa Segmental medial arteriolysis Systemic lupus erythematosus
Small vessel	Behçet disease Churg-Strauss syndrome Henoch-Schönlein purpura Hepatitis C–associated cryoglobulinemic vasculitis Wegener granulomatosis

endovascular therapy.[12] Symptomatic arterial narrowing is an indication for catheter-based angiography, especially if there is a possibility that balloon angioplasty (percutaneous transluminal angioplasty [PTA]) could be used to treat the arterial abnormality.

Mesenteric artery aneurysms caused by a vasculitis may be proximal or distal in location and may be fusiform or saccular with a narrow or broad neck. Many of these disorders present with multiple aneurysms in one or more vascular territories. Aneurysms that have enlarged, are greater than 3 cm in diameter, are causing pain or other symptoms, or have bled should be treated. However, there is little consensus on the minimum size of an asymptomatic aneurysm to warrant treatment except for women of childbearing age. Mesenteric aneurysms appear to be at higher risk for rupture during pregnancy.[13] This lack of an understanding of the natural history of smaller mesenteric aneurysms can be particularly perplexing with disorders such as segmental arterial mediolysis and PAN that can present with multiple aneurysms. Isolated mesenteric aneurysms can be managed with operative aneurysmorrhaphy, operative exclusion, embolization, covered stents, flow-diverting stents or a combination of techniques and technologies.[14-17]

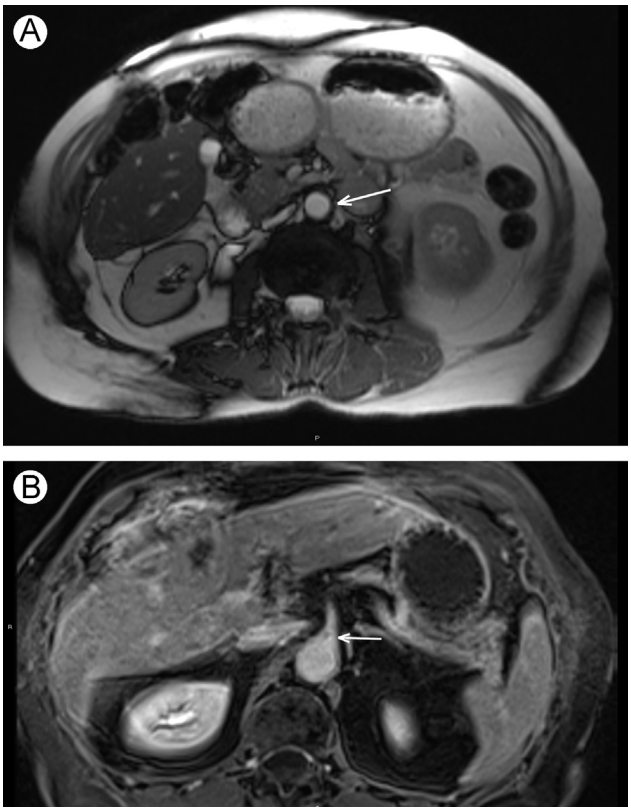

Figure 1 Abdominal MR images of a 75-year-old woman with giant cell arteritis affecting the infrarenal abdominal aorta, the proximal superior mesenteric artery and right renal artery are shown. (A) A T2-weighted, bright-blood sequence (truFISP, Siemens Medical, Erlangen, Germany) image demonstrates wall thickening (arrow) of infrarenal abdominal aorta. (B) A T1-weighted, contrast-enhanced image (delayed VIBE, Siemens Medical, Erlangen, Germany) reveals aortic wall thickening and contrast enhancement that extends into the proximal SMA (arrow), suggesting ongoing and active inflammatory changes of the abdominal aorta. MR, magnetic resonance.

Endovascular Therapy

Whenever possible, interventions should be performed during a quiescent or chronic phase of the disease, as determined by the absence of systemic symptoms and a low erythrocyte sedimentation rate and C-reactive protein level. Outcomes are not as good when procedures are performed in the presence of acute vascular inflammation. Once a decision is made to proceed with an endovascular procedure, elective high-quality visceral angiography with 3 phases (arterial, parenchymal, and venous) should be the standard. Repeat angiography with a vasodilator, such as papaverine (American Regent, Shirley, NY) may be indicated in the setting of a focal stenosis to exclude spasm, especially in the smaller arterial branches.

Symptomatic mesenteric artery stenoses are often amenable to PTA or cutting-balloon angioplasty.[14] Even in occluded segments, PTA alone may be possible, with high technical success rates and reasonable patency rates. The long-term patency rates for stents is too low to recommend their routine use as a primary treatment, particularly as these diseases often present at a young age.[18] The long-term patency of PTA and stents also needs to be compared with that of operative bypass, which provides an 83% patency at 10 years.[19,20] However, stents are an essential tool for the management of flow-limiting dissections or arterial recoil after angioplasty (Fig. 2).

Direct catheterization and coil embolization is the preferred therapy for aneurysms. These procedures are typically performed using a microcatheter and microcoils. In our practice, detachable 0.018 in coils have become an essential tool, particularly for the first and last coil placed into the aneurysm. It is very important to try to exclude all flow into the aneurysm as some degree of coil compaction would occur over time, making reperfusion of the aneurysm a possibility if the coils are not densely packed within