RadioGraphics

CT Findings in Sclerosing Mesenteritis (Panniculitis): Spectrum of Disease[1]

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LEARNING OBJECTIVES

After reading this article and taking the test, the reader will be able to:

- Describe the pathophysiologic features and clinical manifestations of sclerosing mesenteritis.
- Recognize the CT appearance of sclerosing mesenteritis and of other conditions that can mimic this disorder.
- Discuss the role of CT in the diagnosis of sclerosing mesenteritis.

Sclerosing mesenteritis is a complex inflammatory disorder of the mesentery. Although sclerosing mesenteritis is often associated with other idiopathic inflammatory disorders such as retroperitoneal fibrosis, sclerosing cholangitis, Riedel thyroiditis, and orbital pseudotumor, its exact cause is unknown. The computed tomographic (CT) appearance of sclerosing mesenteritis will vary depending on the predominant tissue component (fat, inflammation, or fibrosis). CT plays an important role in suggesting the diagnosis in the proper clinical setting and can be useful in distinguishing sclerosing mesenteritis from other mesenteric diseases with similar CT features such as carcinomatosis, carcinoid tumor, lymphoma, desmoid tumor, and mesenteric edema. Nevertheless, surgical biopsy and pathologic analysis are usually necessary to make the diagnosis. Treatment may consist of therapy with steroids, colchicine, immunosuppressive agents, or orally administered progesterone. Surgical resection is sometimes attempted for definitive therapy, although the surgical approach is often limited by vascular involvement. CT with three-dimensional volume rendering is optimal for accurate, noninvasive follow-up of sclerosing mesenteritis and of any potential complications.

Index terms: Mesenteritis, 792.20, 792.768 • Mesentery, CT, 792.1211 • Mesentery, diseases, 792.768 • Mesentery, neoplasms, 792.30

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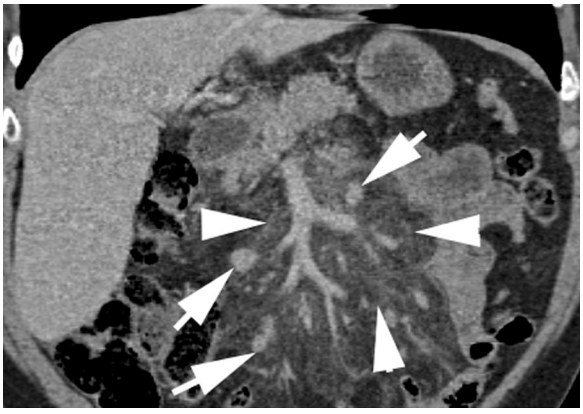


Figure 1. Sclerosing mesenteritis. Coronal multiplanar reformatted image from CT demonstrates subtle increased attenuation within the mesentery (arrowheads). Adenopathy is also noted (arrows).

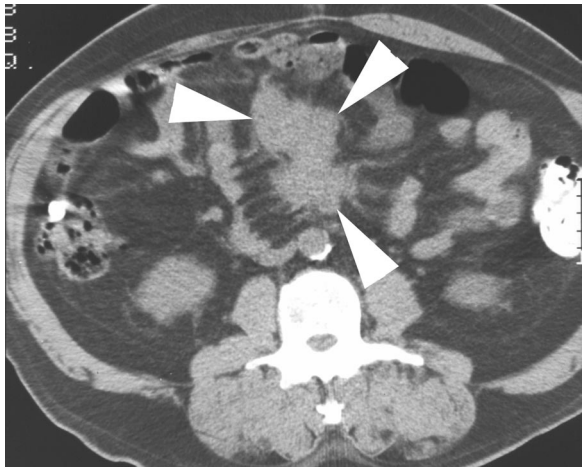


Figure 2. Sclerosing mesenteritis. Axial CT scan shows an irregular soft-tissue mass in the root of the mesentery (arrowheads).

Introduction

Sclerosing mesenteritis is a rare condition of unknown cause that is characterized by chronic mesenteric inflammation (1,2). The process usually involves the mesentery of the small bowel, especially at its root, but can occasionally involve the mesocolon (2–4). On rare occasions, it may involve the peripancreatic region, omentum, retroperitoneum, or pelvis (2,5–9). Although the cause of sclerosing mesenteritis is unknown, the disorder is often associated with other idiopathic inflammatory disorders such as retroperitoneal fibrosis, sclerosing cholangitis, Riedel thyroiditis, and orbital pseudotumor. All of these disorders are characterized by chronic inflammation and fibrosis, and more than one condition may be present in a single patient. Although the pathogenesis of sclerosing mesenteritis has not been elucidated, autoimmunity in the context of an established collagen vascular disease has been suggested as a possible mechanism. Infection, trauma, and ischemia have also been suggested as possible causative factors (4,10–12). In addition, an association between sclerosing mesenteritis and prior abdominal surgery has been reported (2). In one series by Daskalogiannaki et al (13), sclerosing mesenteritis was reported to coexist with malignancy in up to 69% of patients. These malignancies included lymphoma, breast cancer, lung cancer, melanoma, and colon cancer (13).

In this article, we discuss and illustrate the histologic features, clinical manifestations, computed tomographic (CT) appearance, diagnosis, and treatment of sclerosing mesenteritis and the CT findings in conditions that can mimic this disorder.

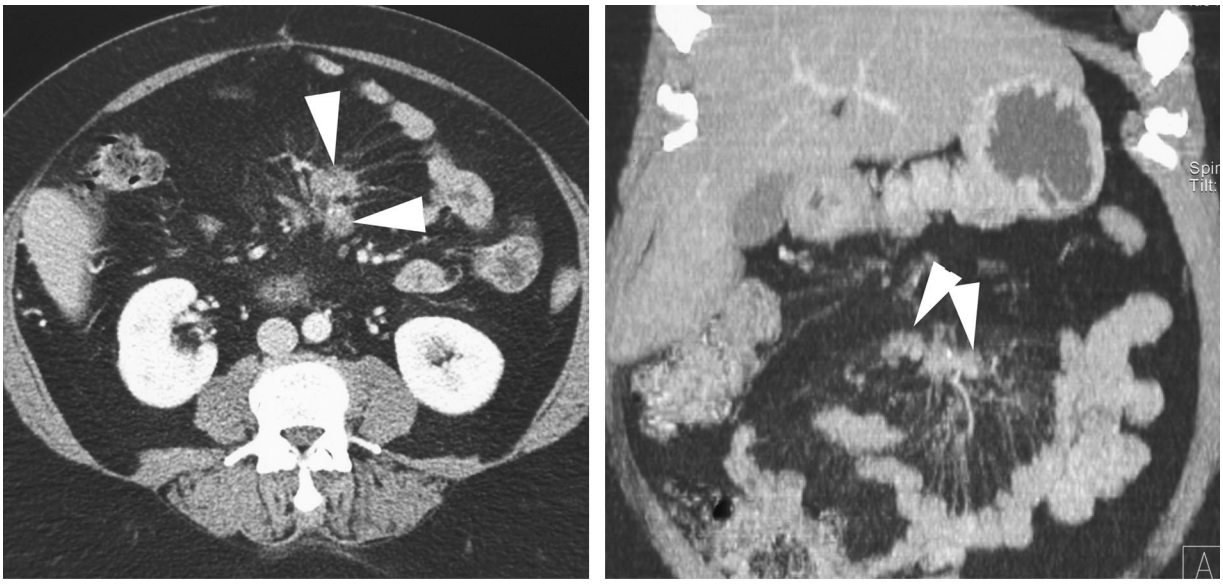
Histologic Features

Sclerosing mesenteritis is also known as retractile mesenteritis, systemic nodular panniculitis, liposclerotic mesenteritis, and xanthogranulomatous mesenteritis (10,14,15). However, *sclerosing mesenteritis* is the accepted pathologic term (2,15).

Sclerosing mesenteritis can be categorized into three subgroups on the basis of the predominant tissue type in the mass: Mesenteric panniculitis is characterized by chronic inflammation, mesenteric lipodystrophy by fat necrosis, and retractile mesenteritis by fibrosis.

In most patients, the condition consists of a mixture of chronic inflammation, fat necrosis, and fibrosis (15). However, in some patients, the mass will demonstrate a sufficient preponderance of one tissue type to allow its categorization into one distinct histologic subtype. When fat necrosis and acute inflammation are present, the term *mesenteric panniculitis* is sometimes used.

Differential diagnosis usually includes disorders such as inflammatory pseudotumor and desmoid tumor. These conditions require histologic



a. **b.**

Figure 3. Sclerosing mesenteritis. Axial CT scan **(a)** and coronal multiplanar reformatted image **(b)** demonstrate irregular soft-tissue masses in the root of the mesentery (arrowheads).

analysis for accurate diagnosis because the imaging findings may be identical to those in sclerosing mesenteritis. Carcinoid tumors, mesenteric metastases, and lymphoma may also mimic the clinical and imaging findings in sclerosing mesenteritis but can easily be distinguished at pathologic analysis.

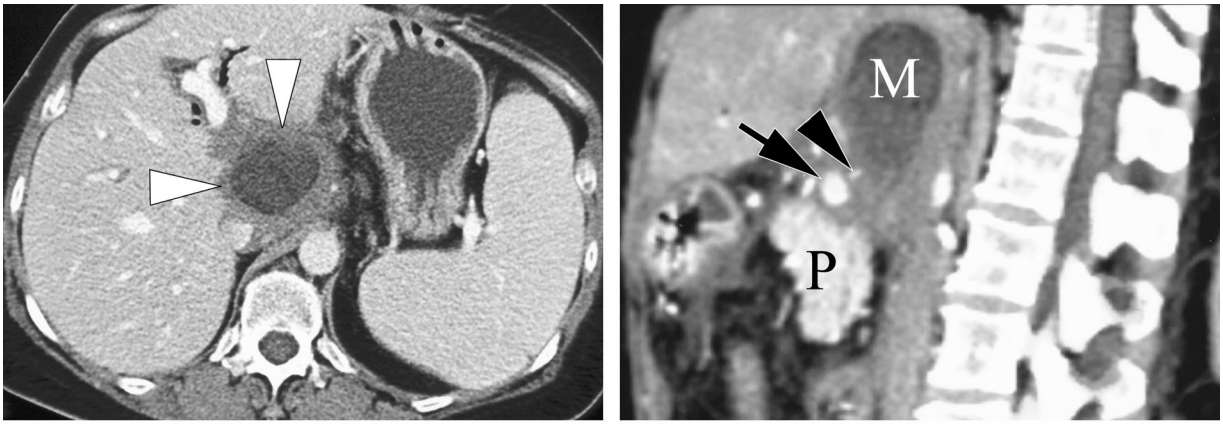
Clinical Manifestations

The clinical manifestation of sclerosing mesenteritis can vary. Patients may present with abdominal pain, intestinal obstruction or ischemia, a mass, or diarrhea (4,10,11). Laboratory studies may demonstrate elevation of the erythrocyte sedimentation rate or anemia but may be normal in some patients (13). Occasionally, sclerosing mesenteritis will be discovered incidentally in an asymptomatic patient.

Sclerosing mesenteritis appears to have a male predilection (10,13). Patient age varies in most series, usually ranging from 20 to 90 years, with the average age around 60 years (2,7,10,15). The most common site of involvement is the small bowel mesentery, where the condition appears as one or more masses or as diffuse mesenteric thickening. Sclerosing mesenteritis in the large bowel has also been described (3–5). The majority of colonic lesions involve the rectosigmoid colon. Patients present with an abdominal mass, constipation, and fever. At surgery, mesenteric thickening and fibrosis is noted, often with nodular masses involving the appendices epiploicae of the colon. Sclerosing mesenteritis rarely involves the peripancreatic region but can mimic a pancreatic mass (8,9).

CT Findings

The CT appearance of sclerosing mesenteritis can vary from subtle increased attenuation in the mesentery (Fig 1) to a solid soft-tissue mass (Fig 2) (2). Sclerosing mesenteritis most commonly appears as a soft-tissue mass in the small bowel mesentery (Fig 3), although infiltration of the region of the pancreas or porta hepatis is also possible (Fig 4). The mass may envelop the mesenteric vessels, and, over time, collateral vessels may develop. There may be preservation of fat around



a. b. c.

Figure 4. Sclerosing mesenteritis. **(a)** Axial CT scan demonstrates a necrotic-cystic mass (arrowheads) in the region of the porta hepatis. **(b)** Sagittal multiplanar reformatted image shows a low-attenuation soft-tissue mass *(M)* in the region of the porta hepatis located superior to the hepatic artery (arrowhead), portal vein (arrow), and pancreas *(P)*. **(c)** Coronal volume-rendered image shows soft tissue (black arrowheads) infiltrating the area around the hepatic artery (white arrowhead), portal vein (long arrow), and bile duct (short arrow), which contains a stent.

the mesenteric vessels, a phenomenon that is referred to as the "fat ring sign" (Fig 5) (2). This finding may help distinguish sclerosing mesenteritis from other mesenteric processes such as lymphoma, carcinoid tumor, or carcinomatosis. In addition, Sabate et al (2) described the presence of a tumoral pseudocapsule in 50% of patients with mesenteric panniculitis.

Calcification may be present, usually in the central necrotic portion of the mass, and may be related to the fat necrosis (Fig 6) (2,11,12). Cystic components have also been described and may be the result of lymphatic or venous obstruction as well as necrotic change (16). Enlarged mesenteric or retroperitoneal lymph nodes may also be present (Fig 1) (2).

A mesenteric process that is composed primarily of chronic inflammation is commonly referred to as mesenteric panniculitis, although this process is still a subgroup of sclerosing mesenteritis. The mesentery may appear to have increased attenuation with small nodes but without evidence of a discrete soft-tissue mass (Fig 1). In such cases, the term *misty mesentery* is often applied. This term was used by Mindelzun et al (17) and refers to increased attenuation in the mesentery but is not specific for mesenteric panniculitis. Any process that infiltrates the mesentery can result in a misty mesentery. Therefore, in addition to mesenteric panniculitis, hemorrhage, edema, or tumor (lymphoma) can have a similar appearance (17,18).

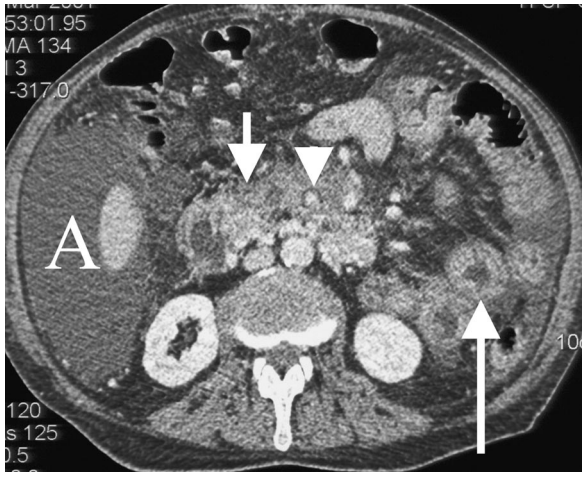
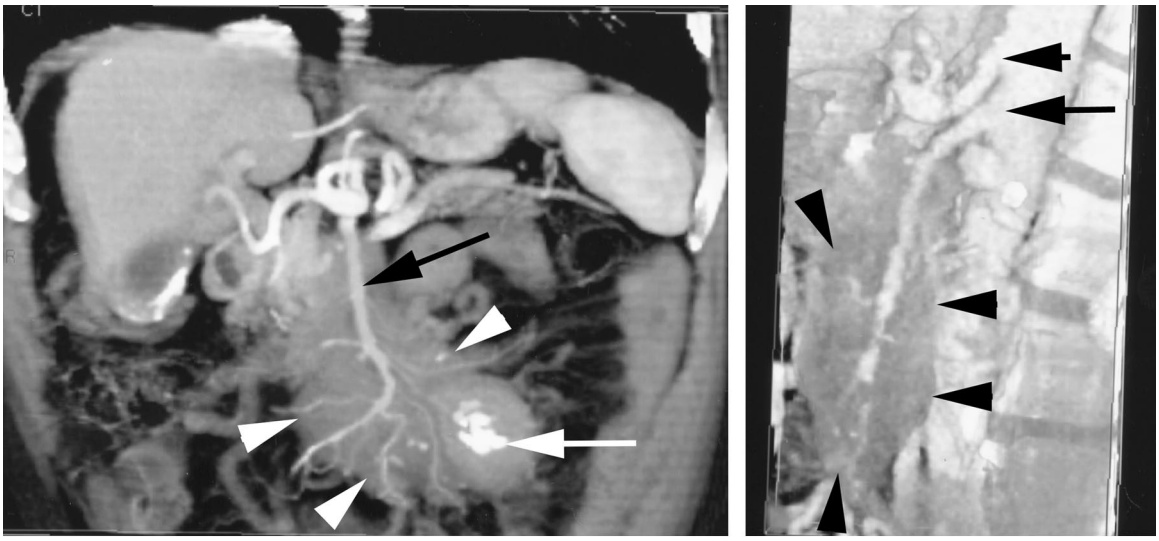


Figure 5. Fat ring sign. On an axial CT scan, a halo of fat (arrowhead) is preserved around the superior pulmonary artery despite the presence of an infiltrating soft-tissue mass (short arrow). The patient had bowel ischemia due to progressive arterial compromise, resulting in small bowel thickening (long arrow) and ascites *(A)*.



a. b.

Figure 6. Sclerosing mesenteritis. **(a)** Coronal volume-rendered image shows a soft-tissue mass (arrowheads) with calcification (white arrow) in the mesentery along the distribution of the superior mesenteric artery (black arrow). **(b)** On a sagittal volume-rendered image, the soft-tissue mass (arrowheads) encases the superior mesenteric artery (long arrow) in the root of the small bowel mesentery. Short arrow indicates the celiac axis.

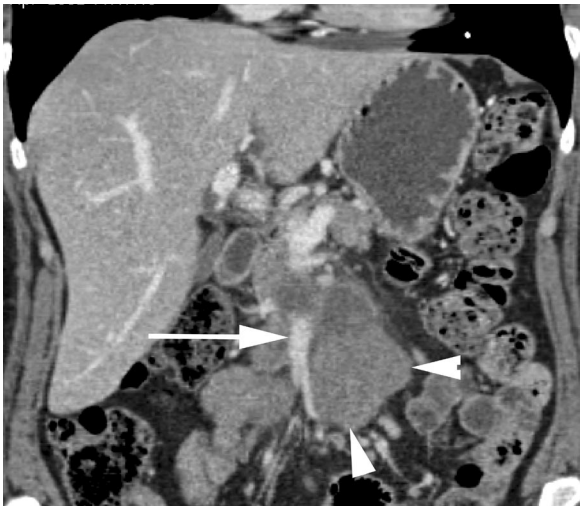


Figure 7. Lymphoma. Coronal multiplanar reformatted image demonstrates soft-tissue masses in the mesentery (arrowheads) along the distribution of the superior mesenteric vein (arrow).

Because of the complex appearance of the mass and its relationship to the mesentery, multiplanar reformatting or three-dimensional CT is often useful in evaluating the mass (1). CT angiography is especially helpful in delineating the relationship of the mass to the mesenteric vasculature, which may be important if surgery or surgical biopsy is contemplated (1). Significant involvement of the mesenteric vessels can compromise blood flow to the bowel and result in bowel wall thickening due to ischemia. In the majority of cases, however, the bowel will not be affected, which may help in differentiating this condition from others such as lymphoma.

Conditions That Can Mimic Sclerosing Mesenteritis

Several conditions can mimic the CT appearance of sclerosing mesenteritis, including lymphoma, carcinoid tumor, carcinomatosis, primary mesenteric mesothelioma, and mesenteric edema (19). Except for primary mesenteric mesothelioma, these conditions are considerably more common than sclerosing mesenteritis.

When lymphoma manifests as a nodal mass in the root of the mesentery, it may mimic the CT appearance of sclerosing mesenteritis (Fig 7). However, unlike sclerosing mesenteritis, lymphoma will not contain calcification, unless it has been previously treated. Both conditions can encase mesenteric vasculature, but lymphoma will almost never result in ischemia. The preservation of a halo of fat around the involved vessels (fat ring sign) also favors a diagnosis of sclerosing mesenteritis (2). If large, discrete nodes are visualized, lymphoma is the more likely diagnosis. Treated lymphoma may also produce a misty mesentery and simulate the CT appearance of the mesenteric panniculitis subgroup of sclerosing mesenteritis (Fig 8).

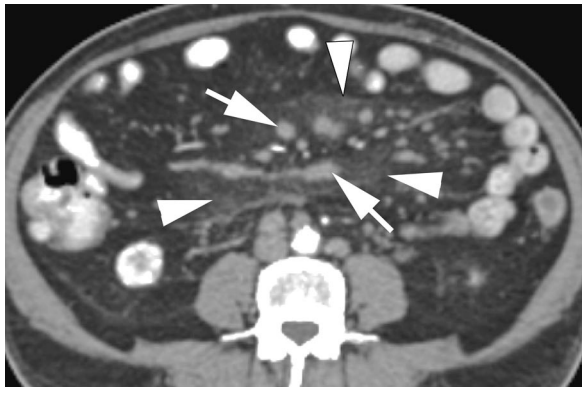


Figure 8. Lymphoma. Axial CT scan shows lymphadenopathy (arrows) and stranding (arrowheads) of the mesentery.

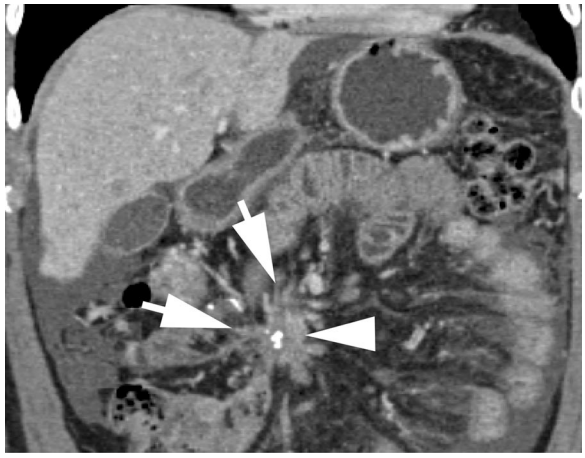


Figure 9. Carcinoid tumor. Coronal multiplanar reformatted image shows a calcified soft-tissue mass (arrowhead) with desmoplastic reaction (arrows) in the root of the mesentery.

The CT appearances of carcinoid tumor and sclerosing mesenteritis can be identical (20). Both can appear as an ill-defined, infiltrating soft-tissue mass in the root of the mesentery with associated calcification and desmoplastic reaction (Fig 9). Furthermore, both may result in ischemia and obstruction. Again, the preservation of a halo of fat around the involved vessels (fat ring sign) favors a diagnosis of sclerosing mesenteritis (2,21). If a discrete enhancing mass is seen in the bowel wall or if hypervascular liver metastases are present, carcinoid tumor is the likely diagnosis.

In patients with carcinomatosis, mesenteric implants can simulate the CT appearance of sclerosing mesenteritis (21). Calcification can be present in both conditions, especially if the primary tumor is a mucinous adenocarcinoma (eg, ovarian or colon cancer). However, in patients with carcinomatosis, implants will not be confined to the root of the mesentery but will also be present in the omentum and on the surface of the liver, spleen, or bowel. Ascites is also common in carcinomatosis but is not associated with sclerosing mesenteritis.

Like carcinomatosis, primary mesenteric mesothelioma can produce mesenteric soft-tissue implants that may simulate the CT appearance of sclerosing mesenteritis. However, mesothelioma is usually not confined to the mesentery, and tumor implants will also be seen in the omentum and along the bowel surfaces. Ascites may be present in mesothelioma but is not associated with sclerosing mesenteritis. Calcification is not common in mesothelioma.

Mesenteric edema may result from various conditions such as cirrhosis, hypoalbuminemia, heart failure, portal or mesenteric vein thrombosis, and vasculitis. Trauma can also result in edema and hemorrhage in the mesentery. When fluid or blood infiltrates the mesentery, the attenuation of the mesenteric fat increases. This finding may mimic the CT appearance of sclerosing mesenteritis, especially that of the mesenteric panniculitis or mesenteric lipodystrophy subtypes (17). Mesenteric edema secondary to systemic disease is often diffuse and coexists with generalized subcutaneous edema and ascites, which will not be present in patients with sclerosing mesenteritis. Also, the clinical history will often be the clue to the correct diagnosis.

Diagnosis

When sclerosing mesenteritis is suspected from the clinical or imaging findings, biopsy is necessary for definitive diagnosis. Although results of percutaneous biopsy may suggest the diagnosis, surgical excisional biopsy is often required for complete histologic analysis. In the course of the diagnostic evaluation of a patient with suspected sclerosing mesenteritis, it is imperative to exclude an underlying infection or malignancy.

Treatment

Treatment of sclerosing mesenteritis is usually empirical and may consist of therapy with steroids, colchicine, immunosuppressive agents, or orally administered progesterone (22–24). Surgical resection is sometimes attempted, but complete removal is often difficult due to vessel compromise and may be of no clear benefit to the patient (10,25). In cases of colonic involvement by sclerosing mesenteritis, a colostomy may be necessary because complete surgical resection is often not technically possible.

With surgical and medical treatment, some patients will follow a relatively benign course, whereas others will experience progression of the disease, which eventually leads to death. In some

cases, the process resolves completely (26). CT with three-dimensional volume rendering is the optimal study for accurate, noninvasive follow-up of the volume, extent, and vascular involvement of the mass and of any potential complications.

Conclusions

Sclerosing mesenteritis is a complex disorder characterized by mesenteric inflammation. Its clinical manifestation can be nonspecific, and CT may be the first imaging modality to suggest the diagnosis. CT appearances vary depending on the predominant tissue component (fat, inflammation, or fibrosis). CT plays an important role in suggesting the diagnosis in the proper clinical setting and can also be useful in distinguishing sclerosing mesenteritis from other mesenteric diseases such as lymphoma or carcinoid tumor.

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