Cureus
Part of SPRINGER NATURE

Open Access Case Report

Chronic Sclerosing Mesenteritis With Postoperative Abdominal Wall Heterotopic Ossification: A Diagnostic Challenge

Review began 10/17/2026
Review ended 11/12/2026
Published 11/16/2026

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DOI: 10.7759/cureus.119759

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Abstract

Sclerosing mesenteritis is an uncommon fibroinflammatory disorder involving mesenteric adipose tissue. Its clinical and radiological features may overlap with malignant, inflammatory, and systemic fibroinflammatory conditions, including immunoglobulin G4-related disease (IgG4-RD). This report describes the longitudinal course of a 60-year-old man with chronic intermittent abdominal pain, bloating, and abdominal distension who had previously undergone exploratory laparotomy, with mesenteric histopathology reported as sclerosing mesenteritis. During subsequent evaluation, an osseous lesion was identified within the rectus abdominis muscle at the site of the previous laparotomy and was excised. Histopathological examination demonstrated normal bone, with bone marrow in which all hematopoietic cell lines were represented in maturation, supporting postoperative heterotopic ossification. Serial abdominal imaging from 2020 through 2024 demonstrated persistent mesenteric abnormalities, with later imaging additionally describing bilateral perirenal fascial abnormalities and pancreatic structural changes. These later radiological findings raised consideration of IgG4-RD, but the diagnosis could not be confirmed because serum IgG4 testing could not be obtained and retrospective immunohistochemistry of the original mesenteric tissue was impossible because the archived material was unavailable. This case highlights the diagnostic uncertainty that may arise when longstanding sclerosing mesenteritis is accompanied by extra-mesenteric radiological abnormalities suggestive of a possible systemic fibroinflammatory disorder. It also emphasizes postoperative abdominal wall heterotopic ossification as an uncommon benign condition that may mimic recurrent or malignant disease, further complicating diagnostic assessment.

Categories: General Surgery, Rheumatology, Gastroenterology
Keywords: abdominal wall, fibroinflammatory disease, heterotopic ossification, igg4-related disease, mesenteric panniculitis, sclerosing mesenteritis

Introduction

Sclerosing mesenteritis is an uncommon fibroinflammatory disorder affecting mesenteric adipose tissue, most commonly the root of the small bowel. Its etiology is unknown, and it has been associated with many factors such as abdominal trauma, surgery, malignancies, autoimmune diseases, infection, diabetes, and metabolic syndrome. Its prevalence ranges from 0.16% to 3.4%, with a male predominance, particularly in the sixth and seventh decades of life. Its presentation varies, ranging from incidental radiological abnormalities to non-specific symptoms such as chronic abdominal pain, bloating, distension, diarrhea, constipation, low-grade fever, nausea, and vomiting. In rare cases, it can lead to life-threatening complications such as bowel obstruction and mesenteric ischemia due to the mass effect it exerts on adjacent structures. Although sclerosing mesenteritis is often suspected on contrast-enhanced CT based on characteristic imaging features described by the Coulier criteria, histopathological examination can provide diagnostic confirmation. Because its imaging appearance can overlap with malignant and inflammatory disorders, diagnosis requires correlation of clinical, radiological, and pathological findings over time [1-3].

Immunoglobulin G4-related disease (IgG4-RD) is a chronic immune-mediated condition characterized by fibroinflammatory infiltration of multiple organs, and very specific criteria have to be met for a definite diagnosis. It presents with a broad spectrum of clinical manifestations mainly affecting the pancreas, biliary tree, kidneys, lungs, retroperitoneum, major salivary glands, aorta, meninges, thyroid, and, rarely, mesentery [4]. The relationship between sclerosing mesenteritis and IgG4-RD remains incompletely defined. Some mesenteric lesions fulfill the pathological and clinical criteria for IgG4-RD, whereas conventional sclerosing mesenteritis may show overlapping histological features without sufficient evidence for that diagnosis [5,6]. The mesentery is infrequently affected in IgG4-RD, and according to the 2019 American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) classification criteria for IgG4-RD, it is not among the typical organs of the entry criteria [4,7]. IgG4-related sclerosing mesenteritis

(IgG4-SM) is a rare entity with current evidence deriving mainly from case studies, and no formal guidelines have been published to date specifically for it [7].

Heterotopic ossification is the formation of mature bone within soft tissue outside the normal skeleton. Abdominal wall heterotopic ossification after surgery is uncommon but well recognized and has been documented after exploratory laparotomy for damage control surgery and laparotomy for abdominal diseases such as gastrointestinal cancer and peptic ulcer disease [8-13]. Its pathophysiology remains unknown, but one proposed mechanism is that trauma may initiate signaling pathways in mesenchymal progenitor cells through bone morphogenetic proteins excreted by the injured cells, promoting their differentiation into osteoblasts and chondroblasts, which can multiply and produce bone if the heterotopic environment permits osteogenesis [12]. The condition is more common in males and in vertical scars and may clinically or radiologically mimic recurrent or malignant disease. Therefore, heterotopic ossification should be considered whenever a hard mass develops at a prior abdominal incision [8-13].

This report describes a patient with long-standing sclerosing mesenteritis and postoperative abdominal wall heterotopic ossification in whom later extra-mesenteric imaging findings broadened the differential diagnosis to a possible systemic fibroinflammatory disorder, without sufficient evidence to establish a unifying diagnosis.

Case Presentation

A 60-year-old man was evaluated for a long-standing history of intermittent abdominal pain, bloating, and abdominal distension. He had previously undergone exploratory laparotomy during the investigation of these symptoms, although the exact operative date is not available in this current record. The available pathology documentation reported mesenteric tissue findings consistent with sclerosing mesenteritis, but the original histological slides and paraffin blocks were not available for review or ancillary staining. During subsequent evaluation, a sizable osseous lesion was identified within the rectus abdominis muscle at the site of the previous laparotomy incision and was excised. The histological examination demonstrated normal bone, with bone marrow in which all hematopoietic cell lines were represented in maturation. In this clinical context, the lesion was most consistent with postoperative heterotopic ossification. The available record does not establish a direct causal relationship between the mesenteric disease and the abdominal wall ossification. Because the chronic mesenteric disease, ectopic mature bone formation, and later extra-mesenteric imaging abnormalities did not readily fit a single established entity, the patient underwent specialist assessment and further diagnostic consideration.

Diagnostic assessment and longitudinal imaging

Due to the broad differential diagnosis and the suspicion of systemic diseases such as autoimmune disorders and malignancy, multiple investigations were performed, including abdominal CT, colonoscopy, MR enterography, chest CT, and chest radiograph. The available records demonstrate persistence of a mesenteric fibroinflammatory-appearing process over several years. The most notable later change was the 2024 CT description of relatively extensive sclerosing mesenteritis with regional nodes, additional bilateral perirenal fascial abnormalities, and pancreatic head/uncinate atrophy, which broadened the differential beyond isolated mesenteric disease. Although most of the original CT/MR DICOM datasets were unavailable, two archived CT images were retrieved and assessed (Figure *1*). The longitudinal imaging findings were otherwise described according to the contemporaneous radiology reports (Table *1*).

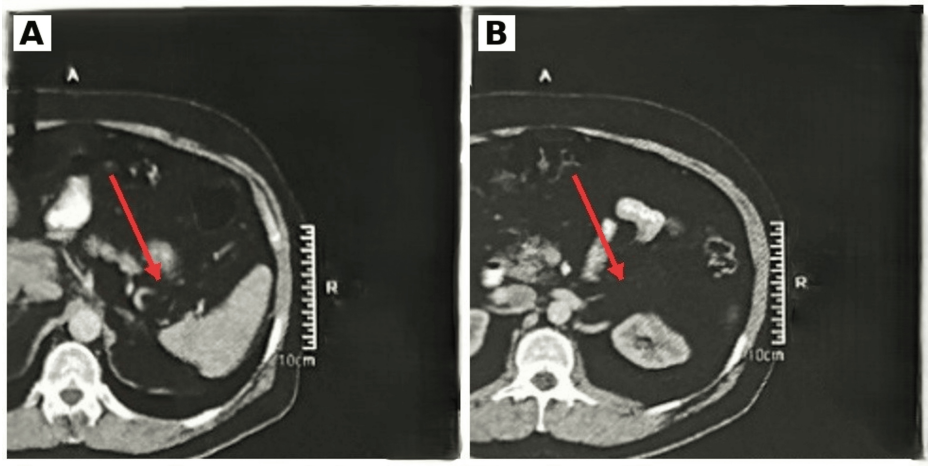


FIGURE 1: Abdominal CT images from 2020 in a patient with sclerosing mesenteritis.

A and B: The red arrows indicate central mesenteric regions for review. Potential characteristic findings include increased attenuation of mesenteric fat ("misty mesentery"), the fat-ring sign around mesenteric vessels, and a peripheral pseudocapsule.

Date	Investigation	Main finding
2020	Abdominal CT	Haziness of mesenteric fat with small mesenteric lymph nodes (<10 mm), reported as compatible with sclerosing mesenteritis
2020	Colonoscopy	No significant mucosal abnormality; grade I hemorrhoids were reported
2020	MR enterography	Small mesenteric nodular abnormalities with surrounding fat haziness; no significant bowel-lumen pathology; findings considered compatible with mesenteric lipodystrophy
2022	Abdominal CT	Persistent limited mesenteric fat haziness at the central mesenteric root without major interval change; mild postoperative anterior abdominal wall changes at the umbilical level
2023	Chest CT	No pathological pulmonary, mediastinal, or lymph-node findings reported
2024	Abdominal CT	Relatively extensive sclerosing mesenteritis with regional nodes; bilateral perirenal fascial abnormalities; borderline iliac nodes (approximately 11 mm right and 9.5 mm left); pancreatic head/uncinate atrophy; postoperative supraumbilical hernias with small-bowel protrusion
2025	Chest radiograph	Mild lower-lung interstitial prominence (mainly left) and degenerative thoracic spine changes; no acute specific pulmonary finding reported

TABLE 1: Longitudinal imaging and endoscopic findings from the available records.

Abdominal wall heterotopic ossification

The abdominal wall lesion represents a separate and unusual component of the case. It arose within the rectus abdominis at the site of the prior laparotomy (Figure *2*). The osseous lesion was sent for histological examination, and the pathology report described normal bone, with bone marrow in which all hematopoietic cell lines were represented in maturation, which has been documented as a finding of heterotopic ossification [13]. In conjunction with the lesion's location within the abdominal wall at a previous surgical site, the pathological findings strongly support the diagnosis of postoperative heterotopic ossification.



FIGURE 2: Macroscopic appearance of the excised abdominal wall osseous lesion. An elongated osseous fragment removed from the rectus abdominis muscle at the site of the previous laparotomy.

Laboratory evaluation

In the context of excluding hematologic, inflammatory, and malignant etiologies, extensive laboratory workup was performed. Laboratory investigations performed in 2026 were largely unremarkable, with no major hematologic or inflammatory abnormality documented. The complete blood count showed no significant leukocytosis or eosinophilia, and renal and liver function parameters were within the reported reference ranges. C-reactive protein was only minimally elevated at 0.52 mg/dL (reference: <0.50 mg/dL). Additional biochemical testing showed a urea level of 43 mg/dL, creatinine 1.05 mg/dL, lactate dehydrogenase 195 IU/L, and amylase 57 U/L. The available clinical records also documented negative antinuclear antibodies, negative anticardiolipin and β2-glycoprotein I antibodies, normal β2-microglobulin, and no paraprotein on serum immunoelectrophoresis. Total serum IgG was reported as 1,026 mg/dL. Importantly, this was a total IgG measurement and not a serum IgG4 concentration, which was not available in the records and could not be obtained (Table *2*).

Investigation	Result	Unit	Reference range
WBC	8.2	×10³/μL	4.2–11.5
Hemoglobin	15.8	g/dL	14.0–18.0
Platelets	232	×10³/μL	150–450
Eosinophils	2	%	1.0–4.0
CRP	0.52	mg/dL	<0.50
Creatinine	1.05	mg/dL	0.50–1.30
Urea	43	mg/dL	19–49
AST	25.1	U/L	<31.0
ALT	42.5	U/L	<45.0
LDH	195	IU/L	120–246
Amylase	57	U/L	30–118
Total IgG	1026	mg/dL	—
ANA	Negative	—	Negative
Anticardiolipin antibodies	Negative	—	Negative
β2-glycoprotein I antibodies	Negative	—	Negative
β2-microglobulin	Normal	—	Normal
Serum immunoelectrophoresis	No paraprotein	—	—
Serum IgG4	Not available	—	—

TABLE 2: Selected laboratory investigations from the available 2026 records.

WBC: white blood cells; CRP: C-reactive protein; AST: aspartate aminotransferase; ALT: alanine aminotransferase; LDH: lactic dehydrogenase; IgG: immunoglobulin G; ANA: antinuclear antibodies; IgG4: immunoglobulin G4

Differential diagnosis

The principal diagnostic consideration was idiopathic sclerosing mesenteritis versus a systemic fibroinflammatory disorder, particularly IgG4-RD. Consideration of IgG4-RD was prompted by the chronic mesenteric fibroinflammatory process together with the later bilateral perirenal fascial abnormalities and the pancreatic structural changes, as these are organs that are commonly involved in IgG4-RD. However, the available evidence was insufficient to establish the diagnosis because serum IgG4 concentration was not available, and the original mesenteric biopsy material could not be retrieved for retrospective immunohistochemistry. Consequently, the characteristic pathological features of confirmed IgG4-RD, i.e., increased IgG4-positive plasma cells(>10/high-power field), an elevated IgG4+/IgG+ plasma cell ratio (>40%), storiform fibrosis, and obliterative phlebitis, could not be assessed in this patient [4]. This limitation is particularly important because the published literature includes both true IgG4-SM and conventional sclerosing mesenteritis that mimics IgG4-RD histologically [5,6,14]. IgG4-RD in the present case should therefore be described as a differential diagnosis rather than an established diagnosis.

Discussion

The main educational value of this case lies in the longitudinal diagnostic uncertainty surrounding persistent sclerosing mesenteritis and the coexistence of a separate postoperative abdominal wall lesion. The mesenteric abnormality was documented radiologically from 2020 onward. Initial CT showed mesenteric fat haziness with small regional lymph nodes compatible with sclerosing mesenteritis, and subsequent MR enterography and CT continued to demonstrate mesenteric abnormalities. The 2024 CT additionally described bilateral perirenal fascial abnormalities and pancreatic structural change. These findings broadened the differential but were not diagnostic of IgG4-RD.

IgG4-SM is an exceptionally rare disease, described mainly through case reports, with a very challenging diagnosis as it simulates other diseases, especially malignancies, and many radiological and

histopathological criteria have to be met for a definite diagnosis. Examples of these case reports include Minato et al. [5] who reported a mesenteric lesion with characteristic IgG4-related histology, including storiform fibrosis, obliterative phlebitis, and numerous IgG4-positive plasma cells, with an IgG4+/IgG+ plasma cell ratio of 64%, above diagnostic thresholds, and Abe et al. [14] who described IgG4-SM associated with bowel obstruction, with storiform fibrosis, obliterative phlebitis, numerous IgG4-positive plasma cells, and an IgG4+/IgG+ plasma cell ratio of approximately 50%. In a recent cohort study published by Zhang et al. [7], out of 1,409 patients who met the 2019 ACR/EULAR diagnostic criteria for IgG4-RD, only 29 were diagnosed with IgG4-SM, and after a subsequent systematic review of the literature, only 32 cases of IgG4-SM fit a definite diagnosis. This highlights the rarity of this disease and its difficult diagnosis. Zhang et al. [7] further described that IgG4-SM may be characterized by greater organ involvement and higher disease activity compared to typical IgG4-RD. They also reported that glucocorticoid-based therapies have a favorable effect on patients. By contrast, Avincsal et al. [6] highlighted cases of sclerosing mesenteritis that mimicked IgG4-RD without fulfilling the diagnostic criteria, emphasizing that many such cases are unlikely to represent IgG4-RD. Fukuda et al. [15] similarly reported sclerosing mesenteritis histologically mimicking IgG4-RD. This distinction is important in the present case. Total IgG is not equivalent to serum IgG4, and perirenal fascial and pancreatic structural changes should be interpreted in clinical context rather than considered diagnostic in isolation. The absence of the original mesenteric tissue also prevents retrospective assessment of IgG4-positive plasma cells, the IgG4/IgG plasma cell ratio, storiform fibrosis, and obliterative phlebitis. Therefore, although the combination of chronic sclerosing mesenteritis with later extra-mesenteric abnormalities is clinically suggestive and warrants consideration of IgG4-RD, the present case does not provide sufficient evidence for that diagnosis.

The abdominal wall lesion provides a second teaching point. Heterotopic ossification may be underreported and may mimic neoplastic or recurrent lesions. In the present case, the anatomical location at the previous laparotomy site and the histological finding of normal bone with bone marrow in which all hematopoietic cell lines were represented in maturation strongly support a postoperative process. Recognition of this entity is important to avoid misinterpretation of an unusual abdominal wall mass and unnecessary concern for malignant disease. Although the precise timing of its development and its clinical impact during the postoperative course could not be established from the available records, histopathological examination confirmed the benign nature of the osseous lesion, supporting the diagnosis of postoperative heterotopic ossification. There is no evidence in the available records that the heterotopic ossification represents a manifestation of sclerosing mesenteritis or IgG4-RD. The two findings should therefore be presented as coexisting conditions rather than manifestations of a single proven disease mechanism. This distinction prevents an attractive but unsupported causal association. The broader lesson is that longitudinal assessment is particularly valuable when historical pathology is incomplete. When tissue cannot be revisited, later imaging may raise a clinically meaningful hypothesis, but it cannot substitute for the pathological and serological evidence required to confirm a systemic fibroinflammatory disorder.

Limitations

Several limitations should be acknowledged. First, the original mesenteric histological slides and paraffin blocks were unavailable for retrospective pathological review. Therefore, IgG4 and IgG immunohistochemistry could not be performed on the original mesenteric tissue. Second, a serum IgG4 concentration was not available in the records and could not be obtained. Third, the original CT/MR DICOM datasets were unavailable; longitudinal radiological interpretation was therefore based on the available reports and printed imaging material rather than independent retrospective review of the complete datasets. Fourth, the complete operative report, including the exact operative findings and the precise interval between the laparotomy and identification/excision of the abdominal wall ossification, was unavailable. Fifth, the pathology images for sclerosing mesenteritis and heterotopic ossification were unavailable. Sixth, treatment details and a formally documented long-term outcome were incompletely available in the supplied records.

Conclusions

This case illustrates the diagnostic complexity of chronic sclerosing mesenteritis when additional radiological findings raise the possibility of a systemic fibroinflammatory disorder. Although IgG4-RD is a reasonable differential diagnosis, the available evidence is insufficient to establish it: serum IgG4 testing could not be obtained, and retrospective tissue immunohistochemistry was impossible because the archived mesenteric material was unavailable. Separately, normal bone containing bone marrow with representation of all hematopoietic cell lines in maturation, arising within the rectus abdominis at a previous laparotomy site, is consistent with postoperative heterotopic ossification. This case emphasizes the importance of distinguishing documented diagnoses from plausible but unconfirmed systemic associations and of recognizing postoperative heterotopic ossification as a benign alternative to a malignant diagnosis when an osseous mass appears at an abdominal incision.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the

work.

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Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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