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CASE REPORT

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# Duodenal stricture secondary to IgG4-related chronic sclerosing duodenitis—A case report with review of the literature

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**Key Clinical Message**

This case highlights the importance of a definite diagnosis of an IgG4-related chronic sclerosing duodenitis based on histological and radiological findings to rule out any malignancy in the mass. While dealing with patients having concentric duodenal thickening resulting in stricture formation, one should think of inflammatory etiology as well. IgG4-related disease is one of these inflammatory disorders where we see soft tissue thickening without a large mass or any associated lymphadenopathy as in our case.

**Abstract**

Immunoglobulin G4-related disease (IgG4-RD) is distinguished as an infiltration of IgG-4-positive plasmacytes involving inflammatory lesions across multiple organs which is accompanied by raised IgG4 levels in the serum. Several inflammatory disorders are recognized as part of the IgG4-RD family based on shared histopathological features, which include Mikulicz's disease, chronic sclerosing sialadenitis, or Riedel's thyroiditis. Our case highlights a distinctive presentation of IgG4-related diseases; a 58-year-old man presenting with duodenal stricture highly suspicious of a duodenal mass/ampullary mass later found to be due to IgG4-related sclerosing duodenitis with negative malignancy on biopsy. We present the diagnostic challenges faced and relevant findings noted.

**KEYWORDS**

case report, duodenal obstruction, duodenitis, IgG4-related disease, IgG4-related duodenitis

## 1 | INTRODUCTION

Immunoglobulin G4-related disease (IgG4-RD) is derived from a group of fibroinflammatory disorders with unknown incidence, often characterized by an infiltration of IgG-4-positive plasma cells in affected organs characteristically accompanied by raised serum IgG4 levels.[1] The inflammation is classically associated with a "storiform"

fibrosis which leads to chronic organ damage and solitary demyelinating lesions larger than 2 cm. The raised IgG4 levels are also seen in sclerosing pancreatitis, Mikulicz's disease, sclerosing sialadenitis, Riedel's thyroiditis, and fibrosis of mediastinum and retroperitoneum.[2] Our case highlights a distinctive presentation of IgG4-related disease; a 58-year-old man presenting with duodenal stricture highly suspicious of a duodenal mass/ampullary mass later found to be due to IgG4-related sclerosing duodenitis. We present the diagnostic challenges faced and relevant findings seen.

## 2 | CASE PRESENTATION

A 58-year-old male presented to the emergency department (ED) with complaints of abdominal pain, nausea, dizziness, vomiting, and constipation.

### 2.1 | Physical examination

On physical examination, the pulse reached 115 beats/min, blood pressure of 89/44 mmHg, respiratory rate of 20 breaths per minute, and oxygen saturation of 99%. He was dehydrated and his abdominal examination revealed a distended gut which was soft and non-tender. Based on the patient's presenting complaints and physical examination, his laboratory investigations that included blood, electrolyte (Table 1), renal, liver, and pancreatic (Table 2) workup were ordered.

The patient was managed with IV hydration and fluid resuscitation in the ED with which his blood pressures were normalized, and heart rate was improved. A preliminary diagnosis of acute kidney injury secondary to biliary sepsis and pancreatitis was made and and the patient was admitted in the general surgery ward.

The patient's past medical history was significant for diabetes and hypertension. He had been in his usual state of health when there was a sudden onset of 10–12 episodes of vomiting which were watery and yellowish in color. He was unable to tolerate oral and liquid diet.

**TABLE 1** The patient's blood and electrolyte investigations.

| Investigations | Value | Normal range |
|---|---|---|
| Sodium ($Na^+$) | 134 mmol/L | 136–145 mmol/L |
| Chloride ($Cl^-$) | 84 mmol/L | 98–107 mmol/L |
| Hemoglobin (Hb) | 16.1 g/dL | 12.3–16.6 g/dL |
| Hematocrit (Hct) | 51.1% | 38.4%–50.7% |
| White blood cell (WBC) | $19.3\times10^9$/L | $4.8–11.3\times10^9$/L |
| Platelet count (PLT) | $589\times10^9$/L | $154–433\times10^9$/L |

He was previously admitted to our healthcare facility with complaints of vomiting and weight loss. Magnetic resonance cholangiopancreatography during the previous admission demonstrated a stricture in the distal CBD with a mildly dilated proximal CBD and intrahepatic bile ducts. There was mild relative thickening of the head of the pancreas and circumferential wall thickening of D2 and D3 segment of duodenum with proximal distention of the stomach, pylorus, and D1 segment of the duodenum. He underwent an endoscopic retrograde cholangiopancreatography (ERCP) which showed complete obstruction at the level of the D2 segment with possible malignant infiltration. The patient was tested for anti-nuclear antibody, which was positive while the patient's IgG-4 levels were also positive and recorded as 2840 mg/L (normal: 39.2–864 mg/L). He left the facility against medical advice and visited another facility where he underwent an endoscopy and ERCP.

The endoscopy report from that facility revealed ulcerated and swollen peri-ampullary region. During ERCP they put a stent in the CBD. Subsequent computed tomography (CT) scan of the abdomen from the same facility revealed thick and swollen head and uncinate process of the pancreas, suggesting acute pancreatitis. Associated thickening of the D2 and D3 segments of the duodenum was also noted, findings of which were suggestive of neoplastic etiology.

### 2.2 | Diagnosis

During the current admission biopsy of the suspected duodenal/ampullar mass was taken during ERCP. Histopathology revealed small bowel mucosa with eroded surface epithelium and moderate villous atrophy. The lamina propria revealed moderate lymphoplasmacytic infiltrates with negative dysplasia and negative malignancy (Figure 1A–C). Subsequently, contrast-enhanced CT of

**TABLE 2** The patient's renal, liver, and pancreatic laboratory workup.

| Investigations | Value | Normal range |
|---|---|---|
| Blood urea nitrogen (BUN) | 67 mg/dL | 6–20 mg/dL |
| Creatinine (Cr) | 5.1 mg/dL | 0.9–1.3 mg/dL |
| Total bilirubin | 1.7 mg/dL | 0.1–1.2 mg/dL |
| Direct bilirubin | 1.0 mg/dL | 0–0.2 mg/dL |
| Gamma-glutamyl transpeptidase (GGT) | 332 IU/L | <55 IU/L in males |
| Alanine aminotransferase (ALT) | 65 IU/L | <45 IU/L in males |
| Aspartate aminotransferase (AST) | 49 IU/L | <35 IU/L in males |
| Alkaline phosphatase (AST) | 159 IU/L | 45–129 IU/L |
| Serum lipase | 892 U/L | 13–60 U/L |

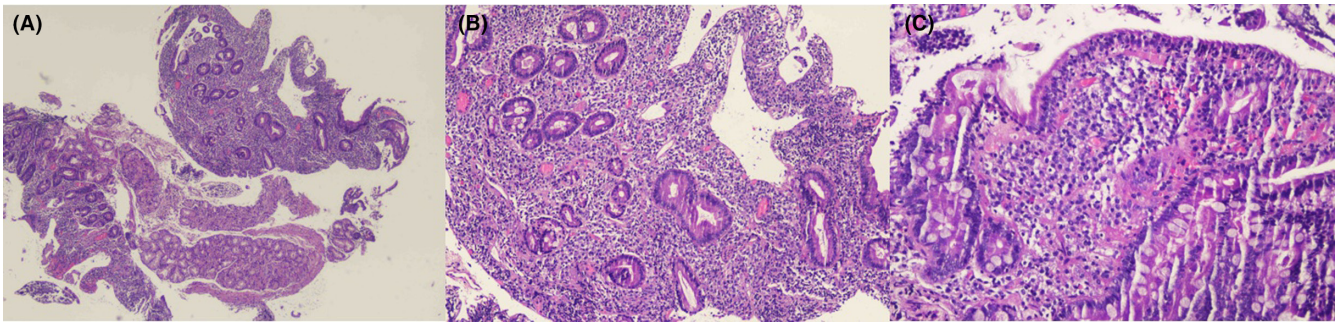


FIGURE 1 (A) Low magnification (4×) showing duodenal mucosal biopsies. There is moderate duodenitis and mucosal ulceration. (B) High magnification (10×) showing duodenal biopsies with expanded lamina propria by moderate lymphoplasmacytic infiltrate. (C) High magnification (40×) showing moderate villous atrophy with increased intraepithelial lymphocytes.

the abdomen and pelvis was performed which showed circumferential wall thickening of the D2 and D3 portions of the duodenum resulting in duodenal stricture (Figures 2 and 3A,B). Additionally, the left kidney was small in size and had a large staghorn calculus. Based on the history, laboratory investigations, histopathology, and radiological scans, the patient was diagnosed with IgG4-related chronic sclerosing duodenitis (stricture).

### 2.3 | Treatment

The patient underwent a Witzel jejunostomy for duodenal obstruction to place a feeding tube for enteral nutritional support. The abdomen was opened by a supraumbilical vertical midline incision. The duodenojejunal flexure and an appropriate site distal to it was identified for an enterotomy. The jejunostomy tube was inserted and secured internally in place with sutures. The jejunostomy tube was then secured externally on the skin exit site and checked for its patency.

## 3 | CONCLUSION AND RESULTS (OUTCOME AND FOLLOW-UP)

Postoperatively, the patient remained well and tolerated feed with a nasogastric tube in place and an intact feeding jejunostomy tube. The patient was discharged in a stable condition on a short-term steroid therapy (prednisone). On follow-up, the patient had the jejunostomy tube removed and an exploratory laparotomy was done for a gastrojejunostomy. Postoperatively, the patient was received in a vitally stable condition and managed with IV fluids, antibiotics, analgesics, and antiemetics. The patient was taken on norepinephrine support, which was gradually tapered, and blood pressures were monitored. The patient eventually became clinically stable and was discharged on request. Follow-up in the clinic and over the phone has been unremarkable.

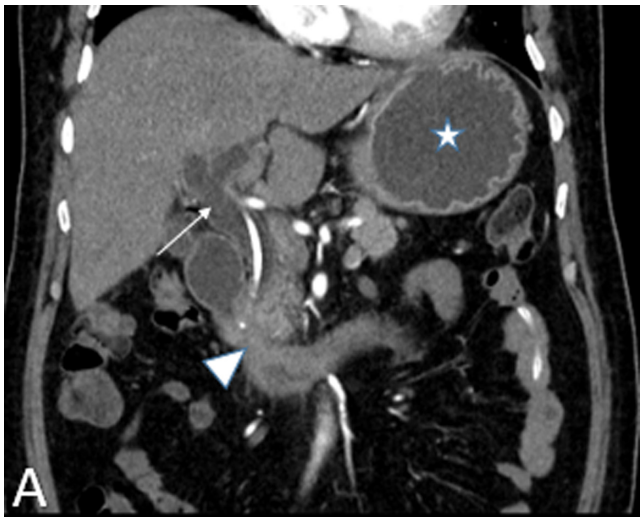


FIGURE 2 Segmental thickening of D2 and D3 segments of the duodenum (arrowhead) with proximal duodenum and stomach dilatation (star), and significantly dilated biliary channels (arrow).

## 4 | DISCUSSION

IgG4-RD is a condition characterized by dense infiltration of plasma cells that test positive for IgG4 in affected tissues. It involves inflammatory lesions across multiple organs. The exact epidemiology of IgG4-RD is not known; however, it appears to be more common in the Asian population.[2]

The exact etiology of IgG4-RD is not known; however, recent studies have explored multiple hypotheses including but not limited to links with molecular mimicry, genetic predisposition, infection, and autoimmune dysregulation.[3] IgG4-RD normally presents with mass enlargement and the symptoms vary based on the organs that are affected. The condition may present with inflammation mimicking a tumor and causes mass effects leading to compression or obstruction. Kidney disease and proteinuria is very commonly observed with IgG4-RD.[4]

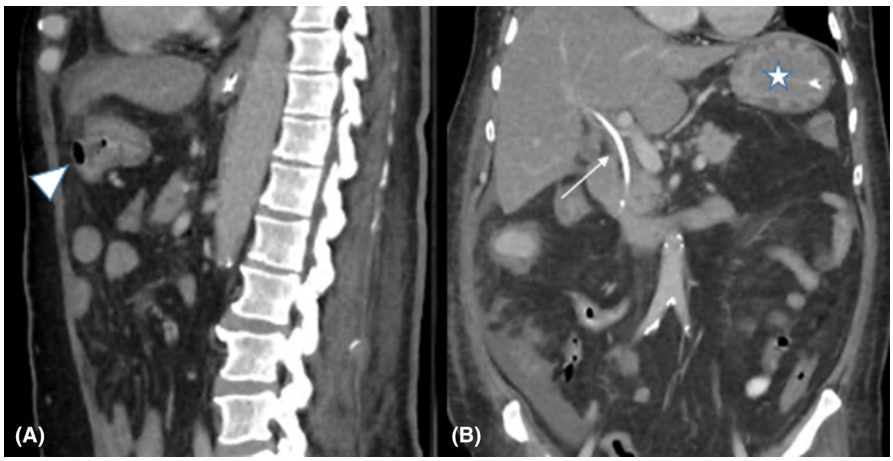


FIGURE 3 (A, B) Site of gastrojejunostomy (arrowhead) with interval resolution of the stomach (star) and CBD (arrow) dilatation.

Several inflammatory disorders are recognized as part of the IgG4-RD family based on shared histopathological features. Inflammation of the salivary glands is observed in chronic sclerosing sialadenitis, also called Kuttner's tumor. Mikulicz's disease causes swelling and inflammation of the salivary and lacrimal glands. Riedel's thyroiditis involves fibrotic invasion of the thyroid gland. Additional conditions classified under IgG4-RD include those causing inflammation and fibrosis in specific areas. For instance, mediastinal fibrosis impacts the mediastinum. Retroperitoneal fibrosis, also known as Ormond's disease, affects the retroperitoneum. Periaortitis leads to aortitis. Idiopathic hypocomplementic tubulointerstitial nephritis results in kidney inflammation. Multifocal fibrosclerosis causes fibrosis across multiple organs. Inflammatory pseudotumor (IPT) presents as inflammatory lesion mimicking tumors.[4]

The signature characteristic linking these related diseases is dense infiltration of plasma cells testing positive for IgG4 in the involved tissues. However, IgG4 levels in the blood are not always elevated. Based on this defining histopathological feature, these disorders comprise the IgG4-RD spectrum.[5]

While IgG4-RD is rare, criteria have been established for diagnosis. The Mayo criteria and Japanese Comprehensive Clinical Diagnostic Criteria combine clinical findings, histopathology, and response to steroids. Both require organ swelling, elevated concentrations of IgG4 antibodies in serum, and histopathological characteristics found on biopsies, such as dense lymphoplasmacytic infiltrates and IgG4 deposits. The Mayo criteria also evaluate response to steroid therapy. These standardized approaches aid in distinguishing IgG4-RD from alternative conditions.[1]

The pathologic presentations of an IgG4-RD may differ with lesions in several organs. There has also been consensus on two diagnostic criteria for IgG4-RD, which includes a serum IgG4 level of >135 mg/dL, > 40% of IgG+ plasma cells being IgG4+ and a >10 cell/high powered field of biopsy sample. This is consistent with our patient's serum IgG4 levels, which was 2840 mg/L (284 mg/dL).[6]

Both criteria describe organ swelling from lymphocytic infiltration, as was seen in our patient with duodenal thickening. Serological testing typically shows elevated IgG4 plasma concentrations. Histopathological findings normally include dense lymphoplasmacytic infiltration and IgG4 deposition.

The Mayo criteria additionally considers clinical improvement with steroid administration. In line with these criteria, our patient responded well to hydrocortisone treatment. Due to duodenal obstruction, a jejunostomy was also required to ensure adequate nutrition during management. Biopsy ruled out suspected neoplastic causes of thickening. In multiple cases, it has been observed that the installation of a biliary stent improves symptomatic outcomes for patients that also present with autoimmune pancreatitis.[7]

Diagnostic evaluation in our case was aligned with established IgG4-RD criteria through clinical presentation, therapy response, and exclusion of alternative diagnoses through histopathology. Formalizing approaches like the Mayo and CCD criteria aid in distinguishing this rare condition.

Radiological imaging is one of the most crucial steps of identifying the lesions in IgG4-related disease. Depending on the muscle and the calcification present in the organ, CT scans might show signs from hyperattenuated to isoattenuated. MRI images can vary with contrast enhancement. However, a definite diagnosis cannot be established solely based on imaging as these cannot differentiate these lesions from true tumors.[8]

Some cases of IgG4-RD of the duodenum are also associated with a history of duodenal ulcers. Kato et al. report the case of a young patient who was managed with a proton pump inhibitor for hemorrhagic duodenal ulcer that presented with hematemesis and hematochezia. However, the patient returned to the healthcare with complaints of vomiting and poor weight gain, which revealed to be a duodenal stricture on gastroscopy. Increased serum IgG4 levels and

IgG4-positive plasma levels with lymphoplasmacytic inflammation in the duodenal wall and underlying sclerosing fibrosis on histopathology lead to a subsequent diagnosis of an IgG4-related duodenal stenosis.[9]

Occasionally, an IgG4-RD may recur which occurred in one of the cases where an IgG4-RD patient with mural thickening of the proximal duodenum underwent a Whipple's procedure for resection; however, the patient presented again with abdominal pain, nausea, vomiting, and a raised serum IgG4 level. This was associated with inflammatory changes and duodenal thickening on CT scan while an endoscopy revealed perianastomotic erosions and erythema indicating recurrence of the IgG4-RD.[10]

IgG4-RD is rare and is usually an incidental finding on routine imaging or can also be found on investigating for a nonspecific clinical presentation. This shows that definite diagnosis of an IgG4-RD that presents as an IPT depends on both imaging and histological findings done secondary to a surgical resection or sample taken for biopsy. Therefore, the first line of treatment for an IPT is surgical resection if the diagnosis of an IgG4-RD is not clearly established. However, in case of an autoimmune IgG4-related pathological presentation, steroids remain as the mainstay treatment.[11]

## 5 | CONCLUSION

IgG4-related chronic sclerosing duodenitis is a rare entity that generally presents with a duodenal mass or obstruction. This case highlights the importance of a definite diagnosis of an IgG4-related chronic sclerosing duodenitis based on histological and radiological findings to rule out any malignancy in the mass. A duodenal stricture can also have an inflammatory cause which was the case with our patient in which the duodenum was thickened with lymphocytic infiltration suggesting an IgG4-related disease. While dealing with patients having concentric duodenal thickening resulting in stricture formation, one should think of inflammatory etiology as well. IgG4-related disease is one of these inflammatory disorders where we see soft tissue thickening without a large mass or any associated lymphadenopathy as in our case.

### AUTHOR CONTRIBUTIONS

**Khizer Masroor Anns:** Data curation; writing – original draft; writing – review and editing. **Musa Salar:** Writing – original draft; writing – review and editing. **Hashim Salar:** Data curation; writing – original draft; writing – review and editing. **Faheemullah Khan:** Conceptualization; project administration; resources; supervision; validation; writing – review and editing. **Wasim Ahmed Memon:** Conceptualization; supervision. **Muhammad Aman:** Data curation; supervision; writing – review and editing. **Uffan Zafar:** Supervision; writing – review and editing. **Khurram Minhas:** Data curation. **Hasnain Zafar:** Supervision. **Jehanzeb Shahid:** Supervision.

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### FUNDING INFORMATION

None.

### CONFLICT OF INTEREST STATEMENT

None.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

### ETHICAL APPROVAL

Ethical approval was not needed because it is a case report.

### CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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