



Gastric Stenosis Due to Fibrous Capsule Post Gastric Band Removal: Review of Literature and Case Report

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How to cite this paper: Mazen, B., Adel, A.M. and Georges, B.N. (2026) Gastric Stenosis Due to Fibrous Capsule Post Gastric Band Removal: Review of Literature and Case Report. *Open Access Library Journal*, 13: e14990.
<https://doi.org/10.4236/oalib.1114990>

Received: February 5, 2026

Accepted: March 1, 2026

Published: March 4, 2026

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Abstract

Laparoscopic adjustable gastric banding (LAGB) was widely used as a minimally invasive and reversible bariatric procedure; however, mid- and long-term follow-up has revealed a significant incidence of late complications and suboptimal results. Although band removal is generally considered curative, persistent or delayed gastric obstruction due to a retained fibrous capsule is increasingly recognized and remains underreported in the literature. We report the case of a 54-year-old woman with a history of LAGB placement from 2009 to 2020 who presented with progressive vomiting and intolerance to both liquids and solids. Computed tomography demonstrated esophageal dilatation with stasis and a restrictive calcified structure encircling the gastric cardia. Upper gastrointestinal endoscopy revealed severe narrowing of the cardia with normal mucosa, and endoscopic balloon dilation was unsuccessful. Surgical exploration identified a rigid, circumferential calcified perigastric ring at the site of the previous band, consistent with a persistent fibrous capsule causing luminal stenosis. Complete excision of this structure was performed, and intraoperative endoscopy confirmed immediate restoration of gastric patency without residual stenosis. This case together with a review of the available literature, highlights a rare but clinically significant complication of LAGB removal that requires revisional surgery and excision of the fibrous capsule to achieve durable symptom resolution. Therefore, meticulous dissection of the capsule during the removal procedure may be necessary to prevent gastric stenosis, but further studies are needed to reach a definitive conclusion and recommendation.

Subject Areas

Surgery & Surgical Specialties

Keywords

Band Removal, Fibrous Capsule, Gastric Stenosis, Capsule Dissection

1. Introduction

Laparoscopic adjustable gastric banding (LAGB) was introduced in the 1990s as a minimally invasive and reversible bariatric procedure for the management of morbid obesity [1] [2]. The procedure involves placing a silicone band around the proximal stomach to create a small gastric pouch, which restricts food intake and promotes early satiety. Early outcomes were favorable due to its perceived safety, adjustability, and reversibility; however, mid- and long-term follow-up has demonstrated a significant incidence of late complications, including band slippage, intragastric band migration, pouch dilation, erosion, dysphagia, and functional gastric obstruction [3] [4].

Histopathologic studies have shown that the presence of the band elicits a chronic foreign-body reaction, resulting in collagen deposition, fibrosclerosis, and formation of a fibrous capsule around the stomach [5]. While removal of the band is generally expected to resolve symptoms, there is growing recognition that the residual fibrous capsule can persist after removal and may act as a mechanical constrictive agent, leading to persistent or delayed gastric stenosis and dysphagia [4] [6]. Additionally, systematic reviews of long-term outcomes indicate that reoperation rates remain significant and that nearly half of patients may require revisional surgery over 10 - 20 years, highlighting the clinical relevance of post-explant complications such as fibrous capsule formation [7]. Understanding the pathophysiology, operative findings, and clinical implications of this fibrotic capsule is critical for effective management and for preventing late complications following band removal.

2. Case Report

This is the case of a 54-year-old lady, with initial BMI of 46.6 kg/m who underwent adjustable gastric band placement in 2009 followed by band removal in 2022 due to intractable vomiting. Removal of the gastric band was extremely difficult due to dense adhesions to surrounding tissues and the liver. At one month postoperatively, the patient showed no clinical improvement and continued to experience persistent nausea and vomiting. She was subsequently lost to follow-up and re-presented to our hospital in 2025 with recurrent vomiting and intolerance to both liquids and solids with BMI of 31.5 kg/m². A thoraco-abdomino-pelvic CT scan performed in June 2025 showed marked esophageal dilatation with stasis, as well as a calcified structure surrounding the gastric cardia with a restrictive appearance

(**Figure 1**). Upper gastrointestinal endoscopy on 22 September 2025 revealed narrowing of the cardia to approximately 8 mm, without visible fibrotic tissue (**Figure 2**). Balloon dilation was attempted at 10, 11, and 12 mm without success, and the cardia could be traversed only with significant effort. Biopsies for *Helicobacter pylori* were negative, and the duodenal bulb and duodenum were normal.

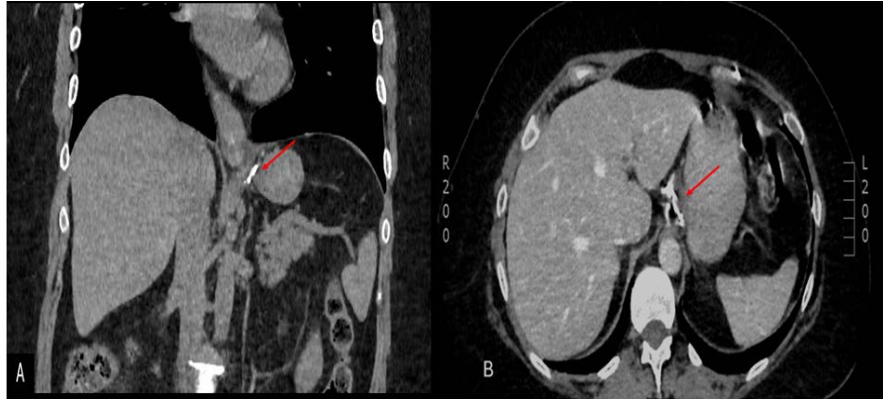


Figure 1. CT abdomen and pelvis showing a gastric stenosis (A) due to presence of a calcified ring around the cardia of the stomach (B).



Figure 2. Gastroscopy showing luminal narrowing due to external compression without presence of lesion at the level of the cardia of the stomach.

Given persistent symptoms, Laparoscopic surgical exploration was performed on 17 December 2025. Four trocars were used with the aid of ultrasonic device for dissection. 10 mm optical trocar was placed at the supra-umbilical midline, 12 mm trocar was placed at the right upper quadrant (left hand) and two 5 mm trocars were placed at the subxyphoid (liver retractor) and the left upper quadrant (right hand). Intraoperatively, a severely restrictive calcified perigastric thick ring was identified (**Figure 3**). The ring was carefully dissected and completely excised, and the histopathological analysis highlight: a focally calcified, paucicellular fibrous tissue. (**Figure 4**). Intraoperative upper gastrointestinal endoscopy demonstrated easy passage into the stomach without resistance or residual stenosis (**Figure 5**).

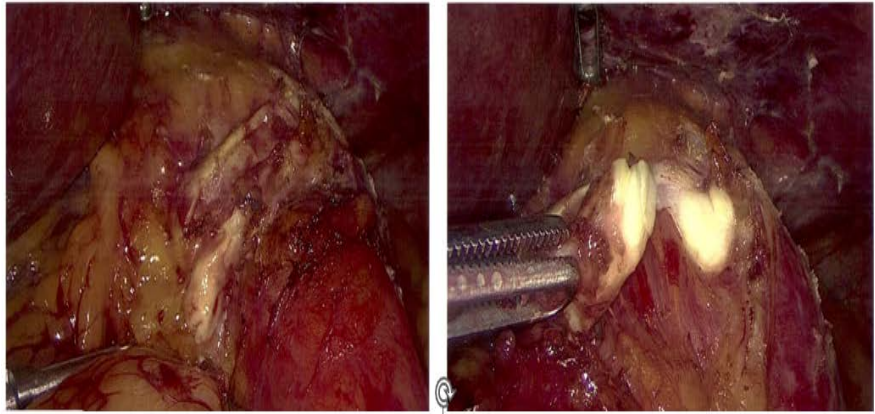


Figure 3. Laparoscopic exploration showing a fibrous and calcified ring around the cardia of the stomach acting as a constrictor and causing gastric stenosis.

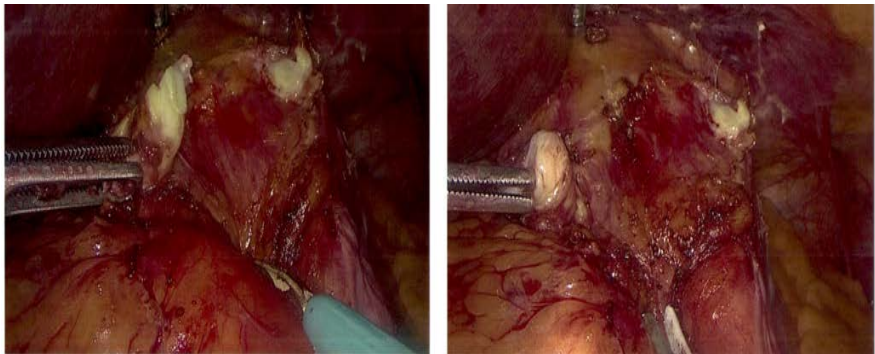


Figure 4. Excision of the fibrous band and resolution of the gastric stenosis.



Figure 5. Intra-operative gastroscopy shows resolution of luminal stenosis.

The patient was seen one month post-surgery and was extremely pleased with the results. She has completely stopped vomiting and is able to eat properly, having gained 10 kg. She is considering a second-line bariatric surgery and is enrolled in the bariatric surgery program.

3. Literature Review

LAGB has been associated with a substantial burden of late complications, resulting in frequent band removal. Although band removal is commonly regarded as

definitive treatment, accumulating surgical evidence demonstrates that gastric stenosis may persist or present *de novo* after band removal due to a retained fibrous capsule, indicating that the structural consequences of banding may not be fully reversible [1]-[4]. The persistent capsule can generate complications even in revisional bariatric surgery after LAGB. This may increase the risk of leakage or stricture formation due to the presence of fibrotic and unhealthy tissue surrounding the gastric wall [8].

Operative findings reported in the literature consistently identify a dense, circumferential fibrous capsule at the level of the previous band, functioning as a fixed extrinsic constrictor of the stomach. At surgical exploration, this capsule is often tightly adherent to the gastric serosa and surrounding tissues, resulting in tethering, reduced gastric compliance, and focal luminal narrowing. The stomach frequently appears encased by rigid fibrotic tissue rather than distorted by intrinsic pathology, supporting a purely mechanical etiology [1]-[4].

Histopathologic analyses of perigastric tissue following band removal have demonstrated marked collagen deposition, chronic inflammatory infiltrates, and fibrosclerosis, consistent with a prolonged foreign-body reaction [5]. Importantly, this fibrotic response may persist or progress after band removal, as the capsule does not reliably regress once the band is removed. Progressive contraction of this scar tissue provides a clear mechanistic explanation for delayed gastric stenosis.

The clinical significance of these operative findings is illustrated by multiple case reports. Vallin *et al.* described persistent dysphagia following gastric band removal, with intraoperative identification of scar-related gastric stenosis requiring surgical correction [2]. Kassir *et al.* reported gastric outlet obstruction occurring three months after band removal, caused by dense adhesions at the prior band site [3]. Delayed presentations further emphasize the progressive nature of this pathology. Eom *et al.* reported gastric stenosis presenting four years after adjustable gastric band removal, with operative findings of circumferential fibrotic adhesions encasing the stomach; surgical adhesiolysis restored gastric patency and resolved symptoms [9].

Kouzmina *et al.* reported a case of secondary achalasia and persistent dysphagia after adjustable gastric band removal, where delayed resection of a fibrous pseudocapsule was required to relieve obstructive symptoms despite prior explantation of the band [6]. This case underscores that residual fibrous tissue can produce not only focal gastric stenosis but also functional esophageal outflow obstruction resembling achalasia.

Tilleard and Jeyarajan well illustrated a delayed case presentation where the patient developed severe dysphagia nine years after band removal with a persistent fibrous scar capsule adherent to the proximal stomach. Its laparoscopic excision prompted and sustained symptom resolution, confirming the capsule itself as the pathological substrate [4].

The presence of unexplained dysphagia after band removal is an important indicator and symptom to guide and highlight the presence of a capsule causing

compression as a differential diagnosis [2]. Preoperative imaging and endoscopy commonly demonstrate focal narrowing at the prior band site with relatively normal mucosa, confirming extrinsic compression [1] [9].

The mechanical rigidity of the fibrotic explains endoscopic failure in such cases. Surgical adhesiolysis and fibrotic ring's removal can assure sustainable symptoms relief as reported in the literature [2]-[4] [6]. In case of persistent symptoms after band removal, Kouzima *et al.* suggested timely excision of the pseudocapsule to address gastric stenosis and pseudoachalasia-like symptoms [6].

In summary, the literature findings suggest that gastric stenosis after gastric band removal is principally caused by a persistent, circumferential fibrous capsule acting as a fixed external constrictor of the stomach. This scar tissue may remain clinically silent for years before progressive contraction leads to symptomatic obstruction or dysmotility. Recognition of this mechanism is essential for accurate diagnosis and effective management. Proactive resection of the fibrous capsule at the time of band removal may be critical to prevent persistent or late-onset obstruction and should be considered in surgical planning.

4. Conclusion

Gastric stenosis caused by a persistent fibrous capsule is a rare but clinically relevant late complication following LAGB. It results from a chronic foreign-body reaction leading to the formation of a dense fibrotic ring, which may persist or progressively contract, ultimately causing gastric obstruction and dysphagia. Endoscopic balloon dilation is often ineffective in these cases. Available evidence in the literature indicates that surgical excision of the fibrotic capsule is usually required and is effective in resolving the stenosis. In symptomatic patients, surgical re-exploration is warranted, as it serves both diagnostic and therapeutic purposes through excision of the fibrotic ring. Therefore, meticulous dissection of the capsule during the removal procedure may be necessary to prevent gastric stenosis, taking into consideration the operative risks of capsular excision, notably serious injury, perforation, and bleeding. Further studies are needed to reach a definitive conclusion.

Conflicts of Interest

The authors declare no conflicts of interest.

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