



Case Reports

Esophageal necrosis and obstruction after esophageal variceal banding

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A 78-year-old woman with a history of liver cirrhosis related to non-alcoholic steatohepatitis presented to the hospital with abdominal pain and distention. She was diagnosed with abdominal ascites and underwent paracentesis without evidence of infection. Esophagogastroduodenoscopy identified Grade 2 esophageal varices that were treated with band ligation. The patient developed dysphagia and was found to have esophageal necrosis and complete esophageal obstruction related to variceal banding. She was treated with removal of band ligatures and esophageal dilation, resulting in improved symptoms. Esophageal obstruction is a rare but important complication of variceal banding, which may occur within 24 hours of the procedure.

INTRODUCTION

Esophageal varices frequently complicate liver cirrhosis and are commonly related to portal hypertension. Esophageal varices are graded in terms of size and severity.¹ Placement of band ligation for the treatment of Grade 2 and greater esophageal varices is a mainstay of therapy and systemic non-selective beta-blocking agents.¹ Complications of this common intervention include bleeding, esophageal ulcers, and very rarely esophageal obstruction, which will manifest clinically as dysphagia after the procedure.²

CASE REPORT

A 78-year-old woman with a history of liver cirrhosis, diabetes mellitus, breast cancer, and hypertension presented to the hospital with abdominal pain and distention over several months. She reported weight gain, lower extremity edema, and fatigue. She denied nausea, vomiting, dysphagia, fever, chills, constipation, diarrhea, hematemesis, melena, and hematochezia. She reported accumulation of recurrent abdominal ascites requiring daily diuretic medications. She had no previous history of esophageal varices, hepatic encephalopathy, or other complications of advanced liver cirrhosis.

On physical examination, the patient was afebrile and chronically ill-appearing. Abdominal distention with a fluid wave and lower extremity swelling was noted. Complete blood count and chemistry panel were within normal limits except mild thrombocytopenia, 105 platelets x 10⁹/L. Serum alanine transaminase and aspartate aminotransferase levels were normal. Serum bilirubin levels were normal. Serum albumin level was 3.1 g/dL. Prothrombin time was 17.1 seconds (range 10.0-13.0 seconds). Ascitic fluid analysis revealed ascites albumin level of 1.2 g/dL and 114

nucleated cells/mm³. Gram stain and culture were negative. Computed tomography of the abdomen and pelvis revealed a nodular liver, splenomegaly, and ascites.

An esophagogastroduodenoscopy (EGD) was performed to screen for esophageal varices. During the procedure, grade II esophageal varices were identified in the lower third of the esophagus, and two band ligatures were placed with complete eradication and deflation of varices ([Figure 1A](#)). Within 24 hours of the procedure, the patient complained of inability to tolerate oral intake, dysphagia, and nausea with vomiting. Her symptoms went on without improvement for five days of initial conservative management when repeat EGD was performed with the findings of esophageal obstruction and necrosis related to variceal banding ([Figure 1B](#)). Esophageal band ligatures were removed, and the esophageal stricture, related to necrosis and banding, was dilated to 15mm with a balloon dilator ([Figure 1C](#)). The patient tolerated clear liquids after the procedure and advanced her dietary intake without further complications. She was discharged home in stable condition with a plan for follow-up endoscopy within 4-6 weeks.

DISCUSSION

Esophageal varices frequently complicate liver cirrhosis and are commonly related to portal hypertension.³ Placement of band ligation for the treatment of esophageal varices is a mainstay of therapy, in addition to systemic non-selective beta blocking agents.¹ Band ligation of esophageal varix leads to local venous thrombosis followed by sloughing of necrosed tissue into the lumen within 2-3 days.³ This treatment aids in reducing variceal size and risk of future hemorrhage.⁴ Complications of band ligation include post-procedural pain, hemorrhage, esophageal ulcers, chronic strictures, and acute mechanical obstruction and necrosis of the esophagus.⁵

Table 1. Summary of Reported Patient Characteristics in Esophageal Obstruction After Banding

Source	Year	Geographic Location	Patient Age	Patient Gender	Type of Cirrhosis	Reason for Endoscopy	Grade of varices banded	Banding Indication	Type of obstruction	Dysphagia/Obstruction after how long	Treatment
Saltzman et al.	1993	Massachusetts, USA	58	Male	Hepatitis C virus	Surveillance	Grade 3	Prophylaxis	Complete distal esophageal obstruction	Symptoms immediately after procedure	Band ligation removal
Dilshad et al.	2003	Lahore, Pakistan	60	Female	Hepatitis C virus	Surveillance	Grade 3	Prophylaxis	Complete distal esophageal obstruction	Symptoms immediately after procedure	Conservative management
Verma et al.	2009	Texas, USA	65	Female	-	Surveillance	-	Prophylaxis	Complete mid-esophageal obstruction	24 hours after procedure	Conservative management
de Melo et al.	2011	Alabama, USA	84	Female	Primary biliary cirrhosis	Screening	-	Prophylaxis	Complete distal esophageal obstruction	Symptoms immediately after procedure	Sequential esophageal dilation and temporary nasogastric tube
Nikoloff et al.	2011	Pennsylvania, USA	67	Female	Primary biliary cirrhosis	Surveillance	Grade 3	Prophylaxis	Complete distal esophageal obstruction	Symptoms immediately after procedure	Conservative management
Chahal et al.	2013	Baltimore, MD	54	Female	Alcoholic Cirrhosis	Surveillance	-	Prophylaxis	Complete obstruction of the distal esophagus	Symptoms immediately after procedure	Conservative management
Elizondo-Rivera et al.	2014	Bloomington, Indiana	64	Female	-	Surveillance	Large varix	Prophylaxis	Complete obstruction of the distal esophagus	Symptoms immediately after procedure	Conservative management
Kwiatk et al.	2016	Wisconsin, USA	67	Female	-	Bleeding	Grade 2	Active Bleed	Complete esophageal obstruction	Symptoms immediately after procedure	Band ligation removal
Mansour et al.	2017	Huntington, WV	65	Female	Alcoholic cirrhosis	Bleeding	Grade 2	Active Bleed	Complete obstruction of the distal esophagus	21 days after procedure	Conservative management
Jalil et al.	2018	Columbia, MO	68	Female	Hepatitis C virus	Surveillance	Grade 2	Prophylaxis	Complete obstruction of the distal esophagus	Immediately after procedure	Band ligation removal
Kubovy et al.	2018	Hastings, New Zealand	62	Female	Autoimmune liver disease	Surveillance	Grade 2	Prophylaxis	Complete distal esophageal obstruction	3 days after procedure	Conservative management
Sobotka et al.	2019	Columbus, Ohio	89	Female	Non-alcoholic steato-hepatitis	Screening	Grade 2	Primary PPx	Complete esophageal obstruction and necrosis	24 hours after procedure	Band ligation removal and esophageal dilation
Gupta et al.	2022	Rhode Island, USA	78	Female	Non-alcoholic steato-hepatitis	Screening	Grade 2	Prophylaxis	Complete distal esophageal obstruction	24 hours after procedure	Band ligation removal and esophageal dilation

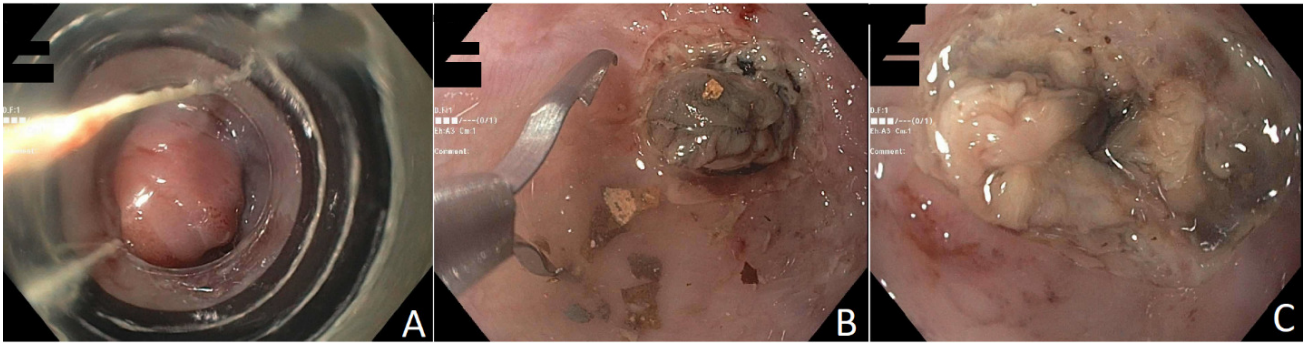


Figure 1. Esophageal varices in the lower third of the esophagus after application of two band ligatures with complete eradication and deflation of varices (A). Findings of complete esophageal obstruction and necrosis related to variceal banding (B). Esophageal band ligatures were removed, and the stricture was dilated (C).

Twelve reported cases of esophageal obstruction after band ligature placement were found since the advent of the procedure in 1988.^{3–14} Review of reported cases reveals that patients are predominantly female, are asymptomatic prior to the band ligation, and typically develop symptoms of severe dysphagia within 1–21 days of the procedure (Table 1). All reported patients were found to have esophageal obstruction on repeat EGD.^{3–14} A minority responded to conservative management with nil per os, with the majority requiring removal of band ligatures and dilation of the esophagus. All patients could resume oral intake within 1–14 days of treatment initiation. None required surgical intervention, but one case was complicated by intramural esophageal dissection and bleeding.⁷

Esophageal obstruction should be suspected when dysphagia, odynophagia, inability to tolerate oral intake, and nausea with vomiting occur after band ligation. The pathophysiology involves necrosis of the esophageal mucosa surrounding the banded varix leading to obstruction of the lumen of the esophagus.¹³ Risk factors for this rare complication have not been identified. However, it may include placement of the band ligature close to the mucosa, which is already exhibiting signs of tissue compromise such as edema or necrosis.¹¹ Other factors may include impaired lower esophageal sphincter function and esophageal motility after esophageal variceal ligation. Notably, dysphagia

after esophageal band ligature placement may result from more benign causes such as esophageal spasm and dysmotility, which may be treated supportively.

In conclusion, esophageal obstruction is a rare complication that should be considered in patients who report dysphagia after esophageal variceal banding. Esophageal obstruction after esophageal variceal banding is likely related to mucosal necrosis and edema related to the band ligature. Treatment of esophageal obstruction and necrosis involves removing band ligatures and esophageal dilation if a stricture is present. Reported outcomes suggest that patients generally regain the ability to tolerate an oral diet after band ligatures are removed, as was the case with our patient.

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REFERENCES

1. Garcia-Tsao G, Sanyal AJ, Grace ND, Carey WD. Prevention and management of gastroesophageal varices and variceal hemorrhage in cirrhosis. *Am J Gastroenterol.* 2007;102(9):2086-2102. [doi:10.1111/j.1572-0241.2007.01481.x](https://doi.org/10.1111/j.1572-0241.2007.01481.x)
2. Kim HI, Yoon JY, Kwak MS, Cha JM. Gastrointestinal and Nongastrointestinal Complications of Esophagogastroduodenoscopy and Colonoscopy in the Real World: A Nationwide Standard Cohort Using the Common Data Model Database. *Gut Liver.* 2021;15(4):569-578. [doi:10.5009/gnl20222](https://doi.org/10.5009/gnl20222)
3. Chahal H, Ahmed A, Sexton C, Bhatia A. Complete esophageal obstruction following endoscopic variceal band ligation. *J Community Hosp Intern Med Perspect.* 2013;3(1):20043. [doi:10.3402/jchimp.v3i1.20043](https://doi.org/10.3402/jchimp.v3i1.20043)
4. de Melo S. Complete esophageal occlusion after band ligation. *Endoscopy.* 2011;43(S 02):E259-E259. [doi:10.1055/s-0030-1256522](https://doi.org/10.1055/s-0030-1256522)
5. Dilshad AA, Niazi AK, Zubair M, et al. Severe Dysphagia After Endoscopic Variceal Band Ligation: A Case Report Proceeding. *SZP GMI.* 2003;17(2):2.
6. Elizondo-Rivera R, González-González J, Garcia-Compean D, Maldonado-Garza H. Complete esophageal obstruction after endoscopic variceal band ligation. *Endoscopy.* 2014;46(S 01):457-458. [doi:10.1055/s-0034-1377528](https://doi.org/10.1055/s-0034-1377528)
7. Jalil AAA, Hammoud G, Ibdah JA, Samiullah S. Removal of Esophageal Variceal Bands to Salvage Complete Esophageal Obstruction. *Clin Endosc.* 2018;51(5):491-494. [doi:10.5946/ce.2018.011](https://doi.org/10.5946/ce.2018.011)
8. Kubovy J, Boswell T, Vautier G, Arnold M. Complete esophageal obstruction following endoscopic variceal ligation: a case report and literature review. *Clin Exp Gastroenterol.* 2018;11:165-168. [doi:10.2147/ceg.s161772](https://doi.org/10.2147/ceg.s161772)
9. Kwiat JT, Merchant P. Successful removal of an esophageal band causing complete esophageal obstruction after variceal ligation. *Gastrointest Endosc.* 2016;83(5):1030-1031. [doi:10.1016/j.gie.2015.11.035](https://doi.org/10.1016/j.gie.2015.11.035)
10. Mansour M, Abdel-Aziz Y, Awadh H, Shah N, Ajmera A. Complete Esophageal Obstruction after Endoscopic Variceal Band Ligation in a Patient with a Sliding Hiatal Hernia. *ACG Case Rep J.* 2017;4(1):e8. [doi:10.14309/crj.2017.8](https://doi.org/10.14309/crj.2017.8)
11. Nikoloff MA, Riley TR III, Schreiber IR. Complete esophageal obstruction following endoscopic variceal ligation. *Gastroenterol Hepatol.* 2011;7(8):557-559.
12. Saltzman JR, Arora S. Complications of esophageal variceal band ligation. *Gastrointest Endosc.* 1993;39(2):185-186. [doi:10.1016/s0016-5107\(93\)70065-6](https://doi.org/10.1016/s0016-5107(93)70065-6)
13. Sobotka LA, Ramsey M, Wellner M, Kelly SG. Rare cause of dysphagia after esophageal variceal banding: a case report. *World J Gastrointest Endosc.* 2019;11(4):292-297. [doi:10.4253/wjge.v11.i4.292](https://doi.org/10.4253/wjge.v11.i4.292)
14. Verma D, Pham C, Madan A. Complete esophageal obstruction: an unusual complication of esophageal variceal ligation. *Endoscopy.* 2009;41(S 02):200-201. [doi:10.1055/s-0029-1214856](https://doi.org/10.1055/s-0029-1214856)