Robotic Assisted Pyloroplasty for Gastric Outlet Obstruction Secondary to Bouveret's Syndrome

Aja Harding, D.O.[a], Aja.Harding@corewellhealth.org, Cecilia Lee, D.O.[a], Cecilia.Lee@corewellhealth.org,
Kevin Jamil, M.D.[b], Kevin.Jamil@corewellhealth.org

Background

Bouveret's syndrome is a rare cause of gastric outlet obstruction caused by an impacted gallstone and is a rare variant of gallstone ileus. The pathophysiology is from chronic localized inflammation of both the gallbladder and adjacent near-by duodenum due to impacted gallstone and increased intraluminal pressure. It's hypothesized that direct pressure causes wall ischemia and eventual perforation of both the gallbladder and duodenum leading to a cholecystoduodenal fistula. Although rare it has a notable morbidity and mortality of up to 30%, and should be kept as a differential diagnosis.

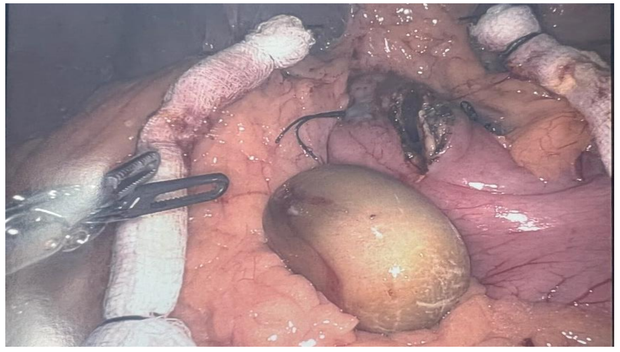
Figure 1: CT gastric outlet obstruction



Case Description

A 66 year-old male presented with 2 days of epigastric pain, nausea and emesis. Initial workup demonstrated gastric outlet obstruction on CT due to a large mass in the duodenum (figure 1) and a fistulous connection between the gallbladder and the first portion of the duodenum (figure 2). An EGD demonstrated significant debris and poor visualization and EGD was aborted. This was followed by repeat EGD demonstrating a large mobile mass in D1 which was unsuccessfully removed. Next, the patient underwent a robotic assisted pyloroplasty in hopes of removal of the mass and therefore the cause of gastric outlet obstruction (figure 2). Following a transverse pyloroplasty, a 4.5 cm mass was extracted similar appearing to a gallstone (figure 3). Procedure concluded with transverse closure of the pyloroplasty. Pathology was consistent with a large gallstone. Patient did well postoperatively and had a negative leak test however contrast was consistent with persistent cholecystoduodenal fistula (figure 4).

Figures 2: intraoperative photos



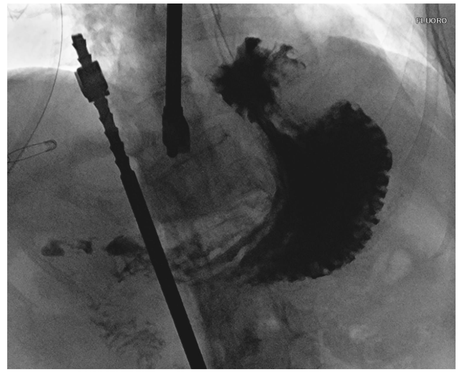
Discussion & Conclusion

Incidence of Bouveret's syndrome (BS) is 2-3% of all gallstone related gastrointestinal obstructions. BS occurs most commonly in elderly women, with gallstones >2.5cm and post surgical altered anatomy. The presentation of BS can be similar to symptomatic cholelithiasis - consisting of abdominal pain, nausea, vomiting, and hematemesis, however, can also extend to obstructive symptoms of distention, anorexia and weight loss [1]. Complications for untreated BS include duodenal perforation, distal esophageal rupture, hematemesis and gastric bezoar. Diagnosis can be challenging, however, history and imaging remain the basis for diagnosis. As with gallstone ileus -- a plain abdominal XR can demonstrate a calcified mass within the duodenum and gastric distention. RUQ US findings suspicious for BS would include pneumobilia and extraanatomic gallstone. CT scans can demonstrate localized inflammation of the gallbladder and duodenum, pneumobilia and may even demonstrate the bilioduodenal fistula. EGD can be diagnostic but at times may unable to remove the obstructive gallstone. EGD may show a dilated stomach, old digested food and a hard nonfleshy mass within the duodenum [1]. Some utility in lithotripsy and extracorporeal shock wave, however, pieces of gallstone would need piecemeal removal and have the potential of converting BS into gallstone ileus [3]. 42% of patients fail endoscopic management and ultimately 91% of patients require operative management for definitive treatment [4]. Operative management currently is approached either proximally with a gastrotomy or distally with a duodenotomy, removal of the gallstone and closure of gastro/duodenal opening. Currently, there is no standard of care with treating BS and the bilioduodenal fistula. Operative intervention indications include size >2.5cm, residual stones in the gallbladder, multiple stones in the intestinal lumen, perforation, stricture, failure of endoscopic retrieval and sepsis. For BS, both one-stage and two-stage approaches exist with the one stage procedure with a mortality of 20-30% and a 3 fold rise in mortality. Importantly, if the cholecystoenteric fistula tract is not addressed the patient is prone to developing cholecystitis, cholangitis, cholangiocarcinoma, gallbladder adenocarcinoma, or recurrent obstruction.

Figure 3: gallstone 4.5cm



Figure 4: postop UGI with residual fistula



References

[1] Cappell, M. S., & Davis, M. (2006). Characterization of Bouveret's syndrome: a comprehensive review of 128 cases. *Official journal of the American College of Gastroenterology| ACG*, *101*(9), 2139-2146.

[2] Shah FA, Winkle SM, Truitt T, Guez G, Draper K. Bouveret Syndrome: A Rare Form of Gallstone Ileus. Cureus. 2021 Mar 22;13(3):e14042. doi: 10.7759/cureus.14042. PMID: 33898128; PMCID: PMC8059669.

[3] Ayantunde AA, Agrawal A. Gallstone ileus: diagnosis and management. World J Surg. 2007 Jun;31(6):1292-7. doi: 10.1007/s00268-007-9011-9. Epub 2007 Apr 15. PMID: 17436117.

[4] Mavroeidis VK, Matthioudakis DI, Economou NK, Karanikas ID. Bouveret syndrome-the rarest variant of gallstone ileus: a case report and literature review. Case Rep Surg. 2013;2013:839370. doi: 10.1155/2013/839370. Epub 2013 Jun 24. PMID: 23864977; PMCID: PMC3707284.