Potential postsurgical complications and the role of endoscopy in their management

Complication	Incidence	Description	Role of endoscopy in management
Marginal ulceration	3% to 7% after RYGB.	Seen at the gastrojejunal anastomosis (GJA) and often caused by chronic nonsteroidal anti-inflammatory drug (NSAID) use.	For the minority of patients who don't respond to medical management with antisecretory agents and cessation of smoking and NSAID use, endoscopic approaches can be an adjunct to surgical revision. Endoscopy can help confirm the presence of marginal ulcers; manage bleeding ulcers with mechanical hemostasis and epinephrine injection; and reverse RYGB anatomy in patients with recalcitrant ulcers who are poor surgical candidates.
Anastomotic strictures or stenoses	0.3% to 0.5% after RYGB.	Most commonly seen at the GJA, symptomatic strictures are typically those that cause narrowing to a diameter of less than 10 mm.	Endoscopic dilation is a highly effective treatment, with reported success rates of more than 95%. Alternative therapies for strictures that don't respond to standard dilation include the use of intramucosal steroids (triamcinolone acetonide), self-expanding metallic stents (SEMSs) or lumen apposing metal stents (LAMSs).
Anastomotic/staple line leaks	0.5% to 5% after RYGB and LSG, respectively; or lower when performed by more experienced surgeons.	Most frequently seen at the GJA and after revisional RYGB surgery.	Use of air inflation during intraoperative endoscopy can help detect early leaks and facilitate intraoperative repair. Management is dependent on the patient's clinical stability, the chronicity of the leak and the presence of organized fluid collections. Simultaneous endoscopic placement of stents during surgical exploration may be considered in patients who are unstable with systemic inflammatory response syndrome or peritonitis. Endoscopic repair approaches also include wall closure, diversion of contents and endoscopic internal drainage of fluid collections.
Gastrogastric fistula (GGF)	1% to 3% after RYGB.	Occurs when there is an abnormal communication between the gastric pouch and the gastric remnant that allows ingested food to enter the bypassed stomach and duodenum. Often causes postsurgical weight gain.	Long-term success with endoscopic repair is challenging. However, endoscopic strategies can help in some cases. This includes the use of endoclips for small fistulas, endoscopic suturing for larger fistulas and endoscopic stenting of the gastrojejunostomy in early cases. Argon plasma coagulation and other techniques to debride surrounding mucosa may help make endoscopic techniques more effective in closing the GGF.
Dumping syndrome	Although it can occur after either RYGB or LSG, early dumping occurs more often after RYGB.	Early dumping typically occurs within an hour of eating and is primarily an osmotic process due to the passage of undigested food into the small intestine triggering rapid fluid shifts into the intestinal lumen. Late dumping, which is much less common and poorly understood, can occur 1 to 3 hours after meals. This condition is characterized by alterations in multiple hormonal and glycemic patterns.	There are emerging data on endoscopic management for cases refractory to treatment with dietary modifications and medications. Endoscopic approaches include reducing the diameter of a dilated and incompetent GJA with endoscopic transoral outlet reduction. Endoscopic revision appears to be a safe and effective technique to consider before pursuing surgical revision.
Gastric stenosis/twist	Up to 0.7% to 4% after LSG.	Occurs mainly in response to rotation of the staple line and asymmetrical scarring of the gastric sleeve, leading to kinking of the gastric sleeve.	Multiple endoscopic approaches to sleeve stenosis have been described, including balloon dilation (both hydrostatic and pneumatic) as a first line approach, and stenting using fully covered stents for cases that are refractory to balloon dilation.