Surgical Complications of Bariatric Surgery

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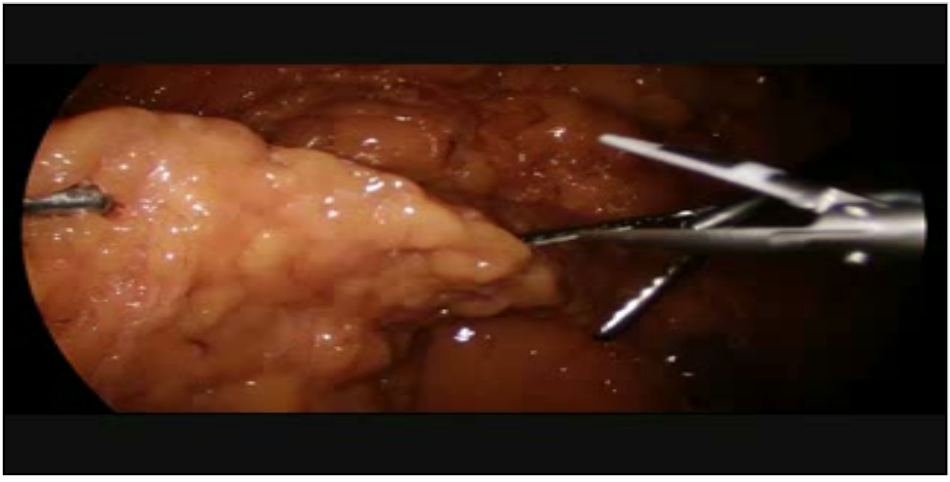
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BARIATRIC PROCEDURES

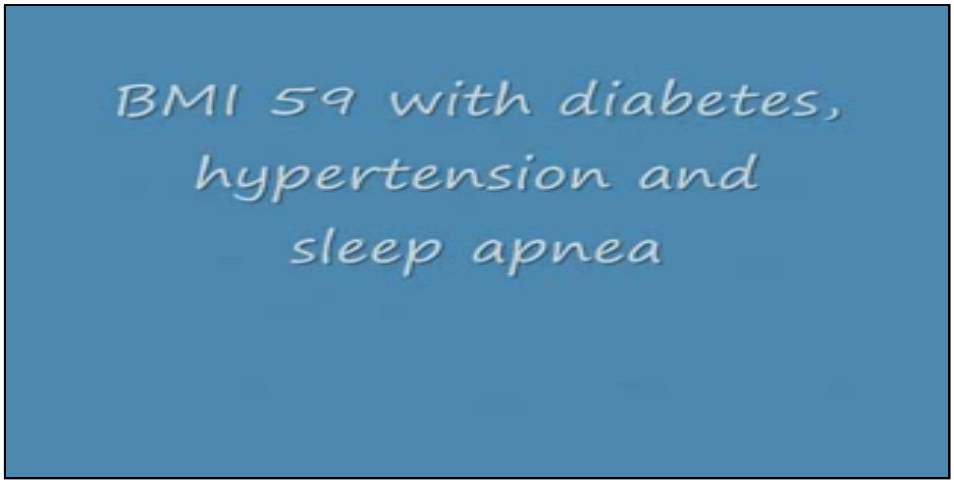
The three most common operations done in North America are laparoscopic gastric bypass



Video RYGB:

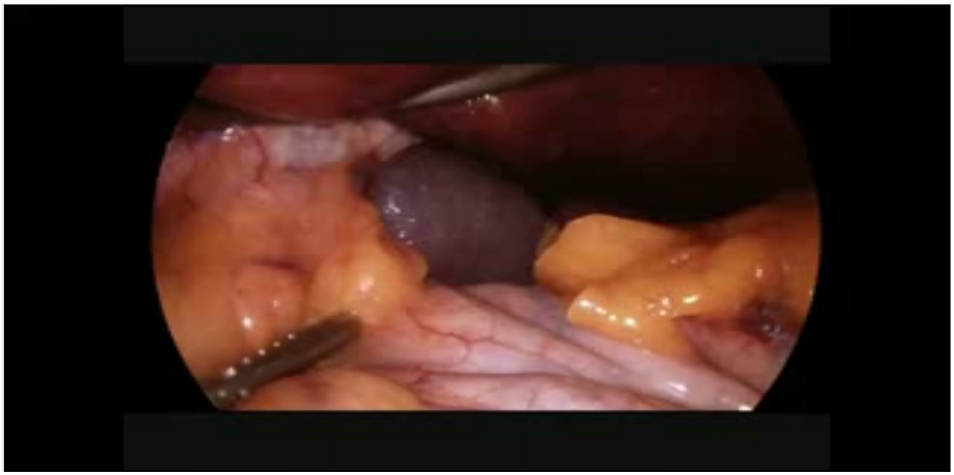
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laparoscopic vertical sleeve gastrectomy **(insert video VSG)**



Video VSG:

and laparoscopic gastric banding **(insert video GB).**



Video GB:

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COMPLICATIONS THAT CAN OCCUR WITHIN THE FIRST WEEK OF SURGERY

Postoperative Leaks

Postoperative leaks from gastric bypass or sleeve gastrectomy usually occur within the first 48-72 hours and patients present with tachycardia and abdominal pain. The incidence of leak is somewhere between .2-2% [1-3]. The leak is defined by leakage of gastric contents into the peritoneal cavity. The best way to diagnose possible leakage after gastric bypass or sleeve gastrectomy is to do diagnostic laparoscopy. Gastrograffin swallow can often demonstrate a leak but is not 100% reliable [2]. Very often, CAT scans done too close to the time of surgery cannot detect a leak.

At diagnostic laparoscopy, the management of a suspected leak is to try and repair it with omental patch, but the cornerstone of treatment is to adequately drain the area and wash out the abdomen of contaminated material. A gastrostomy tube is placed in the gastric remnant to decompress the stomach and also to be used as a conduit for feeds while the leak heals. Another option for nutrition would be to pass a nose jejeunal feeding tube past the anastomosis into the jejunum [3].

Video 1



Video 1:

Leaks from sleeve gastrectomy can be especially challenging and may be difficult to heal. Typically, the leaks after sleeve gastrectomy occur at the top of the stomach at the gastroesophageal junction. It is possible that in some patients there is a poor blood supply to this part, but the cause of leakage at this location is never been clearly explained. Sometimes, these leaks do not heal because the pressures in the stomach after sleeve gastrectomy maybe twice normal and gastric contents are forced out through the leak. There have been attempts to try and close this leak with stenting, or clipping the hole with a bear claw using over the scope technology [4,5].

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Video 2



Video 2:

Definitive surgical management is indicated if the fistula persists for more than 12 weeks. Surgical options include conversion to Roux-en-Y gastric bypass, total gastrectomy with Roux-en-Y esophago gastrectomy and Roux-en-Y fistulojejunostomy.

Video 3



Video 3:

Postoperative Bowel Obstruction

Postoperative bowel obstruction after gastric bypass occurs between 0.2%-1% [6]. The cause can be from problems at the enteroenterostomy either from technical problems or from hemorrhage or edema of the anastomosis. Other causes can be from incarceration hernias through

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the port site, or when omentum has been removed from a hernia at the original operation. Any patient with bowel obstruction after gastric bypass surgery should have immediate diagnostic laparoscopy. Obstruction can cause the gastric remnant to dilate and perforate which could result in death. If the bowel obstruction is from an incarcerated hernia, the hernia can be repaired with mesh after the bowel has been reduced.

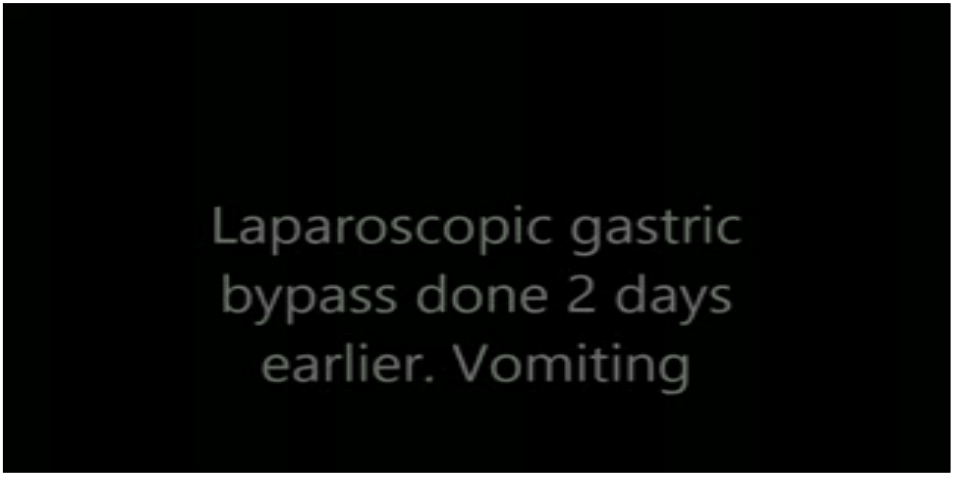
Video 4



Video 4:

The management of postoperative bowel obstruction at the enteroenterostomy is to perform another enteroenterostomy to bypass the obstruction. If the gastric remnant is dilated, it is important to leave a gastrostomy tube to decompress the gastric remnant to prevent perforation of the staple line.

Video 5



Video 5:

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Postoperative Bleeding

Bleeding can occur following gastric bypass surgery or sleeve gastrectomy with an incidence of .5-2% [7-9]. The bleeding can occur at the staple line and result in melena stool. This can result in hypotension which typically occurs 24 hours following gastric bypass surgery. Patients can have massive bleeding. In the majority of times, the bleeding settles on its own without surgery, but if blood transfusion is necessary, it is often safer to perform diagnostic laparoscopy and gastroscopy. If the bleeding is felt to be at the enteroenterostomy, the anastomosis can be resected.

Video 6

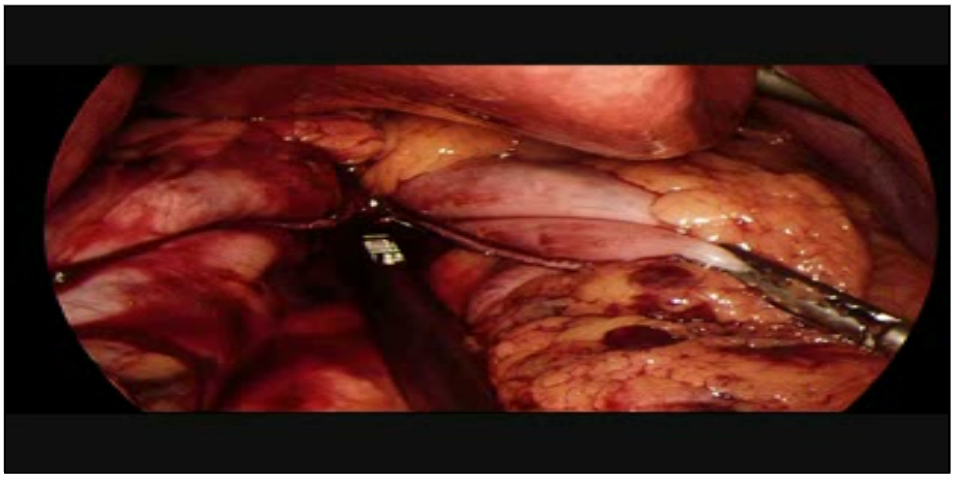


Video 6:

Bleeding can also occur at the staple lines from the gastric pouch and the remnant. It can be controlled by putting clips or by over sewing the bleeding point. Typically, if there is postoperative bleeding, the patient will present with tachycardia, abdominal pain, and sometimes fever. It is important to evacuate the blood clot to prevent postoperative sepsis which occurs when the clot gets infected. Sometimes the spleen can get injured from the stapler.

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Video 7



Video 7:

Video 7A



Video 7A:

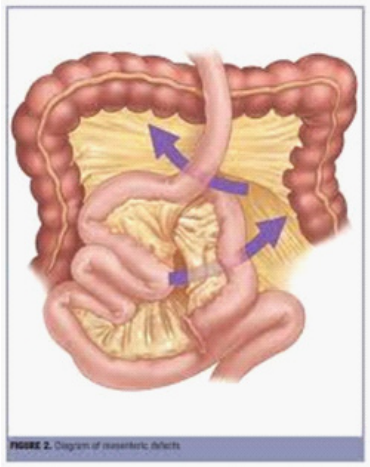
COMPLICATIONS THAT CAN OCCUR AFTER THE FIRST WEEK FOLLOWING SURGERY.

Internal Hernia

Internal hernia with small bowel obstruction is a complication seen after gastric bypass with a frequency of 1%-9%. [4-6]. The Roux-en Y jejunal limb can be placed in the antecolic or retrocolic position. Internal hernias can occur underneath the mesentery of the jejunal limb, or between the

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mesentery at the enteroenterostomy. There is some controversy as to whether closing the spaces makes any difference as to the internal hernia rates.



Internal hernia.

Typically the patient will present to the emergency room with crampy abdominal pain, possible vomiting usually 6-18 months after gastric bypass surgery. A CAT scan may show a small bowel obstruction or a swirling pattern of the small bowel mesentery which may indicate twisting of the mesentery. Any patient with crampy abdominal pain after gastric bypass should be assessed with diagnostic laparoscopy by a surgeon familiar with the anatomy to exclude internal hernia because imaging is not 100% reliable. The surgical principles involve inspecting the spaces to determine if there is bowel running through the spaces, and then reducing the small bowel by starting at the terminal ileum and running the small bowel proximally. After the hernia is reduced, the spaces should be closed with non-absorbable sutures. Pregnancy should not be a reason to delay surgery.

Video 8



Video 8:

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Gallstones and Common Bile Duct Stones.

Gallstones are more common with rapid weight loss. However the chance of requiring a laparoscopic cholecystectomy following gastric bypass is felt to be between 5-10%. There is really no indication for removing the gallbladder at the time of laparoscopic bariatric surgery as the majority patients will never need to have their gallbladder removed in the future.

If a patient develops common bile duct stones after gastric bypass this can be a challenging problem to deal with surgically. The diagnosis can be suspected in a patient with abdominal pain in the right upper quadrant similar to the gallbladder pain. Often the liver enzymes are elevated. Ultrasound and MRCP may detect a stone in the common bile duct.

It is possible to remove the common bile duct stones endoscopically using a double balloon technique to advance the endoscope. Unfortunately, this takes quite a bit of time and most endoscopists are not willing to commit to doing this. Another option would include doing a laparoscopic common bile duct exploration [10]. The third option would be to perform a transgastric ERCP and sphincterotomy [11].

Video 9

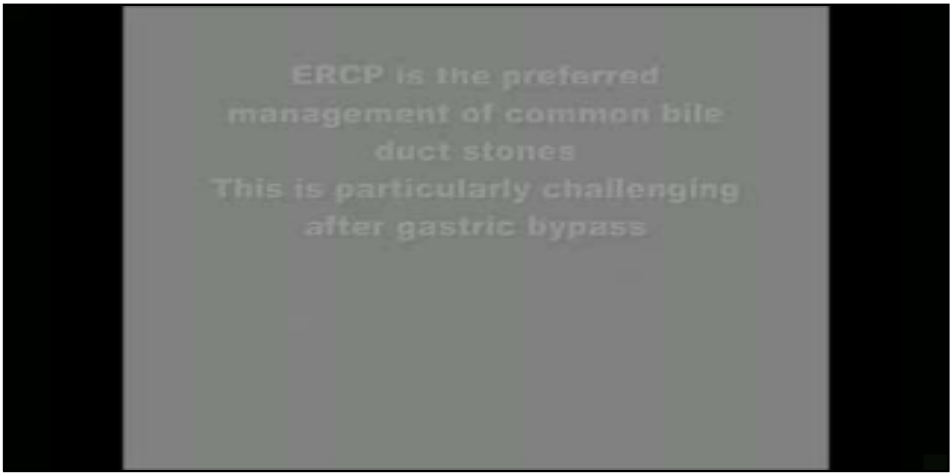


Video 9:

The standard of care in many places is to perform ERCP with sphincterotomy for the management of common bile duct stones. When this is done using the transgastric approach, the patient requires a general an aesthetic. Usually 4 laparoscopic ports are inserted into the abdomen, and a separate 12 mm port is inserted in the left upper quadrant and then into the antrum of the gastric remnant. The port is directed towards the pylorus to help with the endoscopist to intubate the duodenum. ERCP is done with the patient in the supine position. After successful sphincterotomy, the endoscope is removed, and the small gastrotomy is closed with Endo G.I. stapler.

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Video 10



Video 10:

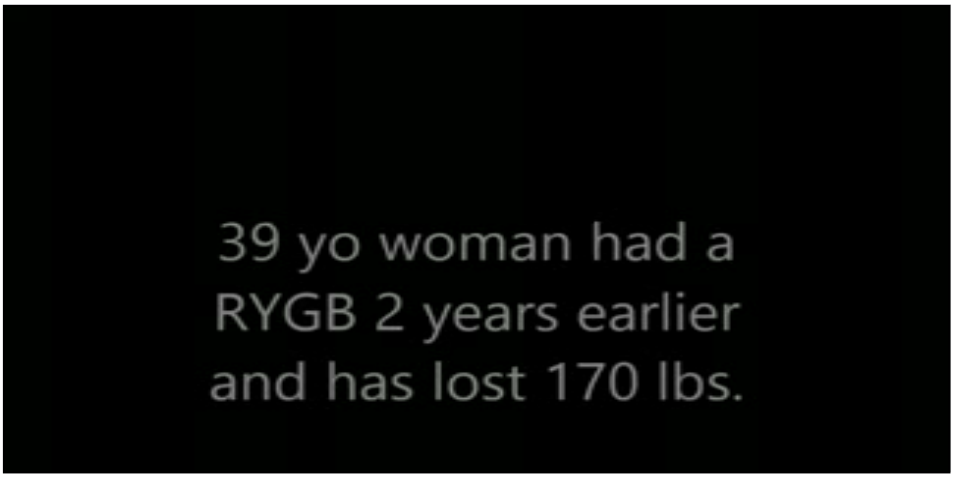
Complications Related To Peptic Ulcerations after Gastric Bypass

Ulcers usually occur at the gastro jejunostomy. However, they can also occur in the duodenum where they are difficult to diagnose. Common etiologies include non steroidal anti-inflammatory agents, cigarette smoking, and fistula to the gastric remnant. It is felt that the fistula to the gastric remnant may cause gastrin to be secreted from the G cells in the antrum. This stimulates the gastric pouch to produce acid and causes ulceration in the jejunum just below the Gastro jejunostomy.

Ulcers can present with pain, bleeding, or perforation. The pain is typically in the epigastrium and may be associated with vomiting. The diagnosis can be made usually with gastroscopy. H. pylori will need to be excluded by biopsy the gastric pouch. The majority of these ulcers will be successfully treated with proton pump inhibitors and sulcrate, but some remain refractory to this treatment. When the ulcers recur or remain refractory, consideration needs to be made for non steroidal anti-inflammatory use, cigarette smoking, and the possibility of a fistula to the gastric remnant. An upper G.I. series may demonstrate a fistula to the gastric remnant. In these cases, revisional surgery needs to be done to prevent complications from the peptic ulcers. Usually, this involves respecting the fundus of the stomach to ensure that the fistula is removed.

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Video 11



Video 11:

Bleeding presents with hematemesis or melena stool. Gastroscopy usually demonstrates the ulcer and usually this is usually controlled with adrenaline, electrocautery, or clips. When surgery is necessary, the Gastro jejunostomy needs to be resected and the fund us of the stomach should be removed as well to eliminate the possibility of there being an undiagnosed fistula to the gastric remnant.

Video 12



Video 12:

Perforations usually present with peritonitis and the patients usually go to the emergency room. Very often, free intraperitoneal air is demonstrated on plain films of the abdomen or CAT scan. Urgent surgery is necessary. Usually, the perforation can be managed by omental patching and drainage. Patient should be managed on long-term proton pump inhibitors and cautioned not to smoke or take non steroidal anti-inflammatory agents.

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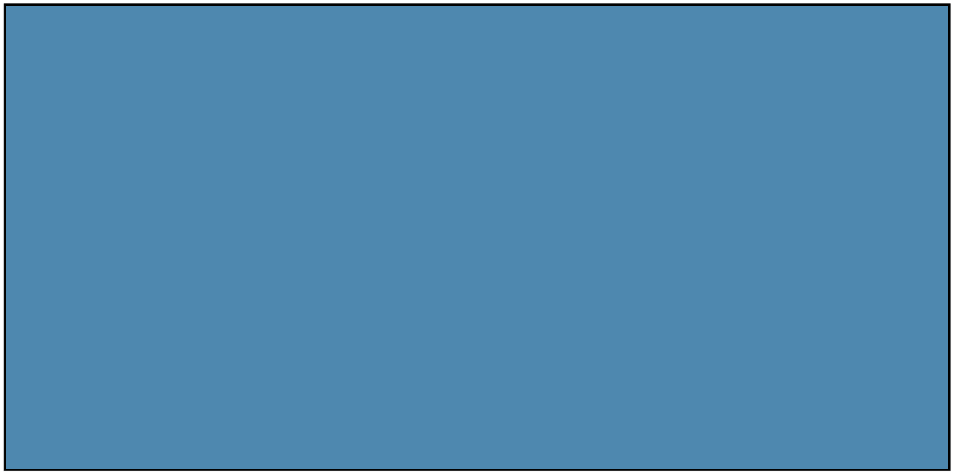
Video 13



Video 13:

Ulcers can also occur in the duodenum although are much less frequent. They can present with perforations or bleeding. They are difficult to diagnose and can mimic the pain of internal hernia. It may require transgastric endoscopy which is quite difficult and requires general anaesthetic. When they present with perforation, they are treated with patching with omentum and drainage. If they present with a large bleed, they may require laparotomy and oversewing of the bleeding ulcer with resection of the gastric remnant [12].

Video 14

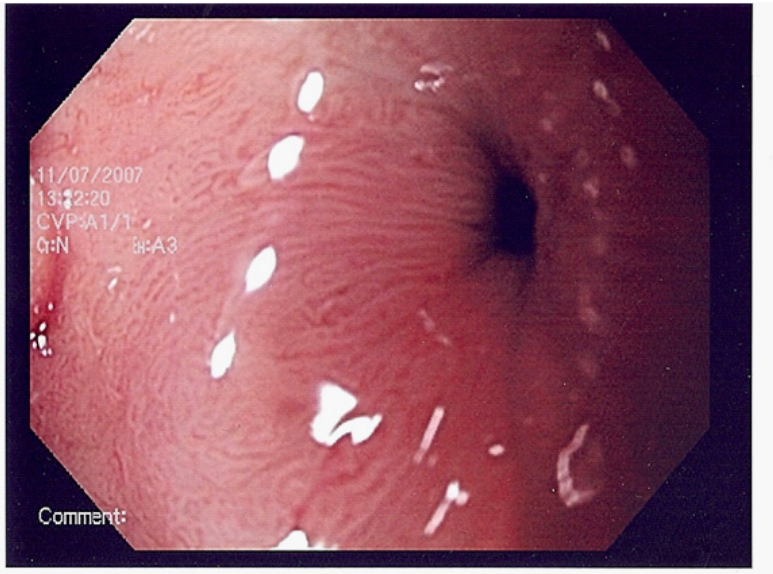


Video 14:

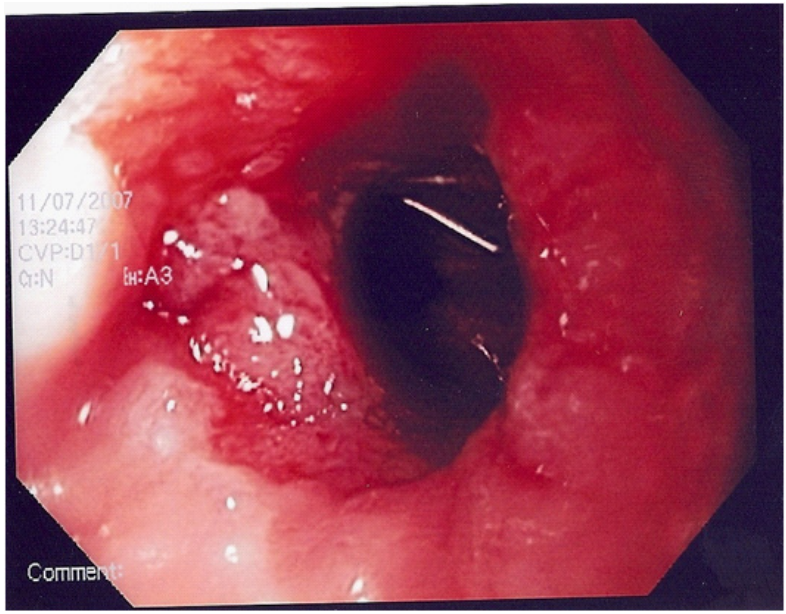
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Postoperative Strictures

Strictures at the gastrojejunostomy occur .1%-10% and usually appear 6-12 weeks after gastric bypass. Very often the patient present with vomiting and inability to eat solid food. The treatment is balloon dilatation to allow about 10mm opening. Often one post-operative dilatation is necessary, but sometimes, multiple dilatations are necessary. If a stricture presents later, laparoscopic resection of the gastrojejunostomy may be necessary.



Stricture with a 2 mm opening.



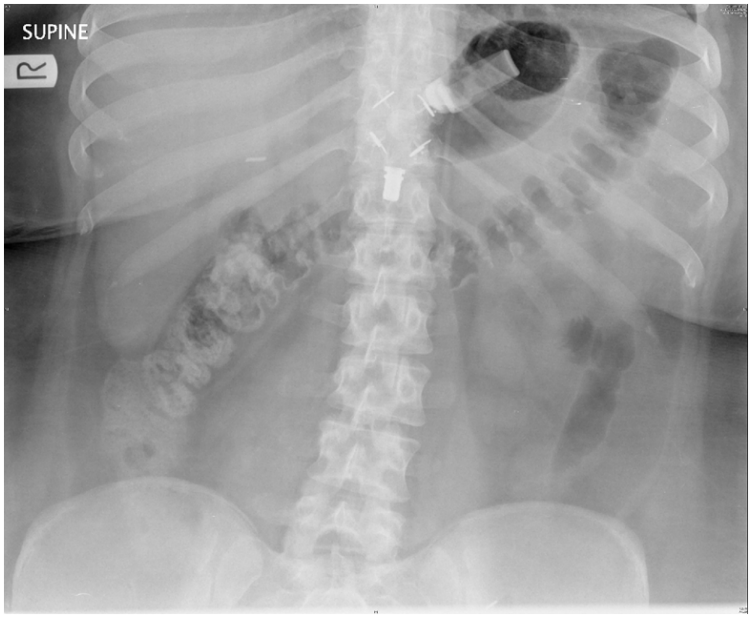
After balloon dilatation now 10mm in diameter.

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COMPLICATIONS OF GASTRIC BAND

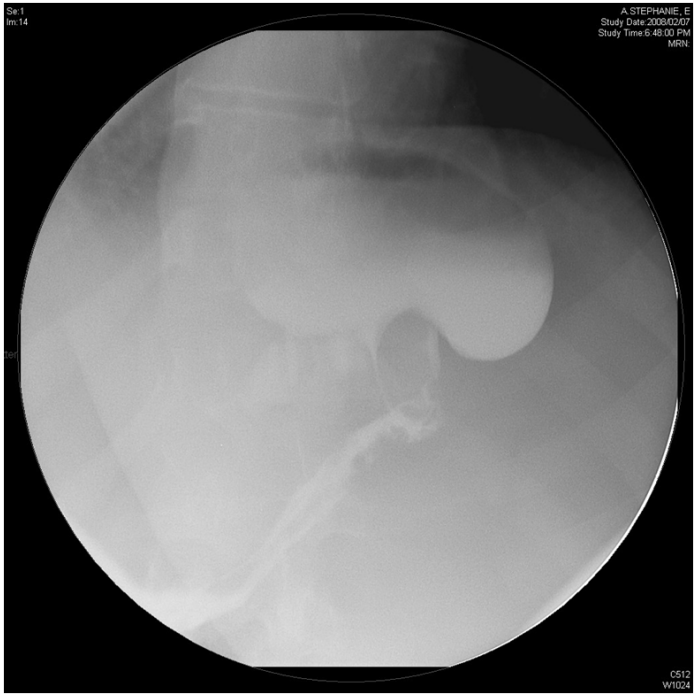
Slipped Band

The gastric band is usually just below the gastroesophageal junction. A slipped band occurs when the stomach prolapses underneath the band. This causes a mechanical obstruction and acute distension of the gastric pouch. This can progress to infarction of the stomach. The symptoms are usually vomiting and epigastric pain. The diagnosis is confirmed by performing a plain x-ray. The normal position of the band is where the anterior and posterior wall of the band are superimposed and pointing to the left upper quadrant. When the band slips, the anterior and posterior walls of the band are no longer superimposed and the band is in a horizontal position. An upper GI series can confirm pouch dilatation and obstruction [13].



Normal position of a gastric band.

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Dilated gastric pouch from slipped band.

The first step in the management is to deflate the band by aspirating all of the fluid from the port. The next step is to remove the band from the slipped position using a laparoscope. The options at that time are to re-position the band or to allow the edema and inflamation to settle. Another bariatric procedure such as a sleeve gastrectomy or gastric bypass could be offered to the patient after 2-3 months [14].

Video 15



Video 15:

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Erosion

When the gastric band erodes into the stomach, very often there are no symptoms. Sometimes, the patient presents with weight gain. In some patients the band becomes infected and the infection spreads along the tubing and presents with a subcutaneous abscess around the port.

The management is to remove the band. The safest method is to cut the band endoscopically and remove it through the oropharynx. The port and the tubing can be removed through a small skin incision. To remove the band endoscopically, at least 50% of the band has to be exposed in the stomach [15].

Video 16



Video 16:

Another approach is to remove the band laparoscopically. Very often, the liver is intimately involved with the stomach because of inflamation. The key is to expose the clasp of the band and to free the attachments to the underlying tissue. The band is removed through one of the port sites. No attempt is made to close the hole in the stomach. A drain can be used over where the band had eroded into the stomach, but usually the hole in the stomach closes within 24 hours. After the inflamation has settled, usually within 3-6 months, the patient can be offered a laparoscopic sleeve gastrectomy or a laparoscopic gastric bypass.

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Video 17

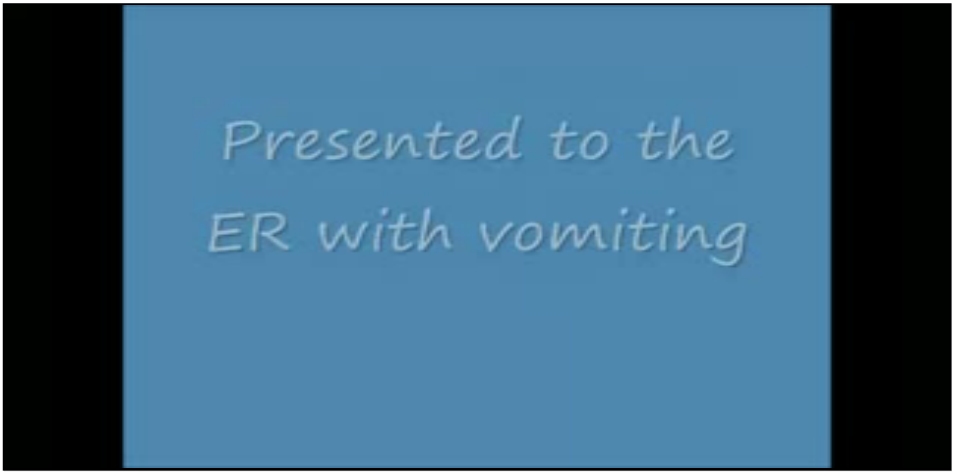


Video 17:

Band Migration

Migration of the band occurs when the entire band erodes into the stomach and becomes lodged in the small intestine. Further migration is prevented by the attachment of the band by the tubing to the port. The patient may present with a small bowel obstruction. The treatment is to perform laparoscopy and remove the band from the small intestine. The band is extracted through one of the port sites. The port and tubing are removed through a small skin incision [14].

Video 18



Video 18:

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