

Overview of Gastric Outlet Obstruction Surgical Treatment

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Abstract: Gastric outlet obstruction (GOO) is an acknowledged complication of malignancies of the upper intestinal (UGI) system. The most common causes are gastric and pancreatic malignancies, with lymphomas, ampullary carcinomas, biliary tract cancers and metastases likewise contributing.

A comprehensive review aiming to evaluate the different surgical procedures that can be performed in the treatment of Gastric outlet obstruction (GOO), we used the literature to evaluate and compare these surgical procedures, through evidence based trails. A comprehensive search for relevant literature clinical trials was undertaken by searching electronic databases (MEDLINE, Embase, Cochrane, Scopus, LILACS, BVS and CINAHL) up to January 2017. Decisions concerning the use of surgical verses endoscopic procedures for GOO need the highest level of surgical judgment. Physicians needs to think about the private patient's quality and expectancy of life, the prognosis of the disease, the availability and the success of each treatment option. GOO can be successfully dealt with by both gastrojejunostomy and stenting. Gastrojejunostomy seems associated with better long term outcomes while stenting seems related to better short term outcomes. New laparoscopic procedures and new technologies in endoscopic stents will likely continue to change the treatment recommendations for GOO.

Keywords: Gastric outlet obstruction (GOO), gastric and pancreatic malignancies, with lymphomas, ampullary carcinomas, biliary tract cancers and metastases likewise contributing.

1. INTRODUCTION

Gastric outlet obstruction (GOO) is an acknowledged complication of malignancies of the upper intestinal (UGI) system. The most common causes are gastric and pancreatic malignancies, with lymphomas, ampullary carcinomas, biliary tract cancers and metastases likewise contributing. In patients with pancreatic cancer, it is estimated that 15 - 20% of patients develop gastric outlet obstruction ⁽¹⁾. Associated signs, consisting of queasiness, throwing up, abdominal distension and the sequelae of poor nutrition, contribute considerably to morbidity in patients who are typically terminally ill with restricted quality and quantity of staying life ⁽²⁾. However, GOO is a common problem of both benign and malignant disease of the duodenum, stomach and pancreas. It is brought on by occlusion of the lumen by intrinsic or extrinsic development ⁽³⁾. Since as much as 55% of gastric cancers and up to 75% of periampullary cancers are not resectable at the time of diagnosis, they represent the most typical reasons for malignant gastroduodenal obstruction ^(4,5). GOO can likewise be caused by lymphoma, biliary disease, metastasis to the duodenum or jejunum and extrinsic compression ⁽⁵⁾. Malignant gastroduodenal obstruction is associated with restricted length of patient survival. Patients, typically, live 3-6 months ^(5,6). Deadly blockage is a major issue for physicians to deal with since it is connected with a marked decrease in lifestyle in a group of patients who are already substantially clinically compromised ⁽⁶⁾. In the setting of patients struggling with GOO, palliative interventions are frequently essential to ease signs and enhance quality of life ⁽⁷⁾.

The stomach has a considerable capacity to distend allowing GOO to go unnoticed by the patient until high grade blockage develops ⁽⁶⁾. The signs of GOO are often improperly ascribed to the patient's cancer or the treatments they are

undergoing (consisting of chemotherapy, radiation therapy or both). However, the diagnosis of GOO can be made by obtaining a good history of present disease from the patient. Patients present with symptoms of nausea, throwing up, malnutrition, reflux, abdominal distension and dehydration⁽⁵⁾. Patients often present with throwing up undigested food hours after consuming and the vomit is frequently described as bilious⁽⁶⁾.

In the palliative setting, a significant clinical goal for patients with malignant GOO is to restore the ability to endure an oral diet. Given that average survival in this patient group may be as brief as 3 - 4 months^(8,9), an ideal treatment must bring back oral consumption rapidly, with few complications, brief hospital stay and without negative influence on survival. The conventional method for the palliation of malignant GOO has been open gastrojejunostomy (OGJ). More recently there have been reports of laparoscopic gastrojejunostomy (LGJ)^(10,11), and although its role has actually not been plainly defined, many now believe it to be much safer than OGJ⁽¹¹⁾. Over the past years or so there has also been an increasing experience with using palliative endoscopic stenting (ES); a variety of different types of upper GI stents have since appeared⁽¹²⁾ and the procedure is progressively advocated and carried out⁽¹³⁾.

A comprehensive review aiming to evaluate the different surgical procedures that can be performed in the treatment of Gastric outlet obstruction (GOO), we used the literature to evaluate and compare these surgical procedures, through evidence based trails.

2. METHODOLOGY

A comprehensive search for relevant literature clinical trials was undertaken by searching electronic databases (MEDLINE, Embase, Cochrane, Scopus, LILACS, BVS and CINAHL) up to January 2017. The search was not language restricted and combined the following terms: “gastric outlet, “obstruction”, “gastrojejunostomy” “endoscopic surgical procedure” OR “endoscopic surgical procedures OR stent OR stents”. Reference lists of published articles were also searched to find more possible relevant studies. This search was limited to English language published articles and to human subject studies.

3. RESULTS

➤ Gastrojejunostomy surgical techniques in general:

Gastrojejunostomies can be carried out in an antecolic or retrocolic style. The antecolic technique links the distal stomach to the jejunum. The retrocolic technique involves positioning of the jejunal loop through the transverse colon mesentery⁽¹⁴⁾. An incision is made in the upper midline of the abdominal area. In an antecolic gastrojejunostomy the cosmetic surgeon must determine an area of the distal stomach and a loop of jejunum distal to the ligament of Treitz that can be easily generated close distance to the stomach. Usually an area 15-20 cm distal to the ligament of Treitz is picked. Care needs to be required to recognize the proximal jejunum when making a gastrojejunostomy, because anastomosing the ilium to the stomach is a rare complication related to high morbidity. A posterior row of silk stitches is put to connect the stomach and jejunum. Electro cautery is then utilized to open the jejunum and the stomach developing gastric and jejunal stomas respectively. The inner layer of the anastomosis is performed utilizing a running full density absorbable stitch which is carried anteriorly. Interrupted silk sutures are then put to finish the anterior part of the two layer gastrojejunostomy⁽¹⁴⁾.

A stapled anastomosis can likewise be performed in which case the enterotomy and gastrotomy are performed as described above to help with positioning of the stapler. The opening should be large enough to allow entry of the staple device. The intestinal anastomosis (GIA) stapling gadget is positioned through the holes created in the stomach and the jejunal and the anastomosis is carried out by firing the stapler. The enterotomy and gastroenterotomy are then closed together utilizing a transanastomotic (TA) stapling gadget⁽¹⁴⁾. The first action is once again to identify the sites for the anastomosis of the stomach and jejunum if a retrocolic gastrojejunostomy is performed. The transverse colon is lifted cephalad to visualize the mesentery and identify an avascular location through which the jejunal loop can pass through. A hand sewn anastomosis is performed in the very same fashion described above for the antecolic approach utilizing a 2-layer anastomosis with a posterior row of silk disturbed stitches. The jejunal and gastric stomas are created using electro cautery. The inner layer of the anastomosis is accomplished with a running complete thickness absorbable suture. The retrocolic gastrojejunostomy is then completed utilizing cut off silk seromuscular stitches positioned anteriorly⁽¹⁴⁾.

Similar strategies are used to carry out the stapled anastomosis for a retrocolic gastrojejunostomy. The jejunal and gastric stomas are created using electro cautery. The retrocolic gastrojejunostomy is then finished using the GIA stapler and the

openings developed in the stomach and jejunum are closed together utilizing a TA stapler, if a retrocolic approach is utilized most cosmetic surgeons will loosely suture the edges of the mesentery to the jejunum to minimize the risk of herniation of the bowel loop⁽¹⁴⁾. The midline cut is closed in the typical style regardless of whether a retrocolic or antecolic technique was used. A nasogastric tube is typically preserved postoperatively on suction up until bowel function returns and a diet can be initiated⁽¹⁴⁾.

➤ **Surgical treatment for GOO:**

A. Gastrojejunostomy (GJ):

Traditionally, GOO caused by malignancy is treated with a palliative open gastrojejunostomy (OGJ), which is surgically performed⁽¹⁵⁾. Although this technique has a favorable result and eases numerous symptoms stemmed from GOO, it leads to some morbidity and mortality given the poor condition of these patients^(1,16). A number of current studies have reported the effectiveness of "laparoscopic" GJ (LGJ) with regard to expediency, invasiveness, and safety; however, its role has actually not been clarified^(17,18). Jeurnink et al⁽²⁾ reported that LGJ appears to be more beneficial regarding bearable oral administration, the duration of the hospital stay, and the problem ratio compared to OGJ. Nevertheless, no significant differences were determined between the two methods⁽¹⁹⁾. Navarra et al⁽²⁰⁾ likewise published a randomized regulated trial (RCT) that compared LGJ and OGJ (n = 12 patients each). LGJ resulted in considerably less intra-operative blood loss, a much shorter time to enduring solid food intake, and a reduced rate of issues; nevertheless, no significant difference was recognized in the postoperative medical facility stay⁽²¹⁾. On the other hand, older retrospective research studies have reported advantages with regard to intra-operative blood loss and health center remain as well as a high conversion rate to OGJ^(22,23). Various outcomes of LGJ have actually been reported, and this variation can be discussed by the small sample sizes and low power. However, no scientific trials with adequate power have actually demonstrated the effectiveness of LGJ compared to OGJ, and LGJ is now the favored requirement for malignant GOO treatment⁽²⁴⁾.

B. Laparoscopic Gastrojejunostomy:

Understanding the anatomy of the stomach, liver, ligament of Treitz and esophagus are very important details for the cosmetic surgeon to comprehend before carrying out a laparoscopic gastrojejunostomy⁽²⁵⁾. It is required to determine the existence of hepatomegaly since a big left lateral sector might mean that the falciform ligament will need to be divided for optimum hepatic retraction and visualization⁽²⁵⁾. Again, accurate recognition of the ligament of Treitz is crucial to ensure localization of the jejunum⁽²⁵⁾. Prior to surgical treatment the patient is normally asked to undergo bowel preparation. After induction of anesthesia, a nasogastric tube (18 gauge) is placed to decompress the stomach. This will likewise be utilized throughout the creation of the gastrojejunostomy anastomosis and as an intraluminal stent to ensure patency of the newly developed gastro-jejunal lumen. A urinary catheter is also positioned to decompress the bladder⁽²⁵⁾.

The patient is positioned in the supine position on the operating table. The arms are extended on arm boards and foot plates and safety straps are positioned to secure placing. The cosmetic surgeon bases on the patient's best side while the assistant cosmetic surgeon and camera operator are on the left side⁽²⁵⁾. The authors suggest an open Hassan technique to access the abdomen. A long 45 degree, 10 mm endoscope permits optical visualization of the personnel anatomy⁽²⁵⁾. Five ports are put as follows: 1) one to the left of midline listed below the breast bone to be used for liver retraction (an expandable liver paddle is utilized to candidly retract the left lobe of the liver); 2) one to the right of midline to be utilized for the instrument in the cosmetic surgeons left hand; 3) one to the right of the umbilicus for the instrument to be used in the cosmetic surgeon's right-hand man; 4) one to the left of the umbilicus to be used for the camera; and 5) one in the left lower quadrant to be utilized for the instrument in the assistant's right hand⁽²⁶⁾. Laparoscopic gastrojejunostomy can be performed with a stapler or with a hand stitched technique.

For the hand sewn strategy a needle motorist for suturing and a left handed instrument, either blunt grasper or curved pointer grasper, will be needed. To begin the building of the gastrojejunostomy the left lobe of the liver need to be completely retracted. To facilitate this, a nathanson retractor is placed in the epigastrium to elevate the liver and expose the gastro esophageal fat pat which is utilized to identify the gastro esophageal junction^(25,26). The proximal end of the jejunal limb is thoroughly identified and brought into the upper abdominal area (typically in an antecolic, antegastric manner). A running back wall stitch line is developed utilizing a 2-0 Vicryl stitch (around 20 cm in length). Two enterotomies are made, one in the stomach and one in the jejunal limb, about 1.5 cm in length and a couple of millimeters far from the running back wall suture line⁽²⁶⁾. The suture is run from the patients left side corner to the best corner and the remaining stitch and needle are conserved. A second, inner running suture line is developed using a 2-0 Vicryl which is started at the patients left side corner of the open enterotomy. Another 2-0 Vicryl suture is utilized to close the inner layer anteriorly. Prior to completion of the inner layer closure, a 34 French nasogastric (NG) or orogastric (OG) tube is passed

across the anastomosis under direct visualization. The inner layer closure is finished by bringing the two sutures onto the anterior aspect of the anastomosis and connecting them together. Needles are cut and eliminated. The previous external layer Vicryl suture is then used to continue anteriorly to enhance the inner layer. This can likewise be finished by starting a different second stitch beginning from the corner and tying in the middle of the anterior aspect gastrojejunostomy⁽²⁶⁾.

A leakage test is then carried out. The patient is placed in the Trendelenburg position and the left upper quadrant is filled with normal saline to immerse the anastomosis⁽²⁶⁾. Air is presented into NG tube up until appropriate inflation of the stomach and jejunal anastomosis is observed. A leak test can likewise be carried out with methylene blue through the NG tube, if leak is noticed the location is repaired with extra non absorbable stitches till no additional burrow leak is seen⁽²⁶⁾.

When carrying out a gastrojejunostomy to minimize postoperative problems, there are numerous of essential strategies that should be used. To lessen anastomotic ulcer and stricture formation, the inner layer is closed utilizing absorbable stitches⁽²⁶⁾. The aperture of the anastomosis is controlled by closing the enterotomy problem over an NG or OG tube. Care needs to be required to avoid suturing to television which can result in disturbance of the closure⁽²⁶⁾. If forehand stitching appears uncomfortable in orientation⁽²⁶⁾, back-hand suturing in the corners may enable more precise suturing. The tension on the running suture is kept by the assistant throughout the closure procedure to prevent loosening of the closure and allowing potential leak. Prior to tying the knots the whole stitch should be cinched down to additional eliminate possible gaps⁽²⁶⁾.

C. Endoscopic treatment of GOO:

Endoscopic treatment of GOO with endoluminal self-expanding metal stents was first described by Topazian et al⁽²⁷⁾ in the early 1990s. Over the previous years, experiences and reports of the use of ES have increased. In addition, various types of upper intestinal stents have actually appeared, and reputable ES procedures have been advocated and performed⁽²⁸⁾. Recently, several posts have actually reported that patients who present with GOO with a long life expectancy must go through ES given its safety, minimal invasiveness, and cost-effectiveness⁽²⁹⁾. Self-expandable metal stents (SEMSs) are the basic devices for recanalization of a blocked gastrointestinal lumen. Some SEMSs exhibit re-occlusion since of tumor in growth through openings in between the stent wire filaments or stent migration as late major complications⁽³⁰⁾. Covered SEMSs avoid ingrowth through the mesh wall, and they are beneficial compared with exposed SEMSs in esophageal cancer⁽³¹⁾. In deadly colorectal blockage, covered stents do not exhibit an advantage compared with exposed stents due to high migration rates⁽³²⁾. Several research studies have actually also recommended that covered stents are connected with more frequent re-intervention regardless of approximately similar results and problems in deadly GOO. For that reason, with regard to ES for GOO, the effectiveness and issues of covered and exposed SEMSs in patients with GOO have actually just recently been highlighted. Kim et al⁽³²⁾ reported a potential RCT of covered vs exposed stents for the palliation of GOO in gastric cancer patients and concluded that the general stent patency did not vary between the two groups; furthermore, regular migration of the covered SEMSs offsets its advantages in the avoidance of re-stenosis. Maetani et al⁽³³⁾ likewise reported similar results in a multicenter randomized trial in Japan, i.e., no significant difference in the stent patency in between triple-layered covered and exposed metallic stents for the palliation of deadly GOO; however, the use of a triple-layered covered SEMS was related to less regular stent dysfunction more than 4 weeks after the preliminary stent. No matter the stent configuration, covered or uncovered, the ES procedure for GOO caused by malignancy is considered safe and efficacious.

4. CONCLUSION

Palliative treatments are offered to patients with the intent of relieving the symptoms of GOO and eventually enhancing patient lifestyle. Decisions concerning the use of surgical verses endoscopic procedures for GOO need the highest level of surgical judgment. Physicians needs to think about the private patients quality and expectancy of life, the prognosis of the disease, the availability and the success of each treatment option. GOO can be successfully dealt with by both gastrojejunostomy and stenting. Gastrojejunostomy seems associated with better long term outcomes while stenting seems related to better short term outcomes. New laparoscopic procedures and new technologies in endoscopic stents will likely continue to change the treatment recommendations for GOO. When it pertains to palliative care, it is imperative that physicians involved are sufficiently trained in end of life management to guarantee that each patient gets the appropriate treatment for their specific circumstances.

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