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Laparoscopic Gastropexy for Gastric Volvulus; Systematic Review

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Abstract: **Gastric volvulus was Explained by Berti in 1866 based on the autopsy of a 61-year-old woman. Laparoscopy not only verifies the medical diagnosis and determines underlying inclining conditions. this systematic review was aim to collect the evidence from the few published trails and mostly case reports studies evaluating this surgical intervention procedure, we aimed also to show the efficiency of it and compare it with the traditional surgical procedures A laparoscopic technique to treatment can be utilized in the majority of cases, consisting of severe circumstances. MIDLINE (PubMed), and EMBASE databases were searched for relevant articles matching our concerned topic which is: Laparoscopic Gastropexy for Gastric Volvulus; only Six studies were identified discussing the effectiveness and efficiency of laparoscopic intervention in gastric volvulus up to date December, 2016. A number of recent reports have explained a laparoscopic technique to both persistent and intense gastric volvulus with great results. Gastric volvulus associated with large paraesophageal hernias can also be handled laparoscopically. It can be concluded that laparoscopic surgical treatment now represents a safe and acceptable method to treating gastric volvulus, with minimal morbidity and a shorter medical facility stay.**

Keywords: **Gastric volvulus, Gastropexy, medical diagnosis and determines underlying.**

1. INTRODUCTION

Gastric volvulus was Explained by Berti in 1866 based on the autopsy of a 61-year-old woman [(1)]. There are 3 types of gastric volvulus: organoaxial (most common), where unusual torsion happens on a stomach's longitudinal axis (line linking the cardia and the pylorus along the luminal axis of stomach); mesenteroaxial, where torsion takes place along a vertical axis (from lower curvature to greater curvature); and a combination both the above types [(2)]. The occurrence is uncommon, around 20% of gastric volvulus cases occur in infants under 1-year-old, and the other 80% in grownups, among which 80% to 90% cases take place in the 5th years of life [(3)].

In general, the treatment of an acute gastric volvulus stays emergency surgical repair. In patients who are not surgical prospects (secondary to comorbidities or an inability to tolerate anesthesia), endoscopic decrease might be attempted. Persistent gastric volvulus may be treated on a nonemergency basis, and surgical treatment is significantly being carried out through a laparoscopic method. A review of patients handled conservatively with chronic gastric volvulus were reported to have a high reoccurrence rate however very few major issues [(4)].

A laparoscopic approach lessens the access trauma and is superior for upper intestinal benign lesions. Laparoscopy not only verifies the medical diagnosis and determines underlying inclining conditions. Effective fixation can also be accomplished. Previous reports on laparoscopic gastropexy for gastric volvulus were performed by insertion of numerous percutaneous endoscopic gastrostomy tubes to anchor the stomach to the anterior stomach wall [(5,6)].

Objective: There has not been yet a systematic review for laparoscopic gastopexy for treating gastric volvulus, therefore this systematic review was aim to collect the evidence from the few published trails and mostly case reports studies evaluating this surgical intervention procedure, we aimed also to show the efficiency of it and compare it with the traditional surgical procedures

2. METHODS

Systematic review study was performed according to the guideline of systematic and meta-analysis reviews.

Studies Search Method:

MIDLINE (PubMed), and EMBASE databases were searched for relevant articles matching our concerned topic which is: Laparoscopic Gastropexy for Gastric Volvulus; only Six studies were identified discussing the effectiveness and efficiency of laparoscopic intervention in gastric volvulus up to date December, 2016.

So we included all these studies in our review, and plus we also included other surgical intervention trails for the same condition to evaluate and compare it with the laparoscopic procedures in our discussion.

We have used Mesh term in searching PubMed: "Laparoscopic Gastropexy" AND "Gastric Volvulus". We also searched references list of each identified study for more inclusion studies.

3. RESULTS & DISCUSSION

We identified Six trails [6,7,8,9,10,11] that were mostly reporting cases underwent Laparoscopic Gastropexy for treatment of Gastric Volvulus, and most of these studies are very recent ones.

The first included study by Palanivelu et al, in 2007 [6] they treated 14 patients with gastric volvulus during the period of 10 years; There were 10 males and 4 females and the average age was 64 (range = 55 - 73) years. 2 patients had primary type and 12 had secondary type gastric volvulus. No patient had gangrene of the stomach, so no resection was necessary. The volvulus was of the organoaxial type in nine patients and mesentericoaxial type in three patients. Laparoscopy exposed a strangulated stomach with overall blockage. The contents were lowered however we were not able to untwist the stomach so a gastrotomy was made and fluid and air were drawn out to decompress the stomach (**Figure 1**) [6]. The dilated stomach became typical in size. The mucosa looked like a dark" peppery" surface. After untwisting the stomach, we waited for the typical color to return, which was con- firmed by intraoperative endoscopy. The gastrotomy wound was sutured and gastropexy was carried out by repairing the fundus to the diaphragm, repairing the gastrocolic omentum to the lateral stomach wall, and suturing the anterior surface of stomach to the anterior abdominal wall (**Figure 2**) [6]. A wide-bore drainage tube was kept in the peritoneal cavity. Of the 12 patients with secondary gastric volvulus, 2 had intense volvulus and 10 had persistent volvulus. Diaphragmatic hernia (Bochdalek) and paraesophageal hiatal hernia were the precipitating consider 4 and 8 patients, respectively. The stomach, left colon, higher omentum, and a few loops of the small bowel were seen in the left pleural cavity. These were returned back into the peritoneal cavity by thoroughly separating the sac from pleura. Next, the sac was dissected out entirely with a harmonic scalpel (Ethicon, Somerville, NJ), the diaphragmatic problem was closed with nonabsorbable sutures, and a 15 X 12-cm piece of Parietex^{TM} mesh was positioned over the flaw and sutured. The stomach was fixed to the diaphragm and lateral peritoneum to prevent reoccurrence. Among the patients with diaphragmatic hernia was 6 months pregnant and presented with intense functions; she was run on an emergency basis. this study revealed that the typical operating time was 104 (range = 85 - 123) minutes. Liquid diet plan was started on the second postoperative day (POD) for all patients other than those with the intense presentations. For those cases, liquids were started on the 4th POD. One patient had a fever for two days and constant nasogastric tube aspiration showed coffee-ground aspirate that gradually decreased in volume. The nasogastric and drainage tubes were removed on the 4th POD. The patient was discharged on the 6th POD [6].

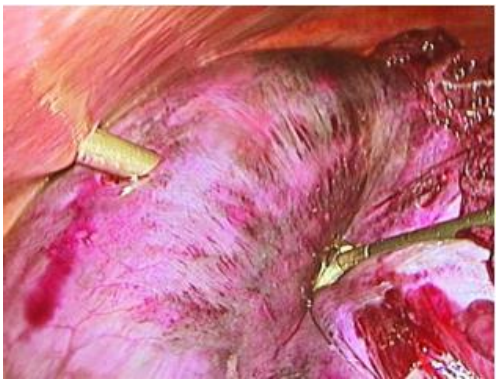

Figure 1: Congested, dilated stomach

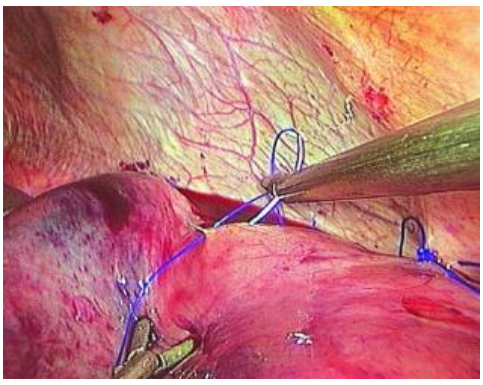

Figure 2: Gastropexy.

The other study by Morelli et al in 2008 [7] they had a case which is a 34-year-old female presented with numerous episodes of persistent upper stomach pain connected with retching and vomiting, dealt with unsuccessfully with intramuscular metoclopramide. Endoscopic assessment of the upper gastrointestinal tract showed a believed rotation of the stomach, and a persistent gastric volvulus was exposed by barium meal. With an anterior laparoscopic gastropexy performed as the very first surgical technique the patient was operated on effectively. their patient was scientifically and radiologically followed-up for 2 years without any evidence of reoccurrence, either symptomatic or radiological. Based on this result, they concluded that the laparoscopic gastropexy can be seen and considered as a preliminary 'gold standard' for the treatment of gastric volvulus [7].

The third trail was performed by Lee et al in 2015 (8) a very recent trail, they reported a 79-year-old woman with persistent gastric volvulus treated with endoscopic decompression and laparoscopic gastropexy. A plain abdominal radiograph revealed a big air bubble check in the left upper abdomen (**Figure 3A**). A contrast-enhanced abdominal computed tomography exposed a markedly distended stomach; the transposition of the gastroesophageal junction and gastric antrum verified a recurrent or persistent state of mesenteroaxial gastric volvulus (**Figure 3B**). Laparoscopic surgery was carried out under basic anesthesia. The cosmetic surgeon stood on the best side of the patient. The umbilical port for the video camera was prepared with the open strategy. Pneumoperitoneum was produced with co2 and intracorporeal pressure was maintained at 12 mmHg. Three 5-mm trocars were placed. There was no evidence of a hiatal hernia. The spleen had no redundancy, but the 2nd and 1st duodenal portions showed redundancy. Decrease of the gastric volvulus was carried out with two laparoscopic graspers through traction of the greater curvature of the stomach. The greater curvature of the stomach was sutured to the abdominal wall by utilizing laparoscopic stitch methods. The stomach was lifted up to the abdominal wall to check the ideal point of the gastropexy. 4 prolene 2-0 sutures were placed along the greater curvature of the stomach from 5 cm above the pylorus to the lower body. The space in between stitches was about 3 cm. Four 3-mm skin incisions were made with a no. 11 blade to place an endo-closure to draw out the prolene stitch (**Figure 4A**). The pneumoperitoneum was slightly launched to 5 mmHg, and the prolene sutures were connected and firmly held in their positions without any excessive traction (**Figure 4B**).

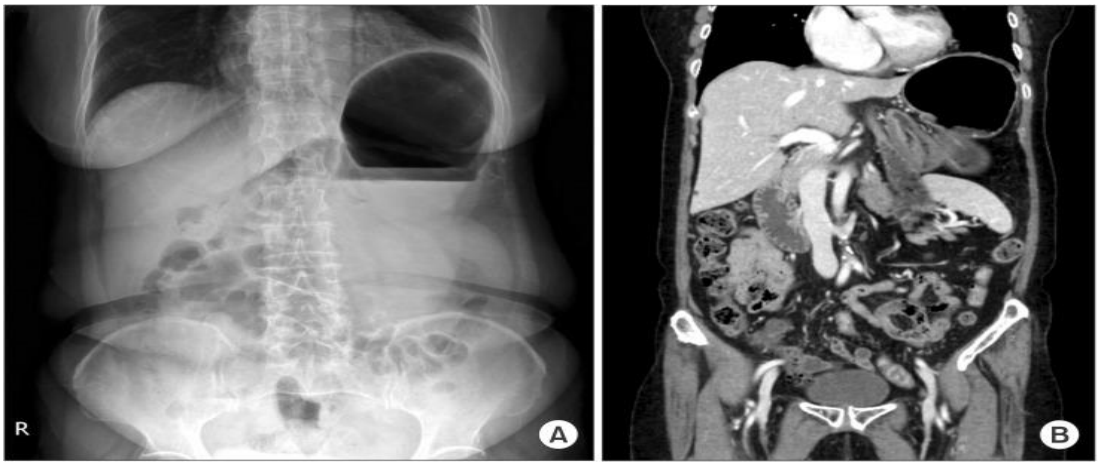

Figure 3: (A) simple abdominal radiograph showing a double bubble sign in the left upper abdomen. (B) markedly distended stomach with transposition of the gastroesophageal junction and gastric antrum.

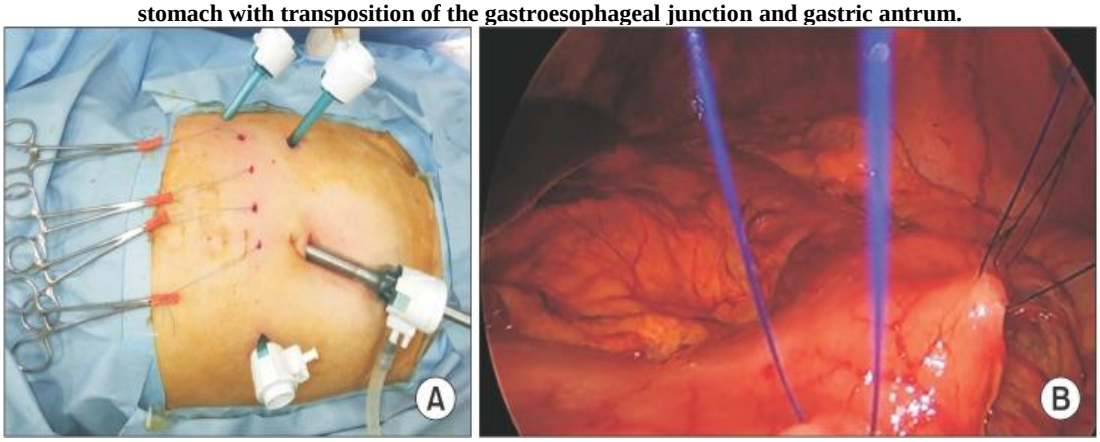

Figure 4: (A) Photos showing the placement of 4 trocars. Four 3-mm incisions were made for the anterior gastropexy. (B) Gastropexy with prolene sutures. The sutures were lifted through the 3-mm skin incisions.

Fourth study was performed by Toyota et al in 2014 [9] involving 88-year-old lady with regular vomiting and failure to consume was confessed to our health center on 3 different events where she got conservative treatment for a couple of days. Upside-down stomach was identified. Because of her advanced age, complications (bedridden state, left hemiplegia after cerebral infarction, cardiac arrest) and poor general condition, the minimally intrusive method of endoscopic repositioning and gastropexy was carried out. Laparoscopic repair of hernias and gastropexy was performed. Using a laparoscope, two causes of reoccurrence were discovered. One cause was that the variety of adherence between the stomach and the abdominal wall was narrow (from the antrum only to the lower corpus of stomach), so the upper corpus of stomach was turned and herniated into the esophageal hiatus. The other cause was adhesion in between the omentum and the esophageal hiatus which caused the stomach to turn and repeatedly ended up being herniated. Endoscopic treatment for upside-down stomach can be an useful option method in high-risk patients, its ability to prevent recurrence is restricted [9]

- **Overview and comparing different surgical procedures on treatment of Gastric volvulus:**

Gastric volvulus is defined as an abnormal rotation of the stomach of more than 180 ° [12], creating a closed-loop obstruction, resulting lastly in imprisonment and strangulation [13]. Gastric volvulus can be categorized into 3 forms, organo-axial, combined and mesenterico-axial. In the very first form the stomach turns around an axis that connects the gastro-oesophageal junction and the pylorus, the antrum turning in the opposite direction to the fundus of the stomach. The 2nd kind is characterized by the rotation around an axis that bisects both the lesser and greater curve; the rotation is typically incomplete and takes place periodically, with uncommon vascular compromise. The combined kind is unusual; in this case the stomach twists both mesenterico-axially and organo-axially. This form is generally observed in patients with persistent volvulus. Various ligamentous structures typically keep the stomach in place: the gastrophrenic ligament, the gastrocolic ligament, the gastrosplenic ligament and peritoneal fixation of the duodenum. The lack or loosening of gastrocolic and gastrosplenic ligaments were demonstrated by Dalgaard to trigger gastric volvulus [14]. Congenital diaphragmatic hernia, para-oesophageal hernia or wandering spleen are the main secondary causes of this condition [15,16,17]. Both persistent recurrent and acute gastric volvulus have actually been reported. Scientific findings seem connected to the degree of rotation and subsequent gastric blockage. They consist of frequent abdominal pain, vomiting and gastric distension in the chronic frequent kind, through to medical proof of severe abdominal areas due to vascular compromising in the intense form, or as an issue of the chronic reoccurring form. The Borchard triad [13] was not seen in our case as a nasogastric tube was put without problem. Many cases are dealt with routinely as gastritis, with subsequent treatment based on proton pump inhibitors and/or antacids. In 1968 Tanner [12] described different methods of surgical repair for gastric volvulus. These included gastrojejunostomy, fundo-antral gastrogastrostomy (Opolzer's operation), partial gastrectomy, division of bands, repair work of diaphragmatic hernia, basic gastropexy, gastropexy with department of the gastrocolic omentum (Tanner's operation) and repair of eventration of the diaphragm. The majority of these have become obsolete, replaced by less-invasive strategies. Endoscopic derotation of the stomach has actually offered satisfactory results [19,20]. Provided the persistent nature of this clinical condition, endoscopic derotation can be thought about as a short-lived service. In patients with high-risk pre-operative conditions, endoscopic derotation with a double or single PEG (percutaneous endoscopic gastrostomy) tube positioning has been reported to have success [21,22]. There have actually been few reports of laparoscopic gastropexy for management of intense and chronic gastric volvulus [9,10,11]. Laparoscopy has the advantage of putting the stomach in a three-dimensional aircraft, providing appropriate sight of stitch placement, with no risk to the peritoneal wall. Our strategy included some important actions to prevent recurrence. The gastrocolic ligament department from antrum to fundus, as described by Tanner [12], lowered the upward pulling force and drag on the greater curvature. The use of an ultracision harmonic scalpel allowed us to accomplish a precise dissection with very little blood loss.

4. CONCLUSION

A laparoscopic technique to treatment can be utilized in the majority of cases, consisting of severe circumstances. A number of recent reports have explained a laparoscopic technique to both persistent and intense gastric volvulus with great results. Gastric volvulus associated with large paraesophageal hernias can also be handled laparoscopically. It can be concluded that laparoscopic surgical treatment now represents a safe and acceptable method to treating gastric volvulus, with minimal morbidity and a shorter medical facility stay. This is most likely to be of considerable benefit for the treatment of a predominantly senior population that is impacted by this condition, frequently with substantial comorbidity.

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