

COMPARISON OF LAPAROSCOPIC TRUNCAL VAGOTOMY AND GASTROJEJUNOSTOMY WITH OPEN SURGERY FOR PYLORIC STENOSIS

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Abstract

Background: Peptic ulcer complication continues to inflict high morbidity. Surgery still remains the treatment of choice of peptic ulcer with Gastric Outlet Obstruction (GOO). With the advent of minimal access surgery laparoscopic truncalvagotomy with gastrojejunostomy is an attractive option. A selected group of patients may benefit more with laparoscopic than the open surgery. To evaluate the safety, efficacy and outcome of laparoscopic surgery for GOO in comparison with conventional laparotomy.

Materials and methods: This is a retrospective study comparing Laparoscopic Truncal vagotomy and Gastrojejunostomy (LTVGJ) with open procedure. We excluded patients with severely malnutrition, age >60 years, malignancy, chronic hypertrophic pyloric stenosis, bleeding disorder, peritonitis, portal hypertension, jaundice, ASA >II. The study was performed on 30 patients who were clinically and radiologically diagnosed from June 2012 to June 2018. Out of them 15 patient were laparoscopically and 15 patients were done by laparotomy. Laparoscopic Truncal vagotomy and Gastrojejunostomy (LTVGJ) was done with ETS Flex 45 stapler. Operation technique, number of wound infection, post operative pain and hospital stay, early return to work were studied.

Results: Thirty patients were studied, 28 male 2 female (Male to female ratio 9: 1) about 60% of the patients were within 3rd and 4th decade of age. Operation time was 120-180 minute, Only one patient had wound or port infection, 70% cases require less analgesic requirement than open surgery and hospital stay was 7 days.

Conclusion: Laparoscopic truncal vagotomy with gastrojejunostomy is advantageous to open surgery by less postoperative pain, earlier return to normal diet, less wound infection, earlier discharge from hospital and early return to normal daily activity. Though it is costly, it offers excellent aesthetical results and may be considered as safe, effective and standard treatment option for selected patients.

Key words

Laparoscopy; Stapler gastrojejunostomy; Vagotomy.

Introduction

Chronic inflammation, scarring of the antrum and pylorus are associated with the development of Gastric Outlet Obstruction (GOO). Complications of Peptic Ulcer Disease (PUD) is bleeding, perforation and gastric outlet obstruction remain prevalent¹⁻⁷. Gastric outlet obstruction is the more accurate term for the commonly used term 'Pyloric Stenosis', as the site of obstruction is rarely the pylorus itself. The obstruction is usually in the first part of the duodenum secondary to cicatrized duodenal ulcer or proximally where the diagnosis of carcinoma is most probable⁸.

The role of the laparoscopic approach in the treatment of GOO is under investigation and may represent a valid form of therapy with low morbidity. The experience of several international centers has been published. One group in China performed laparoscopic truncalvagotomy and gastrojejunostomy for GOO related to PUD with nearly complete resolution of symptomatology. They reported no conversions to open procedure or mortalities⁶.

The advent of Minimal Access Surgery (MAS) allows the conventional procedure to be performed via laparoscopy. The minimally invasive technique continues to evolve. As technology and instrumentation continue to improve, so we have the complexity of operations that can be performed in a minimally invasive way.

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Material and methods

A retrospective study of 30 cases of benign gastric outlet obstruction due to chronic duodenal ulcer, carried out during time period of June 2012 to June 2018. All these patients were selected from the general surgical units of our institute. All patients of benign gastric outlet obstruction due to chronic peptic disease were included in this study. Severely malnourished, >60 years aged patients, malignancy, chronic hypertrophic pyloric stenosis, bleeding disorder, peritonitis, portal hypertension, jaundice, ASA >II were excluded from this study. Endoscopy was done in all the cases to confirm the diagnosis [Fig-1]. Upper GI endoscopy can help to visualize the gastric outlet and may provide a tissue diagnosis when the obstruction is intraluminal.

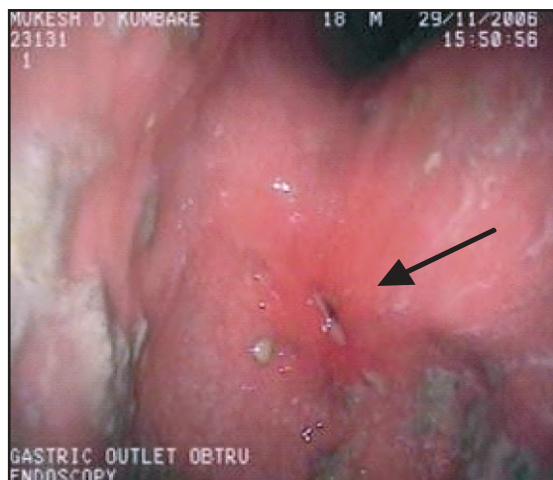


Fig 1 : Endoscopic view of GOO (Arrow).

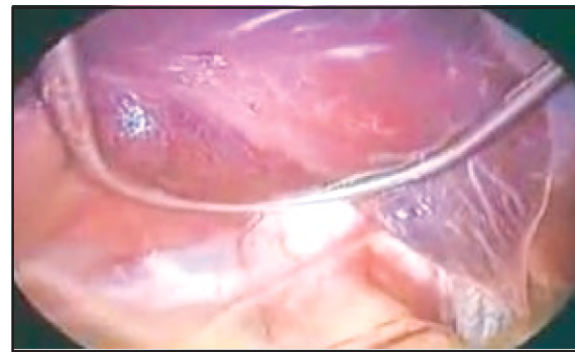
Procedure

Operation was carried out by using standard technique as described by the author⁷. Under general anaesthesia, the patient was placed in modified lithotomy position. Port Position- The camera port (10mm) was placed in the umbilicus. The right hand working port (10mm) was placed in the left mid-clavicular line & the left hand working port (5mm) was placed in the right mid-clavicular line at the level of the umbilicus, depending on the level of the greater curvature of stomach. 5 mm port was placed in the epigastrium for retraction of the left lobe of liver. Another port in the left anterior axillary line (5 to 10 mm) was placed for the Babcock's forceps that was used to retract the stomach.

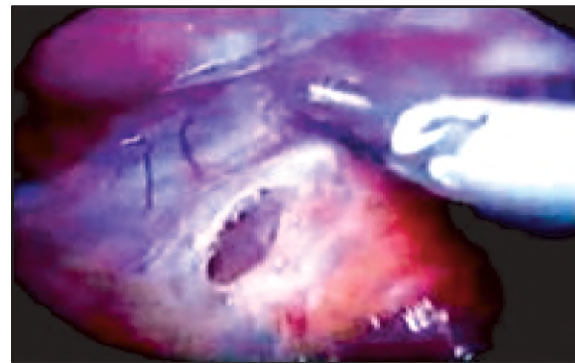
Anterior Vagotomy : The left lobe of liver was retracted anteriorly while the stomach was pulled caudally. Then anterior vagus nerve identified and dissected.

Posterior Truncal Vagotomy : The left lobe is retracted anteriorly by a blunt nosed retractor introduced through the subxiphoid trocar. Proximally, the dissection was done bluntly to look for any additional branches, the so-called 'criminal nerve of Grassi'. Lower 5 cms of the esophagus is cleared of all the attachments, by which the vagotomy becomes complete.

Posterior Antecolic Gastrojejunostomy and Stapled Gastro-jejunostomy : The right mid clavicular port is converted to 12 mm for introducing Endo GIA stapler [Fig-2].



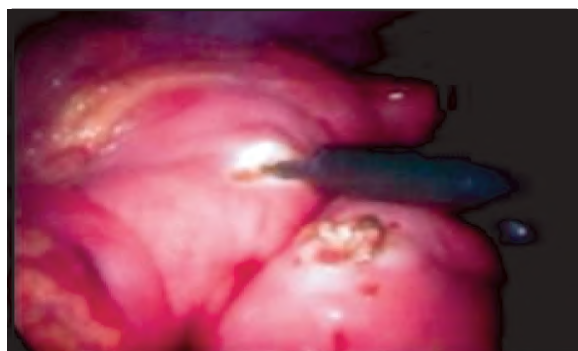
a) Exposure of esophagogastric junction.



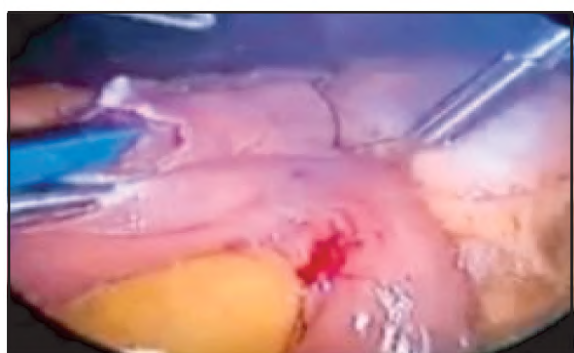
b) Opening of phrenoesophageal membrane.



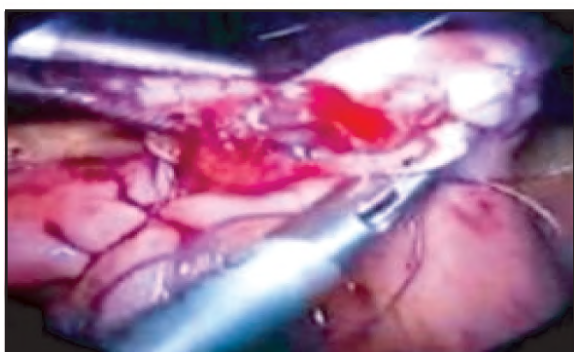
c) Division of vagus nerve.



d) Stab incision over stomach and jejunum.



e) Firing of stapler.



f) Closure of stapler entry wound using vicryl.

Fig 2 : Technique of stapler GJTT (a-f).**Results**

Present study was carried out under the aegis of a Chittagong Medical College Hospital from June 2012 to June 2018. 30 patients of gastric outlet obstruction due to chronic duodenal ulcer were included in this study.

30 (Thirty) patients were studied, 28 male 2 female (Male to female ratio 9: 1) about 60% of the patients were within 3rd and 4th decade of age. Operation time was 120-180 minute, No wound or portinfection, 70% cases require less analgesic requirement than open surgery and hospital stay was 7 days

Among the selected patients, 94.73 % patients were not operated previously for either peptic ulcer or its complication, 5.26 % patient were operated previously for perforation peritonitis i.e peptic ulcer related complication.

Table I : Distribution of symptoms.

Symptoms	No. of Patients	Percentage %
Pain in abdomen	22	73.33
Vomiting (Recurrent, nonbilious)	30	100
Loss of appetite	24	80
Loss of weight	20	26.66
Post prandial fullness	16	53.33

Recurrent nonbillious vomiting was observed in all the patients. Among the selected patients, 73.33 % were having pain in abdomen, 80 % were having loss of appetite, 26.66 % were having loss of weight and 53.33 % were having postprandial fullness (Table I).

Table II : Distribution of signs.

Signs	No. of Patients	Percentage %
Pallor	13	43.3
Abdominal distension	4	13.3
Visible peristalsis	16	53.3
Succussion splash	30	100

Succussion splash was the commonest sign observed in all the patients. 43.3% patients were having pallor, 13.3% were having abdominal distension, 53.3 % were having visible gastric peristalsis, and no patient was having a palpable mass.

The mean operative time required was 108.21 minutes. Among all selected patients 5.26 % required time less than 90 min, 15.78 % between 91-100 min, 26.31 % between 101-110 min, 21.05 % between 111-120 min, 15.78 % between 121-130 min, 10.52 % between 131-140 min and 5.26 % patients required time more than 140 minutes. Time required for surgery increased with difficulty in dissection. The conversion rate of laparoscopic gastrojejunostomy with total truncal vagotomy to open method was 0.3 % i.e. out of 30 cases which were started as laparoscopic method; one patient was converted into open method. The reason for conversion was due to adhesions.

The post operative pain was graded on a scale of 0-10 as per the Visual Analogue Scale (VAS). The pain scale was calculated on day 1, 2 and 7 of operation. Thus on day 1, the mean pain scale measured was 5.26 ± 1.19 . Thus on day 2, the mean pain scale measured was 3 ± 0.81 and on day 7, the mean pain scale measured was 0.36 ± 0.59 .

Postoperative Complications

In the present study, two patients had intraoperative complication of suture line bleeding. Delayed gastric emptying was noted in four patients as an early postoperative complication. Thus the incidence of intraoperative and early postoperative complication was 5.26 % and 10.52 % respectively. In present study, six patients developed delayed postoperative complications. Four of them had post vagotomy diarrhoea and two had stromal ulceration.

Patients required analgesics for mean of 46.73 ± 41.94 hours. The mean time for starting oral feeds was 4.73 ± 2.42 days. The mean time required for ambulation was 8.42 ± 2.36 hours. The mean length of hospital stay was 6.78 ± 2.59 days in the present study.

In the present study the rate of post-operative wound infection was low. There was no major wound related complication in any of the patients. Only 1 patient had wound infection. Patient had only erythema and induration. Patients with wound infection were treated with antibiotics and local measures.

Subjective cosmetic results were assessed by patients themselves and showed that a large number of patients were satisfied with the quality of scars, they got after laparoscopic gastrojejunostomy and total truncal vagotomy. Only two patients was not satisfied with the quality of scars. In 78.94 % patient scar was barely visible. A small well healed scar was present in 21.05 % patients. No patient had either large well healed scar or complicated scar. Average follow up duration was 17.05 ± 7.04 months in the present study.

Discussion

Laparoscopic surgery is a well established alternative to open surgery across disciplines. Although the magnitude of impact varies by procedure, generally the benefits of laparoscopy on postoperative pain, cosmetics, hospital stay and convalescence are recognized widely.

The mean age of selected patients was 37.89 years. For females it was 36.4 years and for males it was 38.42 yrs.

In the present study, the mean operative time required was 108.21 minutes (85 – 145min). The mean operating time in the study by Bin Dayna K was 180 mins, by Palanivelu C was 98 mins (80-124mins) by Wing was 114 mins (70-180mins) by Wyman was 210 mins (180-240 mins)³. The findings of present study are comparable to that of study^{9,10,6,3}.

In the present study, the conversion rate was 0.3 %. The reason for conversion was intraoperative adhesions in a patient previously operated for peptic ulcer perforation. No conversion had been noted in study by^{6,10,11}. They had not mentioned that whether their patients previously operated for peptic ulcer or its complication or not. Thus, we can infer that the most common reason for conversion is adhesions. In such cases surgeon should not hesitate to convert the procedure to open. Conversion under these circumstances reflects sound surgical judgment and should not be considered a complication of LTVGJ.

According VAS scale, the present study showed that, on day 1, the mean post operative pain was 5.26. On day 2, the mean post operative pain was 3. On day 7, the mean post operative pain was 0.36. The visual analogue scale values on day 1, 2 and 7 were less. The present study findings are comparable to study by¹². Thus, patients operated laparoscopically experience less pain, right from the day of operation because of smaller key hole incisions.

In the present study, the mean analgesic requirement was 46.77 hours (1.94 days). The mean analgesic requirement was 49 hrs (2.01days)¹³. Wing conducted a study over 15 patients and found that the mean postoperative analgesic requirement was an average 1 (0 - 6) doses of intramuscular pethidine⁶. The present study findings are comparable with the study¹³.

The present study shows that the mean time for starting oral feeds was 4.73 days. Palanivelu C conducted a study over 142 patients and found that the mean time to start tolerating regular diet was 5.5 days after laparoscopic gastrojejunostomy and truncalvagotomy⁷. Wyman conducted a study over 12 patients and mentioned that nasogastric tubes were removed on second or third postoperative day when drainage was minimal and soft diet was then commenced³.

In the present study, the mean time for ambulation was 8.42 hours. Dulucq conducted a study over 33 patients and found that the mean time required for ambulation was 2.3 ± 0.7 days¹⁴.

The present study is comparable with the studies of other authors^{3,4,7}. The keyhole size incisions, less post operative pain score, early ambulation with early start of oral feeds and shorter convalescence allow early discharge from hospital.

The present study shows the incidence of intraoperative complication of suture line bleeding was 5.26%. Suture line bleeding as a complication is seen in 1.66 % of the patients in analysis by⁷. The hemorrhage from the staple line was controlled by placing a continuous running suture of 3-0 polygalactine over staple line. Incidence of no intraoperative complication of anastomotic gapping was observed in the present study. Anastomotic gapping as a complication was seen in one case (0.83 %) in analysis of⁷. Endo GIA stapler was applied on wrongly on the jejunalmesentry side, they could identify gap immediately and sutured it with polygalactine 3-0.

In the present study, there was no mortality seen. The incidence of intraoperative mortality in study was also found to be zero^{3,6,7,11}.

The present study shows no incidence of postoperative efferent loop kinking. Delayed gastric emptying as a complication seen in 4 patients (26.66 %) and were treated conservatively and able to be discharged from hospital on postoperative day 13, 25, 31 and 32 respectively⁶. The present study shows the incidence of delayed gastric emptying to be 10.52 %. It was manifested by Ryle tube discharge of more than 500ml daily with upper abdominal distension and vomiting on oral intake despite good peristalsis. They were managed conservatively with prolonged gastric decompression and intravenous support. Intravenous administration of metoclopramide every third day and parenteral alimentation was carried out. Their gastric paralysis resolved on tenth and twelfth postoperative days, respectively. Subsequently they had no problems with follow-up.

Postoperative efferent loop kinking as a complication was seen in 1.66 % of patients (2 out of 120) in the analysis by, presenting with bilious vomiting on the 10th and 14th postoperative days respectively⁷. Both underwent laparotomy and adhesiolysis with release of kinked loop. Both recovered well without further morbidity.

Wing in their study found that, one of the patient (6.66 %) complicated with delayed gastric emptying presented one year after operation with anastomotic stenosis, which was managed by revision of the gastrojejunostomy⁶. The present study shows no incidence of anastomotic stenosis.

The present study shows the incidence of stomal ulcer to be 5.26 %. Stomal ulcer as a complication was seen in 13.33 % patients in the analysis by⁶. One of these patients also has history of postoperative delayed gastric emptying and he presented with perforated stomal ulcer 5 weeks after the initial operation, and a gastrectomy was performed. Wyman found the incidence to be 8.33 % patient and developed peritonitis 5 weeks following surgery³. At laparotomy perforated stomal ulcer was found. A polygastrostomy was performed and he made uneventful recovery.

The present study shows the incidence of postvagotomy diarrhea 10.52 %. The patients were treated with loperamide three times daily and all of them responded. Postoperative diarrhea was seen in 10% of patients who had undergone bilateral truncalvagotomy (Obstruction group) in the analysis by⁷. The frequency of diarrhea varied from 4 to 9 times a day. The patients were treated with loperamide b.i.d. and t.i.d. as required and all of them responded.

In the the present study, there was no dumping and portsite hernia seen as a postoperative complication. The incidence of dumping and portsite hernia in study by was also found to be zero^{3,7}. Average follow up duration in studies by Abdel salam, Palanivelu C and Wing was 22.8 ± 9.8 months, 6.4 years, 80 months (2 to 123 months) and 6 months (1 to 12 months) respectively^{11,7,6}. In the present study average follow up duration was 17.05 ± 7.04 months.

Limitations

- i) Sample size is too small
- ii) Single center RCT
- iii) Time consuming procedure than open
- iv) Cost is very high in our socio economic aspect.

Conclusion

It is viable and safe option with shorter operative time and length of stay. It can be performed successfully with minimal morbidity and no mortality. However extreme care and skill is required to identify anatomy and handling of stapler. Further experience and long term results of this approach are required before it can be advocated as routine surgical practice.

Recommendations

- i) Multi center RCT needed with a large sample size to say the procedure as standard
- ii) Can be done easily in a well-equipped center in experienced surgeons hand.

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Contribution of authors

MNHB - Conception, desing, data analysis, drafting and final approval.

MNH - Acquisition of data, interpretation of data, critical revision and final approval.

MSI - Data analysis, drafting and final approval.

Disclosure

All the authors declared no competing interests.

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