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Safety of Minimally Invasive Oesophagectomy without Pyloroplasty

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Authors' contributions

This work was carried out in collaboration between all authors. Author MSA designed the study, wrote the protocol. Author AA managed the literature searches and wrote the first draft of the manuscript. Author AMS managed the interpretation of the results. Authors AH, AN and HA did the operative interventions. All authors read and approved the final manuscript.

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ABSTRACT

Open oesophagectomy may be associated with significant morbidity and mortality. With the increasing experiences in laparoscopic and thoracoscopic techniques, minimal invasive approaches to oesophagectomy are being explored to determine the feasibility, results, and potential advantages. Pyloroplasty is performed during oesophagectomy to avoid delayed gastric emptying and hence reduces the risk of aspiration pneumonia. By contrast, it has been argued that pyloroplasty is unnecessary as gastric outlet obstruction is a rare occurrence following oesophagectomy and that the procedure itself is associated with a number of complications.

Aim: The aim of this study is to assess the safety of minimally invasive oesophagectomy without pyloroplasty.

Methods: Retrospective cohort study was carried out of 90 consecutive surgically fit oesophagogastric cancer patients irrespective to the age and gender having undergone minimally

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invasive oesophagectomy without pyloroplasty. The outcomes were measured in terms of developing postoperative gastric outlet obstruction or evidence of pyloric stenosis in endoscopy, operative time, intraoperative complications, in hospital and 30 days mortality rate.

Results: 8/90 of minimally invasive oesophagectomy without pyloroplasty developed postoperative gastric outlet obstruction with endoscopic evidence of pyloric stenosis (8.9%). 7/8 with postoperative delayed gastric empyting had been managed conservatively with repeated endoscopic dilatation (87.5%) while one out of eight patient necessitated laparoscopic pyloroplasty (12.5%). Only one among 90 necessitated laparoscopic pyloroplasty .The mean operative time was 366 minutes. 11/90 had postoperative leak (12.2%) which was managed conservatively. The postoperative in hospital mortality was 4/90 (4.4%) and the 30 days mortality is 2/90 (2.2%).

Conclusion: Routine pyrloroplasty is not advocated as the incidence of post operative complication delayed gastric empting, leak, aspiration pneumonia are comparable with pyroloplasty more over pyloroplasty is associated with increased operative time ,so not doing is a safe and a wise decision.

Keywords: Oesophagectomy; open; minimally invasive; pyloroplasty.

1. INTRODUCTION

Oesophageal cancer is the ninth most common cancer in the United Kingdom (UK), and around 8,000 people are newly diagnosed with the disease each year [1].

China has the highest incidence (13/0.1 million) of oesophageal cancer worldwide. Surgery is often the main treatment modality for patients with resectable esophageal cancer because it is potentially curative in up to 40% of cases [2-4].

Oesophageal cancer accounts for about 1% of all cancers and 6% of digestive malignant tumors; its mortality is like the high mortality rate of pancreatic cancer and is 4 times greater than that of rectal cancers. The incidence (6.6 to 100,000 inhabitants/year) and mortality (3.8 per 100,000 inhabitants/year) are increasing in the European union; the average age is 67 years and it is rarely encountered the age of 25 [5].

It is estimated that about 16,980 individuals (13,450 men and 3,530 women) were diagnosed with oesophageal cancer and 14,710 were reportedly died in2011 in the United States of America [6]. China is also one of the countries with the highest esophageal cancer risk in the world [7].

Minimally invasive oesophagectomy (MIO), which is less traumatic, allows for earlier postoperative recovery, and incurs fewer complications, has, not surprisingly, attracted a great deal of interest from surgeons and researchers. Furthermore, the enhanced visualization afforded can facilitate intraoperative procedures, alleviate blood loss, and reduce complications. In fact, as part of an effort to reduce the risks of oesophagectomy MIO has been adopted in many specialized centers [8].

To do or not to do pyloroplasty after oesophagectomy, some are advising in order to prevent gastric stasis with its complications [9], others are advocating not to do pyloroplasty to save time and to prevent the associated biliary reflux which have very short term side effects that may jeopardize the anastomosis and the long term biliary gastritis [10].

2. METHODS

Retrospective cohort study was carried out of 90 consecutive surgically fit oesophagogastric cancer patients irrespective to age and gender having undergone minimally invasive oesophagectomy without pyloroplasty.

The abdominal phase was laparoscopically performed with mobilisation of the stomach along the greater and lesser curvature preserving the gastro-epiploic arcades and the right gastric artery. Lymphadenectomy was done using harmonic scalpel or hook diathermy to skeletonise the coeliac axis, common hepatic and splenic arteries. The left gastric artery was clipped and divided flush with its origin from the coeliac axis. The gastric conduit was fashioned according to the site of the tumor using three applications of blue (height of staple) cartridges.

Thoracoscopic phase was done in prone position with single lung ventilation. Two 12 mm ports with one or two 5 mm ports were used to approach the right thoracic cavity. Mobilisation of the lower thoracic oesophagus was performed

after division of the arch of the Azygous vein using vascular cartridge. The oesophagus was divided at a level just above the tracheal bifurcation. 2-field lymphadenectomy was completed with removal of subcarinal lymph nodes as well as the para-oesophageal ones. The gastric conduit was railed into the thoracic cavity with traction on the lower oesophagus.

The specimen was delivered via a minithoracotomy at the 10th intercostal space in the posterior axillary line. Oesophagogastric anastomosis was performed using circular intraluminal stapler (The stapler was taken out through anterior gastrotomy that was closed using stapler). One or two right chest drains were inserted depending on the dryness of the field and surgeon preference.

Patients were managed in the intensive care unit (ITU) for the first post-operative night. The majority of the patients were extubated within 24 hours of surgery. They were kept nil by mouth for the first four days while they receive their nutritional requirements via feeding jejunostomy or occasional by total parenteral nutrition TPN. On the fifth post-operative day every patient had gastrografin (GG) swallow to evaluate the anastomosis prior to allow him to have enteral nutrition.

The outcomes were measured in terms of developing postoperative delayed gastric emptying or evidence of pyloric stenosis in endoscopy, operative time, intraoperative complications, hospital and 30 days mortality rate.

3. RESULTS

8/90 of minimally invasive oesophagectomy without pyloroplasty developed postoperative delayed gastric emptying with endoscopic evidence of pyloric stenosis (8.9%). 7/8 with postoperative delayed gastric emptying had been managed conservatively with repeated endoscopic dilatation (87.5%) while one patient necessitates laparoscopic pyloroplasty (12.5%). The mean operative time was 366 minutes. 11/90 had postoperative subclinical leak (12.2%) which was managed conservatively. The postoperative in hospital mortality was 4/90 (4.4%) and the 30 days mortality is 2/90 (2.2%).

4. DISCUSSION

In an attempt to lower morbidity of the open oesophageal resection for cancer, some centers have explored Minimally Invasive oesophagectomy (MIO). The potential benefit of this technique is to improve the pain control and pulmonary function by avoiding synchronous thoracotomy and laparotomy incisions. Recently, several series have described the feasibility and safety of minimally invasive Ivory Lewis oesophagectomy. The extent of minimally invasive techniques has ranged from a laparoscopic abdominal component with a thoracotomy or mini-thoracotomy, to a thoracoscopic thoracic component and an open abdominal procedure [11,12].

Oesophageal cancer is the ninth most common cancer in the United Kingdom (UK), and around 8,000 people are newly diagnosed with the disease each year [1]. Surgery alone or in combination with chemotherapy or chemo-radiation treatment is the mainstay of cure for localized esophageal adenocarcinoma and one of several options for esophageal squamous cell cancer, which may also be radically treated with definitive chemo radiotherapy or radiotherapy alone. Oesophagectomy for oesophageal cancer is a major procedure. Audit data for 1220 oesophagectomies carried out in England and Wales from April 2011 to March 2012 showed that 29.7% of patients would experience a complication while 8.9% would experience serious morbidity requiring a reoperation [1]. The thirty-day mortality rate is 1.7% [13].

Regarding routine pyloroplasty, advisors to that intervention support the concept that pyloroplasty prevents early gastric outlet obstruction, and hence, reduces the risk of pulmonary aspiration. On the contrary, it has been argued that pyloroplasty is unnecessary as gastric outlet obstruction is a rare occurrence following oesophagectomy and that is associated with a number of drawbacks.

8/90 of laparoscopic oesophagectomy without pyloroplasty developed postoperative gastric outlet obstruction with endoscopic evidence of pyloric stenosis (8.9%).

7/8 with postoperative pyloric stenosis had been managed conservatively with repeated endoscopic dilatation (87.5%) while one patient necessitates laparoscopic pyloroplasty (12.5%) So only one among 90 (1.1%) was in need for pyloroplasty Nguyen et al. (14) had much higher incidence of pyloroplasty (22% - 31 out of 140) This is because we are trying endoscopic dilatation as the first line of treatment.

The mean operative time was 366 minutes while in the study of Nguyen [14] the total operative time was significantly shorter in the group without pyloroplasty.

11/90 had postoperative leak (12.2%) which was managed conservatively, while Nguyen NT et al.

[14] had incidence of 9.7% vs. 9.6%, with and without pyloroplasty showing that pyloroplasty has no role in the incidence of leak. This is in favor of not doing pyloroplasty.

The postoperative in hospital mortality was 4/90 (4.4%) and the 30 days mortality is 2/90 (2.2%). This goes hand in hand with Nguyen NT et al [14] who stated that, the 30-day mortality was 2.1 per cent with an in-hospital mortality of 3.4 per cent. They were doing tube gastrectomy without pyloroplasty like us.

Khan et al. [15] after revision of 170 relevant papers stated that pyloroplasty seems to reduce the incidence of gastric outlet obstruction and speed up gastric emptying. In addition, the incidence of complications from this procedure seems low. However, other significant improvements to outcomes such as mortality, nutrition, anastomotic leakage, gastric symptoms and aspiration are yet to be established.

9 RCT [9,10,16-22], that included 553 patients, found non-significant benefit of pyloroplasty for pulmonary morbidity. They found non-significant trends towards quicker gastric emptying. They concluded that pyloric drainage procedures reduce the occurrence of early postoperative gastric outlet obstruction after oesophagectomy with gastric reconstruction, but they have little effect on other early and late patient outcomes. Zieren et al. [17] randomised 107 patients to pyloroplasty or control but found no significant differences between the two groups. However, the complication rates in this study were low in both groups.

Mannell et al. [18] performed a 40-patient RCT looking at gastric emptying, but again, due to the low incidence of symptoms, no significant differences were seen. Chattopadhyay et al. [10] performed a small RCT to look at gastric emptying in 24 patients. Emptying was significantly delayed by more than 10 times in both groups post-operatively compared to preoperatively, but the difference was significantly better in the pyloroplasty group. There were no other differences in either group. More over pyloroplasty is associated with increased operative time, so not doing is a safe and a wise decision.

5. CONCLUSION

All the data from our study and worldwide studies concluded that routine pyrloroplasty is not advocated as the incidence of post operative complication ,gastric empting, leak, pulmonary aspiration are comparable with pyloroplasty more over pyloroplasty is associated with increased operative time, so not doing is a safe and a wise decision.

CONSENT

Written consent was signed by every patient.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Cancer Research UK: Oesophageal Cancer Incidence Statistics. Available:http://www.cancerresearchuk.org/cancer-info/cancerstats/types/oesophagus/incidence/
2. Enzinger PC, Mayer RJ. Esophageal cancer. N Engl J Med. 2003;349:2241-2252.
3. Wu PC, Posner MC. The role of surgery in the management of oesophageal cancer. Lancet Oncol. 2003;4:481-488.
4. Dubecz A, Sepesi B, Salvador R, et al. Surgical resection for loco regional esophageal cancer is underutilized in the United States. J Am Coll Surg. 2010;211: 754-761.
5. U.S. National Institutes of Health. SEER Stat Fact Sheets: Esophagus. Available:http://seer.cancer.gov/statfacts/html/esoph.html

6. Leonard DG, Kelsen DP, Allegra CJ. Esophageal cancer. In. Bethesda handbook of clinical oncology. 2nd ed. Philadelphia: Lippincott Williams & Wilkins. 2005;61-71.
7. Parkin DM, Bray F, Ferlay J, et al. Global cancer statistics, 2002. CA Cancer J Clin. 2005;55:74-108
8. Luketich JD, Nguyen NT, Weigel T, et al. Minimally invasive approach to oesophagectomy. JSLS. 1998;2:243-247.
9. Gupta S, Chattopadhyay TK, Gopinath PG, et al. Emptying of the intrathoracic stomach with and without pyloroplasty. Am J Gastroenterol. 1989;84:921-923.
10. Chattopadhyay TK, Shad SK, Kumar A. Int ragastric bile acid and symptoms inpatients with an intrathoracic stomach after oeso-phagectomy. Br J Surg. 1993; 80:371-373.
11. Atkins B, Shah A Hutcheson K. Reducing hospital morbidity and mortality following oesophagectomy. Ann Thorac Surg. 2004; 1170–1176.
12. Sutton CD, White SA, Marshall LJ, et al. Endoscopic assisted intrathoracic oesophagogastrotomy without thoracotomy for tumors of the lower oesophagus and cardia. Eur J Surg Oncol. 2002;46–48.
13. National Oesophago-gastric cancer audit; 2012.
    Available:http://www.hscic.gov.uk/og
14. Nguyen NT[1], Dholakia C, Nguyen XM, et al. Outcomes of minimally invasive esophagectomy without pyloroplasty: Analysis of 109 cases. Am Surg. 2010; 76(10):1135-8.
15. Khan OA, Manners J, Rengarajan A. Does pyloroplasty following esopha-gectomy improve early clinical outcomes? Interact Cardiovasc Thorac Surg. 2007; 6(2):247-50.
16. Fok M, Cheng SW, Wong J. Pyloroplasty versus no drainage in gastric replacement of the esophagus. Am J Surg. 1991;162: 447-452.
17. Zieren HU, Muller JM, Jacobi CA, Pichlmai er H. Should a pyloroplasty be carried out in stomach transposition after subtotal esophagectomy with esophago-gastric anastomosis at the neck? A prospective randomized study. [German]. Chirurg. 1995;66:319-325.
18. Mannell A, McKnight A, Esser JD. Role of pyloroplasty in the retrosternal stomach: Results of a prospective, randomized, controlled trial. Br J Surg. 1990;77:57-59.
19. Kobayashi A, Ide H, Eguchi R, Nakamura T, Hayashi K, Hanyu F. The efficacy of pyloroplasty affecting to oral-intake quality of life using reconstruction with gastric tube post esophagectomy [Japanese]. Nippon Kyobu Geka Gakkai Zasshi – J Jpn Ass Thor Surg. 1996;44:770-778.
20. Huang GJ, Zhang DC, Zhang DW. A comparative study of resection of carcinoma of the esophagus with and without pyloroplasty. In: De Meester TR, Skinner DB, editors. Esophageal Disorders. New York: Raven Press. 1985;383-387.
21. Kao CH, Chen CY, Chen CL, et al. Gastric emptying of the intrathoracic stomach as oesophageal replacement for oesophageal carcinomas. Nucl Med Commun. 1994;15: 152-155.
22. Hsu HK, Huang MH, Chien KY, etal. Functi onal of using the stomach as an esophageal substitute. J Surg Assoc ROC. 1984;17:186-188.

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