



A STUDY ON COMPARISON BETWEEN VIDEO ASSISTED THORACOSCOPIC SURGERY AND TRANSHIATAL ESOPHAGECTOMY FOR CARCINOMA ESOPHAGUS

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ABSTRACT **AIM:** To compare the outcomes, perioperative events and advantages of each method in patients undergoing esophagectomy for carcinoma esophagus by video-assisted thoracoscopic surgery (VATS) and transhiatal esophagectomy (THE).
METHODS: A retrospective analysis was done for 70 patients, who underwent esophagectomy between July 2013 and July 2018 in the department of Surgical Gastroenterology, Thanjavur Medical College Hospital. Patients were divided into two groups based on operative technique (VATS vs THE), with 31 patients in the VATS group and 39 patients in the THE group. Duration of surgery, intraoperative blood loss and blood transfusion, number of lymph nodes harvested, postoperative pain score, number of days requiring chest tube drainage, complications such as wound infection and anastomotic leak and length of hospital stay were all statistically analyzed between the two groups.
RESULTS: There was no statistical difference between the two groups with regard to duration of surgery or number of lymph nodes harvested. The VATS group had significantly less intraoperative blood loss, intraoperative blood transfusion, postoperative pain, earlier ambulation, shorter postoperative hospital stay, and a shorter period of time requiring chest tube drainage. Pulmonary complication (pneumonia and pleural effusion) was less prevalent among the VATS group.
CONCLUSION: Compared with THE, VATS-assisted esophagectomy is less traumatic with lower intraoperative blood loss, faster recovery, and a better overall outcome.

KEYWORDS :

INTRODUCTION

In 1910, Swedish physician Jacobaeus first applied the use of the thoracoscope for the treatment of pleural adhesions, and used enhanced artificial pneumothorax in the treatment of cavitory pulmonary tuberculosis. The thoracoscopic technique has been in clinical use for more than 100 years. Video assisted thoracoscopic surgery (VATS) usually refers to two dimensional imaging on a television screen through small incisions and specialized equipment in the chest. VATS provides the surgeon with a superior operative visual field to open surgery. Thoracoscopy has been widely used in resection of pulmonary bullae and mediastinal tumors, as well as formal lobectomy. However, totally thoracoscopic esophagectomy is still controversial. The minimally invasive nature and cost of treatment of totally thoracoscopic esophagectomy are matters of interest. The two surgical methods were analysed with regards to operative duration, intraoperative blood loss, intraoperative blood transfusion, number of lymph nodes harvested, perioperative complications, number of days requiring chest tube drainage, amount of drainage, duration of hospital stay, and postoperative pain score.

MATERIALS AND METHODS

Seventy patients (49 males and 21 females, mean age 52.57 years, range 27 -78 years) with esophageal carcinoma were treated in the Department of Surgical Gastroenterology between July 2013 and July 2018. They were randomly divided into two groups according to surgical technique adopted, 31 patients in the VATS group and 39 patients in the transhiatal esophagectomy (THE) group. Preoperative clinical staging ranged from Ia to IIb. Histology type was primarily squamous cell carcinoma (21 upper esophageal, 44 middle esophageal and 5 OG junction - Siewert type I). Selection criteria included patients with: a preoperative chest computed tomography (CT) showing no significant local invasion; tumor diameter less than 3 cm; tumor length less than 5 cm; confirmation by biopsy HPE; exclusion of distant metastases; and good systemic organ function without contraindication to surgery.

OPERATIVE TECHNIQUES

Preoperative preparation was similar for both VATS and THE. General Anaesthesia with Endotracheal tube and artificial pneumothorax, if necessary, were used. The operative areas were prepped and draped in the usual sterile materials at the neck, right sternoclavicular joint, and

the remainder of the operative field and patient positioned appropriately as per procedure proposed. For patients undergoing VATS, an incision was made in the posterior axillary line of the ninth intercostal space for a 10 mm Trocar for a 30° thoracoscope. Subsequent 5 mm trocars were placed in the fourth intercostal space, axillary midline scapular line, the seventh intercostal space, scapular line, and the ninth intercostal space. The azygos vein was ligated and divided, the electric hook was used to divide the inferior pulmonary ligament and to open the mediastinal pleura, and the electric hook was used to dissect the esophagus along its longitudinal axis from its root at the neck to the diaphragmatic hiatus, while carefully preserving the recurrent laryngeal nerve and tracheal membrane. Intrathoracic lymph nodes (carinal, esophageal, and left recurrent laryngeal nerve) were dissected, with clipping of the thoracic duct to prevent chylothorax. After complete dissection of the esophagus with the aid of an esophageal traction belt, hemostasis was achieved after lavage of the thoracic cavity, and a chest tube was placed for drainage. After the VATS portion of the operation, an abdominal incision was made. The gastric tube was constructed according to conventional methods, and a gastric pull-up was performed to the left neck. In the THE group, conventional left neck and abdominal midline incisions were made. Postoperative treatment was according to the routine for conventional transhiatal esophagectomy. Data on the duration of the operation, intraoperative blood loss, number of lymph nodes harvested, period of time required for chest tube drainage, amount of drainage, duration of postoperative hospital stay, postoperative pain, and postoperative complications were all measured.

RESULTS

The VATS and THE group were matched for age, gender, preoperative pulmonary function, tumor location, histology type, and stage of pathology.

The surgery duration (175 +/- 15 min in VATS and 190 +/- 15 min in THE), number of lymph nodes harvested, and the number of lymph node stations were not statistically different.

There was lesser intraoperative blood loss (150 +/- 25 ml in VATS and 250 +/- 25 ml in THE), and less intraoperative blood transfusion (6/31 in VATS and 18/39 in THE) in the VATS group, compared to the THE group, which was found to be statistically significant.

Postoperative pain scores were significantly lower in the VATS group compared with the THE group.

The VATS group also had significantly earlier ambulation and a shorter hospital stay compared with the THE group.

There was no significant difference between the groups with regard to the period of time required for chest tube drainage, or amount of drainage.

Although total postoperative complications were similar in the two groups, the pulmonary complication (pneumonia and pleural effusion) was less prevalent in the VATS group.

DISCUSSION

With the development of a more socialized economy and improvement of living standards, cancer has become a serious threat to human health and affects quality of life. Esophageal cancer is one of the more serious types of cancer, with 200 000 people having died in high incidence areas (up to 150/10 million). The World Health Organization (WHO) has listed esophageal cancer as the world's seventh most common malignant tumors. In China, esophageal cancer is the fourth highest cause of mortality. Treatment with traditional surgery, requiring esophagectomy and digestive tract reconstruction, results in surgical trauma, slow postoperative recovery, and patient discomfort, among other complications. Thoracoscopic esophagectomy can shorten postoperative recovery time, reduce lung injury and postoperative pulmonary complications, and can achieve the same clinical results as conventional thoracotomy, with an improved quality of life. Updates and improvements in technology, surgical technique, and sophistication of laparoscopic instruments have been made. In 2000, the first thoracic and laparoscopic combined approach was reported for the treatment of esophageal carcinoma. This operation preserves the integrity of the thorax and abdomen, has reduced effects on respiratory function, with a faster postoperative recovery, and significantly lower incidence of postoperative complications. For esophageal carcinoma, this surgical approach has opened up new avenues to treatment. Although the laparoscopic approach significantly reduces trauma, other problems are still being disputed, specifically complete tumor excision and local and regional lymph node dissection, to achieve the standard of a radical operation. Upon encountering complications intraoperatively (such as injury to blood vessels or tracheal injury), VATS should be converted to an open chest operation without delay, for safety reasons and so as not to affect the radical resection of the operation. However, we believe that proper, accurate preoperative analysis by gastroscopy and thoracic contrast enhanced CT, careful dissection of the thoracic duct with the use of clips and ultrasonic knife handle, with an aspirator or traction belt traction esophageal tracheal esophageal clearance, can provide adequate visualization and avoid tracheal membrane injury. Conversion to thoracotomy was not required in many VATS cases. The lateral prone position combined with artificial pneumothorax, does not require the use of the trefoil to stretch the lung, and provides superior visualization of the operative field, reduces intraoperative workload, reduces intraoperative lung tissue mechanical injury, and, finally, reduces the occurrence of postoperative pulmonary complications. The VATS group had a shorter operation duration, a larger number of lymph nodes dissected, and lower postoperative complication of pulmonary rates. There was also less intraoperative bleeding than in the THE group. This may be related to the proficiency of the operation and strict selection. In addition, postoperative pain numeric rating scale (NRS) scores after the first ambulation, postoperative hospital stay, duration of chest drainage, and amount of chest tube drainage, were significantly less in the VATS group. These findings may be attributed to the minimal chest trauma caused as a result of no required incision to the intercostal nerve, chest wall muscles or undue retraction on the ribs. VATS also has an amplified visual effect on the thoracic duct, small blood vessels, and lymphatics. Patients undergoing VATS largely retain the integrity of the thoracic cavity, thus, preserving respiratory function, with postoperative pulmonary function and activity superior than in THE.

CONCLUSION

VATS esophagectomy for esophageal carcinoma is technically feasible and safe, with several advantages, such as causing less trauma, quicker recovery, fewer complications, and positive outcomes. However, the technical difficulty is higher compared to THE, so case selection must be strict. As the number of cases increase and in-depth follow-up research is conducted, long-term survival will be better elucidated.