International Journal of Surgery 10 (2012) 232–235

Contents lists available at SciVerse ScienceDirect

International Journal of Surgery

journal homepage: www.theijs.com

Review

Does thoracoscopic mobilisation of the oesophagus during oesophageal resection result in improved outcomes as compared to open thoracotomy?

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ARTICLE INFO

Article history:
Received 2 March 2012
Received in revised form
13 March 2012
Accepted 14 March 2012
Available online 19 March 2012

Keywords:
Thoracoscopic
Oesophagectomy

ABSTRACT

A best evidence topic was written according to structured protocol. The question addressed was in patients undergoing trans-thoracic oesophagectomy for carcinoma of oesophagus, does a thoracoscopic mobilisation result in improved outcomes as compared to open thoracotomy. 88 papers were found using the reported search strategy of which five papers were selected as representing the best evidence to answer this question are discussed. Overall the evidence on this topic is poor with no prospective randomised controlled trials. We conclude that thoracoscopic mobilisation is a safe alternative to open resection with comparable results in overall short term morbidity and mortality rates. The thoracoscopic approach may have some benefits in terms of reduced blood loss and shorter hospital stay without compromising lymph node clearance and oncological value, but more studies are required to confirm these findings.

1. Introduction

A best evidence topic was conducted according to a structured protocol. This is fully described in a previous publication in the International Journal of Surgery.[1]

2. Clinical scenario

You are at a multidisciplinary team meeting discussing a 65 year old patient with potentially resectable adenocarcinoma of the distal oesophagus. He has undergone neoadjuvant chemotherapy and is scheduled for a two stage Ivor-Lewis oesophagectomy. Although your unit's policy is to perform a laparoscopic mobilisation of the stomach followed by an open thoracotomy, one of the surgeons suggests performing a thoracoscopic mobilisation of the oesophagus in an attempt to improve the morbidity associated with open surgery. You resolve to check the literature to determine if thoracoscopic mobilisation of the oesophagus during oesophageal resection results in improved outcomes compared to with open thoracotomy.

3. Three part question

In patients undergoing oesophagectomy for carcinoma of the oesophagus, does a thoracoscopic mobilisation of oesophagus result in improved outcomes compared with open thoracotomy.

4. Search strategy

Search was performed on the Advanced Healthcare Databases including Embase, Medline and the Cochrane Database. Free text words including Minimally invasive/Thoracoscopic oesophagectomy/VATS oesophagectomy/Open Ivor Lewis/Carcinoma oesophagus/MIE with AND/OR and combination of Mesh headings was used to carry out the search. The search was limited to English papers and to include randomized and non-randomised clinical trials; comparative studies and systematic reviews. In addition reference lists of relevant papers were searched. The search was current as of 20th September 2011.

5. Search outcome

77 abstracts were identified using the search strategy, of which 3 were systematic reviews. Individual papers from these systematic reviews were retrieved and after removing duplicates a total of 88 abstracts were identified and examined. 37 abstracts were eliminated as they focused purely on minimally-invasive oesophagectomy; 15 were irrelevant as they included robotics and other surgical procedures; 13 had no like for like comparisons; 9 were in foreign languages and 2 were trial registrations. Excluding these 76 abstracts, the remaining 12 papers were read in full. From these, only five papers directly compared open and thoracoscopic approaches for trans-thoracic oesophagectomy and these were selected as representing the best evidence to answer this clinical question.

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doi:10.1016/j.ijsu.2012.03.007

Table 1
Best evidence papers.

Author, date and country	Patient group (OO = open oesophagectomy TO = thoracoscopic oesophagectomy)	Study type and level of evidence	Outcomes	Key results	Comments
Osugi et al[2] 2003 Osaka, Japan.	149 Patients with diagnosis of squamous cell carcinoma of oesophagus with neoadjuvant therapy. OO $n = 77$ TO $n = 72$	Level IV Retrospective, non-randomised	Primary Outcomes (OO vs. TO) Other outcomes (OO vs. TO)	Inpatient mortality: 0% vs. 0% (not significant) Anastomotic leaks: 1.4% vs. 2.7% ($p = 0.610$) Respiratory complications: Early group : not significant. Late group : significant low in TO group ($p = 0.008$) Operative time: Longer in TO ($p = 0.031$) Blood loss: comparable ($p = 0.985$) Median intensive care stay: not recorded. Median hospital stay: not recorded. Median lymph node yield: comparable ($p = 0.985$)	This was a retrospective study looking at VATS and open oesophagectomies. Inclusion criteria for VATS looked at patients with good pulmonary function and absence of pleural adhesions which might have introduced bias in respiratory complications. VATS group was further subdivided into early and late groups. Operative time and blood loss was less in the later group ($p < 0.001$) which signifies the learning curve for the procedure. LN harvest was no different in the early and late groups.
Smithers et al[3] 2007 Queensland, Australia.	446 Patients with diagnosis of carcinoma of oesophagus OO $n = 114$ TO $n = 332$	Level IV Retrospective, non-randomised	Primary Outcomes (OO vs. TO) Other outcomes (OO vs. TO)	Inpatient mortality: 2.6% vs. 2.3% (no significant differences) Anastomotic leaks: 8.7% vs. 5.4% (no significant differences) Respiratory complications: 28% vs. 26% (no significant differences) Operative time: less in TO ($p = 0.01$) Blood Loss: less in TO ($p = 0.01$) Median intensive care stay: shorter in TO ($p = 0.03$) Median hospital stay: shorter in TO ($p = 0.03$) Median lymph node yield: comparable (p = not stated)	This was a retrospective comparison between open surgery, thoracoscopic + laparotomy and thoracoscopic + laparoscopic approach. Open operation was confined to cancers that crossed the gastric cardia. The 3 approaches had similar post op morbidity profiles with no outstanding benefits in either. No detrimental effects with respect to LN clearance or tumor clearance locally were seen in thoracoscopic group. Thoracoscopic group had poorer respiratory function to start with introducing selection bias which may have affected end respiratory function in this study.
Hamouda et al[4] 2009 London, UK	75 Patients. OO $n = 49$ TO $n = 26$	Level II b Prospective study	Primary Outcomes (OO vs. TO) Other outcomes (OO vs. TO)	Inpatient mortality: 0% vs. 0% (not significant) Anastomotic leaks: 12% v/s 4% (not significant) Respiratory complications: 32% vs. 27% (not significant) Operative time: 249 min v/s 223 min ($p = 0.06$) Blood loss: less in TO ($p = 0.02$) Median hospital stay: comparable (not significant) Median lymph node yield: comparable (p = not stated) Overall survival & disease free – no long-term f/u	This was a prospective study design done in a single institute & a single surgeon. Patients were divided into 3 groups – Open Ivor Lewis (group A), Lap gastric mob with open thoracotomy (Group B) and Lap gastric mob with VATS (Group C). Oncological principles were not compromised during the transition from open to thoracoscopic procedure. Overall morbidity was comparable in all the 3 groups and 30 day mortality was 0% in all groups. Only groups B & C comparison was used as a part of this paper.
Pham et al[5] 2010 Ohio,USA.	85 Patients with diagnosis of carcinoma of oesophagus plus 5 in benign category. OO $n = 46$ TO $n = 44$	Level IV Retrospective, non-randomised	Primary Outcomes (OO vs. TO) Other outcomes (OO vs. TO)	Inpatient mortality: 0% vs. 0% (not significant) Anastomotic leaks: no difference Respiratory complications: 17% vs. 19% not significant. Operative time: less in To ($p < 0.0001$) Blood loss: less in TO ($p < 0.001$) Median intensive care stay: shorter in TO ($p = 0.03$) Median hospital stay: shorter in TO ($p = 0.004$) Median lymph node yield: comparable (p = not stated)	This was a retrospective study design with the use of historical controls. Overall complications were higher than equivalent studies. High rate of atrial arrythmias was recorded in both open and thoracoscopic groups. Patients undergoing thoracoscopic procedure all had cervical oesophageal mobilization which contributed to higher morbidity rate in this group due to complications like laryngeal nerve injury.

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