Is early surgical management of chylothorax following oesophagectomy beneficial?

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Abstract

A best evidence topic in surgery was written according to a structured protocol. The question addressed was whether the initial surgical management of chylothorax after oesophagectomy results in a better outcome. Altogether 357 papers were found as a result of the reported search, of which 4 represented the best evidence to answer the clinical question. The authors, journal, date and country of publication, patient group studied, study type, relevant outcomes and results of these papers were tabulated. Three studies were retrospective and from single centres with small patient numbers, while one study was a prospective, randomized controlled trial, from which a subgroup analysis was included in our results. We conclude that although all studies to date have had very small patient numbers and some contradictory results, there is some evidence that early surgical intervention of chylothorax following oesophagectomy reduces hospital stay when compared with conservative treatment.

Keywords: Chylothorax • Oesophagectomy • Surgical management

INTRODUCTION

A best evidence topic was constructed according to a structured protocol. This is fully described in the ICVTS [1].

CLINICAL SCENARIO

You are called to see a patient 4 days following an Ivor–Lewis oesophagectomy for a distal oesophageal cancer. You notice that 400 ml of chylous fluid has drained into the chest drain in the last 12 h. Your colleague suggested reoperating immediately on this patient to ligate the thoracic duct. You resolve to check the literature yourself to see whether this approach is sensible.

THREE-PART QUESTION

In patients who develop chylothorax following oesophagectomy, is early surgical intervention compared with conservative therapy beneficial?

SEARCH STRATEGY

Medline was searched from 1950 to June 2011 using OVID interface for the terms [Oesophagectomy.mp OR esophagectomy.mp] AND [chylothorax.mp] AND [surgery.mp]. In addition, the reference lists of the relevant papers were also searched.

SEARCH OUTCOME

Three hundred and fifty-seven papers were found as a result of the reported search. Papers not in English or with no English translation were excluded. Papers involving thoracic surgical operations other than oesophagectomies or anecdotal case reports were also excluded. Studies included were those examining management of chylothorax following oesophagectomies with a comparative component. Four papers were identified that provided the best evidence to answer the question. These are presented in Table 1.

DISCUSSION

Chylothorax occurrence after oesophagectomy is a well-described complication with a quoted incidence ranging from 0.4 to 4% [5–7]. Deficiency of chyle leads to malnutrition and immunological depletion and therefore poses a significant clinical problem especially in cases of persistent or high-output chyle leaks [8]. There remains, however, significant controversy as to the management of this postoperative condition with some advocating conservative management, while others arguing that surgical management is more effective.

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In terms of the role of surgery in resolving postoperative chylothorax following oesophagectomy, Orringer et al. [9] undertook a non-comparative study, which reported that operative intervention for patients with chylothorax resulted in a 100% resolution rate. On the basis of their experience, they had identified the site of chyle leakage with the use of cream and ligated with sutures, thus advocating prompt ligation of the thoracic duct after diagnosis of chylothorax. In terms of comparative studies, Merigliano

<table>
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<th>Author, date, journal and country</th>
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<tr>
<td>Merigliano et al. (2000), J Thorac Cardiovasc Surg, Italy [2]</td>
<td>Single-centre retrospective cohort study (level III)</td>
<td>19 of 1787 patients who underwent oesophagectomy developed a postoperative chylothorax (1.1%)</td>
<td>Success rate (resolution)</td>
<td>36 vs 100%</td>
<td>This study advocated prompt and aggressive treatment with early thoracic duct ligation for chylothorax after oesophagectomy, due to difficulty in predicting resolution of chyloous leakage. The authors report no complications or deaths related to thoracic duct ligation in the surgical group. Hospital stay was greatly reduced in patients who underwent early thoracic duct ligation as the initial management.</td>
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<td>Rao et al. (2004), Dis Esophagus, India [3]</td>
<td>Single-centre, retrospective cohort study (level III)</td>
<td>14 of 552 oesophagogastrectomies developed a postoperative chylothorax (2.54%)</td>
<td>Success rate (resolution)</td>
<td>71% in both groups</td>
<td>This study included 31 patients with benign oesophageal disease, of which none had developed chylothorax, as well as those with malignancy who had preoperative radiotherapy. The authors also recommend a trial period of initial conservative management before surgical options are considered.</td>
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<td>Schumacher et al. (2007), Dis Esophagus, Germany [4]</td>
<td>Single-centre retrospective cohort study (level III)</td>
<td>10 of 409 patients who had oesophagectomy developed a postoperative chylothorax (2.4%)</td>
<td>Success rate (resolution)</td>
<td>50 vs 87.5%</td>
<td>This study describes a large reduction of chyle output after initial surgical intervention. Although they did note a lower incidence of complications in the conservative group, 1 of the 2 patients who was discharged after conservative management was readmitted due to symptomatic ongoing output and proceeded to have successful surgical intervention. They therefore concluded that early thoracic duct ligation was the optimum treatment of postoperative chylothorax.</td>
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<td>Lai et al. (2011), Ann Thorac Surg, China [5]</td>
<td>Single-centre prospective RCT (level II)</td>
<td>7 of 328 patients who underwent oesophagectomy developed a chylothorax (2.1%)</td>
<td>Success rate (resolution)</td>
<td>67 vs 50%</td>
<td>This subset of patients was part of a study comparing outcomes following ligation and preservation of the thoracic duct. This study supported the notion of prophylactic thoracic duct ligation to decrease postoperative chylothorax formation.</td>
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et al. [2] examined 19 patients who developed postoperative chylothorax and found no complications or deaths related to thoracic duct ligation in the surgical group when compared with a 9% mortality rate in the conservative group. Hospital stay was also reduced in patients who underwent early thoracic duct ligation as initial management, with an average of 6 (range 2–14) days.

Schumacher et al. [4] undertook a study assessing the efficacy of operative intervention versus conservative treatment. They found that surgery was associated with a higher resolution of chylothorax and a shorter hospital stay, and advocated prompt and aggressive treatment with early thoracic duct ligation for chylothorax after oesophagectomy. In contrast, Rao et al. [3] showed no difference between the two groups in terms of resolution of chylothorax.

The only prospective study of this subject was recently published by Lai et al. [5], who conducted a trial of 653 transthoracic oesophagectomy patients and randomized them to a ligation group and a preservation group. A subgroup analysis of patients who did go onto to develop chylothorax revealed, in contrast to the previous studies, a higher success rate of chylothorax resolutions in the conservative group.

There are a number of limitations to all of these studies. In particular, most of these were retrospective studies and all had very small patient numbers and as such were too small to perform meaningful statistical comparisons. In addition, there are limited data on other potential management options for chylothoraces, including talc pleurodesis, pleuropertitoneal shunts [10] or fibrin glue [11]. Overall, however, despite these provisos and the apparently contradictory findings from some of these studies, it does appear that surgical intervention reduces the length of hospital stay. Finally, it should be noted that these studies do not address how early and at what volume of chyle output should surgeons intervene. Wemys-Holden et al. [8] suggested that early thoracic duct ligation should be considered if there is a persistence of high-volume chyle output. This suggestion that the volume of chyle output is important was reiterated by Alexiou et al. [7] and Schumacher et al. [4], who suggest that high volume of chyle output is a crucial factor in deciding on surgical intervention for chylothorax, but there has been no consensus on the specific volume to intervene. Dugue et al. [12] quoted a chyle output of <10 ml/kg after 5 days of conservative management as a reliable predictor of successful treatment, and if the leak is higher than that, the patient should be reoperated on. However, these studies are based on clinical experience and lack any objective statistical basis. Finally, there is an increasing use of minimally invasive procedures in thoracic surgery and this approach has been used in the management of chylothorax—for example, Hayden et al. [13] have demonstrated the feasibility of video-assisted thoracoscopic surgery to manage this complication.

**CLINICAL BOTTOM LINE**

There is some evidence that early surgical reoperation may reduce hospital stay in patients with postoperative chylothorax following oesophagectomy when compared with conservative treatment. However, it is dependent on the clinical condition of the patient, volume of chylos output, and needs to be assessed on an individual case basis.

**Conflict of interest:** none declared.

**REFERENCES**


eComment. Optimal management of chylothorax following oesophagectomy

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It was interesting to read the best evidence topic on early surgical management of chylothorax following an oesophagectomy by Choh et al. [1]. Through review of published literature, they concluded that an early surgical intervention in the form of thoracic duct ligation led to a prompt resolution of the chylothorax, which translated into a shorter length of hospital stay. We perform our oesophagectomies with a minimally invasive approach for both the abdominal and thoracic phases at our institution, and it has been shown that this layer is evident covering the vertebral column, which encases the thoracic duct. This layer is evident even in patients who have undergone neoadjuvant chemo-radiation. If this layer is breached or we see clear fluid emanating in the oesophageal bed, we prophylactically mass ligate the soft tissues between the azygos vein and the descending thoracic aorta at the diaphragmatic hiatus. This incorporates the thoracic duct and can be comfortably done in a minimally invasive manner. We believe in early resolution of chylothorax developing after oesophagectomy as a conservative management entails restrictions on early enteral nutrition. It has been shown that early enteral nutrition after oesophagectomy is associated with beneficial effects on immunological competence and suppression of the excessive inflammatory response following oesophagectomy [2], which may have both short-term and long-term prognostic significance. Thus, our approach has been to surgically manage chylothorax which either has an output >1000 cc on postoperative day one or >500 cc/day for two consecutive days. Chylothorax of such a magnitude is unlikely to lead to an early resolution with a conservative management, thus depriving the benefits of...