Editorial

Optimal Surgical Approach for Esophagectomy: The Debate Still Goes on?

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Surgical resection remains the mainstay treatment for patients with localized esophageal cancer. In dedicated centers, esophagectomy has become a safe operation with a mortality rate of 2%–3%.[1–3] A volume-outcome relationship is demonstrated.[4] However, many controversies remain in regard to the treatment of esophageal cancer, and the optimal approach for esophageal extirpation is still an area of debate. Several methods of surgical access exist for esophagectomy, including right or left thoracotomy, transhiatal approach, and laparoscopy, thoracoscopy, mediastinoscopy, and their combinations. Some of these issues are discussed in this article.

Transthoracic versus Transhiatal Resection

This controversy has been ongoing for at least the past three decades. Proponents of transhiatal resection believe that surgical resection for esophageal cancer is mostly palliative and that a cure is a chance phenomenon for only those with very early tumors. A more thorough lymphadenectomy through a thoracotomy merely improves staging, but it does not affect prognosis. Postoperative morbidity is expected to be less with the less-invasive transhiatal approach.[5] Conversely, surgeons who practice transthoracic esophagectomy consider the open approach to be safer with dissection under direct visual control. A more thorough lymphadenectomy leads to better staging and survival.

Few randomized trials testing the two approaches have been conducted; the largest one studied 106 patients who underwent transhiatal esophagectomy and 114 who had the transthoracic approach for midlower-third/cardia adenocarcinomas. Pulmonary complication rates were 27% in the former group compared to 57% in the latter. No significant difference in in-hospital mortality at 2% and 4% was demonstrated. Significantly more lymph nodes were dissected in the transthoracic group (16 vs. 31). Overall 5-year survival was 34% (transhiatal) and 36% (transthoracic). It is important to note that in individuals with limited nodal spread (1–8 positive lymph nodes), transthoracic esophagectomy imparted a survival advantage (64% vs. 23%). Survival was not different in patients having no nodal metastases or in those with more.[6]

The advent of transhiatal esophagectomy occurred when esophagectomy was a high-risk operation with high mortality rates, and this less-invasive method probably contributed to reducing overall death rates. The improvements in surgical techniques and perioperative care enable either procedure to be carried out safely when selected appropriately, and the margin of benefit in reducing morbidity for most patients with the transhiatal operation is not overwhelming. The location and stage of the primary tumor has a bearing on which surgical approach is selected. From a purely safety point of view, a transhiatal resection is not suitable for patients with advanced middle- or upper-third tumors, especially when the tumor closely abuts the tracheobronchial tree. After neoadjuvant chemoradiotherapy, tumor infiltration or fibrosis may obliterate tissue planes and would also make dissection under visual control preferable. As such, transhiatal resection is more suitable in Western patients, where adenocarcinoma of the lower esophagus from Barrett's esophagus is much more prevalent. In Asian countries, this approach is much less utilized. Indeed, in the randomized trial from the Netherlands detailed above, only lower esophageal adenocarcinomas were included. No large randomized trial has been conducted for more-proximally located squamous cell cancers.

Minimally Invasive Esophagectomy

Minimally invasive esophagectomy (MIE) is increasingly explored as a surgical option in esophageal extirpation. Various combinations of minimally invasive approaches

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have been explored, including thoracoscopy, laparoscopy, mediastinoscopy, hand-assisted laparoscopy, and open laparotomy and thoracotomy. The myriad of surgical methods implies a lack of consensus on which one is superior.

Large single-center series are few.[7–10] Several reviews on MIE have been published[11–14]; none could conclusively show that MIE is better or worse than that of the open approach, and no randomized controlled trial has been undertaken. Conversion rate is approximately 5%, respiratory complications 13% to 22%, and a very low mortality rate of 3% is achieved.[12,13] Biere and colleagues examined 10 comparative studies contrasting MIE with open esophagectomy, comprising 1,061 patients. A trend toward less mortality and anastomotic leak rates with selected patients undergoing MIE was found. But again, definitive conclusions could not be reached because of selection bias and the variety of techniques used.[14]

In most reports, the number of patients studied so far generally was too small to have enough statistical power to demonstrate a difference. There are also other reasons why benefits are difficult to confirm. With modern analgesic methods such as epidural analgesia, postoperative pain control is a less-critical problem.[15] The genesis of cardiopulmonary complications is multifactorial, and surgical trauma from mediastinal dissection is independent of the incision size. The lengthened time of single-lung anesthesia may offset the benefit of a smaller incision. A learning curve obviously exists for such complicated procedures; in most centers the full technical potential may not have been realized.

The most important test for the benefits of MIE would be long-term stage-by-stage comparisons of survival, but stage migration may be hard to eliminate, and selection bias is evident. Most series do not report on survival data, and in those that do, there is no reported difference compared with historical controls. Existing data, however, do show that nodal harvesting is equivalent to that of open surgery.[11] The place of minimally invasive esophagectomy remains controversial without a well-conducted randomized controlled trial.

Benefits of Lymphadenectomy for Esophageal Cancer

The ability to perform lymphadenectomy is closely related to the surgical approach utilized, and an open transthoracic or thoracoscopic approach is necessary for a safe and thorough lymphadenectomy. Increasing evidence is emerging to show that extended lymphadenectomy is related to survival. In addition to studies on specific techniques, such as "three-field lymphadenectomy"[16] and "en bloc esophagectomy,"[17] statistical data are available from single- and multi-institutional reports,[18,19] as well as from population studies.[20,21] The number of nodes removed correlates significantly with long-term survival. One international multicenter study showed that this number was an independent prognostic factor in addition to age, gender, cell type, presence of nodal metastases, number of nodes involved, and depth of tumor invasion.[19] The optimal number of nodes removed was identified as 23, though this number varies among studies. From a Worldwide Esophageal Cancer Collaboration, which included institutions from the United States, Europe, and Asia, the number of nodes that must be removed to maximize survival depends on the pT classification: for pT1, approximately 10 nodes must be resected; for pT2, 20 nodes, and for pT3 or pT4, 30 nodes or more.[22] Thus one should resect as many regional nodes as possible, balancing the extent of lymphadenectomy with morbidity.

Optimal Surgical Approach for Lymphadenectomy?

It does seem that we have an answer for the debate on the optimal approach for esophagectomy; for patients with localized advanced esophageal cancer and sufficient physiological reserve, the prognostic benefit of extended lymphadenectomy dictates an open transthoracic approach or an equivalent thoracoscopic method as long as the latter can replicate what open surgery can achieve. Thoracoscopic esophagectomy is becoming more and more commonly performed. It is quite likely to mature as a widely accepted method of esophagectomy.

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