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• *REVIEW* •

Surgical resection for esophageal carcinoma: Speaking the language

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Abstract

The terminology used to describe esophagectomy for carcinoma can be confusing, even for specialists in gastrointestinal disease. As a result, specific terms are often used out of their intended context. To simplify the nomenclature, two points regarding procedures for surgical resection of the esophagus are critical: the extent of resection (radical *vs* standard) and the operative approach (choice of incisions). It is important to understand that the radicality of the resection may have little to do with the operative approach, with the exception of esophagectomy without thoracotomy (transhiatal esophagectomy), which mandates the performance of a standard or non-radical resection. Esophagectomy has emerged as the standard curative treatment option for patients with esophageal carcinoma; however, unlike the surgical resection of other types of solid tumors, many different surgical options and/or approaches exist for these patients. This heterogeneity of care may result from the fact that the esophagus is accessible through more than one body cavity (left hemithorax, right hemithorax, abdomen). In addition, and partially as a result of its accessibility, different types of surgical specialists harbor this operation in their armamentarium, including general surgeons, thoracic surgeons, and surgical oncologists. Despite this enthusiasm amongst surgeons, little consensus exists as to which option is most oncologically sound. Further, the details of the various surgical approaches and procedures for resection of the esophagus are often difficult to comprehend, even for specialists in gastrointestinal disease, with much of the relevant terminology used out of its intended context. To facilitate the understanding of the surgical options for esophageal carcinoma, it is useful to view the operation from two angles: the extent of resection (Aradical@ *vs* Astandard@) and the operative approach (choice of incisions).

Key words: Esophageal carcinoma; Terminology

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STANDARD *VS* RADICAL RESECTION

Esophagectomy for carcinoma can be viewed as being comprised of two components: resection of the esophagus itself and resection of the enveloping lymphatics. Controversy exists regarding how radical, or extensive these two components should be. Standard resection of the esophagus involves simple extirpation of the organ, leaving behind adjacent peritumoral tissues and organs. However, unlike the intra-abdominal gastrointestinal tract, the esophagus is not separated from the surrounding mediastinal organs and fat by a serosal covering, suggesting that simply removing the organ itself may leave behind microscopic tumor in the surrounding tissues, particularly with deeply penetrating lesions. Surgeons performing radical, or en bloc esophagectomy, as initially described by Skinner[1], attempt to address this issue by removing all peritumoral tissues in addition to the esophagus. For the intrathoracic esophagus, this includes all posterior mediastinal fat and lymphatics, the thoracic duct, as well as the posterior pericardium and bilateral parietal pleurae: a Aposterior mediastinectomy@. For a tumor at the gastroesophageal junction, a cuff of normal diaphragm is removed surrounding the tumor. In both cases the goal is to never actually for visualizing the tumor in the gross specimen.

The extent of lymphadenectomy performed during esophagectomy is also highly variable, ranging from minimal to radical. With regard to the esophageal lymphatics, three distinct lymphatic regions, or fields, have been described[2]. The abdominal field represents the lymph node areas below the diaphragm, from the crura to the celiac axis. The mediastinal field generally refers to the lower aspect of the mediastinum, from the carina down to the diaphragm. Strictly speaking, the cervical field encompasses the deep lateral nodes accompanying the accessory nerve, the deep external nodes lateral to the carotid sheath, which includes the scalene, or supraclavicular nodes, and the deep internal nodes, which accompany the recurrent laryngeal nerves down into the chest. Of the three cervical areas, however, it is this latter group that has received the greatest attention due to the relatively high frequency of metastases encountered in this area, reported to be as high as 35% in patients with tumors of the tubular esophagus[3]. A Aradical@ esophagectomy, therefore, refers to a procedure by which the esophagus and its enveloping tissues are

removed as a single specimen (en bloc), combined with either two-field (abdominal and mediastinal) or three-field (abdominal, mediastinal, cervical) lymphadenectomy.

OPERATIVE APPROACH

While terms such as Aradical@ and Astandard@ describe the extent of resection and lymphadenectomy, a separate set of terms describe the operative approach and the choice of incisions used by the surgeon to perform the procedure. These operative approaches can be simply viewed as either transthoracic (involving a thoracotomy) or transhiatal (not involving a thoracotomy). A standard esophagectomy can technically be performed using either of these operative approaches; however, a radical operation mandates the transthoracic approach to directly access the posterior mediastinum. The transhiatal esophagectomy, popularized in the recent past by Orringer[4], involves a laparotomy for mobilization of the gastric replacement conduit, dissection of the thoracic esophagus through the diaphragmatic hiatus, and a cervical esophagogastrostomy through a cervical incision. Transthoracic approaches include: (1) The combination of a laparotomy and a right thoracotomy with an intrathoracic esophagogastrostomy (Ivor Lewis esophagectomy[5]). (2) A right thoracotomy, laparotomy and neck incision with a cervical anastomosis (McKeown esophagectomy[6]). This technique is sometimes incorrectly confused with the three-field lymphadenectomy by virtue of its three incisions. While it is correct that three incisions may be popular for performing a radical esophagectomy with a three-field lymphadenectomy, many surgeons perform a standard esophagectomy using this operative approach as well. (3) Left thoracic approaches may involve thoracotomy alone, with the abdominal portion of the procedure performed through the diaphragm, or thoracoabdominal incisions where the costal margin is divided to facilitate access to the abdomen. For these left thoracic approaches, the anastomosis between the remaining esophagus and the replacement conduit may be placed either in the superior mediastinum or in the neck through a cervical incision.

ONCOLOGIC CONSIDERATIONS

Although it is generally agreed that the accuracy of staging is enhanced by a radical procedure, debate currently exists regarding whether or not any oncologic benefits are provided over standard esophagectomy. While cure rates in the range of 10-15% are consistently seen after standard esophagectomy alone for stage III esophageal carcinoma[4,7,8], multiple series now demonstrate long-term survival figures of 25-45% after radical procedures for similarly staged disease[9,10]. Despite these data, the answer to this controversy should ideally come from prospective, randomized trials, since the phenomenon of stage migration may occur in comparison with non-randomized series of patients. In this regard, the only published phase III trial till this date compared transhiatal resection with a radical, transthoracic esophagectomy and two-field lymphadenectomy for patients with adenocarcinoma of the esophagus[11]. The overall 5-year survival with the radical approach was 39%, compared with 29% for the patients undergoing the transhiatal, standard resection. Although not statistically significant, this trial was powered to detect a survival increase of 50%. However, many esophageal cancer specialists would consider less of an increase in survival to be clinically relevant.

SUMMARY

The terminology concerning surgical resection for esophageal carcinoma tends to be somewhat confusing and is often used out of its proper context. The extent of resection and lymphadenectomy is best described as either Aradical@ or Astandard@, and with the exception of the transhiatal esophagectomy has little to do with the operative approach, which mainly refers to the surgeons=choice of incisions.

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