3 Surgical Treatment of Esophageal Carcinoma

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INTRODUCTION

There has been an improvement in the outcome of surgical resection for esophageal carcinoma in recent years (1). In a review of publications of esophagectomy performed during the decade 1990–2000, the overall mortality from surgery was 6.7%, compared with 13% for the period 1980–1988 (2). Overall five-year survival for those undergoing resection currently ranges from 23% for Western series to 30.5% for Eastern patients (2). This may be in part due to better selection of cases through more accurate staging using endoscopic ultrasound (EUS), cross-sectional imaging, and more recently, positron emission tomography (PET) scanning (3).

In the West, neoadjuvant treatment prior to resection (4) is increasingly being made use of, whereas Eastern surgeons favor more radical surgery incorporating extensive lymphadenectomy, involving the abdominal, mediastinal, and cervical nodal dissection (5). Esophagectomy is being performed more safely at increasingly specialized and high-volume centres (6–8). Despite these advances, the overall prognosis for patients remains poor due to the late presentation of this disease in the majority of cases. In this situation, optimization of palliative measures may lead to improved quality of life (9).

Despite optimism for a minority of patients who benefit from a curative resection, a number of controversies exist. First, what are the most appropriate and cost-effective staging investigations? This aspect of care is critical in identifying resectable (and potentially curable) disease. Second, if early stage disease is identified, is radical surgery appropriate, and if so, by which approach? Finally, does surgery have any part to play in advanced disease or should these patients be treated nonsurgically?

PREOPERATIVE STAGING

Endoscopy and Ultrasound

The staging of esophageal carcinoma has become a multimodal process with tests that complement rather than replace one another, in order to improve accuracy. Investigations aim to determine the clinical International Union Against Cancer "tumor node metastases" (TNM) stage that would help determine the prognosis and hence the management plan for each patient. The decision whether to proceed with extensive staging investigations rests with the clinician and depends on the general health and wishes of the patient, and their performance status and fitness for intervention. Preoperative staging results are typically compared with the histopathological stage of those who have undergone a resection in order to determine their sensitivity and specificity.

Conventional endoscopy with or without a barium swallow is usually performed as an initial assessment of the primary tumor to enable a tissue diagnosis. More recently, high-resolution endoscopy has been performed for early esophageal lesions with chromoendoscopy using methylene blue dye for known cases of Barrett's esophagus and Lugol's iodine where squamous-cell carcinomas are common (10). The accuracy of high-resolution endoscopy in the diagnosis of superficial esophageal lesions is in the region of 80% (10).

EUS with fine-needle aspiration offers proven effective discrimination of tumors involving the lamina propria (T1) from those invading the muscularis propria (T2), and of carcinomas invading the adventitia (T3) from those involving adjacent structures (T4) (11). It has an overall reported sensitivity for staging of 71.4% to 100% and specificity of 66.7% to 100%, which is superior to that of conventional computerized tomography (CT) (11). However, there is a drawback in that up to 45% of tumors are nontraversable with the endoscopic probe (the majority of

which are T3) (11). The use of fine EUS probes may resolve this problem in the future. From a practical point of view, the addition of EUS has been shown to increase the agreement between surgeons regarding the management of patients with esophageal carcinoma and should play a role in the initial staging of this disease (12). In patients who have undergone neoadjuvant chemoradiotherapy, EUS becomes less accurate in restaging owing to surrounding fibrosis and soft-tissue changes and the results (which have a tendency toward overstaging) should be interpreted with caution (13,14).

Cross-Sectional Imaging

The most commonly used staging investigation for esophageal carcinoma is CT. Magnetic resonance imaging has been shown to be comparable to CT in accuracy, but not as easily available (15). CT has a recognized sensitivity of 40% to 80% and specificity of 14% to 97% for the primary tumor and a sensitivity of 40% to 79% and specificity of 25% to 67% for the lymph node stage (11). The variations in these values reflect the interobserver variability in the interpretation of results (16).

Using more modern and sensitive spiral CT scanners and in a unit where there is a special interest in esophageal cancer, the sensitivity and specificity of staging may be increased to that obtained by EUS (17). If both investigations are used together, there is an increased agreement between clinical stage and pathologic stage, suggesting that CT and EUS should be considered as complementary rather than supplementary investigations (17).

There is some similarity with EUS in that the accuracy of CT in restaging disease after neoadjuvant treatment may be unpredictable. There are reports of overstaging in 36% of cases and understaging in 20% (18) and of difficulty in estimating tracheobronchial invasion (19). Following neoadjuvant treatment, if restaging is required, then a multimodality approach would seem advisable.

Laparoscopy and Thoracoscopy

Direct visualization of either the thoracic or peritoneal cavity is an attractive staging approach. In addition to its diagnostic potential, laparoscopy may provide therapeutic options, such as insertion of a feeding jejunostomy tube for patients with irresectable disease (20). However, there is controversy concerning the balance of risks and benefits of performing these investigations routinely. A staging investigation that can prevent unnecessary surgery and guide more appropriate treatment should be considered.

If laparoscopy and thoracoscopy are combined and added to conventional investigations (CT and EUS), the stage may be altered in over 30% of patients by reducing it in 19% and advancing it in 13% (21). Nguyen et al. used a package of minimally invasive staging modalities (laparoscopy, bronchoscopy, esophagoscopy, and laparoscopic ultrasound) and found that it predicted resectability in 97% of cases, compared with only 61% of those staged by conventional imaging by CT and EUS (22). The treatment plan was altered in 36% of patients by this approach (22).

Others have shown that the inclusion of laparoscopy (with ultrasound) avoided a laparotomy in only 5% of patients with gastroesophageal junction tumors (23). Using laparoscopy with at least five ports and a median operation time of 32 minutes, Menon and Dehn (24) detected incurable disease in 24% of patients deemed resectable on CT criteria. They did not include EUS in their staging investigations. The majority of these studies were performed on Western series of patients with predominantly lower third adenocarcinomas. These results cannot be extrapolated to Eastern patients with squamous-cell carcinoma and a more proximal tumor distribution.

Based on the evidence, it is difficult to justify the routine use of both thoracoscopy and laparoscopy. Performing a laparoscopy alone for carcinomas of the lower third of the esophagus or gastroesophageal junction appears justifiable as it offers additional staging information (including histology) that may alter the management of a number of patients and also enables insertion of a feeding jejunostomy for inoperable cases. The procedure should be performed in a methodical manner with several ports inserted to enable manipulation of the upper abdominal viscera, lymph node sampling where appropriate and routine opening and inspection of the lesser sac (24).

Positron Emission Tomography

There is growing evidence concerning the use of fluorodeoxyglucose PET scanning to stage esophageal cancer. The majority of reports evaluate PET when used in addition to established modalities, such as CT and EUS. A recent study that reviewed the world literature on the diagnostic accuracy of PET reported a sensitivity of 0% to 92% (median of 57%) and specificity of 75% to 100% (median of 90%) for the detection of lymph-node status. The same study identified a sensitivity of 35% to 100% (median of 69%) and specificity of 87% to 100% (median of 93%) for the detection of metastatic disease (3). The variability of results is attributed to heterogeneous groups of selected series of patients, differences in imaging protocols and in the interpretation of results, and the inclusion of patients who have received neoadjuvant treatment.

PET has been shown to detect incurable disease (i.e., upstage the tumor) in 17% of patients who have been deemed resectable using CT and EUS (25). However, when PET was compared with spiral CT, the benefit gained in the prevention of unnecessary explorations was minimal (26). When compared with other staging methods, PET was the only investigation able to independently predict a curative resection in patients who underwent an attempt at surgery (27). There is probably more evidence to recommend the inclusion of PET alongside CT and EUS for staging esophageal carcinoma. This investigation is currently expensive and not yet widely available. When combined with EUS, PET has been shown to be the most cost-effective staging option for esophageal carcinoma (28). Investigations are currently proceeding to evaluate the combination of PET and CT to stage this disease.

Analysis Summary

Based on level Ib evidence, a grade A recommendation can be made that CT and EUS are the imaging modalities of choice for the staging of esophageal carcinoma. PET scanning should be considered in addition if available. A level C recommendation can be made based on level III evidence for the use of a staging laparoscopy for gastroesophageal junction and lower-third esophageal carcinomas.

APPROACH TO SURGICAL RESECTION

Open Esophagectomy

The main modality for cure of esophageal carcinoma is surgical resection. When the tumor is confined to the epithelium, mucosa, or submucosa (Tis, T1a, and T1b, respectively), it may be categorized as early-stage disease (29). There are good prospects for long-term survival in this group of patients, and surgery plays a key role in the management (30). A variety of different operations have been performed, ranging from a limited transthoracic esophagectomy to transhiatal esophagectomy (without a thoracotomy), through to radical esophagectomy with two- or three-field lymphadenectomy and en-bloc esophagectomy. Recently, we have also seen the introduction of minimally invasive esophagectomy (31). These differences in approach and philosophy regarding radicality are in part due to the spectrum of disease encountered in Western populations (a relative paucity of early disease and predominantly lower-third adenocarcinoma) versus eastern centers with a relatively larger proportion of early stage- disease and squamous carcinoma (32).

In considering the optimal approach, the main controversy is whether a thoracotomy is necessary. Transhiatal esophagectomy can be performed safely in patients with stage I disease with a five-year survival of 59% (33). There was an in-hospital mortality rate of 4%, an anastomotic-leak rate of 13%, and incidence of other serious complications, such as recurrent laryngeal nerve injury and chylothorax of less than 1% each (33). These impressive results are from a unit with considerable experience of the transhiatal approach and may not be assumed by other centers. A radical transhiatal subtotal esophagectomy has been performed on patients with early stage disease with a 30-day mortality of 2.4% and five-year survival of 83% (34).

Ivor–Lewis esophagectomy involves a thoracotomy and abdominal incision, and can be performed with an in-hospital mortality rate of 2% to 4%, leak rate of 2% to 3.5%, and complication rate of 29% to 45% (35,36). Five-year survival rates of over 94% have been reported for stage I disease (37). Several studies have directly compared the outcome of transhiatal esophagectomy

with the Ivor–Lewis esophagectomy. A prospective randomized clinical trial of 67 patients showed no significant difference in postoperative complications, including anastomotic-leak rate between the two approaches, although the operating time for the Ivor–Lewis operation was significantly longer (38). Two similar randomized clinical trials with smaller numbers of cases showed no significant difference in morbidity (including anastomotic-leak rate), mortality, or median survival between the two operations, although the operating time again was significantly longer with a thoracotomy (39,40).

A meta-analysis that compared the outcome of transhiatal and transthoracic esophagectomy in all studies published up to 2001 showed a significantly higher in-hospital mortality rate of 9.2% for transthoracic versus 5.7% for a transhiatal resection (41). In the same study, the three-year survival rate was 25% for transthoracic versus 26.7% for transhiatal resection (41). There were no significant differences in postoperative complications observed. The majority of studies have been performed on mixed series of cases that include early-stage esophageal cancer, and the evidence suggests that either operative approach is appropriate for this group of patients.

What is becoming clear from the literature is the relationship between outcome and case volume for esophageal resection. An analysis of 10 years of esophagectomy data revealed that units in which over 20 cases are performed per year, the in-hospital mortality can be kept below 5% (7). There is evidence from the United Kingdom that the centralization of cancer services leads to more accurate staging and better 30-day mortality, presumably as a result of increasing case volume (6). It is possible that the increase in the proportion of operations being performed at "high-volume" centers has contributed to the improvement in survival observed following esophagectomy over the past 10 years or more (8).

Minimally Invasive Surgery

There have been several reports of the performance of all or part of an esophagectomy through smaller incisions using thoracoscopic and laparoscopic techniques (31). Initially, a thoracoscopic esophageal mobilization was accompanied by a laparotomy to fashion the gastric conduit (42). This was followed by a laparoscopic version of the transhiatal esophagectomy, where thoracotomy and single-lung ventilation was avoided (43). The total minimally invasive esophagectomy eventually followed with an anastomosis performed in the neck (44–47). More recently, a minimally invasive Ivor-Lewis resection technique has been described (48). Although the literature has confirmed that these approaches are feasible, they are technically demanding and time-consuming operations, and can be associated with substantial intraoperative blood loss (31). Even so, they could be appropriate for early-stage disease where performing a radical lymphadenectomy may not be essential.

Outcomes of minimally invasive esophagectomy from experienced units have been impressive with respect to mortality. The largest published series of 222 cases reported a mortality of 1.4%, leak rate of 11.7%, and conversion rate of 7.2%, and similar stage-specific survival to open procedures (46). Of more concern is that leak rates of over 28% have been reported for the total endoscopic technique, making this approach difficult to recommend after initial reports (45). Recently, Panalivelu et al. reported their excellent results of minimally invasive esophagectomy and lymphadenectomy for squamous carcinoma, with the thoracoscopic component performed with the patient in the prone position (47). Their operative mortality in 130 cases was 1.5% and anastomotic-leak rate was 2.3% with stage-specific survival similar to published series of open cases (47). Experience with a minimally invasive Ivor-Lewis resection is limited to a series of 50 cases from James Luketich with an operative mortality of 6% and anastomotic-leak rate of 6% (48). Further studies, preferably within the context of controlled trials, are required in order to evaluate this technique before it can be accepted as a standard practice.

The Role of Lymphadenectomy

There are contrasting views on the role of radical lymphadenectomy in the management of esophageal carcinoma. Japanese surgeons advocate extended lymphadenectomy involving cervical, mediastinal, and abdominal lymph node groups: three-field lymphadenectomy (5) or an en-bloc resection involving a margin of neighboring structures (5,49). Their experience with

predominantly squamous-cell carcinoma and its pattern of lymph-node metastasis has probably influenced their strategy. Japanese patients generally also have less comorbidity, are physically leaner, and have more early-stage disease. These factors have undoubtedly led to a more aggressive approach. The potential advantages include improved locoregional control of the disease and improved prognostic information provided by analysing a larger number of lymph nodes (49). The potential disadvantages relate to the morbidity associated with extensive lymph-node dissection leading to tissue ischaemia, anastomotic and lymphatic leaks, and damage to other important structures.

A recent review of 522 cases of radical three-field esophagectomy, consisting of predominantly Eastern series of squamous carcinomas, reported cervical-node metastases in 16.7% to 35.0% of patients with positive nodes in the recurrent laryngeal nerve region in 35.0% to 48.6% of cases (49). They report an operative mortality of 4% and major morbidity rate of 37.7% to 46.7% that included anastomotic leaks in 96 cases (18.4%), recurrent laryngeal nerve palsies in 139 patients (26.6%), and tracheal injury (owing to ischemia following nodal dissection) occurring in 26 (4.9%). Five-year survival of 30% to 50% is reported, and may rise to 94% for stage I disease (49).

An alternative to three-field lymphadenectomy is a two-field approach with resection of just the mediastinal and abdominal nodal groups and avoiding a neck incision. There have been two studies attempting to compare the three-field with the two-field approach in a randomized fashion. Kato et al. (50) used strict selection criteria, and randomly allocated 150 patients in total. They found a significantly larger lymph-node yield and operating time for the three-field approach (50). However, the more extensive resection had a lower in-hospital mortality of 2.6% for three-field dissection compared with 12.3% for the two-field operation and a five-year survival rate of 49% for the more radical procedure versus 34% for the two-field operation (50).

A smaller trial by Nishihira et al. randomly allocated patients to a three-field or a two-field lymphadenectomy with their esophagectomy, and again identified an unsurprisingly significant difference in lymph-node yield and operating time between the two groups (51). They found a significantly higher incidence of nerve injury (recurrent laryngeal and phrenic) and requirement for a tracheostomy in the three-field approach (51). However, the anastomotic-leak rate for the two-field group was 20% and in-hospital mortality rate was 7% (51). These values were significantly higher than those in the three-field group (6% and 3%, respectively). A possible explanation for this is that a leak from an anastomosis performed in the chest is more dangerous than one completed in the neck. There was a nonsignificant trend toward improved five-year survival for the more radical operation.

These two randomized studies do not enable conclusions to be drawn regarding the justification for a radical (three-field) approach to esophageal resection. This type of surgery has a high morbidity, even in the hands of those units with the most experience. It is impossible to extrapolate the results of a small number of studies of selected groups of patients from specialized centers of excellence to the wider surgical community. Outside the context of a unit with experience in this procedure, radical three-field resection for esophageal cancer cannot be recommended.

Neoadjuvant Strategies

There are several potential oncologic advantages in giving chemoradiotherapy preoperatively in esophageal cancer. First, systemic treatment is delivered with an intact tumor blood supply; second, tumors may be down-staged converting irresectable to resectable disease; and finally, the giving of two concurrent treatments may have a synergistic effect on locoregional control (52).

In recent years, there have been two meta-analyses of randomized controlled trials (RCTs) that compared neoadjuvant chemoradiotherapy followed by surgery with surgical resection alone for esophageal carcinoma (both squamous and adenocarcinoma). Urschel and Vasan identified nine RCTs covering some 1116 patients, and Fiorica et al., analysed six trials containing 764 cases in total (4,52). Chemoradiotherapy regimens typically consisted of two to three weeks of radiotherapy together with cisplatin alone or cisplatin and fluorouracil (52,53). These

meta-analyses identified a small but statistically significant advantage of neoadjuvant treatment followed by surgery over surgery alone for rate of complete resection, three-year survival, and locoregional recurrence rate (4,54). The survival benefit was evident when chemotherapy and radiotherapy were given concurrently. The survival advantage was lost if trials containing chemotherapy and radiotherapy given sequentially were considered separately (54). These trials contained predominantly squamous-cell carcinomas. A single RCT of patients with esophageal adenocarcinoma showed a significant difference in three-year survival of 32% for the neoadjuvant group versus 6% for surgery alone (53).

Since these meta-analyses have been published, a moderately large multicenter RCT from Australasia, containing 256 patients, showed no significant survival advantage for neoadjuvant treatment (cisplatin and fluorouracil-based chemotherapy with 35 Gy of concurrent radiotherapy given in 15 fractions) followed by surgery compared with surgery alone for esophageal adenocarcinoma (55). For squamous carcinoma, there was a significant difference in relapse-free survival for the neoadjuvant group compared with surgery alone, but only a nonsignificant trend toward improved overall survival for those patients (55).

Despite the optimism of the results of neoadjuvant treatment, there are several disadvantages. These include a lower rate of resection and a higher postoperative mortality rate (4,54). This treatment may make the operation technically more difficult and lead to more anastomotic leaks and cardiopulmonary complications due to the effects of treatment on local tissues (4,54). Until larger RCTs are performed, it is impossible to recommend the routine use of neoadjuvant chemoradiotherapy prior to resection for adenocarcinoma of the esophagus. Its use in squamous cell carcinoma has a stronger scientific basis.

With respect to the use of neoadjuvant chemotherapy prior to surgery versus surgery alone, a meta-analysis of 1976 patients from 11 RCTs has been performed (56). This showed a significant difference in resection rate favoring the surgery-alone group and a significantly higher rate of R0 resection in the neoadjuvant chemotherapy group. There were no significant differences in operative mortality, leak rate, or three-year survival between the groups (56).

Since this report, an important RCT from the United Kingdom of 390 patients who received an infusion of cisplatin and fluorouracil chemotherapy prior to esophagectomy versus 397 patients who received surgery alone has been performed (57). The patient group was typical of a Western case mix, with two-thirds made up of adenocarcinoma, and a third being squamous. Overall survival, two-year survival, and disease-free survival were significantly better for the neoadjuvant chemotherapy group over the surgery-alone group (57). A very recently published RCT, again from the United Kingdom, compared perioperative chemotherapy using epirubicin, cisplatin, and fluorouracil in 250 patients with surgery alone in 253 patients (58). The case mix included resectable gastric adenocarcinoma as well as lower-third esophageal and junctional carcinomas. Postoperative complication and mortality rates were similar between the groups. The chemotherapy group had a higher chance of overall survival with a five-year survival of 36% versus 23% for surgery-alone group (58). These two RCTs support a role for neoadjuvant chemotherapy for esophageal carcinoma, especially in populations where adenocarcinomas predominate.

Analysis Summary

With respect to the surgical approach to esophagectomy, a grade B recommendation can be made based on level II evidence that both transhiatal and Ivor-Lewis esophagectomy are appropriate procedures for esophageal resection in the absence of proven metastatic disease. These operations should preferably be performed in units performing more than 20 cases per year (grade A recommendation, based on category Ib evidence).

Radical three-field lymphadenectomy may improve survival over two-field lymphadenectomy in experienced Eastern centers that deal with predominantly squamous carcinoma (grade B recommendation based on level IIb evidence), but is associated with increased morbidity. Alternatively, the use of preoperative chemoradiotherapy should be considered prior to surgery for patients with squamous carcinoma (grade A recommendation based on level Ia evidence). The routine use of neoadjuvant chemoradiation prior to surgery for esophageal adenocarcinoma cannot be recommended (based on level IIb evidence). Based on level Ia evidence, a grade A recommendation can be made for the use of neoadjuvant chemotherapy prior to resection for esophageal carcinoma.

There is currently insufficient evidence to support the routine practice of minimally invasive esophagectomy (grade C recommendation based on level III evidence). However, this approach may be safely performed in high-volume centers experienced in advanced laparoscopic esophageal surgery (grade C recommendation based on level III evidence).

PALLIATION

Esophageal Stents

The presence of disseminated disease or the poor physical condition of a patient may prevent surgical resection for esophageal cancer. In this situation, the prognosis is very poor, and palliative measures are appropriate. The aims of palliation are to improve symptoms, such as dysphagia, and possibly to prevent fistula formation. Treatment options include placement of an esophageal stent (metal mesh, plastic, covered or uncovered) and radiotherapy, delivered either by external beam or the intraluminal route (brachytherapy) and laser ablation. Unlike surgery for esophageal cancer, the issue of palliation has been subjected to a considerable number of randomized trials. These studies are usually controlled relative to a reference intervention, as it is considered unethical to offer these patients no treatment.

The earliest stents were plastic tubes, and these have been compared with self-expanding metal stents (Wallstent) in a randomized, controlled manner (59). Both types of stent provided immediate and effective palliation for dysphagia and sealed esophageal fistulae, but Wallstents were associated with fewer serious complications and better patency rate of 90% and 88% at one and three months, respectively. Corresponding patency rates were 66% and 50% for the plastic stent (59). In another randomized trial of covered versus uncovered expandable stents, the covered variety were associated with significantly less problems with tumor ingrowth (requiring further intervention) compared with uncovered ones (60).

Expandable metal esophageal stents are relatively expensive and unsurprisingly, several different products have emerged. When Ultraflex™, Flamingo Wallstent®, and Gianturco-Z stent (all covered) are compared, there are no significant differences in the degree of palliation of dysphagia or complications between the groups (61,62). The use of expandable covered stents is emerging as the "gold standard" for the palliation of esophageal cancer.

Brachytherapy

Other therapies, such as laser or thermal ablation, have had limited success (63,64). A single dose of intraluminal brachytherapy has been compared with the placement of an expandable metal stent. Brachytherapy provided better long-term palliation for dysphagia and quality of life scores, but the stent provided more rapid relief of symptoms after deployment (9). Almost a half of the patients in the brachytherapy group also had a stent inserted, and this may explain some of the differences in outcome.

What is clear from the evidence is that covered metal stents provide effective palliation for dysphagia and treatment of esophageal fistulae. Brachytherapy may provide symptom relief for longer for patients who are fit. A combination of both treatments may prove most effective in this unfortunate group of patients whose median survival is less than six months with treatment (9).

Analysis Summary

There is good evidence (level Ia) supporting the routine use of expandable covered stents for the palliation of dysphagia and treatment of esophageal fistulae in patients who are unfit for surgery or have irresectable esophageal cancer (grade A recommendation). The use of intraluminal brachytherapy may be a suitable alternative treatment modality for patients without a fistula (grade A recommendation based on level Ia evidence).

CONCLUSIONS

The mortality of resection for esophageal carcinoma has been improved in recent decades. This has probably resulted from improved case selection by staging and the use of neoadjuvant treatment prior to resection by Western surgeons and radical lymphadenectomy performed by Eastern surgeons.

The most appropriate staging investigations will identify locally advanced or metastatic disease prior to a major resection so that management can be tailored to the patient. There is substantial evidence that a combination of CT, EUS, and PET scan is an ideal package for preoperative imaging, accompanied by a staging laparoscopy for lower-third or gastroesophageal junction tumours. A staging thoracoscopy should be considered in selected cases.

The ideal approach to esophagectomy is the one that gives the highest chance of a complete (R0) resection and the lowest morbidity and mortality in the hands of the particular surgeon. There is no clear evidence favoring one particular open approach compared with another. Minimally invasive esophagectomy is increasingly being performed, but this should be done in institutions with high-volume experience in laparoscopic esophageal surgery. The debate concerning the use of neoadjuvant treatment and surgery versus more radical surgery will require further RCTs in order to determine whether one or the other offers a clear benefit. Either approach is acceptable in the institutions and population groups where they have been assessed.

With respect to palliation for irresectable or metastatic disease, surgery is not appropriate because the life expectancy of these patients is so short. The use of a covered expandable metal stent provides rapid relief of dysphagia and treatment of an esophageal fistula. The use of intraluminal brachytherapy may provide more prolonged relief of symptoms in appropriate cases.

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