

ORIGINAL ARTICLES

PROGNOSTIC FACTORS INFLUENCING MORBIDITY AND MORTALITY IN ESOPHAGEAL CARCINOMA

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PURPOSE: In 1980, operative mortality for esophageal resection was 29%. Over the last 15 years, technical and critical care improvements contributed to the reduction of postoperative mortality rate to 8%. The aim of this study is to analyze retrospectively the role of different factors (surgical procedure, stage of the disease, and anesthetic risk) on the postoperative mortality of 63 patients that underwent esophagectomy with gastric interposition for cancer.

METHODS: Seventy-two patients underwent esophagectomy. The stomach was the esophageal substitute in 63 cases. Surgical procedures included transthoracic esophagectomy in 49 patients and transhiatal esophagectomy in 14 cases. Among the 49 transthoracic esophagectomy patients, there were 18 patients with a high anesthetic risk (ASA III). Among the patients that underwent transhiatal esophagectomy, there were 10 patients with a high anesthetic risk (ASA III).

RESULTS: The operative mortality rate was 14% (2/14) in transhiatal esophagectomy group and 22% (11/49) in transthoracic esophagectomy group ($P = ns$). The postoperative mortality of patients with a high anesthetic risk (ASA III) was 47% (8/17) after transthoracic esophagectomy and 10% (1/10) after transhiatal esophagectomy ($P < 0.05$).

DISCUSSION: In our experience, the operative mortality was nearly 18% (16.6% after transhiatal esophagectomy and 20.8% after transthoracic esophagectomy). Among the patients with a high anesthetic risk (ASA III) that underwent surgery, the postoperative mortality was significantly lower after transhiatal esophagectomy (10%) compared to transthoracic esophagectomy (47%) ($P < 0.05$).

DESCRIPTORS: Esophageal carcinoma. Transhiatal esophagectomy. Transthoracic esophagectomy. Prognostic factors. Anesthetic risk.

INTRODUCTION

Esophageal carcinoma has a dismal prognosis. The 5-year survival rate of patients with esophageal carcinoma who underwent surgery has been reported to be only 20%¹⁻³. In a 1980 review article by Earlam and Cunha-Melo, more than 32,000 esophageal resections had a collective operative mortality of 29%⁴. Over the past 15 years, technical and critical care improvements have contributed to the reduction of reported postoperative mortality rates from 29%⁴ to 4%-12%^{2,5-13}. The aim of this study is to analyze ret-

respectively the role of different factors (surgical procedure, stage of the disease, and anesthetic risk) on the postoperative mortality, and the morbidity of 63 patients who underwent esophagectomy with gastric interposition for cancer from 1978 to 2000.

MATERIALS AND METHODS

Between 1978 and 2000, 95 patients with esophageal carcinoma were

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admitted to our Institute. Among them, 72 patients (58 men, mean age 65.5 years; 14 women, mean age 62.5 years) underwent esophagectomy (resection rate, 76%). Patients who had jejunum (7 patients) or colon (2 patients) interposition were excluded. Stomach was the esophageal substitute in 63 cases.

Surgical procedures included transthoracic esophagectomy (TTE) according to Lewis¹⁴ in 49 patients and transhiatal esophagectomy (THE) according to Orringer^{15,16} and Akiyama¹⁷⁻²¹ in 14 cases.

The 49 patients that underwent TTE had spinocellular carcinoma in 42 cases

and adenocarcinoma in 7 cases. Tumor locations were cervical esophagus 4% (2 patients), upper thoracic esophagus 4% (2 patients), midthoracic esophagus 31% (15 patients), and inferior thoracic esophagus 61% (30 patients). TTE patients had an extensive 2-field en bloc lymphadenectomy. Cervical lymphadenectomy was performed only for cervical and upper thoracic esophageal tumors.

Tumor stages were stage I (N0) in 2 patients, stage IIA (N0) in 16 patients, stage IIB (N1) in 6 patients, and stage III (N1) in 25 patients. Thirty-one patients had lymph nodal metastases.

Among the 49 TTE patients, there were 18 patients (37%) with a high anesthetic risk (ASA 3 III)²².

Of the 14 patients that underwent THE, 13 had a spinocellular carcinoma and 1 had an adenocarcinoma. Tumor locations were cervical esophagus in 43% (6 cases), upper thoracic esophagus 7% (1 patient), middle thoracic esophagus 21% (3 cases), and inferior thoracic esophagus 29% (4 patients). Lymph node dissection of the lower mediastinum and of the abdomen, including the region of the left gastric and celiac arteries, was performed during THE. Cervical lymph node dissection was performed for the cervical and upper thoracic tumors. Tumor stages were stage I (N0) in 2 patients, stage IIA (N0) in 3 patients, stage IIB (N1) in 3 patients, and stage III (N1) in 6 patients. Nine patients had lymph nodal metastases. The organ used for the substitution of the esophagus was the Akiyama gastric tube in all the cases. Among the patients that underwent THE, there were 10 patients with a high anesthetic risk (ASA 3 III).

Concerning technique, we performed all the cervical anastomoses for the THE procedures and 30/49 of the intrathoracic anastomoses for the TTE procedures using 1 seromuscular interrupted suture of propylene 3/0; we used the EEA stapler in the other 19 cases of TTE.

Discrete data were compared using the Chi square test and the Fisher ex-

act test. Continuous data were compared using the Student's *t* test. The log-rank test of Mantel was used to compare survival curves²³.

RESULTS

The 30-day operative mortality rates were 16.6% (2/14) for THE and 20.8% (11/49) for TTE (*P* = ns). Variables related to age, gender, and histotype are listed in table 1.

Postoperative morbidity (bronchopneumonitis, pleural effusion, anastomotic leakage, recurrent laryngeal nerve paralysis, and chylothorax) was 54% (25/49) for TTE and 57% (8/14) for THE (*P* = ns). The transhiatal approach appeared to have a higher incidence of recurrent laryngeal nerve injuries (33%) (*P* ≤ 0.1).

Major complications were 8 partial or total anastomotic leaks (2 after THE and 6 after TTE, *P* = ns), 25 respiratory complications (6 after THE and 19 after TTE, *P* = ns), 1 chylothorax after TTE, and 4 recurrent laryngeal nerve paralysis after THE (*P* £0.01) (Table 2).

The postoperative period of hospitalization was 24 days (+6.45 SD) for the THE patients and 31.39 days (+9.3 SD) for the TTE patients (*P* <0.05).

The incidence of anastomotic leakage was 14% (2/14) after THE and 12% (6/49) after TTE (*P* = ns). The

mortality for anastomotic leakage after THE was 50% (1/2), and 80% (5/6) after TTE (*P* <0.05). The survival rate for cases with cervical fistula after THE (50%) was higher than the survival rate for cases of intrathoracic fistula after TTE (20%) (*P* <0.05).

Among the TTE-treated patients, the incidence of anastomotic leakage was 10% (3/30) after manual suture and 16% (3/19) after mechanical suture. (*P* = ns). The incidence of anastomotic leakage after manual suture was 14% (2/14) for the THE group, and 10% (3/30) after manual suture for the TTE group (*P* = ns).

The postoperative mortality of patients with a high anesthetic risk (ASA ≥ III) was 44% (8/17) after TTE and 10% (1/10) after THE (*P* <0.05).

Five-year survival rates were 17% for TTE and 8% for THE (*P* = ns), and 28.5% of N0 patients and 6% of N+ patients (*P* <0.025). The 5-year survival curves of the patients in relationship to the presence or the absence of lymph nodal metastases have been previously reported²⁴.

DISCUSSION

Over the past few years, technical and critical care improvements have reduced the reported postoperative mortality rate for patients undergoing resec-

Table 1 - Age, gender, and histotype of patients that underwent TTE or THE.

	TTE	THE	<i>P</i> value
Age	63	61	n.s.
Gender	40 males/9 females	11 males/3 females	n.s.
Histotype (squamous/ adenoK)	42/7	13/1	n.s.

Table 2 - Mayor complications: anastomotic leak, respiratory complications, chylothorax, recurrent laryngeal nerve paralysis.

	TTE	THE	<i>P</i> value
Anastomotic leakage	6/49	2/14	n.s.
Respiratory complications	19/49	6/14	n.s.
Chylothorax	1/49	0/14	n.s.
Recurrent laryngeal nerve injuries	0/49	4/14	<i>P</i> <0.05

tion of esophageal cancer from 29%⁴ to 4%-12%^{2,5-13}, and the 5-year survival rate has improved from 3%-5%⁴ to 20%^{1,2,3}. In our experience, the 30-day operative mortality was nearly 18% (16.6% after THE and 20.8% after TTE), and there was not a statistically significant difference between the two procedures. An extensive review of the literature revealed that other authors² report a 30-day mortality of 6.3% for THE and 9.5% for TTE; TTE had the higher postoperative mortality rate.

Among the patients with a high anesthetic risk (ASA ³ III) that underwent surgery, the postoperative mortality was significantly lower after THE than after TTE. It should be noted that THE represents the best surgical option for patients with esophageal carcinoma and high anesthetic risk because it is associated with reduced surgical trauma, incidence of respiratory distress, and length of postoperative stay in hospital. Other authors report similar results^{2,3,12}.

The postoperative morbidity was very similar for the 2 surgical procedures. The transhiatal approach appeared to have a higher incidence of recurrent laryngeal nerve injuries. The incidence of anastomotic leakage is slightly higher in the THE group, but the survival in case of cervical fistula after THE was better than the survival

in the case of intrathoracic fistula after TTE. The worst prognosis concerning intrathoracic fistula is probably secondary to the mediastinitis following the anastomotic leakage after TTE. In these cases, mediastinal drainage can be introduced after mediastinoscopy. Anastomotic leaks that occur after THE tend to have a more benign course because infection and fistula can be more easily managed.

There was not a difference in the incidence of anastomotic leakage after manual or mechanical anastomoses for TTE.

The 5-year survival rates were significantly higher in patients without lymph nodal metastases. In a retrospective study, Japanese authors^{25,26} reported a better 5-year survival after extensive colothoraco-abdominal (3-field) dissection, in particular for stage 0 and stage IV carcinoma of the upper third of the thoracic esophagus²⁶. Conversely, in patients with carcinoma of the lower third of the esophagus with abdominal lymph nodal metastases, 3-field dissection was not associated with improved 5-year survival rates²⁷. In western countries, surgeons prefer to use preoperative radio- or chemotherapy because they consider esophageal carcinoma to be a disseminated disease²⁸. Prospective studies^{12,13} did not demonstrate a significant differ-

ence in the survival rates of patients treated by TTE with systematic 2-field en bloc lymphadenectomy or of those treated by THE. These results stress the importance of a diagnosis of the esophageal cancer and the relative necessity of an extended lymph node dissection; it follows that patients with a low anesthetic risk (ASA < III) must be treated by TTE or by THE, and may eventually be treated with video-assisted thoracic lymph node dissection or with mediastinoscopy²⁹. In the past few years, treatment of esophageal carcinoma by video-assisted thoracoscopy (VATS) alone did not seem to be possible because of the length of the operation time (10 hours)³⁰. However, in a recent study³¹, minimally invasive esophagectomy had a shorter operative time and less blood loss than THE and TTE.

We suggest that: i) THE represents the best surgical option in patients with a high anesthetic risk (ASA ³ III) because it reduces postoperative mortality significantly; ii) the long-term results are significantly correlated with the presence or the absence of lymph nodal metastases. Enlarged mediastinal lymphadenectomy allows the staging of the disease exactly, but we do not find that the more radical procedure (TTE) results in longer survival.

RESUMO

RHCFAP/3093

CARIATI A e col. - Fatores prognósticos influenciando a mortalidade em esofagectomia. **Rev. Hosp. Clín. Fac. Med. S. Paulo** 57(5):201-204, 2002.

OBJETIVO: Nos últimos 15 anos, melhorias técnicas contribuíram para a redução da taxa de mortalidade pós-operatória de 29 para 8 %. O objetivo deste estudo é analisar retrospectivamente o papel de diferentes fatores na

mortalidade pós-operatória de 63 pacientes submetidos a esofagectomia para tratamento de câncer.

MÉTODOS: Sessenta e três pacientes foram submetidos a esofagectomia com utilização do estômago como substituto. Os procedimentos cirúrgicos incluíram esofagectomia transtorácica em 49 pacientes e esofagectomia trans-hiatal em 14 casos. Entre os 49 pacientes de esofagectomia transtorácica haviam 18 (37%) com

risco anestésico elevado (ASA ≥ III). Quatorze pacientes foram submetidos a esofagectomia trans-hiatal.

RESULTADOS: A mortalidade operatória foi de 14% na esofagectomia trans-hiatal e 22% na esofagectomia transtorácica (p = ns). A mortalidade dos pacientes com risco anestésico elevado foi de 47 % após esofagectomia transtorácica e 10% após esofagectomia trans-hiatal (p < 0,05).

DISCUSSÃO: Em nossa experiên-

cia, a mortalidade foi de quase 18% e 22% após esofagectomia transtorácica. Entre os pacientes com risco anestésico elevado que se submeteram à operação, a mortalidade pós-operatória foi

significativamente mais baixa após a esofagectomia trans-hiatal (10%) comparativamente à esofagectomia transtorácica (47%) ($p < 0,05$).

DESCRITORES: Carcinoma de esôfago. Esofagectomia trans-hiatal. Esofagectomia transtorácica. Fatores prognósticos. Risco anestésico.

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