

Transthoracic versus transhiatal esophagectomy

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Abstract

Introduction: Due to our geographical area of living, esophageal cancer is one of the most common cancers in gastrointestinal system. Treatment of choice in these diseases is surgery. Because of various kinds of surgical techniques, in this study we tried to compare common techniques in these groups of patients.

Materials and Methods: In a retrospective study between 1990 and 2005 all patients with esophageal cancer in middle and distal third of esophagus whom underwent transhiatal or transthoracic esophagectomy, have been studied about age, sex, pathology of tumor and tumor staging. Then in other study, with considering special parameters of two groups (transhiatal or transthoracic) are studied separately about factors such as intraoperative bleeding, operation time, post-operation morbidity, time of hospitalization, mortality 30 days after surgery, incidence of anastomosis leak and stenosis and survival have been evaluated.

Results: 156 patients entered our study with M/F=110/46 ratio. 116 patients with S.C.C and 40 patients with adenocarcinoma. The comparing study between transhiatal groups with Ivor Lewis groups (with similarization) showed intraoperate bleeding, cardiac and pulmonary complications after surgery, mean time of hospitalization, mortality in 30 days after surgery and incidence of late stenosis and survival are similar but the incidence of anastomosis leakage was higher in transhiatal group and mean operation time was longer in Ivor Lewis group. Since the leakage was more common in transhiatal group but mortality rates were the same, it indicates that leaking in neck has a better outcome.

Conclusions: According to the results of this study, both of these techniques are similar and choosing one of them depends on surgeon's choice and patient's conditions.

Keywords: Esophageal Cancer, Esophagectomy, Transhiatal, Transthoracic

Introduction

Due to our geographical area of living, esophageal cancer is one of the most common cancers in gastrointestinal system. Controversy exists as to the optimal surgical approach to the patients with carcinoma of esophagus.

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For decades the most popular approach was Ivor Lewis Esophagectomy via combined celiotomy and thoracotomy (1).

Because this approach permits direct visualization of the tumor and dissection of more periesophageal and nodal tissue, it has been considered to the formal cancer operation for carcinoma of the esophagus (2).

Recently there has been a trend away from this approach in favor of a transhiatal approach reported by Turner and subsequently popularized by Orringer (2-3).

General perceptions now exist that the transhiatal approach may be preferable over the Ivorlewis approach for several reasons. These include avoidance of a painful thoracotomy and decreased operative time, blood loss, mortality, morbidity, length of hospital stay, incidence of anastomotic leaks and stricture rate. Despite these perceptions there has been little data in the literature to support most of these contentions. Some studies have shown a decreased incidence of pulmonary complication with transhiatal approach (5-6).

These series have also shown a decrease in mortality rate as a result of leaks from cervical anastomosis compared to those from intrathoracic anastomosis which may lead to devastating mediastinitis. Other authors believe that there is no benefit of the transhiatal approach and because of resection the little periesophageal tissue it may be an inferior cancer operation (6).

Furthermore, these authors are afraid of blind dissection because dissection is done blindly, the transhiatal operation may be potentially dangerous when the tumor is adherent to adjacent vital structures (7).

In an effort to determine if there are measurable advantages for one approach over the other, we reviewed the outcomes of transhiatal and Ivorlewis esophagectomies done for carcinoma of the lower esophagus.

Materials and Methods

In a retrospective study between 1990 and 2000, all of the patients with esophagectomy (either transhiatal or Ivor Lewis) have been studied and parameters such as age, sex, pathology of tumor, stage of tumor in TNM system have been evaluated. Then in other study, 2 groups of patients with esophageal cancer who have been operated on by these approaches were studied separately about the intraoperative bleeding, operation time, post operation morbidity (leakage of anastomosis, cardiopulmonary complications) duration of hospitalization,

mortality in 30 days after surgery, incidence of anastomosis stenosis and survival. Analysis was done by aid of P.value (0.05) for evaluation of meaningfulness. Since the study was a retrospective one, for better evaluation and comparing, and for similarization of 2 groups we considered entrance and exiting factors including:

1-Entrance factors

- (a) Age between 45 to 65 years
- (b) Pathology of tumor in middle or third esophagus
- (c) Serum albumin at admission time >3 g/dl
- (d) Follow up period of at least 2 years.

2-Exiting factors

- (a) Age over 65 years or under 45 year
- (b) Proximal third tumor
- (c) Sever malnutrition at admission (albumin <3 g/dl)
- (d) History of sever previous cardiopulmonary disease before surgery
- (e) Occurrence of sever complication intraoperative (sever bleeding or airways accidents)
- (f) Occurrence of unwanted technical problems during operation (gastric ischemia, tension of anastomosis site)
- (g) Follow up less than 2 years.

Results

156 patients were identified, 110 men and 46 women. The average age was 62 years. 72 patients underwent transhiatal esophagectomy and 80 patients underwent Ivorlewis esophagectomy. In the transhiatal group, 24 patients had adenocarcinoma and 52 patients had squamous cell carcinoma. In the Ivorlewis group 16 patients had adenocarcinoma and 64 patients had squamous cell carcinoma.

The distribution of pathologic stage between the two approaches and the two histologic types of tumors is shown in the table 1.

Table 1: Distribution of tumor histology and stage between transhiatal and IvorLewis groups

Stage	Histology	Transhiatal	Ivor Lewis
I	squamous cell	16	6
	Adenocarcinoma	4	2
II	squamous cell	14	28
	Adenocarcinoma	6	4
III	squamous cell	14	28
	Adenocarcinoma	6	10
IV	squamous cell	8	2
	Adenocarcinoma	8	-
Total		76	80
156			

Considering entrance and exiting factors, 30 patients with esophageal cancer with transhiatal approach were compared 30 patients with Ivor Lewis surgery about following parameters:

1- Amount of bleeding during surgery:

Mean bleeding amount in patients with transhiatal approach was 500^{cc} and in Ivor Lewis group was 600^{cc} ($P>0.05$) which is not a meaningful difference.

2- Mean time of surgery:

In transhiatal approach it was 275 minutes and in Ivor Lewis it was 389 minutes ($P<0.05$) which is a meaningful difference.

3- Post operation morbidity:

(a) Anastomosis leakage: 6 patients in transhiatal group and 3 in Ivor Lewis group had leakage from anastomosis which has a meaningful difference ($P<0.05$).

(b) Cardiopulmonary complications:

3 patients in transhiatal group and 4 in Ivor Lewis group which is not of meaningful difference ($P>0.05$).

4- Mean time of hospitalization:

In transhiatal group 13 days and in Ivor Lewis group it was about 15 days ($P>0.05$) which is not meaningful difference.

5- Mortality in 30 days after surgery: 2 patients in transhiatal and 3 patients in transthoracic group had morbidity in 30

days. This, itself, indicates that although leakage incidence is higher in transhiatal group but mortality rate in 2 groups is similar and confirms that leakage in neck region anastomosis is a benign process.

6- The cases of death: In transhiatal group two patients died from cardiac problems, but in transhiatal group, one patient died because of leaking complications and the two other died from cardiac problems ($P>0.05$) which is not meaningful difference.

7- Incidence of late stenosis in anastomosis site: In transhiatal group 4 patients and in Ivor Lewis group 3 patients had stenosis after 6 month (there have been no tumoral growth at endoscopic study) $P>0.05$ (no meaningful difference). All these patients have been treated by dilatation.

8- Survival: Mean time of survival in transhiatal group was 19 months and in Ivor Lewis group 20 months ($P>0.05$) (no meaningful difference).

Discussion

Surgical resection for carcinoma of the esophagus is rarely curative and is usually palliative. Controversy exists about the optimal surgical approach for patients with carcinoma of the esophagus.

The two most common approaches are the IvorLewis esophagectomy and the transhiatal or blunt esophagectomy. The IvorLewis approach has been argued to be a superior cancer operation. It allows for direct visualization of tumor and resection of more periesophageal and nodal tissue. Furthermore it facilitates dissection of the tumor from adjacent vital structures (6).

Recently there has been a trend away from this approach. The IvorLewis is reported to have significant cardiopulmonary morbidity because of the required thoracotomy and the devastating consequences of an anastomotic leak in the mediastinum. Alternatively the transhiatal approach is believed to have similar survival with less morbidity.

This approach avoids a thoracotomy and places the anastomosis in the neck preventing mediastinitis in the event of a leak (7). However this approach had been criticized as being an inferior cancer operation because a portion of the procedure is done without direct visualization that could potentially damage adjacent structures (3). Goldfaden D, Putnam JB with prospective study comparing clinical outcomes between the transhiatal and IvorLewis approaches. It includes patient with both adenocarcinoma and squamous cell carcinoma but our analyses have taken this factor into account by performing appropriate subset analyses based on tumor histology where appropriate.

There were roughly equal numbers of patients treated with each approach in the present series. The present series failed to demonstrate any advantages of the transhiatal approach over the IvorLewis approach except for a statistically significant decrease in operative time.

In fact the mean length of stay for the transhiatal group was about 5 days longer than the IvorLewis group. Some series have shown significantly fewer pulmonary complications with the transhiatal approach compared to those reported for the Ivor Lewis approach (5-6).

Stark SP et al reported a retrospective comparison of the transhiatal and IvorLewis approach in patients with adenocarcinoma only paradoxically they found a significantly higher incidence of pulmonary complication in the transhiatal group. They attributed this difference to possible bias in patient selection. Also their series was not evenly divided between the two approaches having only 16 of 48 patients treated with the IvorLewis approach (7). Gotley DC et al held true regardless of tumor stages or histologies.

These results do not preclude the possibility that the IvorLewis approach is a superior cancer operation for early stage tumors as there were significantly more patients with potentially curable stage 1-

tumor in the transhiatal group however this may be balanced by the fact that the transhiatal approach may result in down staging of tumors because lymph nodes are not resected with this approach (13). Chu K et al in their study have mentioned these two techniques to be similar about complications and survival. But they mentioned higher rate of leaking in transhiatal group, but leaking in neck has a better outcome and often is well controlled (9). Another similar study is done by Fok M and et al (11).

In our study, also incidence leakage is higher in transhiatal group but mortality rates were similar. In Moan and et al study, these two techniques were compared about complications and survival was the same result (10).

Fok M and et al have studied early and late complications of these two techniques and found out the transhiatal group had a higher incidence of leaking but in late complications (stenosis at anastomosis) and hospital mortality were the same in two groups (11). Our results are also similar to then and stenosis at anastomosis site is almost similar in two groups.

Hankins IR and et al also have compared these two techniques and concluded that they are similar in most complications and choosing the approach technique depends on surgeon's skill and choice and patient's conditions (12).

Millika K and et al in a 16 years study have pointed out that long-term survival in these two techniques are similar and both of them are acceptable from cancer surgery (14).

Our results are also similar to theirs in about 2 year's survival of patients. In Pac M and et al study, these two techniques have been compared about operation time, incidence of transfusion, hospital mortality and survival have been similar to ours but the leakage of anastomosis was higher in transhiatal and operation time in Ivor Lewis group was longer.

Gocke I, et al have studied about the prognosis in patients with adenocarcinoma of the esophagus is influenced by the depth of the tumor (pT) and the pM-category, as shown in the multivariate analysis.

The present analysis did not demonstrate a relevant difference in survival for patients with N0 and N1 stages undergoing transhiatal or transtrate or transthoracic esophagectomy. It is questionable, if a more extensive mediastinal lymph node dissection, in addition to the clearance of abdominal lymph nodes, offers prognostic advantages in adenocarcinoma of the esophagus. However, the morbidity and mortality associated with the transthoracic approach is higher (15).

In Rentz J, et al study demonstrate no significant differences in preoperative variables and postoperative mortality or morbidity between transthoracic esophagectomy and transhiatal esophagectomy on the basis of a 10-year, prospective, multi-institutional, nationwide study (16).

That Hulscher JB, et al in their study have mentioned that transhiatal esophagectomy was associated with lower morbidity than transthoracic esophagectomy with extended en bloc lymphadenectomy. Although median overall, disease-free, and quality-adjusted survival did not differ statistically between the groups, there was a trend toward improved long-term survival at five years with the extended transthoracic approach (17).

Conclusion

We conclude that transhiatal and Ivor Lewis esophagectomies are comparable operation with equivalent survival rates. The transhiatal approach did not decrease the incidence of complications, transfusions, strictures. Incidence of leakage in transhiatal group was more than Ivor Lewis group but since leaking in neck has better outcome and mortality rate are similar in them.

Although the transhiatal approach requires less operative time these doses not translate into a decrease in hospital stay. Either approach appears to be acceptable depending on surgeon preferences and appropriate patients selection.

References

- 1- Raymond Hurt, et al. Historical review-surgical treatment of carcinoma of the Esophagus. *Thorax* 1991; 46: 528-35.
- 2- Turner GG et al. Excision of thoracic esophagus for carcinoma. *lancet* 1983;1315 - 16.
- 3- Bryant MB et al. Esophagectomy without thoracotomy. *J Thorax Cardiovas Surg*, 1998; 76: 643-54.
- 4- Orringer MB et al. Transhiatal esophagectomy for benign and malignant disease, *J Thorax Cardiovas Surg* 1993; 105:265-277.
- 5- Goldfaden D, Orringer MB, Applman HD, Kalish R et al. Adenocarcinoma of the distal esophagus and gastric cardia comparison of results of transhiatal and thoracoabdominal esophagectomy. *J Thorax Cardiovas Surg* 1986; 91(2): 242-47.
- 6- Putnam JB, Suell DM, Murtrey MJ, Rayan MB, Walsh GL et al. Comparison of three techniques of esophagectomy. *Ann Thorax Surg* 1994; 57(2): 319-25.
- 7- Stark SP, Romberg MS, Pierce GE, Hermreck AS, Jewell WR et al. Transhiatal versus esophagectomy for adenocarcinoma of the distal esophagus. *AJ Surg* 1996; 172(5):478-81.
- 8- Goldmanc M, Maddern G, Prise E, MeunierB, CampionJP et al. Esophagectomy by a transhiatal or thoracotomy. *Br J Surg* 1993; 80(3): 367-70.
- 9- Chu K. M, Law SY, Fork M, Wong J et al. A prospective randomized comparison of transhiatal and transthoracic resection for lower third esophageal cancer. *Am J Surg* 1997; 174(3): 320-24.

- 10- Moom MR, Schulte WJ, Hasler GB, Condon RE et al. Transhiatal and Transthoracic Esophagectomy for adenocarcinoma of the esophagus. Arch Surg 1992; 127(8): 951-55.
- 11- Fok M, Siu KF, Wong J et al. A comparison of transhiatal and transthoracic resection for carcinoma of the esophagus. Am J Surg 1989; 158 (5): 414-419.
- 12- Hankins JR, Attar S, Coughlin TR, Miller TE, Hebel JR et al. Carcinoma of the esophagus a comparison of the results of transhiatal and transthoracic resection. Ann Thorax Surg 1988; 47: 700-705.
- 13- Gotley DC, Bread J, Cooper MY, Britton DC, Williamson RC et al. Transhiatal esophagectomy in the management of esophageal carcinoma. Br J Surg 1990; 77(7): 815-19.
- 14- Millikan KW, Silverstion J, Hart V, Blcir K, Bines S et al. A 15 years review of esophagectomy for carcinoma of the esophagus. Arch Surg 1995; 130(6): 617-24.
- 15- Gocke I, Heckhoff S, Messow CM, Kneist W, Junginger T: Transhiatal and transthoracic resection in adenocarcinoma of the esophagus: does the operative approach have an influence on the long-term prognosis, World J surg Oncol, 2005; 24: 40-45.
- 16- Rentz J, Bull D, Harpole D, Bailey S, Neumayer L, Pappas T, Krasnicka B, Henderson W, Daley J, Khuri S: Transthoracic versus transhiatal esophagectomy: a prospective study of patients, J Thorac Cardivasc Surg, 2003; 125(5): 1114-20.
- 17- Hulscher JB, Van sandick JW, de Boer AG, Wijnhoven BP, Tijssen JG, Fockens P, stalmeier PF, ten Kate FJ, van Dekken H, Obertop H, Tilanus HW, van Lanschot JJ: Extended transthoracic resection compared with limited transhiatal resection for adenocarcinoma of the esophagus, N Engl J Med, 2002; 347(21): 1662-9.

خلاصه

مقایسه دو تکنیک ازوفازکتومی ترانس هیاتال با ترانس توراسیک

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مقدمه: با توجه به منطقه جغرافیایی زندگی ما سرطان مری از جمله سرطان های شایع گوارشی می باشد. درمان انتخابی در این بیماران جراحی است که با توجه به تعدد تکنیک جراحی ما در این مطالعه سعی نمودیم دو تکنیک شایع جراحی در این گروه از بیماران را مورد مقایسه قرار دهیم.

مواد و روش ها: در یک مطالعه گذشته نگر (بین سال های ۱۹۹۰ تا ۲۰۰۵) کلیه بیمارانی که با سرطان ثلث میانی و تحتانی مری تحت عمل جراحی ازوفازکتومی ترانس هیاتال یا ترانس توراسیک قرار گرفته اند را از نظر سن، جنس، پاتولوژی تومور و stage تومور مورد بررسی قرار داده سپس در یک مطالعه مقایسه ای با در نظر گرفتن پارامترهای خاص یکسان سازی دو گروه از بیماران عمل شده (گروه ترانس هیاتال و گروه ترانس توراسیک) را از نظر میزان خونریزی حین عمل، زمان جراحی، موربیدیتی بعد از عمل، طول مدت بستری، مورتالیتی تا ۳۰ روز بعد از بستری میزان بروز نشت و تنگی آناستوموز و بقاء مورد بررسی قرار دادیم.

نتایج: ۱۵۶ بیمار وارد مطالعه شدند که ۱۱۰ بیمار مرد و ۴۶ بیمار زن بوده اند، ۱۱۶ بیمار با SCC و ۴۰ بیمار با آدنوکارسینوما. با در نظر گرفتن معیارهای ورودی و خروجی در دو گروه بیمارانی که تحت جراحی ترانس هیاتال قرار گرفته با گروه Ivor Lewis با هم مقایسه شده که از نظر میزان خونریزی حین عمل، عوارض قلبی عروقی و ریوی بعد از عمل، متوسط زمان بستری، مورتالیتی تا ۳۰ روز بعد از عمل و میزان بروز تنگی دیورس و بقاء اختلاف معنی دار آماری نداشتند ولی از نظر میزان بروز نشت آناستوموز (در گروه ترانس هیاتال شایعتر بوده) و متوسط زمان جراحی (در گروه Ivor Lewis طولانی تر بوده) اختلاف معنی دار آماری داشته اند. با توجه به این که نشت آناستوموز در گروه ترانس هیاتال شایعتر بوده ولی مورتالیتی در هر دو گروه یکسان بوده دلیلی بر خوش خیم بودن نشت آناستوموز در گردن می باشد.

توصیه ها: با توجه به نتایج این تحقیق هر دو تکنیک مزبور از نظر عوارض و میزان امید به زندگی با هم قابل مقایسه بوده و انتخاب هر یک از این روش ها بسته به انتخاب جراح و شرایط بیمار می باشد.

واژه های کلیدی: سرطان مری، ازوفازکتومی، ترانس هیاتال، ترانس توراسیک.