Short Communication

J Babol Univ Med Sci
Vol 19, Issu 11; Nov 2017. P:35-41

Postoperative Outcomes of Transhiatal Esophagectomy in Patients with Esophageal Cancer, at Babol University Hospitals, from 2005 to 2015

Y. Asghari (MD)[1], N. Nikbakhsh (MD)[2], S. Khafri (PhD)[3], S. Kamali Ahangar (BSc)[4], A. Noorbaran (MD) *[5]

1.Student Research Committee, Babol University of Medical Sciences, Babol, I.R.Iran
2.Cancer Research Center, Health Research Institute, Babol University of Medical Sciences, Babol I.R.Iran
3.Fertility and Infertility Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, I.R.Iran
4.Social Determinants of Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, I.R.Iran
5.Clinical Research Development Unit, Shahid Beheshti Hospital, Babol University of Medical Sciences, Babol, I.R.Iran

J Babol Univ Med Sci; 19(11); Nov 2017; PP: 35-41

Received: Jun 11th 2017, Revised: Aug 2nd 2017, Accepted: Oct 3rd 2017.

ABSTRACT

BACKGROUND AND OBJECTIVE: According to the importance of the esophageal cancer problem in northern provinces of Iran, and also high volume of transhiatal esophagectomy operations at Babol university hospitals, this study was conducted to identifying postoperative short term outcomes of transhiatal esophagectomy in patients with esophageal cancer.

METHODS: This cross-sectional study was done on 114 patients with diagnosis of esophageal cancer that underwent transhiatal esophagectomy in Babol university hospitals, north of Iran, from 2005 to 2015. The study data were analyzed applying SPSS for windows (version 23), T-test, 2-independent sample chi-square and exact fisher test.

FINDINGS: Of 114 patients**,** 62 of cases (54.4%) was male and 52 of them (45.6%) was female. The mean age of the patients was 62.25year. The most common symptom of the patients was dysphagia (99.1%). Pathologic feature of the tumors was squamous cell carcinoma in 89.5% of cases. The most common postoperative complications were arrhythmia (13.3%) and pleural effusion (10.5%). Mean admission duration was 9.31±2.94 days. Anastomosis site leak occurred in 8 patients (7.1%). In operation and in hospital mortality occurred for 1 cases (0.9%) and 4 cases (3.5%) respectively.

CONCLUSION: On the basis of this study, Babol university hospitals has good result for postoperative outcomes of transhiatal esophagectomy comparing with other centers especially about admission time, need for tube thoracostomy, anastomosis site leak rate, and mortality rate.

KEY WORDS: *Esophageal Cancer, Transhiatal Esophagectomy, Outcomes, Leak, Mortality*.

Please cite this article as follows:

Asghari Y, Nikbakhsh N, Khafri S, Kamali Ahangar S, Noorbaran A. Postoperative Outcomes of Transhiatal Esophagectomy in Patients with Esophageal Cancer, at Babol University Hospitals, from 2005 to 2015. J Babol Univ Med Sci. 2017;19(11):35-41.

* **Corresponding author: A. Noorbaran (MD)**
Address: Clinical Research Development Unit, Shahid Beheshti Hospital, Babol University of Medical Sciences, Babol, I.R.Iran
Tel:+98 11 32252071
E-mail: anoorbaran@yahoo.com.

[DOR: 20.1001.1.15614107.1396.19.11.5.6]
[DOI: 10.18869/acadpub.jbums.19.11.35]

Introduction

Cancer of Esophagus, is the eighth most common cancer in the world, has two histopathologic subgroups, including squamous cell carcinoma (S.C.C) and adenocarcinoma (1). The southern coast of the Caspian Sea is one of the most common areas of esophageal cancer, with an incidence of over 100 per 100,000 people (2, 3). Dysphagia and weight loss are common complaints in patients that suggest high levels of disease (4).

The main treatment method for prognosis and quality of life in patients with esophageal cancer is surgical procedure (5). Significant consequences of transhital oesophagectomy include recurrent laryngeal nerve damage, bleeding, deep vein thrombosis (DVT) and pulmonary embolism, cervical anastomosis leakage, anastomosis location stricture, surgical wound infections, mediastinitis, and mortality (7,6).

Considering the importance of the issue of esophageal cancer in the northern regions of Iran, the high incidence and prevalence of transhiatal esophagectomy in Babol University of Medical Sciences, this study was conducted to evaluate the center, results and complications of this surgical procedure, in order to improve the results of surgical treatment and improving the quality of life of patients in the future.

Methods

This cross-sectional study was conducted after approval by the Ethics Committee of Babol University of Medical Sciences, code 228.1394MUBABOL.REC. on all patients who esophageal cancer was diagnosed for them based on endoscopic findings and histopathological examination and were undergo transhiatal esophagectomy in Hospitals affiliated to Babol University of Medical Sciences from 1384-94. Patients who were diagnosed as inoperable before surgery due to the extent of the injuries, or during surgical procedure, had to change the technique and thoracotomy, or surgical termination, were excluded. Demographic and clinical data were recorded in the questionnaire. Data were analyzed using SPSS V.23 software (t-test, Chi Square, fisher exact test and logistic regression) and P-value less than 0.05 was considered significant.

Results

This study was performed on 114 patients with esophageal cancers undergoing transhilar esophagectomy. Of these, 62 (54.4%) were male and 52 (45.6%) were female. The mean age of patients is 65.52±9.2 years and the age range of cancers is 38-84 years old. The mean age of men with cancers of the esophagus is 66.8±10 years and the age range of cancers in men is 38-84 years. The mean age in women with esophageal cancers is 63.33±7.3 years and the age range of female esophagus is 42-47 years. The youngest person was 38 years old. The mean age of women was lower than males, but this difference was not statistically significant.

Of the patients, 113 cases (99.1%) complained of dysphagia, and only one patient had no dysphagia due to an upper endoscopic discomfort in the epigastric region, and in the evaluations, the esophageal cancers was diagnosed. Odynophagia was present in 35 (30.7%) patients at the time of referral. 68 patients (59.6%) experienced weight loss at the time of referral. Anemia was diagnosed in 12 patients (10.5%) on initial visitation. One third of the lower esophagus was the most common site of tumor involvement (54 patients: 47.4%). Squamous cell carcinoma in 102 patients (89.5%) involved the majority of cases of esophageal cancer.

Blood groups have the highest incidence of 30, 28, and 21, respectively. The mean surgical duration was 189.65±30.82 minutes, the mean duration of stay in the ICU was 4.99±3.20 days and the mean hospital stay was 9.37±2.94 days. The mean cardiovascular events after surgery were 28.8% in men and 14.8% in men. As it is seen, the difference between these two groups is significant, but there is no significant difference (p=0.068). During surgery, 6 patients had hypotension, of which 2 (33.3%) had post-surgery cardiovascular events, but this relationship was not statistically significant (p=0.477).

Six patients also experienced arrhythmias during surgery, of which four (66.7%) had post-surgery cardiovascular bypass, which statistically showed a significant relationship between intra-arrhythmic during surgery and cardiovascular complications after surgery (p=0.005). The mean age of patients with cardiovascular disease was 67.29±4.5 years and the mean duration of surgery in patients with

[DOR: 20.1001.1.15614107.1396.19.11.5.6]
[DOI: 10.18869/acadpub.jbums.19.11.35]

cardiovascular disease was 192.71±28.3 minutes. There was not a statistically significant relationship between the age of patients and the duration of surgery with the incidence of cardiovascular complications. Also, the mean age of patients with pulmonary complication after surgery was 66.25±4.31 years and the mean duration of surgery in this group was 188.75±25.17 minutes. There was a statistically significant relationship between age of patients (p=0.882) and surgical duration (p=0.134), there was no incidence of post-surgery pulmonary complications. Frequency distribution and type of complication in patients with esophageal cancer undergoing transhital esophagectomy are presented in Table 1.

Table1. Distribution of Absolute and Relative Abnormalities of the Type of Complication Following Transhiatal Esophagectomy Surgery in Patients with esophageal cancer

Complication	Abundance(%)
Death during surgery	1(0.9)
DVT	1(0.9)
Pulmonary embolism	1(0.9)
Recurrent laryngeal nerve injury	2(1.8)
MI (myocardial infarction)	2(1.8)
Splenectomy	2(1.8)
Hospital death	4(3.5)
Pneumonia	4(3.5)
Need for blood transfusion	4(3.5)
Ateletzia	5(4.4)
Irregular heartbeat during surgery	6(5.3)
Pneumothorax	6(5.3)
Hypotension during surgery	6(5.3)
Surgical wound infection	6(5.3)
Congestive Heart Failure	7(6.2)
Lung edema	8(7.1)
Anastomotic leakage	8(7.1)
Need for artificial respiration (respiratory failure)	12(10.6)
Pleural discharges	12(10.6)
Irregular heartbeat during admission	15(13.3)

The most commonly occurring complication following gtranshiatal esophagectomy was abnormal heart arrhythmia, of which 6 occurred during surgery and 15 cases were hospitalized. The insertion of the chest tube was required for 17 patients, 11 of which were due to pleural effusions and 5 cases of pneumothorax, and 1 case of pneumothorax and pleural effusion. In this study, 8 (7%) patients suffered from anastomosis leakage with signs of swelling, redness and secretion from the scar tissue, all of which were treated with supportive and non-surgical treatments, namely, the opening of neck sutures, wound healing, continuous dressing and self-sustaining lumbar repair. Two patients underwent splenectomy due to bleeding caused by spleen injury. 1 death occurred during surgery due to mediastinal bleeding, pressure drop and arrhythmia. Four hospital deaths occurred, of which 3 occurred due to arrhythmia and heart failure on the second day after surgery and one case due to respiratory failure on the sixth day after surgery (1).

Discussion

The results and complications of transhiatal esophagectomy surgery in Babol University of Medical Sciences are comparable to the valid centers. Various studies have shown that mortality (mortality) following esophageal resection surgery is strongly correlated with the number of surgeries performed over the course of one year in the case volume hospital (8, 9). Michael w.wouters et al. reported that hospitals that perform less than seven esophageal resection surgery per year are low volume and those who do more than these numbers of surgeries are considered high volume (10).

The more important thing is that the surgeon's own experience, more important than the volume of surgical patients in a hospital, affects the mortality of the surgery (11). Considering the above mentioned explanation and pointing out that in this study, in the period of 10 years, 114 cases of transhiatal esophagectomy with an annual average of 11.4 were done, Babol University of Medical Sciences hospitals could be designated as the High Volume Center for this surgical procedure. In the present study, the most common complaint of patients was dysphagia (99.1%), only one patient without dysphagia due to the discomfort of epigastric pain was underwent esophagogastroduodenoscopy due to discomfort in epigastric pain and esophagus cancer was diagnosed . Weight loss (59.6%) and odynophagia (30.7%) were

[DOR: 20.1001.1.15614107.1396.19.11.5.6]
[DOI: 10.18869/acadpub.jbums.19.11.35]

other symptoms of the present study at the time of referral. Similarly, in the study of Mozaffar et al. (2008-2000), the most common symptom was dysphagia when it occurred in 97% of patients, while weight loss was 89% and odynophagia was reported, 19% (12). In this study, the most common involvement site was the lower esophagus. 102 cases (89.5%) were S.C.C (squamous cell carcinoma) and 12 cases (10.5%) were adenocarcinoma. In contrast, Tabatabai et al (2009) reported that in 70.7% of patients, the tumor is located in the middle of the esophagus. Also 62.3% of tumors were S.C.C and 36.1% of them were adenocarcinoma cases (13).

While in Orringer et al., most tumors (82%) were at the lower. 13% of them were squamous cell carcinoma and 86% of them were adenocarcinoma (14). In Jangjoo et al., 94% of patients had S.C.C., 4% had adenocarcinoma and 2% had sarcoma (15). In this study, the mean duration of surgery was 189.65±30.82 minutes. Also, the mean duration of NPO in this study was 5.2±1.66 days. The average length of stay in the ICU was 4.9±3.2 days and the average length of staying in the hospital was 9.3±2.94 days, which is similar to Orringer et al. (14).

In another study, Tabatabai et al. (2009) reported that the average transhiatal esophagectomy time in patients under study was 106.13±17.88 min, which was clearly less than the time of surgery in our study, while the mean length of staying in hospital was 12.5±8.11 days and longer than our findings (13). Zamani and colleagues reported that the average duration of surgery was 4.93 hours, the average number of hospital days was 9.95, the average duration of stay in the intensive care unit was 1.6 days, and the duration of the NPO was 6.66 days (4). However, in the study of Mozaffar et al., the mean duration of surgery was 274.92 minutes and the mean hospital stay was 14.39 days (12), both of which were more than our study. Anastomosis leakage occurred in 8 cases (7%) with swelling, redness and secretion from the cervical lesions and with supportive treatment (including opening sutures, clearing and replacing continuous dressing and self-sustaining closure) recovery was achieved in all cases.

In Orringer et al., anastomosis leakage occurred in 185 cases (9.6%), which was relatively similar to our results. This complication was treated by opening the cervical wound and cleansing local dressing and self-sustaining underwent treatment (14). In the study of Gadazand et al., anastomosis leakage was reported in 10% of cases (16).

In the Tabatabai et al study, the anastomosis rate was 21.3%, which was higher than other studies (13). Many researchers have implemented the bilateral chest tubes routine embedding at the end of the transhital esophagectomy (17), while in the present study, the insertion of a chest tube for 17 patients (13.3%) and due to pleural secretion (11 cases) and pneumothorax (4 cases and 1 case of pneumothorax and plural secretion simultaneously) became necessary. In the study of jangjoo et al., 33.3% of patients undergoing transhital esophagectomy required the insertion of a chest tube (15).

In the study of Godazande et al., 20% of patients had hemoturox (16). As it is seen, the requirements for insertion of the chest tube in this study are less than other studies, and on the other hand, and with reference to some studies, the routine insertion of the bilateral chest tube at the end of the transhital esophagectomy procedure can be concluded that the need for routine insertion of the chest tube in this surgical procedure is not appropriate, but it is done depending on the case and on the basis of necessity. In the present study, all cases of pneumothorax occurred in patients whose tumor had involved the midline of the esophagus, and all cases requiring a chest tube were S.CC-type tumor that was compared to that of other studies, so far in a study this pattern of occurrence is not based on the type of pathology and location of the tumor.

In the present study, 1 death occurred during surgery (0.9%) due to bleeding, pressure loss and arrhythmias during esophageal release. While in the Orringer study, 4 deaths occurred during surgery (0.3%) due to uncontrolled bleeding during esophageal release (14). In this present study, mortality rate after surgery was 4 case (3.5%) during hospital stay, 3 of which were due to arrhythmias and heart failure and one case was due to respiratory failure. In the same conclusion, in the Orringer et al. study the rate of hospital mortality in patients with transhiatal esophagectomy due to esophageal cancer was 42 (3%). However, in the study of Raz and his colleagues in the United States (2008), the mortality rate of transhiatal

[DOR: 20.1001.1.15614107.1396.19.11.5.6]
[DOI: 10.18869/acadpub.jbums.19.11.35]

esophagectomy was 27% (18), which is much higher than our study. Dotkowski et al., in Germany (2002) (19), reported a mortality rate of transhital esophagectomy of 3.8% (12). In the study of Zamani and colleagues, mortality rate was reported after transhiatal esophagectomy (12.5%) (4). In a study conducted by Homeh et al. in 2006 in Yemen, the rate of intra-hospital mortality in the transhiatal method was 9.3% (20).

However, in a study by Gockel et al in 2005, 150 patients with cancers of the esophagus who underwent transhiatal esophagectomy had a mortality rate of 6.7% (21). In our study, motility rates were low and similar to some studies, including the orringer study in the United States (14) and Dotkoswski (19) in Germany. The cause of the difference between studies in mortality rate is probably due to the fact that the tumor stage, the patient's condition and surgeon's skill, and the number of cases of surgery (case volume) affects the outcomes and surgical outcomes (17). In the present study, such as the orringer study and many other studies, nutritional jejunostomy was used to support nutrition of the patients and help to weigh and prevent weight loss in the post-surgery period, and proper oral administration (14). The results of our study show that Babol University of Medical Sciences as a High Volume Center, in terms of short-term outcomes, transhiatal esophagectomy for esophageal cancer is equal to many studies and centers. And even in some cases, including the number of cases of recurrent laryngeal nerve damage, the need for a chest tube, cervical anastomosis leakage, mortality during surgery and hospital mortality, has a relative advantage.

Acknowledgments

Hereby, we would like to thank the Research and Technology Council of Babol University of Medical Sciences as well as all personnel in the surgery and operating room in Shahid Beheshti Hospital and Ayatollah Rouhani Hospital of Babol and the Department of Clinical Research Development of Shahid Beheshti Hospital.

[DOR: 20.1001.1.15614107.1396.19.11.5.6]
[DOI: 10.18869/acadpub.jbums.19.11.35]

References

1.Semnani S, Besharat S, Abdollahi N, Keshtkar A, Kabir M, Fazel A. Factors associated with esophageal cancer in the south east part of the caspian sea. J Guilan Med Univ. 2005;13(52):24-8. [In Persian]

2.Sadjadi A, Nouraie M, Mohagheghi MA, Mousavi-Jarrahi A, Malekezadeh R, Parkin DM. Cancer occurrence in Iran in 2002, an international perspective. Asian Pac J Cancer Prev. 2005;6(3):359-63.

3.Siassi F, Pouransari Z, Ghadirian P. Nutrient intake and esophageal cancer in the Caspian littoral of Iran: a case-control study. Cancer Detec Prevent. 2000;24(3):295-303.

4.Zamani M, Tavassoli Âshrafi A, Pooria A, Khalilian A. Comparison between mortality and morbidity of transhiatal versus transthoracic esophagectomy in the treatment of Esophageal cancer. J Mazandaran Univ Med Sci. 2000;9(25):20-4. [In Persian].

5.Rajabi Mashhadi M, Maddah G, Bagheri R, Faghanzadeh Ganji G, Shojaeian R, Nurshafiee S, et al. The comparison of the complications between two surgical techniques of esophageal cancer. J Cardiothorac Med. 2014;2(2):177-80.

6. Charles Brunicardi F, Andersen K, Timothy R, David L, John G, Jeffrey B. Schwartz's principles of surgery .10th ed. USA: McGraw-Hill Education, 2015.

7.Korst RJ, Port JL, Lee PC, Altorki NK. Intrathoracic manifestations of cervical anastomotic leaks after transthoracic esophagectomy for carcinoma. Ann Thorac Surg. 2005;80(4):1185-90.

8.Halm EA, Lee C, Chassin MR. Is volume related to outcome in health care? a systematic review and methodologic critique of the literature. Ann Inter Med. 2002;137(6):511-20.

9.Dudley RA, Johansen KL, Brand R, Rennie DJ, Milstein A .Selective referral to high-volume hospitals: estimating potentially avoidable deaths. JAMA. 2000;283(9):1159-66.

10.Wouters MW, Wijnhoven BP, Karim-Kos HE, Blaauwgeers HG, Stassen LP, Steup WH, et al. High-volume versus low-volume for esophageal resections for cancer: the essential role of case-mix adjustments based on clinical data. Ann Surg Oncol. 2008;15(1):80-7.

11.Dimick JB, Cowan JA, Ailawadi G, Wainess RM, Upchurch GR. National variation in operative mortality rates for esophageal resection and the need for quality improvement. Arch Surg. 2003;138(12):1305-9.

12.Mozafar M, Sohhiyeh MR, Kazemkhani M ,Yekta Z, Tajik A. Comparison of trans-hiatal esophegectomy and trans-thoracic esophegectomy in patients with esophageal cancer at shohadaye tajrish hospital (2000-2008). Iran Surg J. 2009;17(4):19-25. [In Persian]

13.Tabatabai A, Hashemi M, Mohajeri Gh, Ahmadinejad M, Abass Khan I, Haghdani S. Incidence and risk factors predisposing anastomotic leak after transhiatal esophagectomy. Ann Thorac Med. 2009;4(4):197-200.

14.Orringer MB, Marshall B, Chang AC, Lee J, Pickens A, Lau CL. Two thousand transhiatal esophagectomies: changing trends, lessons learned. Ann Surg. 2007;246(3):363-72.

15.Jangjoo A, Mehrabi Bahar M, Mohajerzadeh L, Aliakbarian M, Nouri M, Jabbari Nooghabi M. Necessity of routine thoracostomy tube insertion after transhiatal esophagectomy. J Surg Trauma. 2013;1(3):50-4. [In Persian].

16.Godazandeh G, Khani H, Afzali S, Khalilian A, Malek iE, Tirgar Fakheri H. The effect of esophagectomy and cervical esophagogastrostomy with or without of pyloromyotomy on emptying of intrathoracic stomach. J Mazandaran Univ Med Sci. 2007;17(60):48-57. [In Persian].

17.Kim SH, Lee KS, Shim YM, Kim K, Yang PS, Kim TS. Esophageal resection: indications, techniques, and radiologic assessment. Radiographics. 2001;21(5):1119-37.

18.Raz DJ, Tedesco P, Herbella FA, Nipomnick I, Way LW, Patti MG. Side-to-side stapled intra-thoracic esophagogastric anastomosis reduces the incidence of leaks and stenosis. J Int Soc Dis Eso. 2008;21(1):69-72.

19.Dutkowski P, Kneist W, Sultanow F, Junginger T. Adenocarcinoma of the esophagus: prognostic comparison between transthoracic esophageal resection with expanded 2-field lymph node dissection and trans-hiatal esophageal dissection with abdominal lymph node excision. Kong Deut Gesel Chirurg Kong. 2002;119:333-8.

[DOR: 20.1001.1.15614107.1396.19.11.5.6]
[DOI: 10.18869/acadpub.jbums.19.11.35]

20.Homesh N, Alsabahi A, Al-agmar M. Transhiatal versus transthoracic resection for esophageal carcinoma in Yemen. Singapore Med J. 2006;47(1):54-9.

21.Gockel 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;3:40.

[DOR: 20.1001.1.15614107.1396.19.11.5.6]

[DOI: 10.18869/acadpub.jbums.19.11.35]