Determinants of immediate outcome of surgical esophagectomy

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الخلاصة

ان عملية رفع المرئ عبر فتحة المرئ الحجابية حصلت على شعبية كبيرة خلال السنوات الاخيرة .في عام 1978 اورنجر وسلون جددوا الاهتمام بهذه الطريقة الجراحية واعتبروها طريقة بديلة الى عملية رفع المرئ عبر عملية فتح الصدر التقليدية .هذه العملية تجرى دون الحاجة الى عملية فتح الصدر وبذلك فان التاثير الفسلجي السلبي على الجسم جراء عملية فتح الصدر يتضائل وبذلك فان هذه العملية تقلل من نسبة المضاعفات و الوفاة.

هذه الدراسة استعادية و مستقبلية تشمل 93 مريضا اجريت لهم عمليات رفع المرئ الجراحية لاسباب عدة خلال الفترة من 2003 –شهر كانون الاول ولغاية 2011 شهر تموز في مستشفى النجف التعليمي . نتيجة المرضى بعد العملية تلاحظ خلال فترة شهر كامل .شملت الدراسة ثلاثة طرق لاجراء عملية رفع المرئ وهي اولا طريقة فتح الصدر للجهه اليسرى مع عملية فتح البطن . والطريقة الثانية فتح الصدر للجهه اليمنى مع عملية فتح البطن والطريقة الثالثة هي عملية رفع المرئ عبر فتحة المرئ الحجابية .

اظهرت الدراسة ان الاكبر سنا كان في مجموعة المرضى الاولى (عملية فتح الصدر للجهه اليمنى) واقل سنا في المجموعة الثانية (عملية فتح الصدر للجهه اليسرى) والاقل عمرا في المجموعة الثالثة (عملية رفع المرئ عبر فتحة المرئ الحجابية) . بينت الدراسة زيادة ملحوظة في نسبة الذكور كما بينت الدراسة ان الورم الغدي السرطاني هو الاكثر شيوعا . كما بينت الدراسة ان عملية رفع المرئ عبر فتحة المرئ الحجابية هي الطريقة الافضل اذا كان المريض مرشحا جيدا لهذه العملية وذلك لان هذه الطريقة تضمن وقت اقصر للعملية ، وقت اقصر للرقود في المستشفى ،مع عدم وجود مضاعفات .ولكن هذه الطريقة بينت ان نسبة فقدان الدم اثناء العملية نسبة اعلى مع زيادة نسبة حدوث اضطراب دقات القلب .

استنتج ان عملية رفع المرئ عبر فتحة المرئ الحجابية طريقة افضل عند المرضى المناسبين وذات نتائج مباشرة افضل ولكنها تحتاج الى متابعة ومعاجلة دقيقة .

Abstract

Background: Transhiatal esophagectomy (THE) has been gaining popularity for the past two and a half decades. In 1978 Orringer and Sloan renewed interest in this procedure, presenting it as an alternative approach to the more traditional transthoracic esophagectomy. This is done without a thoracotomy and the physiologic impact on the body is minimized, resulting in decreased morbidity and mortality rates.

Patients and methods: this is retrospective and prospective study include total number of 93 patients underwent surgical esophagectomy for different reasons during period of time from December 2003 until

July 2011, in AL- Najaf Governorate hospitals. Patients reviewed retrospectively, postoperative outcome that noticed during one month period postoperatively. Surgical access is divided into three approaches either left or right thoracotomy approach with laparotomy. Third approach was the transhiatal esophagectomy.

Results: The mean age of patients was the oldest in right thoracotomy group (5o± 6.5 years) and less in left thoracotomy group (48± 4.6 years) and least in transhiatal group (46±5.1 years). Transhiatal group for non tumor causes is exceptional group as this is childhood with age (6±2.3 year). There is significant predominance of male gender and the adenocarcinoma is the predominant histopathological type in all groups. This study addressed that transhiatal approach is a better option for esophageal resection if the patient is good candidate for this approach, as this approach has shorter surgical time, less hospital stay, no anastomotic leak, no gastric dilatation as stomach will be enclosed in the esophageal bed, however this approach- the transhiatal- has more blood loss and more incidence of cardiac compression and arrhythmias which need special and close observation and management.

Conclusions: Transhiatal approach is a better option in suitable candidate that has better immediate surgical outcome yet it need more close observation and management.

Background: Transhiatal esophagectomy (THE) has been gaining popularity for the past two and a half decades. In 1978 Orringer and Sloan renewed interest in this procedure, presenting it as an alternative approach to the more traditional transthoracic esophagectomy.[1] This is done without a thoracotomy and the physiologic impact on the body is minimized, resulting in decreased morbidity and mortality rates.

Introduction

The thoracic esophagus courses through the posterior aspect of the middle mediastinum. In most patients the esophagus lies in the midline, however, slight deviation to the right or left is not uncommon. Although the entire thoracic esophagus can be mobilized from either hemithorax, the ability to evaluate tissue planes at greatest risk for invasion dictates the approach.[2] Tumors in the upper two thirds of the chest are most often approached from the right side of the chest (assess airway, azygos,

pericardium), and tumors of the distal third are approached by several centers from the left side of the chest (assess aorta, pericardium, crus).The blood supply to the uppermost portion of the thoracic esophagus arises from the inferior thyroid arteries. The remainder of the thoracic esophagus is perfused by branches of the bronchial arteries and esophageal perforators directly from the aorta. [3] Because of an extensive network of collaterals between the cervical, thoracic, and abdominal esophagus, the thoracic esophagus can be fully mobilized and left in situ if the operation is unable to be completed.[4]An en bloc esophagectomy refers to the resection of all tissues from the hiatus to the arch of the azygos vein contained within the following borders: the left and right parietal pleura, the adventitia of the aorta, the vertebral bodies, the posterior pericardium, and the membranous airway at the carina.[5] Included within this resection are the esophagus, the vague nerves, para-esophageal lymph nodes (levels 7 and 8), azygos vein (varies by surgeon), thoracic duct, bilateral parietal pleura, the base of bilateral inferior pulmonary ligament level 9 lymph nodes (bilaterally), and the posterior pericardium.[6]

Patients under evaluation for an esophagectomy should be considered potential candidates for transhiatal esophagectomy. The transhiatal approach to esophagectomy has been used for resection of tumors at any location; however, it is best for tumors in the lower esophagus distal to the membranous trachea and at the esophagogastric junction. [7] This approach allows complete excision of the esophagus without the need for a thoracotomy. Patients post radiation treatment and those with periesophageal adhesions from various causes (caustic injuries, achalasia, previous surgeries) can still undergo transhiatal esophagectomy, however, patients with local invasion of major structures or those with distant metastasis (stage IV disease) are considered unresectable because the risk from the surgery far outweighs the benefits derived from the procedure.[8]

Thoracic Esophagectomy via Left Thoracoabdominal Approach:

The patient is positioned in the right lateral decubitus position. The left arm, left neck, chest, and abdomen are prepared into the field. An anterolateral thoracotomy is marked along the sixth intercostals space.

The incision will extend through the costal arch and onto the abdomen obliquely for 5 to 8 cm (just enough to fit one hand in).[9]

Ivor Lewis Esophagectomy: For abdominal Portion, An upper midline laparotomy is made and the gastric mobilization, conduit formation, jejunostomy tube, and gastric emptying procedure are performed as described for the tri-incision esophagectomy. Suture the tip of the conduit to the specimen in such a way that proper orientation can be maintained. [10] For the thoracic Portion: The incision and mobilization of the thoracic esophagus. At completion of the inferior portion of the dissection, bring the conduit up into the chest. Great care must be taken to maintain orientation. [11]

Patients and methods

This is retrospective and prospective study include total number of 93 patients underwent surgical esophagectomy for different reasons during period of time from December 2003 until July 2011, in AL- Najaf Governorate hospitals. Patients reviewed retrospectively including preoperative data (age, gender, clinical, radiological and histopathological findings) and intraoperative findings which mainly concentrates on types of surgical access and approach. Postoperative data including the postoperative outcome that noticed during 30 days period postoperatively, these include the operative mortality and morbidity such as esophageal stenosis, leak, bleeding, gastric dilatation, wound infection. Surgical access is divided into three approaches either left thoracotomy approach with laparotomy, thoracotomy incision is made through left posterolateral incision through the sixth intercostals space, esophagus was mobilized with lymph nodes dissection, and the same was done for stomach through midline upper laparotomy with addition drainage operation pyloroplasty.

Second approach is the right thoracotomy, posterolateral incision was made and thorax is entered through fifth or sixth intercostals space, same in left approach for stomach is applied herewith gastroesophageal anastomosis in right thorax.

Third approach was the transhiatal esophagectomy which includes cervical incision in left side of neck and upper midline laparotomy incision with blind dissection of esophagus from the two incisions then

esophagectomy was done without thoracotomy and same thing done for stomach in first and second approach and here the remaining of stomach was anastomosed to cervical esophagus. All the patients were followed up for 30 days by regular visit to hospital or the private clinic. Statistical analysis was performed with spss software and dichotomous data was expressed with X^2 test while continuous data was expressed using t-test. p- Value is considered significant if it is < 0.05.

Results

The study show that, from the 93 patients, 15 (16.13%) patients have transhiatal approach (6 patients for caustic esophagus, 7 patients for esophageal tumors and 2 patients for long congenital esophageal stenosis), 21 (22.5%) patients approached through left thoracotomy (all of them for tumors), and the remaining 57 (61.29%) patients were approached through right thoracotomy (IVor Lewis operation)**.**All cases were provisionally diagnosed by esophagogram, example shown in figure(1) and proved by endoscopy and direct biopsy. Only patients who sustained esophagectomy were included in this study. The mean age of patients was the oldest in right thoracotomy group (5o± 6.5 years) and less in left thoracotomy group (48± 4.6 years) and least in transhiatal group (46±5.1 years. Transhiatal group for non tumor causes is exceptional group as this is childhood with age (6±2.3 year).Most patients were male in all groups with significant predominance of this gender (86.02%), as shown in table (1).

In histopathological examination for esophageal specimen in tumor cases, as shown in table (2), the adenocarcinoma is the predominant type in all groups, reported in 76 (81.72%) patients (adenocarcinoma 50, 19, 7 patients in right thoracotomy, left thoracotomy, transhiatal groups respectively) while squamous cell carcinoma only reported in right thoracotomy group in 4 (4.3%) patients.Nonhodgking lymphoma surprisingly Involved 5 (5.38%)patients (3, 2 patients in right thoracotomy, left thoracotomy group respectively) as shown in table (2). Figure (2) shows specimen of esophageal lymphoma. Free margin involved in 15 (16.13%) patients (9, 6 patients in right thoracotomy, left thoracotomy groups respectively), while the margins are free of tumors in all patients with transhiatal group. Lymph nodes involvement, mainly

upper abdominal paraaortic lymph nodes were involved in 27(29.3%) patients (20, 7 patients in right thoracotomy, left thoracotomy groups respectively) and no microscopical nodal involvement in transhiatal group. Tumor extends outside the esophageal wall only in 22(23.65%) patients (19, 3 patients in right thoracotomy, left thoracotomy groups respectively). Operative and postoperative data were reported as shown in table(3) , right thoracotomy approach consumed more time in surgery (173±20minutes) and least surgical operation time was reported in transhiatal group (130±13, 125±17 minutes for tumor and non tumor groups respectively).Transhiatal approach in adults has the highest mean of blood loss (600±31 ml) and least blood loss was seen in left thoracotomy group (230±27 ml).Hospital stay for all groups ranged from 4 to 12 days with the least hospital stay was reported in transhiatal group (6± 1.5 days).No operative mortality in our study groups, while different operative and postoperative morbidities were reported as shown in table (4), these includes anastomotic leak in 9,2 patients, in right thoracotomy, left thoracotomy groups respectively and not seen in the Transhiatal group. Acute gastric dilatation occur in 12,3 patients in right thoracotomy, left thoracotomy groups respectively and not reported in the Transhiatal group. Delayed gastric emptying rate which can be treated conservatively was seen in 2, 1 patients in right thoracotomy, left thoracotomy groups respectively and not occur in the Transhiatal group. Wound sepsis was seen in 5, 2 patients in right thoracotomy, left thoracotomy groups respectively and not reported in the Transhiatal group. Postoperative serious arrhythmia and heart failure were only seen in adult transhiatal group in 3 patients and in left thoracotomy group 2 patients. So our study reveal that anastomotic leak, acute gastric dilatation, delayed gastric emptying and wound sepsis are more likely to complicate both right and left thoracotomy approaches and unlikely to occur in transhiatal approach.

Discussion

Esophageal surgery is an important component of thoracic and gastrointestinal surgery and it needs notifiable experience with good learning curve to aid in minimizing the postoperative complication and approaching the pleural cavities, mediastinum, and peritoneal cavity at

the same time, in addition to lymph node dissection which increase the rate of postoperative complications. We tried in this study to show the basis to choose the best approach for esophagectomy to decrease the operative and postoperative morbidities.

In comparison to other studies of esophagectomy for tumors [12] our study has relatively younger age group and this may be due to early involvement of esophagus by cancer transformation which might be due to badly managed reflux esophagitis with its metaplastic and dysplastic changes. Most our patient were male, even higher incidence in male gender than any other studies [13] and this need further study to determine the differential risk factors between male and female in our community. The histopathological finding of esophageal specimen was predominantly adenocarcinoma, occur in 76 patients (81.72%) and squamous cell carcinoma is a rarity (4.3%) and this is not goes with other studies [14] and again this may be related to special risk factors and food habits for our patients. Our study reporting five cases of esophageal lymphoma (5.38%), this would raise question for the occurrence of this extremely rare tumor involvement in esophagus. [13]Transhiatal approach gives full length for esophagectomy yet our study show that the free margin of the resected esophagus not involved by tumors in this group. More lymph node involvement was noticed in right and left thoracotomy groups as those already not a candidate for transhiatal approach because of extra esophageal tumor extension. This study addressed that transhiatal approach is a better option for esophageal resection if the patient is good candidate for this approach, as this approach has shorter surgical time, less hospital stay, no anastomotic leak, no gastric dilatation as stomach will be enclosed in the esophageal bed, no delayed gastric emptying and no wound sepsis, however this approach- the transhiatal- has more blood loss and more incidence of cardiac compression and arrhythmias which need close observation and special management.

Conclusions

Transhiatal approach is a better option in suitable candidate that has better immediate surgical outcome yet it need more close observation and management.

Table (1) – Mean of the age and gender of the patients with esophagectomy.

Item	Right thoracotomy	Left thoracotomy	Transhiatal approach		total	P value
			For tumor Causes	For non tumor Causes		
Mean Age (years)	50±6.3	48±4.6	46±5.1	6±2.3		P<0.02
Male---	49	19	7	5	80 (86.02%)	P<0.03
Female	8	2	0	3	13 (13.98%)	
total	57	21	7	8	93	

Table (2) The histopathological results, free-margin ,lymph node and extraesophageal involvement

item	Right thoracotomy	Left thoracotomy	Transhiatal	total	P-value
adenocarcinoma	50	19	7	76(81.72%)	
squamous cell ca.	4	0	0	4 (4.3%)	
lymphoma	3	2	0	5 (5.38%)	P>0.05
Non-tumour	0	0	8	8 (8.6%)	
Free-Margin not involved	48	15	7	70 (75.27%)	
Free-Margin involved	9	6	0	15 (16.13%)	P>0.05
Lymph-Node involvement	20	7	0	27(29.3%)	P<0.05
Extraesophageal involvement	19	3	0	22(23.65%)	P<0.05

Table (3):Operative and postoperative data.

Item	Right thoracotomy	Left thoracotomy	Transhiatal approach		P value
			Tumor	Non tumor	
Duration of surgery (minutes)	173±20	160±15	130±13	125±17	<0.05
Mean blood loss(ml)	260±35	230±27	600±31	250±12	<0.05
total hospital stay (days)	8±2.5	8±3.6	6±1.5	6±2.1	<0.05
Operative mortality	0	0	0	0	>0.05

Table (4): Postoperative complications.

Item	Right thoracotomy	Left thoracotomy	Transhiatal approach		P value
			Tumor	Non tumor	
Anastomotic leak	9	2	0	0	<0.05
Acute-gastric dilatation	12	3	0	0	<0.05
Delayed-sgastric emptying rate	2	1	0	0	>0.05
Wound infection	5	2	0	0	<0.05
Arrhythmia,heart failure	0	2	3	0	>0.05

Figure (1) Esophagogram showing midesophageal filling defect.

Figure (2) Surgical specimen of mid esophageal lymphoma

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