

Advantages of Single Port Thymectomy via Sub Xiphoid Approach in Lady Reading Hospital Peshawar

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ABSTRACT

Objective: To assess the advantages of single-port sub-xiphoid for thymectomy at Lady Reading Hospital Peshawar

Study Design: Retrospective study

Place and Duration of Study: This study was conducted at the Lady Reading Hospital Peshawar from February, 2016 to March, 2022.

Materials and Methods: This study using non-probability convenient sampling technique was conducted of all the consecutive 70 patients that underwent single port sub xiphoid thymectomy. All patients above 18 years scheduled for thymectomy via single-port sub xiphoid approach were included while patients American Society of Anesthesiologists (ASA III or IV) and with incomplete hospital records were excluded. SPSS v23.0 was used for data analysis. Quantitative variables were presented as mean and standard deviation while qualitative variables as frequency and percentage.

Results: From 70 patients (37 males and 33 females) with mean age of 54 ± 17.46 years, only 3 (4.3%) presented with minor perioperative complications, in 3 cases conversion to conventional approach was needed. Mean follow up time was 10 ± 4.30 months. No intra-operative deaths or mortality post-operative was reported.

Conclusion: Single port sub xiphoid approach for thymectomy is very safe and convenient, having minimal complications. It can be administered as a better alternative to the conventional lateral transthoracic approach.

Key Words: Thymectomy, Sub xiphoid, single port

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INTRODUCTION

At present, less invasive procedures are commonly used rather than conventional median sternotomy for thymectomy in treating thymus related conditions, anterior mediastinal tumors and myasthenia gravis, since there is no need for sternal incision⁽¹⁾. Single port thymectomy with sub xiphoid approach is found to be less invasive with early rehabilitation of patients. It may incur less pain post-operatively, with shortened stay in the hospital and with rapid recovery⁽²⁾.

Traditional approach to thymectomy involved 2-4 transthoracic incisions, whereas the single port incision is considered as least traumatic thoracic procedure, providing comparative outcomes as opposed to multi-incisional thymectomy surgery⁽³⁾.

The standard of thymectomy related thoroscopic surgeries is a single-port video-assisted technique having various advantages such as reduction in the frequency and timing of post-operative hospitalizations and reduced post-operative pain⁽⁴⁾. Presently, most common technique for thymectomy is the approach through lateral transthoracic⁽⁵⁾. Nonetheless, this conventional approach has been found in literature to have drawbacks, like poorly visualized thymus (especially upper pole), challenge of finding phrenic nerve on the contralateral side and pain post-operatively because of damage to intercostal nerve⁽⁶⁾. In contrast, a single port sub xiphoid approach can help in providing a better view of the surgical field for the surgeon, enabling an easy pathway for extended thymectomy. Some research have reported experiences of using concomitantly single port sub xiphoid approach having multiple advantages like detecting phrenic nerves bilaterally with ease, Thymus proximity (specially of upper pole) and intercostal space circumvention⁽⁷⁻⁹⁾.

In consideration of the above mentioned benefits, at our hospital, the single port sub xiphoid approach was being used since February 2016. The objectives of the

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study are to present the advantages of single port thymectomy through sub xiphoid approach at Lady Reading Hospital Peshawar.

MATERIALS AND METHODS

This retrospective study was carried out using non-probability convenient sampling technique through medical records from February 2016 to March 2022 at the Lady Reading Hospital, Peshawar. A total of 70 patients were included in the study after attaining ethical approval from the Ethical Review Committee of the hospital. Patients above the age of 18 years, scheduled for thymectomy, undergoing single port sub xiphoid approach at the ENT department of the hospital and diagnosed with thymoma, thymic cyst, thymic hyperplasia and bronchogenic cyst were included in the study. Patients having incomplete medical records or which was ASA III or IV were excluded from the study. Patient's data was kept confidential and anonymous.

The clinical records of each patient were obtained for demographical data including gender, age, diagnosis of myasthenia gravis (MG) and clinical data such as surgery type (extended or partial thymectomy), duration of surgery and drainage, blood loss during operation, rates of conversion to conventional methods, length of stay in hospital post-operatively, complications, histology, and pathological stage including classification. The confirmation of thymoma was done on pathology by stratification by using the classification of histology according to World Health Organization⁽¹⁰⁾. Pre-operative checkup included chest X-ray and tomography.

Operative Technique: For single port sub xiphoid thymectomy, a small X-shaped wound retractor, 5 mm 30° video thoracoscope, steel wire and Kent retractor was used. Vertical sub xiphoidal incision was given, resecting xiphoid process. The incision was preferred to be given vertically in order to prepare for unforeseen sternotomy if emergency arises. After retrosternal space's finger dissection, mediastinal pleura were opened bilaterally. The retraction of anterior chest wall was completed using Kent's retractor and wiring beneath sternum via third or fourth horizontal intercostal space. One-lung ventilation was used for performing thymectomy. Towards end of procedure, in thoracic cavity, chest tube of 24 Fr was kept in place. Insertion of chest tube was one through operative incision.

Data Analysis: SPSS version 23.0 was used for analysis of data. Quantitative variables such as age, weight, operative time duration, blood loss etc. were represented as mean and standard deviation while qualitative variables like gender, diagnosis of myasthenia gravis, and conversion to conventional method, and type of operation, histology types, WHO

classification of histology and post-operative complications.

RESULTS

Regarding baseline demographics of patients, from the total of 70 patients included in the study, 37 (52.86 %) were males and 33 (47.14 %) females. Overall the mean age of patients was 54 ± 17.46 years. 02 (2.86 %) of the patients were diagnosed with Myasthenia Gravis. In 30 (42.86 %) of cases, partial thymectomy was performed while in 40 (57.14 %) of patients, extended thymectomy was performed. The mean operative time was 128 ± 34 minutes with mean operative blood loss estimated at 194 ± 76 ml. Mean total drainage was observed to be 390 ± 135 ml. The mean duration of chest tube drainage was recorded at 3.2 ± 1.9 days while mean length of stay was 4.7 ± 2.0 days. The mean length of follow up was 10 ± 4.30 months [Table I].

Table No.1: Quantitative demographical data of patients along with peri-operative outcomes

Variables	Mean \pm Standard deviation
Age (years)	54 ± 17.46
Operative time (minutes)	128 ± 34
Operative blood loss (ml)	194 ± 76
Total drainage (ml)	390 ± 135
Chest tube drainage (days)	3.2 ± 1.9
Length of stay (days)	4.7 ± 2.0
Length of follow-up (months)	10 ± 4.30

Table No.2: Qualitative demographical data of patients along with peri-operative outcomes

Variables	Frequency (%)	
Gender	Male	37 (52.86)
	Female	33 (47.14)
Diagnosed with Myasthenia Gravis	Yes	02 (2.86)
	No	68 (97.14)
Conversion to conventional method	Yes	03 (4.39)
	No	67 (95.71)
Type of operation (thymectomy)	Partial	30 (42.86)
	Extended	40 (57.14)
Histological finding	Thymoma	65 (92.86)
	Thymic hyperplasia	02 (2.86)
	Thymic cyst	02 (2.86)
	Bronchogenic cyst	01 (1.43)
WHO classification	A	05 (7.14)
	AB	07 (10)
	B1	07 (10)
	B2	04 (5.71)
Recurrence	Yes	02 (2.86)
	No	68 (97.14)

Only in 03 (4.39 %) of patients, conversion to conventional method was needed. On histological finding, 65 (92.86 %) were reported to have thymoma, 02 (2.86 %) thymic hyperplasia and thymic cyst each while 01 (1.43 %) was found to be bronchogenic cyst. On WHO classification histologically, grade A was observed in 05 (7.14 %) patients, grade AB and B1 in 07 (10 %) patients each and grade B2 in 04 (5.71 %) of patients. Recurrence was reported in only 02 (2.86 %) of cases [Table 2].

With regards to post-operative complications, only 02 (2.86 %) patients were found to have injury to phrenic nerve while only 01 (1.43 %) patient was observed to have secondary hemorrhage [Figure I].

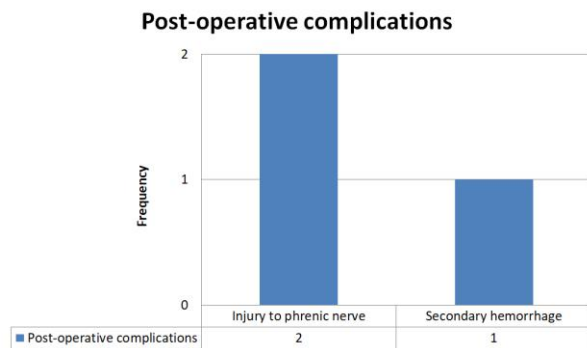


Figure No.1: Graphical representation of post-operative complications in patients undergoing single port sub xiphoid thymectomy

DISCUSSION

In consideration of the various researches, the benefits of an approach with minimal invasiveness for thymectomy are definitely apparent ⁽¹¹⁾. A lateral transthoracic approach is now being regarded as the standardized procedure for thoroscopic thymectomy ⁽¹²⁾. Studies have shown that in application of lateral transthoracic approach, a bilateral approach might possibly be required for exposing both contralateral sides adequately, aiding to remove all of the mediastinal fatty tissues ⁽¹³⁾. Moreover in case of patients with Myasthenia Gravis, an extended thymectomy is termed as an important aspect similar to ectopic foci of thymic tissues which can be found in fat of neck as well as mediastinum ⁽¹⁴⁾. Nonetheless, the duration of operation and pain post-operatively might rise if with subsequent multiple incision, which will be needed in case of bilateral transthoracic approaches, as reported in literature ⁽¹⁵⁾.

On the contrary, a sub xiphoid approach mostly does not lead to any or minimal injury or damage to the intercostal nerves, with reduced post-operative pain and resulting in a cosmetically excellent surgical wound ⁽¹⁶⁾. In our study, we observed three such cases where the single port sub xiphoid approach had to be converted

into conventional approach. In all the three cases injury to brachiocephalic vein had occurred. Similar another research reported a case where single port sub xiphoid approach thymectomy was converted into conventional approach to median sternotomy because of injury to the adjacent vessels. Sub xiphoid approach gives the surgeon / operator a swifter median sternotomy for maintaining homeostasis due to sub xiphoid single port thymectomy being carried out in supine position ⁽¹⁷⁾. Even though, phrenic nerves bilaterally can be easily demarcated though sub xiphoid approach, two cases in our study experienced injury to phrenic nerve because of the phrenic nerve being surrounded by the excisional thymoma. The incidence of complications in our study was observed in 03 (4.29 %) patients, which is much lower to the rate of complications reported in other researches that use the lateral transthoracic approaches ⁽¹⁸⁾.

There were multiple limitations to this study. First of all, the study design of this study was retrospective in nature wherein data of only a small cohort/ sample of patients was available. Secondly this study was conducted at a single center. Selection and observer bias and technical error in history taking/examination could have resulted. Patients were not followed up for long-term (mean follow up time was 10 ± 4.30 months). For further evaluating the long term outcome of single port thymectomy using sub xiphoid approaches, a lengthier cohort, with multiple institutes being included so that a greater sample size is achieved is required to validate the findings reported in this study. Future study differentiating in-between single port versus multiple port thymectomies would also be revealing.

CONCLUSION

From the results of this study, it can be safely and firmly be deduced that single port thymectomy using sub xiphoid approaches is safe technique having very few minor complications with no reported of mortality and/or morbidity. Moreover, sub xiphoid approach was the more useful in extended thymectomies. Further research with larger sample size is required to highlight and compare the findings observed in this research.

Author's Contribution:

Concept & Design of Study: Abdul Baseer
 Drafting: Mohammad Abid Khan, Fawad Ali
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 Revisiting Critically: Abdul Baseer, Mohammad Abid Khan
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Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Tianci C, Shen Z, Chen S, Lin Y, Gao L, Zhang Z, et al. Median sternotomy versus minimally invasive thymectomy for early-stage thymoma: A systematic review and meta-analysis protocol. *Medicine* 2019;98(51):e18359.
2. Suda T, Hachimaru A, Tochii D, Maeda R, Tochii S, Takagi Y. Video-assisted thoracoscopic thymectomy versus subxiphoid single-port thymectomy: initial results. *Eur J Cardio-Thoracic Surg* 2016;49(1):54-8.
3. Suda T. Subxiphoid thymectomy: single-port, dual-port, and robot-assisted. *J Visualized Surg* 2017;3.
4. Raza A, Woo E. Video-assisted thoracoscopic surgery versus sternotomy in thymectomy for thymoma and myasthenia gravis. *Annals Cardiothoracic Surg* 2016;5(1):33-7.
5. Suda T, Kaneda S, Hachimaru A, Tochii D, Maeda R, Tochii S, et al. Thymectomy via a subxiphoid approach: single-port and robot-assisted. *J Thoracic Disease* 2016;8(3):S265-71.
6. Park SY, Han KN, Hong JI, Kim HK, Kim DJ, Choi YH. Subxiphoid approach for robotic single-site-assisted thymectomy. *Eur J Cardio-Thoracic Surg* 2020;58(1):34-8.
7. Zhang L, Li M, Jiang F, Zhang Z, Zhang Q, Xu L. Subxiphoid versus lateral intercostal approaches thoracoscopic thymectomy for non-myasthenic early-stage thymoma: a propensity score-matched analysis. *Int J Surg* 2019;67:13-7.
8. Yano M, Moriyama S, Haneda H, Okuda K, Kawano O, Oda R, et al. The subxiphoid approach leads to less invasive thoracoscopic thymectomy than the lateral approach. *World J Surg* 2017; 41(3):763-70.
9. Xu H, Zhang L. A novel and simple method for establishing the subxiphoid approach during thoracoscopic thymectomy. *Annals Thoracic Surg* 2019;107(5):e369-70.
10. Suster S, Moran CA. Histologic classification of thymoma: the World Health Organization and beyond. *Hematol / Oncol Clinics North Am* 2008; 22(3):381-92.
11. Suda T, Ishizawa H, Nagano H, Negi T, Kawai H, Tochii D, et al. Early outcomes in 147 consecutive cases of subxiphoid single-port thymectomy and evaluation of learning curves. *Eur J Cardio-Thoracic Surg* 2020;58(1):44-9.
12. Yano M, Moriyama S, Haneda H, Nakanishi R. Thymectomy using the subxiphoid approach. *J Thoracic Cardiovascular Surg* 2016;152(1):278-9.
13. Wu CF, Diego GR, Wen CT, Liu YH, Wu YC, Chao YK, et al. Single-port video-assisted thoracoscopic mediastinal tumour resection. *Interactive Cardio Vascular Thoracic Surg* 2015; 21(5):644-9.
14. Lo CM, Lu HI, Hsieh MJ, Lee SS, Chang JP. Thymectomy for myasthenia gravis: video-assisted versus transsternal. *J Formosan Med Assoc* 2014; 113(10):722-6.
15. Yuan ZY, Cheng GY, Sun KL, Mao YS, Li J, Wang YG, et al. Comparative study of video-assisted thoracic surgery versus open thymectomy for thymoma in one single center. *J Thoracic Disease* 2014;6(6):726-33.
16. Sakamaki Y, Kido T, Yasukawa M. Alternative choices of total and partial thymectomy in video-assisted resection of noninvasive thymomas. *Surgical Endoscopy* 2008;22(5):1272-7.
17. Xu H, Liu D, Li Y, Yang L, Wang F, Wang W, et al. The outcomes of subxiphoid thoracoscopic versus video-assisted thoracic surgery for thymic diseases. *J Laparoendoscopic Advanced Surgical Techniques* 2020;30(5):508-13.
18. Asaf BB, Puri HV, Bishnoi S, Nanda NS, Pulle MV, Kumar A. Subxiphoid robotic extended thymectomy—The first Indian report. *J Minimal Access Surg* 2020;16(4):360-3.