


Video Assisted Thoracoscopy Surgery (VATS) as Minimal Invasive Approach for Thymoma with Myasthenia Gravis in Gatot Soebroto Central Army Hospital: A Case Report

Febyan,[1] Joni Indah Sari,[1] Sri Handawati Wijaya,[1] Andreas Andri Lensoen[2]

[1]Faculty of Medicine, Krida Wacana Christian University, West Jakarta, Indonesia

[2]Head of Cardiothoracic and Vascular Surgery Department, Gatot Soebroto Central Army Hospital, Central Jakarta, Indonesia

ABSTRACT

Mediastinal thymoma is rare, although it is the most common anterior mediastinal mass. It tends to grow slowly and benign, but still potentially malignant. Surgery is the mainstay of treatment. The procedure of choice is still standard or partial sternotomy thymomectomy. Video Assisted Thoracoscopic Surgery (VATS) to mediastinal and lung tumor has shown promising result. The potential advantages of this approach compared to sternotomy include better cosmetic, less postoperative pain, shorter length of stay, earlier return to daily activities, less bleeding and fewer other complication.

Keywords: Thymoma, video-assisted thoracoscopic surgery

ABSTRAK

Timoma adalah jenis tumor mediastinum yang langka, banyak ditemukan di mediastinum anterior. Timoma berkembang lambat dan bersifat jinak, namun dapat menjadi ganas. Pembedahan merupakan penatalaksanaan utama, prosedur timektomi atau sternotomi parsial masih banyak digunakan. Bedah toraks dibantu video/*video assisted thoracoscopy* (VATS) telah menunjukkan hasil sangat baik untuk tumor mediastinum dan tumor paru. Keunggulan teknik VATS dibandingkan dengan teknik sternotomi, dari segi kosmetik lebih baik, nyeri pasca-operasi lebih sedikit, masa perawatan lebih singkat, lebih cepat kembali ke aktivitas sehari-hari, pendarahan dan komplikasi lainnya minimal. **Febyan, Joni Indah Sari, Sri Handawati Wijaya, Andreas Andri Lensoen. *Video Assisted Thoracoscopy Surgery* (VATS) sebagai *Minimal Invasive Approach* untuk Timoma dengan Miastenia Gravis di RSPAD Gatot Soebroto Central: Laporan Kasus**

Kata kunci: Bedah toraks dibantu video, timoma

INTRODUCTION

Thymoma

Thymoma is the most common anterior mediastinal tumor and comprises 20% of all mediastinal tumor.[1] Thymoma tends to grow slowly but still has the potential to become malignant.[2] Most thymomas are found accidentally by chest X-ray. Sufficiently large mass can compress surrounding organ structures and be symptomatic. Thymoma can presents with paraneoplastic symptoms, the most common is myasthenia gravis.[3]

The widely-used classification system for thymoma was proposed by *Masaoka, et al* in 1981.[4] This classification system defines the tumor stage by degree of tumor encapsulation and invasion or metastasis to other organ structure. This classification system has a good prognosis predictor ability.[3-4] The other classification system is the *World Health Organization* (WHO) classification by its histopathologic appearance.[5] Chest CT-scan is the imaging modality of choice for patients with mediastinal mass. It can help characterized the invasion of the tumor to surrounding structure and distant metastases.[6] Surgery is the mainstay of treatment as the only available curative modality for thymoma.[7] A standard or partial sternotomy is still the management of choice for management of thymoma.[8] Standard multi-port Video Assisted Thoracoscopic Surgery as the recent advances in instrumentation and techniques is a feasible strategy for management of lung and mediastinal diseases.[9-10]

CASE

A 48 year-old woman with dropping eyelid and double vision since 1 month, diagnosed as Myasthenia Gravis by neurologist. All laboratory and cardio-pulmonary tests were normal. Chest X-ray showed a homogenous circular mass with sharp border and cardiac silhouette in upper right hemithorax. Chest CT scan with contrast showed a mass with smooth countour and well-demarcated border, sized about 6 x 8 x 6.5 cm without expansion to its surrounding vascular structure, pleura, and pericardium. A thymoma was suspected and the patient was consulted to cardiothoracic

Alamat Korespondensi *email: Febyanmd@gmail.com*

and vascular surgeon. The pathology of fine needle biopsy specimen showed spindle cells with little lymphocyte consistent with early stage thymoma.

The cardiothoracic surgeon explained a new method of minimal invasive thoracic surgery called *Video-Assisted Thoracoscopic Surgery* (VATS) to the patient. The patient agreed and signed the written informed consent for the surgery with the procedure and was aware that her data could be used for scientific purposed only. Plasmapheresis was performed preoperatively over a period of three days. After the surgery, patient was recovering well. The pain management is sufficient. The chest drain was removed the following morning after the operation. Postoperative chest x-ray showed no sign of infection and other abnormality. The patient was discharged after 1 week in our surgical ward and seen 2 weeks later in outpatient clinic.

Video Assisted Thoracoscopic Surgery (VATS)

The procedure is performed under general anesthesia with arterial line, double-lumen endotracheal intubation and contralateral one-lung ventilation. The patient is placed in supine position with a 30-degree retroversion. The ipsilateral arm is placed over the head of the patient in a holder. Care should be taken to not to overextend the shoulder, to avoid brachial plexus injury. The surgeon and the assistant stand on the ipsilateral side of the patient while the scrub nurse stands on the opposite site, using a separate monitor.

Three 5-mm ports along the lateral border of the breast are used. The first port is created with a 5-mm skin incision. A dissector is introduced using blunt dissection along the upper edge of the sixth intercostal space in the mid-axillary line to create a pneumothorax. A 5-mm port with a trocar is then introduced into the same incision and a 5-mm, 30-degree thoracoscope is used for inspecting the thoracic cavity for potential adhesions and pathology. Carbon dioxide (CO_2) insufflation is installed using a pressure limit of 6–8 mmHg. Under thoracoscopic guidance, a second 5-mm port is bluntly introduced using a trocar into the anterior axillary line in the third intercostal space and a third 5-mm port placed in the midclavicular line into the sixth or seventh intercostal space. This latter incision is expanded at the end of procedure to 1–3 cm corresponding to the size of the specimen to be resected.

The entire thymic gland, including the two upper and two lower horns and all the fatty tissue in the anterior mediastinum, is excised in an "*en bloc*" fashion without touching the thymoma.[11] Dissection is performed using a bipolar energy device in a clockwise direction on the right side and an anticlockwise direction on the left side (figure 1). A roticulating crasper and 5 mm endopeanuts are used for retraction. On the right side, the right lower horn is dissected along the right phrenic nerve, the pericardium and sternum. The dissection is then continued along the right phrenic nerve until the right mammary vein and along the superior vena cava until its point of fusion with the innominate vein. The right upper cervical horn is isolated, and while retracting the thymic gland inferiorly, the thyrothymic ligament is divided. The dissection is then continued along and above the innominate vein including all thymic and fatty tissue. Side branches to the innominate vein are divided with LigaSure using "double sealing technique". Sealing and cutting is then performed distal to this point. The left upper horn is dissected in the same way as the right upper horn and the thymic vein is divided. The left pleura is localized and continuing the dissection posteriorly. The dissection is continued inferiorly along the left phrenic nerve while the gland is retracted to the right and extended along the pleura and pericardium in order to remove the remaining part of the gland and fatty tissue, including the left inferior horn. The left pleura are kept intact as long as possible to prevent the left lung from occupying operating space.

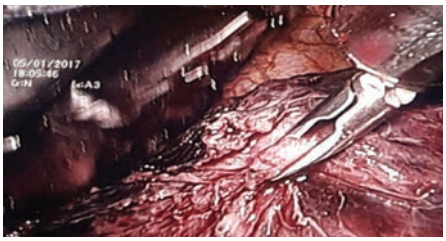

Figure 1. Actual multiportal VATS intraoperative view showing the vision axis

After completing the dissection, the orientation of the specimen is noted. CO_2 insufflation is stopped and the lower 5 mm port is expanded to 1–3 cm according to the size of the specimen. An endobag then introduced into the right thoracic cavity, where there is space and the specimen is grasped and placed into the bag (figure 2). While extracting a thymoma in an endobag, care should be taken not to squeeze the capsule. The specimen is marked with sutures and a drawing is made according to the recommendations from ITMIG.[12] The specimen is sent for pathology. The two 5 mm incisions are closed using only one skin suture. A CH18 chest drain is introduced in lower port and this incision is sutured in three layers.

Figure 2. The thymoma after resection

DISCUSSION

The potential advantages of this approach compared to sternotomy include better cosmetics, less postoperative pain, shorter length of stay, earlier return to daily activities, less bleeding and fewer complications.[11-13] Difference in outcome between the many different minimal invasive approaches to thymectomy is unclear and remains to be investigated.[14] The use of 5 mm ports and a 5-mm camera may potentially introduce less pressure on the intercostal nerve and thus less postoperative pain and possibly less chronic pain.[15] Chest drain is used for the same reason, albeit not adequate for a potential hemothorax; in this case, another chest drain may be needed. CO_2 insufflation is used to compress the ipsilateral lung and mediastinum, providing greater space over the innominate vein and making the dissection of the innominate vein and cervical horns safer. Patients with a compromised cardiac output may not tolerate CO_2 insufflation.[16] In such cases, the pressure can be reduced or CO_2 can be used intermittently for the crucial dissection in the neck.[15-16] Bipolar


electrocoagulation has less lateral thermal spread than monopolar electrocoagulation, allowing for safer dissection along the phrenic nerve and greater vessels.[17] Ultrasonic devices can also be used for dissection, but beware of the heat spread from the active plate. A potential aspect for further development of the technique could involve introducing a sub-xiphoidal incision for thymomas over 5 cm in diameter, thus avoiding compression of the intercostal nerve while extracting larger tumors from the thoracic cavity.[14-17]

CONCLUSION

Thymoma is a rare mediastinal tumor, it is the most common anterior mediastinal tumor. The procedure of choice is still standard or partial sternotomy thymomectomy; the minimal invasive surgery approach called Video Assisted Thoracoscopic Surgery (VATS) to mediastinal and lung tumor has the promising result. The potential advantages of this approach include better cosmetic, less postoperative pain, shorter length of stay, earlier return to daily activities, less bleeding and fewer complications.[8,10-14] The current trend is to reduce the number of ports and minimize the length of incisions to further decrease postoperative pain, chest wall paresthesia, and length of hospitalization.[15-17]

Conflict of Interest

The authors confirm no conflict of interest in this study.

REFERENCES

1. Riedel RF, Burfeind WR. Thymoma: Benign appearance, malignant potential. Oncol. 2006;11(8):887-94.
2. Fischer JE, Bland KI, Callery MP. Mastery of surgery. Philadeplhia: Lippincott Williams & Wilkins; 2006 .p. 447.
3. Tomaszek S, Wigle DA, Keshavjee S, Fischer S. Thymomas: Review of current clinical practice. Ann Thorac Surg. 2009;87(6):1973–80.
4. Detterbeck FC, Nicholson AG, Kondo K, Van Schil P, Moran C. The masaoka-koga stage classification for thymic malignancies. J Thorac Oncol. 2011;6(7):1711-6.
5. Marx A, Chan JKC, Coindre JM, Detterbeck F, Girard N, Harris NL, et al. The 2015 World Health Organization classificationof tumors of the thymus. J Thorac Oncol. 2015;10(10):1383-95.
6. Sperling B, Marschall J, Kennedy R, Pahwa P, Chibbar R.. Thymoma: A review of the clinical and pathological findings in 65 cases. Can J Surg. 2003;46(1):37–42.
7. Ried M, Neu R, Schalke B, von Süßkind-Schwendi M, Sziklavari Z, Hofmann HS. Radical surgical resection of advanced thymoma and thymic carcinoma infiltrating the heart or great vessels with cardiopulmonary bypass support. J Cardiothorac Surg. 2015;10:1-7.
8. Liu TM, Lin MW, Hsieh MS, Kao MW, Chen KC, Chang CC, et al. Video-assisted thoracoscopic surgical thymectomy to treat early thymoma: A comparison with the conventional transsternal approach. Ann Surg Oncol. 2014;21:322–8.
9. Coronia FP, Fiorelli A, Arrigo E, Trovato S, Santini M, Monte AI. Bilateral single-port thoracoscopic extended thymectomy for management of thymoma and myasthenia gravis: case report. J Cardiothorac Surg. 2016;11(153):1-4.
10. Lashkarizadeh MR, Ajami R, Vahedian M, Pourseyedi B, Zeynali H, Fekri MS, et al. Video-assisted thoracoscopic thymectomy as an optimal treatment in myasthenia gravis. J Minim Invasive Surg Sci. 2013;2(2):144-48.
11. 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 Thorac Dis. 2014;6:726-33.
12. Ye B, Tantai JC, Ge XX, Li W, Feng J, Cheng M et al. Surgical techniques for early-stage thymoma: Video-assisted thoracoscopic thymectomy versus transsternal thymectomy. J Thorac Cardiovasc Surg. 2014;147:1599-603.
13. Jurado J, Javidfar J, Newmark A, Lavelle M, Bacchetta M, Gorenstein L, et al. Minimally invasive thymectomy and open thymectomy: outcome analysis of 263 patients. Ann Thorac Surg. 2012;94:974-81.
14. Friedant AJ, Handorf E, Su S, Scott WJ. Minimally invasive versus open thymectomy for thymic malignancies: Systematic review and meta-analysis. J Thorac Oncol. 2016;11(1):30-8.
15. Ye BO, Tantai JC, Ge XX, et al. Surgical techniques for early-stage thymoma: Video-assistedthoracoscopic thymectomy versus transsternal thymectomy. J Thorac Cardiovasc Surg 2014;147:1599-603.
16. Fukai R, Inoue T, Araki O, Shiono H, Watanabe K. Video-thoracoscopic extended thymectomy with sternal elevation and carbon dioxide insufflation. J Case Rep Stud. 2015;3(4):1-5.
17. Melfi FMA, Fanucchi O, Mussi A. Minimally invasive mediastinal surgery. Ann Cardiothorac Surg. 2016;5(1):10-7.