

Successful Surgical Management of Giant Mediastinal Teratoma – A Case Report of a Difficult Case without Any Post-Operative Complication

Alexander Josethang¹, Brema Suranta Prakarsa Utama Pasaribu²

¹General Practitioner, Intern Doctor of Cardiac, Thoracic and Vascular Division, Department of Surgery, Faculty of Medicine, Universitas Sumatera Utara

²Consultant Cardiac, Thoracic and Vascular Surgeon, Department of Surgery, Faculty of Medicine, Universitas Sumatera Utara

ABSTRACT

Introduction. Mediastinal teratoma is a rare germ cell tumor, located in anterior mediastinum and is lack of population-based study. It usually occurs in the age of 20-40 years, accounting for 15% of anterior mediastinal masses in adults and 25% of anterior mediastinal masses in children. It is frequently diagnosed accidentally on chest imaging due to its asymptomatic nature. Hereby, we presented a case of giant anterior mediastinum teratoma with complete surgical excision without any post-operative complication. This case is unique due to its uneventful result after excision. From our literature research, we successfully avoid the potential post operative complications of resecting this tumor such as bleeding, wound dehiscence and even death. It is due to early diagnosis, treatment and good intraoperative management of lesion & hemodynamics.

Case Report. A 21-year old male was referred from pulmonologist oncologist to our Thoracic Surgical Unit with complains of dyspnea and chest pain. Physical examination showed no lung sounds in (R) hemithorax and was dull to percussion, ictus cordis shifted 2 fingerbreadths towards left-side. Chest X-ray showed a large well-defined lesion in (R) hemithorax and chest CT-scan with contrast showed hypodense mass on (R) hemithorax adhering & compressing the lung, diaphragm, pericardium & chest wall, with estimation size of 60 x 20 x 12 cm, lesion displaced the heart. Patient was then treated with complete surgical excision and found a huge cystic tumor with a size of 60 x 20 x 12 cm adhering to all parts of (R) lung, diaphragm and pericardium. He underwent (R) pneumonectomy due to adhesion. Histologic examination was consistent with mature teratoma. Patient showed no complication after surgery and was discharged uneventfully from our hospital after 5 days.

Discussion. Approximately 95% of benign teratomas arise in the anterior mediastinum. The tumor grows progressively, mostly asymptomatic, dyspnea and substernal chest pain are the most common symptoms if present. Productive Cough of hair or sebum is a pathognomonic sign. Chest radiograph typically reveals a well-circumscribed anterior mediastinal mass that often protrudes into one of the lung, they are usually large at the time of diagnosis. Complete surgical excision is a treatment of choice of mediastinal teratoma, which can be performed through median sternotomy or thoracotomy or thoracoscopy. Some patients require additional procedures (eg, lobectomy, pericardiectomy) for complete tumor resection.

Conclusion. There is still limited data on mediastinal teratoma. Early referral & treatment show good prognosis. Benign Mediastinal Teratomas was tricky to be diagnosed, when it is diagnosed, it is usually very large in size. Complete Surgical Excision can be performed safely without any complications.

KEYWORDS: Mediastinal, Teratoma, Surgery, Pneumonectomy; case-report

ARTICLE DETAILS

Published On:
19 February 2024

Available on:
<https://ijmscr.org/>

Successful Surgical Management of Giant Mediastinal Teratoma – A Case Report of a Difficult Case without Any Post-Operative Complication

INTRODUCTION

Mediastinal teratoma is a rare extragonadal germ cell tumors (GCT) (5%). It usually occurs in the age of 20-40 years, accounting for about 15% of mediastinal tumors in adults & 25% of mediastinal tumors in children.^{1,2} It is derived from spontaneous vascular development of some potential stem cells shed during development of thymus primordia at embryonic stage, which commonly occurs near thymus.² Histologically, it is comprised of tissues derived from all 3 germ cell layers (ectoderm, mesoderm and endoderm). 60% of mediastinal germ cell tumors is benign. Modalities of treatment for teratoma consist of surgical excision, chemotherapy and radiotherapy. Benign mature teratoma has excellent prognosis after surgical excision.^{3,4,5}

Clinical manifestations of mediastinal teratoma are diverse, including chest pain, cough, dyspnea, dysphagia as well as potentially lethal respiratory failure and malignant arrhythmias. Mediastinal teratoma is defined as “giant” it occupies half of hemithorax or has diameter of more than 10 cm.⁵

Hereby, we presented a case of a giant anterior mediastinal tumor in 21-year old male which was

successfully managed by complete surgical excision without any post-operative complications.

CASE REPORT

A 21-year old male was referred to our Thoracic Surgical Unit by pulmonologist oncologist with complaints of dyspnea and chest pain for the last 3 months. Chest X-ray revealed a large well-defined lesion in (R) hemithorax (Figure 1) for further diagnostic and treatment. On physical examination, the patient was conscious and well oriented to time and place. His vital signs were stable. We found no lung sounds in (R) hemithorax and was dull to percussion. No venectasis or superior vena cava syndrome existed. Ictus cordis shifted 2 fingerbreadths towards leftside. No murmur was found in his heart. Laboratory findings & electrocardiography were normal. Chest CT-scan with contrast showed hypodense mass on (R) hemithorax adhering & compressing the lung, diaphragm, pericardium and chest wall, with estimation size of 60 x 20 x 12 cm. The lesion displaced the heart (Figure 2).



Figure 1. Chest X-ray showed opaque mass on (R) hemithorax

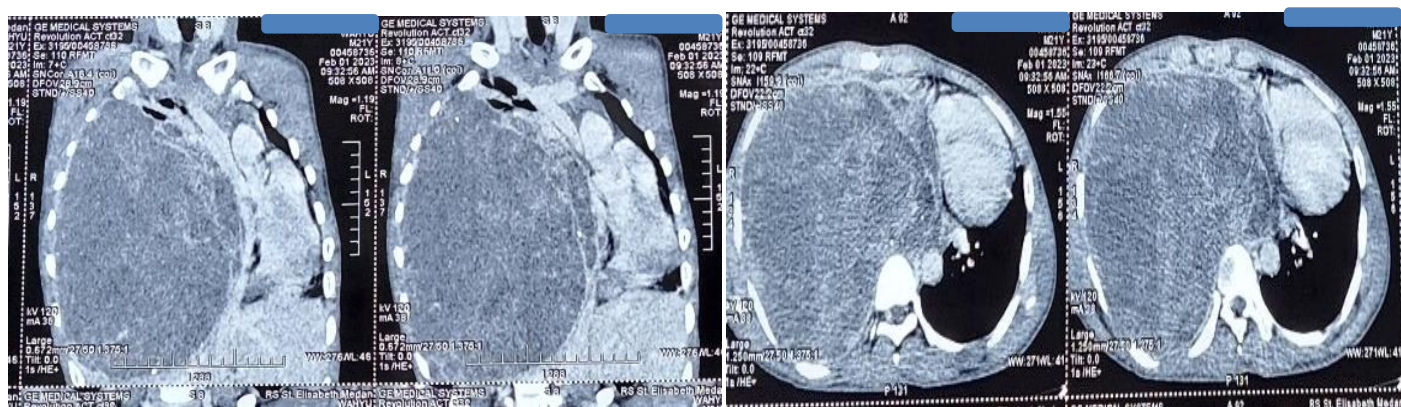


Figure 2. Enhanced chest CT scan with contrast showed large hypodense lesion in (R) hemithorax

Successful Surgical Management of Giant Mediastinal Teratoma – A Case Report of a Difficult Case without Any Post-Operative Complication

This patient was diagnosed with (R) anterior mediastinum tumor suggesting malignancy, highly suggestive teratoma. We decided to perform complete surgical excision by hemiclampshell incision. Combination of epidural thoracic analgesia and general anesthesia and single lung ventilation was performed. The anesthetist did not

use muscle relaxant for induction & maintenance of anesthesia. Intraoperatively, we found a huge cystic tumor of 60 x 20 x 12 cm adhering to all parts of (R) lung, diaphragm and pericardium, and severe adhesion of tumor surrounding organs.

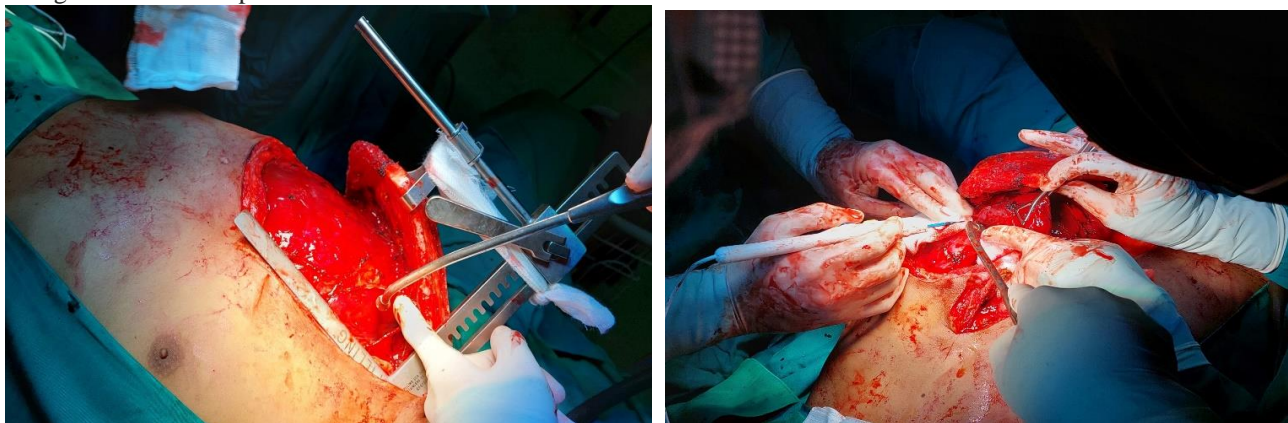


Figure 3. Intraoperative findings of tumor adhering to thoracic wall & adjacent organs

Due to the severe adhesions, we extended the incision to the abdomen. Peritoneum was opened and tumor suppressed diaphragm & liver with adhesions to the liver. No

metastatic lesion in the liver was found. The diaphragm was freed from the tumor. We performed (R) pneumonectomy due to its fragility and firm attachment from the tumor.

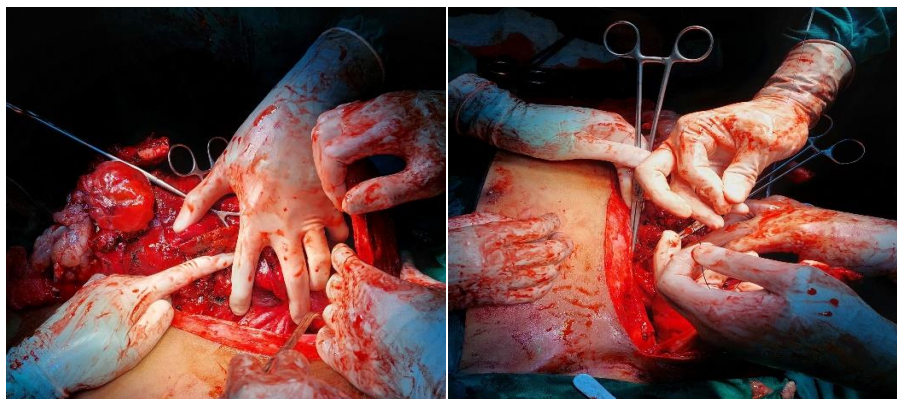


Figure 4. (R) Lung attachment to the tumor

Total excision of tumor without rupture of capsule and hemostasis was done, diaphragm was repaired with 2.0 monofilament. We inserted 28 Fr (R) intrapleural drain and

18 Fr drain to the abdomen. Patient was extubated on the table and admitted to intensive care unit for 2 days.



Figure 5. Diaphragmatic repair with 2-0 monofilament with continuous fashion

Successful Surgical Management of Giant Mediastinal Teratoma – A Case Report of a Difficult Case without Any Post-Operative Complication

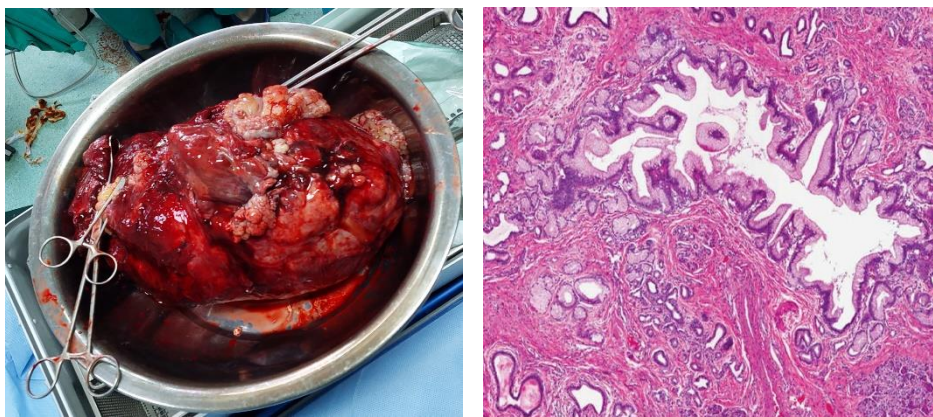


Figure 6. Macroscopic & microscopic findings of mediastinal teratoma (mature intestinal epithelial)

Histopathology examination revealed tumor mass with papillary form with stroma consisting of proliferation of fibroblastic cells with spindle-shaped nuclei, with double sharp sides, soft chromatin, eosinophilic cytoplasm, and covered by ciliated pseudostratified columnar cells, intestinal epithelial covering & stratified squamous epithelium with

intact basal membrane, result was consistent with mature teratoma. He was discharged on post operative day 5 without complication. He underwent control to our outpatient polyclinic, without any problem in his wound, feeling happy without any complaints of dyspnea or chest pain, able to work without any difficulties.

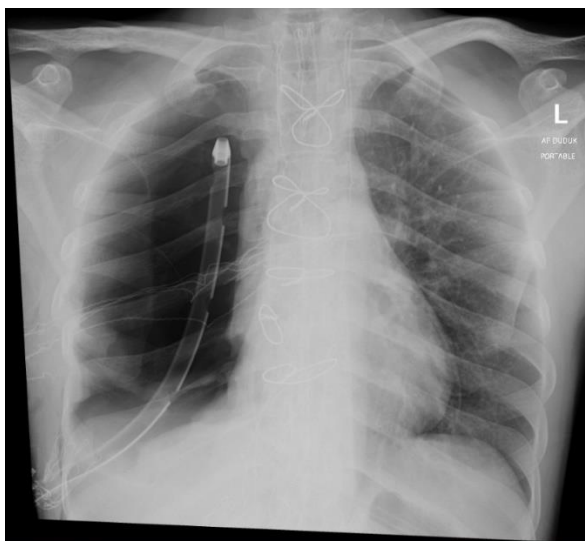


Figure 7. Post-operative chest x-ray showed radiological improvement of (R) hemithorax without pleural effusion

DISCUSSION

Tumors in mediastinal area have various clinical entities depending on which structure it affected. Nature of this tumor can be understood well by understanding anatomic relations within this area.⁷ This case was an interesting yet encouraging that a huge tumor can be excised en toto without any complication. In developing countries, healthcare is not considered as the first priority. People tend to underestimate symptoms. Considering the size of this tumor and its history, he had been neglecting his symptoms before consulting to his doctor who quickly referred him to us, which will improve his prognosis. Few cases of teratoma has been reported, but a tumor this large with successfully excised en toto without post operative complications has never been reported. In the literature, post operative complication were reported to be

7,2% and mean post-operative length of stay at the hospital was 4.3 days.⁸

Mediastinal teratoma was known to be the most common extragonadal germ cell tumors and comprises of 10-15% of all mediastinal tumors in adult. It is thought to be resulted from spontaneous vascular development of some potential stem cells shed during development of thymus primordia at embryonic stage. Another theory of its development is failure of migration from mediastinum to gonads during early development and consisting of at least 2 of 3 embryologic layers (endoderm, mesoderm and ectoderm). A mature teratoma has differentiated cells of somatic structure (skin, bone, teeth, fat & epithelium).^{9,10}

Most patients have no obvious symptoms. Most of them resulted from compression of nearby structures. Mature

Successful Surgical Management of Giant Mediastinal Teratoma – A Case Report of a Difficult Case without Any Post-Operative Complication

teratoma of mediastinum is generally benign. It grows slowly, is asymptomatic and found incidentally on chest X-ray for various reasons.^{3,7,9} Clinical manifestations can include: chest pain, dyspnea, neck mass, superior vena cava syndrome, chest tightness, etc. Rupture of tumor (iatrogenically or spontaneously) causes complications such as pleural effusion, hemothorax, hemoptysis, obstructive pneumonia, pericardial effusion, which manifest as severe symptoms (chest pain, hemoptysis, dyspnea & expectoration of hair & sebaceous material). Delayed clinical presentation affect post operative outcome such as prolong atelectasis, rupture of tumor mass, empyema and sepsis.^{7,9,10,11}

In our case, there was already prolonged symptom of dyspnea for about 3 months, but his family was still refusing surgery until his pulmonologist oncologist counselled him. Then, he underwent chest x-ray which revealed anterior mediastinal mass. Subsequent chest CT-scan with contrast showed a gigantic tumor was adhering and compressing its nearby structures. The chest radiograph typically reveals a well-circumscribed anterior mediastinal mass that often protrudes into one of the lung fields. These tumors are usually large at the time of diagnosis; in a recent series, the median size was 10 × 8.5 × 5.4 cm. Mediastinal teratoma is defined as “giant” it occupies half of hemithorax or has diameter of more than 10 cm.^{5,12}

We did a good exposure of the tumor in order to totally excise this lesion, which is the key factor to have a good prognosis. Complete surgical excision is a treatment of choice of mediastinal teratoma, performed through median sternotomy or thoracotomy or thoracoscopy.⁹ Thoracotomy was chosen since tumor size was > 6 cm.¹³ This tumor was as large as 60 x 20 x 12 cm, well-defined lobulated round mass and no definite invasion to nearby structures, therefore, complete surgical resection resulted in good outcome without complication & recurrence.

We performed hemiclampshell incision extending to the abdomen to achieve good exposure to the tumor and complete excision could be achieved. Clear surgical field provide complete direct view of mediastinal structures so that the surgeon could calmly face various unexpected situations that may occur during surgery.^{13,14} Very large tumor filling almost entire thoracic cavity, adhering to adjacent organs has damaging risk to adjacent organs. In this case, the (R) lung of the patient was fragile and pneumonectomy should be done. Pneumonectomy also comprises of complications such as respiratory failure, acute lung injury, and cardiopulmonary edema.^{14,15} In this case, complete surgical excision without any complications was achieved. Patient was extubated post operative day 2 without any complications and was discharged uneventfully on day 5.

CONCLUSION

Mediastinal teratoma is the most common extragonadal germ cell tumor with mild clinical symptoms.

Early referral & treatment result in good prognosis for the patient. Benign Mediastinal Teratomas was tricky to be diagnosed, when it is diagnosed, it is usually very large in size. In order to accomplish good outcome, several factors must be considered, early diagnosis & referral, choice of incision, intraoperative management of lesion & hemodynamics. Choice of incision based on anatomical location & size of the tumor must be done wisely because it is the key to total resection (which is a key to good prognosis) and achieving clear surgical field. Resection should be done en toto because tumor rupture will cause complications, most commonly pleural effusion, which will increase length of stay.

Conflict of Interest Statement

No conflict of interest exists. We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome

Ethics Statement : Informed consent was obtained from the patient for participation to this study & publication of all their data and/ or images included

REFERENCES

- I. Vieira, R.D., Grimberg, H., Uezumi, K.K. et al. Teratoma of the mediastinum: a case report. *J Med Case Reports* 5, 193 (2011). <https://doi.org/10.1186/1752-1947-5-193>
- II. Tian, Z., Liu, H., Li, S. et al. Surgical treatment of benign mediastinal teratoma: summary of experience of 108 cases. *J Cardiothorac Surg* 15, 36 (2020).
- III. No TH, Seol SH, Seo GW, Kim DI, Yang SY, Jeong CH, Hwang YH, Kim JY. Benign Mature Teratoma in Anterior Mediastinum. *J Clin Med Res.* 2015;7(9):726-8.s
- IV. Wang R, Li H, Jiang J, Xu G. Incidence, treatment, and survival analysis in mediastinal malignant teratoma population. *Transl Cancer Res.* 2020;9(4):2492-2502.
- V. Parker D, Holford CP, Begent RH, Newlands ES, Rustin GJ, Makey AR, Bagshawe KD. Effective treatment for malignant mediastinal teratoma. *Thorax.* 1983;38(12):897-902.
- VI. Fang Y, Qin Z. Surgical treatment of giant mediastinal tumors. *Turk Gogus Kalp Damar Cerrahisi Derg.* 2021;29(1):52-60.
- VII. Sekar SC, Kasliwal N, Mandhane A, Maydeo RA. An uncommon case of anterior mediastinal teratoma. *Int Surg J.* 2020;7(11).
- VIII. Melfi F, Fanucchi O, Davini F, Viti A, Lucchi M, Ambrogi MC, Mussi A. Ten-year experience of mediastinal robotic surgery in a single referral

Successful Surgical Management of Giant Mediastinal Teratoma – A Case Report of a Difficult Case without Any Post-Operative Complication

- centre. *Eur J Cardiothorac Surg.* 2012;41(4):847-51.
- IX. Yasa KP, Permana ACT, Dewi SM. Mediastinal Benign Mature Teratoma in Young Girl, Catastrophic Delayed and Complications of Surgery: A Case Report. *Open Access Maced J Med Sci.*2020;8(C).
- X. Muneera Al-Khalifa, Sara Alsaad, Habib Al-Tareef, Zaid Arekat, Abdulla Darwish, "A Giant Primary Mediastinal Teratocarcinoma in a Male Adult", *Case Reports in Surgery*, 2019;7123241.
- XI. Omachi N, Kawaguchi T, Shimizu S, Okuma T, Kitaichi M, Atagi S, Yoon HE, Matsumura A. Life-threatening and Rapidly Growing Teratoma in the Anterior Mediastinum. *Intern Med.* 2015;54(19):2487-9.
- XII. Hainsworth JD, Greco FA. Benign Teratomas of the Mediastinum. In: Kufe DW, Pollock RE, Weichselbaum RR, et al., editors. *Holland-Frei Cancer Medicine*. 6th edition. Hamilton (ON): BC Decker. 2003
- XIII. Zhang Z, Wang X, Zhou Z, Jiang G, Li Y. Surgical management of primary mediastinal mature teratoma: A single-center 20 years' experience. *Front Surg.* 2022;9:902985.
- XIV. Zhao H, Zhu D, Zhou Q. Complete resection of a giant mediastinal teratoma occupying the entire right hemithorax in a 14-year-old boy. *BMC Surg.* 2014;14:56.
- XV. Kim D, Kim SW, Hong JM. Rapid growing huge teratoma: complete surgical resection. *J Thorac Dis.* 2014;6(10):E217-9.
- XVI. Sutanto PO, Semadi IN. 2019. Pneumektomi kiri pada teratoma mediastinum yang meluas ke paru kiri dan perikardium. *aMedicina* 50(1): 193-197.