Indonesian Journal of Medicine (2024), 09(02): 207-213
Masters Program in Public Health, Universitas Sebelas Maret

Case report
Open Access

Massive Mature Mediastinal Teratoma With Malignant Transformation: An Unusual Case Report

Karla Kalua[1)], Widiastuti Soewondo[1)]

1)Departement of Radiology, Faculty of Medicine, Universitas Sebelas Maret Surakarta, Indonesia

Received: 28 May, 2023; Accepted: 19 February, 2024; Available online: 10 April, 2024

ABSTRACT

Background: Teratoma is a type of germ cell tumor that is rarely found in the anterior mediastinum. Meanwhile, mature mediastinal teratoma with malignant transformation is rare and develops rapidly, with a poor prognosis. This article aims to report one of the uncommon cases of mature teratoma and discuss its imaging features thereby adding insight in providing an accurate diagnosis of this condition.
Case Report: This study presents a case of a 26-year-old male patient who has complained of shortness of breath for 3 months and worsening in the last 3 days. The patient passed through a chest radiographic examination and was diagnosed with a mediastinal tumor. The contrast-enhanced chest computed tomography showed a huge mediastinal mass occupying the right and left hemithorax, measuring 16.9 cm x 20.5 cm x 20.9 cm and pressing against the chest wall, esophagus, trachea, great vessels, and the vital organs, lungs as well as heart, causing several complications in patients.
Conclusion: Knowledge of the teratoma radiological appearance and the characteristics of the various subtypes is very important in the diagnosis of mediastinal teratoma diagnosis for immediate and appropriate treatment.

Keywords: Teratoma, Mediastinum, Malignant, CT scan, Prognosis

Correspondence:
Karla Kalua. Faculty of Medicine Universitas Sebelas Maret Surakarta. Jl. Ir. Sutami 36A, Surakarta 57126, Indonesia. Email: karla.kalu77@student.uns.ac.id, karla.kalu@gmail.com
Phone number: 082134362026

Cite this as:
Kalua K, Soewondo W (2024). Massive Mature Mediastinal Teratoma With Malignant Transformation: An Unusual Case Report. Indones J Med. 09(02): 207-213. https://doi.org/10.26911/theijmed.2024.09.02.07.

BACKGROUND

Teratoma is a type of germ cell tumor (GCT) that is very rarely located outside the gonads, but if it is present, the anterior mediastinum is one of the most common sites (Rosti et al., 2019). Mediastinal Teratoma (MT) is a germ cell tumor that is rarely found (Wang et al., 2020). It accounts for 8-13% of the mediastinal mass (Chow and Lim, 2014). It usually appears at a young age in the second to fourth decades of life. (Kim et al., 2022) The prevalence is not much different between men and women (Chow and Lim, 2014).

Most of the MTs are mature, which are benign, grow slowly, and have a good prognosis if they contain no sarcomatous component (Lee et al., 2018). Patients are usually asymptomatic (Chow and Lim, 2014). The symptomatic one can be caused by compression of surrounding structures or rupture of the malignant tumor (Kim et al.,

2022). Mature MT with malignant transformation is an extremely rare subtype (1-3% incidence) and develops rapidly (Wang et al., 2020). The malignant differentiation is more common in men than women (Anushree, 2015).

Mature MT with malignant transformation is characterized by proliferation and differentiation into various non-germ malignant cells (Le Fèvre et al., 2018). The malignancies such as sarcoma, carcinoma, or both become part of the lesion along with benign non-gem cells (Agarwal et al., 2015). On chest radiograph, it is often misinterpreted as massive pleural effusions (Chow and Lim, 2014). A chest contrast-enhanced computerized tomography (CT) is considered the imaging modality of choice for evaluation (Lee et al., 2018). It can better evaluate the morphology, location, margin, extent and vascularity of the lesion compared to chest radiograph (Foladi et al., 2020).

Malignant transformation in MT had worse prognosis (Lee et al., 2018). It has a high tendency to metastasize or recur (Agarwal et al., 2015). Therapy can be done with surgery, chemotherapy, radiotherapy, or a combination thereof (Le Fèvre et al., 2018). Surgery can be performed on single site lesions and chemotherapy improves patient outcomes only on lesions with certain malignant cell components (Agarwal et al., 2015). Radiotherapy as adjuvant therapy provides a effective approach after surgery (Tu et al., 2013).

This article aims to report one of the rare cases of mature teratoma and discuss its imaging features thereby adding insight in providing an accurate diagnosis of this condition.

CASE REPORT

A 26 year old man presented with complaints of shortness of breath for 3 months which had worsened in the last 3 days. Complaints are felt when the patient sits or stands upright or when lying on his back, there is no change in the quality of pain when changing position. The patient also complained of severe chest pain like burning for one month, dry cough, difficulty swallowing, and drastic weight loss for 3 months. Complaints of fever, cough with phlegm or blood were denied. A history of lung tuberculosis or tumors was denied, and the patient had never undergone routine treatment for the disease. The patient only took herbal, but the complaints did not reduce.

On physical examination, there was a decrease of vesicular breath sounds in both lung fields. Laboratory examination showed increased levels of alpha-fetoprotein (AFP 400 IU/ml) and β-human chorionic gonadotropin (β-hCG 5 IU/l).

The patient then performs a chest radiography and CT scan. The frontal and lateral chest radiographs revealed a large calcified inhomogenous opacity located in the anterior mediastinum extending to the superior mediastinum (see Figure 1).

A contrast-enhanced chest computed tomography showed a huge mediastinal solid mass with fat, cystic, and calcified component, measuring 16.9 cm x 20.5 cm x 20.9 cm, occupying the bilateral hemithorax, and pressing against the surrounding organs, as presented (see Figures 2 and 3).

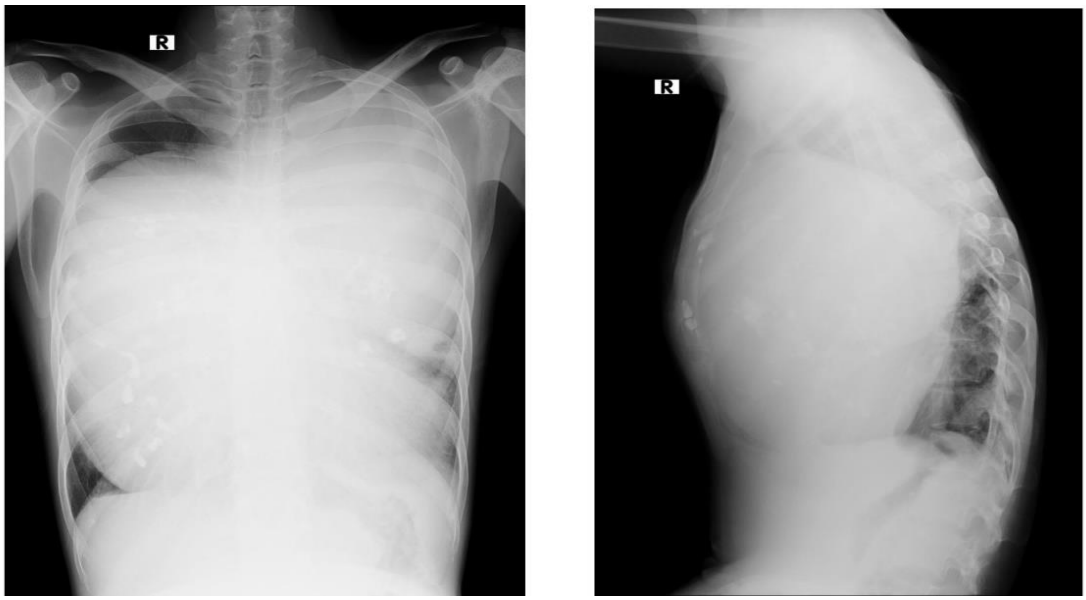

Figure 1. The frontal and lateral chest radiographs showed inhomogeneous opacity with foci of calcifications. in the bilateral anterior mediastinum extending to superior mediastinum, obscuring the anterior costophrenic sinuses, heart, large vessels, retrosternal space and left hemidiaphragm.

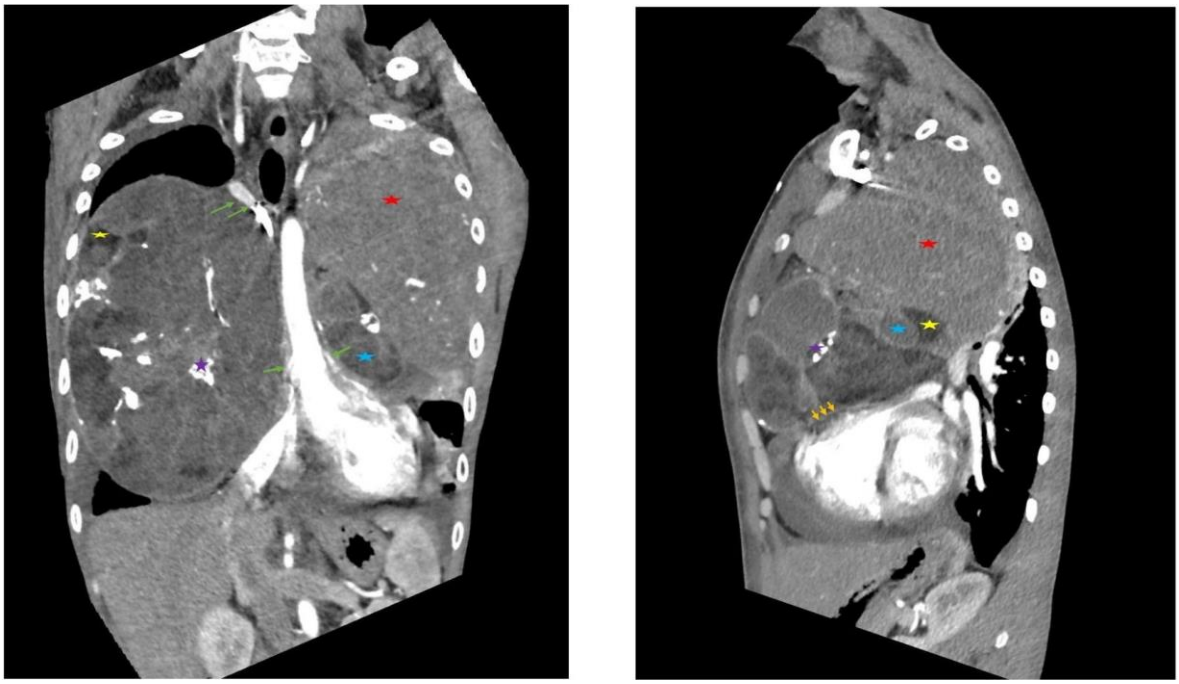

Figure 2. The contrast-enhanced chest CT. a) Sagittal chest CT mediastinum window minimal pericardial effusion (yellow arrows). b) Coronal chest CT mediastinum window showing masses pressing on the vena cava and bilateral pulmonary a/v (green arrows)

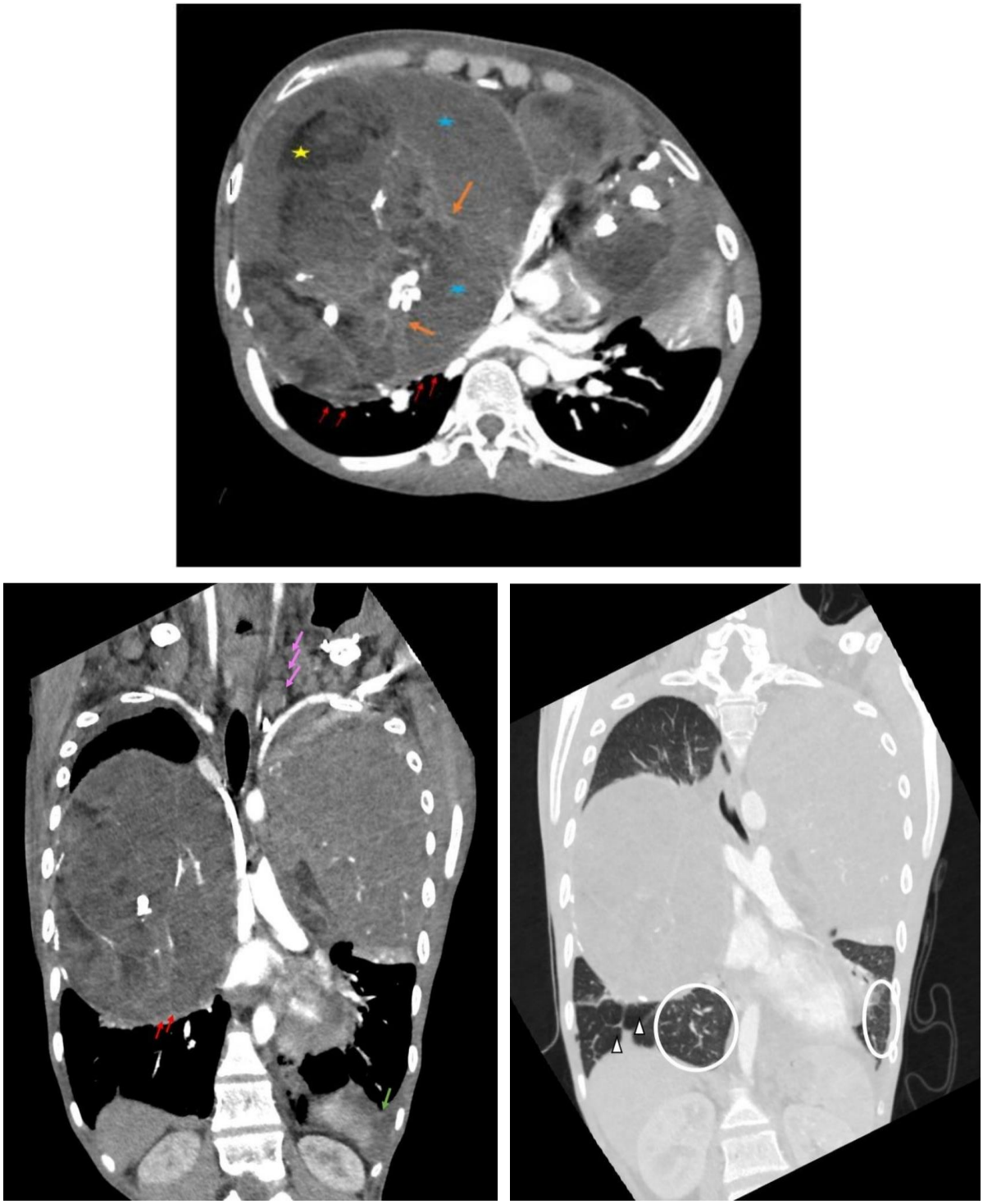

Figure 3. The contrast-enhanced chest computed tomography. Axial chest CT mediastinum window showed a heterodense lesion with septation (orange arrows) with a fatty -49 HU (yellow star) and cystic 9 HU (blue star) components in the anterior mediastinum. Irregularity was seen at the edge of the mass (red arrow).

The patient also underwent a percutaneous Transthoracic Needle Aspiration (TTNA) biopsy. It showed the morphology consistent with a mature teratoma (see Figure 4).

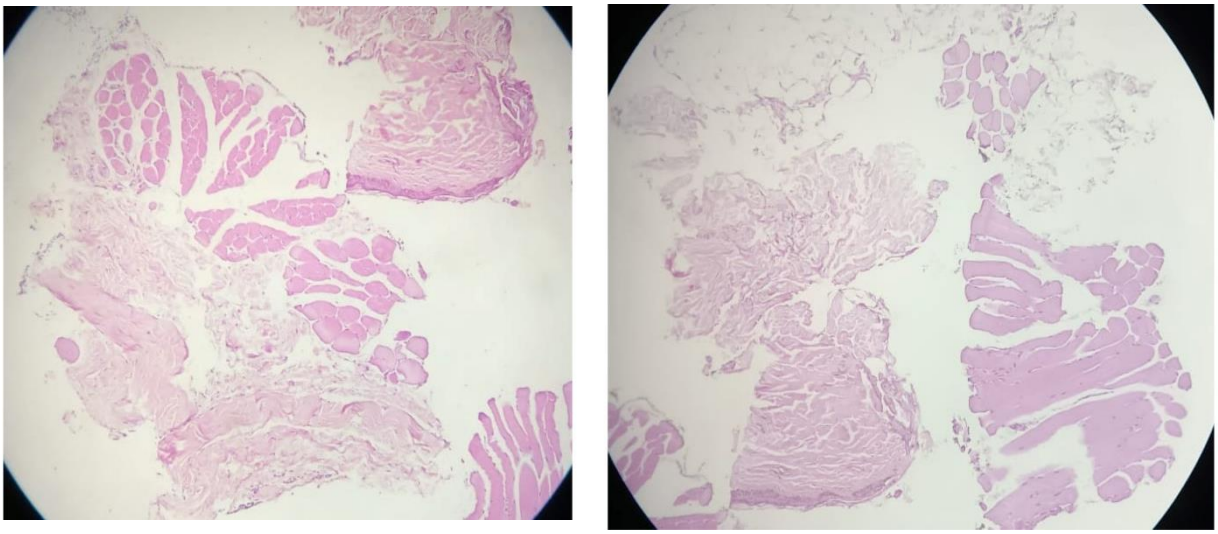

Figure 4. Microscopic findings of mature teratoma in TTNA biopsy (hematoxylin–eosin [HE], original magnification x40). It showed teratomatous characteristics (contains erythrocyte, squamous, epithelial, and adipose cells). However, the mitotic process was not found and there was no sign of malignancy.

The patient then underwent radiotherapy and chemotherapy, but the disease showed poor prognosis and the patient unfortunately died one month later.

DISCUSSION

Teratoma contains tissues derived from 3 germ layers, namely endoderm, mesoderm, and ectoderm. It can be divided into 3 subtypes, which include mature teratoma, immature teratoma, as well as Teratoma with Malignant Transformation (TMT). (Lee, et al. 2018; Kang, et al. 2022; Yuan, et al. 2022). The current terminology for TMT, as recommended in the World Health Organization (WHO) classification, is teratoma with somatic type malignancy which defined as a germ cell tumor accompanied by somatic-type malignant tissues such sarcoma, carcinoma, or both (Agarwal et al., 2015).

On radiology evaluation, mediastinal TMT is often misinterpreted as massive pleural effusions (Chow and Lim, 2014). But in the present case, although the opacity of a large mass on a chest radiograph can be difficult to distinguish from that of a massive pleural effusion, the appearance of foci of calcification identified on this patient's chest radio graph raises raise suspicion for a solid rather than fluid lesion.

A contras-enhanced chest CT is considered the imaging investigation of choice for mediastinal teratomas with typical features of teratomas include fat, cystic fluid, and calcifications component (Foladi et al., 2020). Compression of

surrounding structures or rupture of the malignant tumor can cause symptoms for the patient (Kim et al., 2022). Meanwhile, in this case, a contrast-enhanced chest CT in this patient revealed a mass pressing against the surrounding organs, causing markedly complaints including chest pain, cough, difficulty swallowing, and shortness of breath. (Carter et al., 2014; Foladi et al., 2020; Lee et al., 2018)

Radiological results such as ground glass opacity, pleural and pericardial effusion, as well as multiple lympha denopathies may represent an invasion and metastases to the surrounding tissue. (Chow and Lim, 2014; Tomiyama et al., 2009; Wang and Kazmi, 2011). The solid component predominating in the mass and irregular edges in some parts of the mass also indicated a highly suspicious malignant mass (Kim et al., 2022; Nakazono et al., 2021). The 3 months of complaints experienced by the patient showed a rapid mass progression. Based on clinical and radiological features, it was concluded that the tumor is a mature mediastinal teratoma with a malignant component. (Kim et al., 2022; Rosti et al., 2019)

The laboratory tests showed no significant increase in AFP or β-hCG due to non-germ cell components that were more than AFP or β-hCG -producing cells. (Carter et al., 2014; Kim et al., 2022) Histopathological results that gave no signs of malignancy were also a concern in this case. However, sampling error cannot be completely excluded, because TTNA and core biopsy did not represent the entire tumor. (Lee et al., 2018; Wang and Kazmi, 2011)

CONCLUSION

The knowledge of teratoma radiological appearance and the characteristics of the various subtypes is very important in the diagnosis of mediastinal teratoma for immediate and appropriate treatment.

AUTHORS CONTRIBUTION

All authors had equal contributions in collecting the data of this report, radiological findings, and wrote the manuscript.

CONSENT FOR PUBLICATION

Consent has been obtained from the patient for publication of this case report along with images and other related data

CONFLICT OF INTEREST

There are no conflict of interest.

FUNDING AND SPONSORSHIP

No funding or sponsorship was received for the research or publication of this article.

ACKNOWLEDGEMENT

Acknowledgments are addressed to Dr. dr. Widiastuti, Sp.Rad (K)TR as the supervisor, who has guided and provided criticism and suggestions in drafting until publishing of this report, and all parties who play a role in supporting this article.

REFERENCE

Agarwal S, Mullick S, Gupta K, Dewan RK, (2015). Mediastinal teratoma with coexisting adenocarcinoma and carcinoid tumor (somatic-type malignancy): a case report with a review of the literature. Turk Thorac J 16, 101–104. DOI:10.5152/ttd.2014.4280

Anushree CN (2015). Mature mediastinal teratoma. JCDR. DOI:10.7860/JCDR/-2015/11902.6088

Carter BW, Okumura M, Detterbeck FC, Marom EM, 2014. Approaching the Patient with an Anterior Mediastinal Mass: A Guide for Radiologists. Journal of Thoracic Oncology 9, S110–S118. DOI: 10.1097/JTO.000-0000000000295

Chow M, Lim T (2014). Massive mediastinal teratoma mimicking pleural effusion on computed tomography. smedj 55, e67–e68. DOI:10.11622/smedj.2013-211

Foladi N, Farzam F, Rahil N, Hoshang MMS, (2020). CT features of mature teratoma in the mediastinum of two young adults—a report of two cases. Egypt J Radiol Nucl Med 51, 234. DOI:10.1186/s43055-020-00360-6

Kim SG, Jeong WG, Song SY, Lee T, Lee JE, Park HM, Kim YH (2022). Mediastinal Teratoma: A Pictorial Essay. J Korean Soc Radiol. 8: 597. DOI:10.-3348/jksr.2021.0186

Le Fèvre C, Vigneron C, Schuster H, Walter A, Marcellin L, Massard G, Lutz P, Noël G (2018). Metastatic mediastinal mature teratoma with malignant transformation in a young man with an adenocarcinoma in a Klinefelter's syndrome: Case report and review of the literature. Cancer/Radiothérapie 22, 255–263. DOI:10.1016/j.canrad.-2017.10.006

Lee H, Seon HJ, Choi Y (2018). Radiological-pathological correlation of malignant teratoma with liposarcomatous transformation: P roven by repeated transthoracic needle biopsy. Thoracic Cancer 9, 185–188. DOI:10.1111/1759-7714.12553

Nakazono T, Yamaguchi K, Egashira R, Mizuguchi M, Irie H (2021). Anterior mediastinal lesions: CT and MRI features and differential diagnosis. Jpn J Radiol 39, 101–117. DOI:10.1007/-s11604-020-01031-2

Rosti G, Secondino S, Necchi A, Fornarini G, Pedrazzoli P (2019). Primary mediastinal germ cell tumors. Seminars in Oncology 46, 107–111. DOI:10.10-53/j.seminoncol.2019.04.001

Tomiyama N, Honda O, Tsubamoto M, Inoue A, Sumikawa H, Kuriyama K, Kusumoto M, Johkoh T, Nakamura H (2009). Anterior mediastinal tumors: Diagnostic accuracy of CT and MRI. European Journal of Radiology 69, 280–288. DOI:10.1016/j.ejrad.2007.-10.002

Tu L, Sun L, Zhou Y, Gong Y, Xue J, Gao J, Lu Y, Wang Y (2013). Postoperative radiotherapy for residual tumor of primary mediastinal carcinoid teratoma. J Thorac Dis. 5:E61-64. DOI:-10.3978/j.issn.2072-1439.2012.11.11

Wang J, Kazmi SAJ (2011). Teratoma with Malignant Transformation: A Case Report with Pathological, Cytogenetic, and Immunohistochemistry Analysis. Sarcoma. 2011:1–5. DOI:10.1155/20-11/450743

Wang R, Li H, Jiang J, Xu G (2020). Incidence, treatment, and survival analysis in mediastinal malignant teratoma population. Transl Cancer Res TCR 9, 2492–2502. DOI:10.21037/tcr.2020.-03.19