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Case Report

Prompt diagnosis and management of a ruptured mediastinal cystic teratoma [☆]

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ABSTRACT

Mediastinal germ cell tumors are some of the less frequently encountered anterior mediastinal masses. We report an interesting case of a 26-year-old male with a ruptured mediastinal cystic teratoma. Initial plain radiograph and CT scan of the chest showed radiographic evidence of a ruptured cystic teratoma, including a peripherally enhancing, partially calcified mass with internal fat density. Upon surgical excision, the mass was found to adhere to the thymus and anterior aortic arch. The patient was promptly diagnosed via imaging and managed in a timely manner via complete surgical resection.

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Introduction

Mediastinal tumors can present in a variety of ways depending on their size and location. The most common anterior mediastinal masses include thymomas, germ cell tumors, thyroid disease, and lymphomas [1]. Germ cell tumors in adults can represent up to 15% of anterior mediastinal masses². Germ cell tumors can be further classified into benign teratomas, seminomas, and embryonal tumors [2]. Mature teratomas are composed of ectoderm, mesoderm, and endoderm. Mediastinal mature teratomas are typically asymptomatic, however can cause symptoms if they invade surrounding structures [3]. Perforation of the tumor is a rare but very serious complication. In such cases, patients may present with chest pain

amongst other symptoms. Complete resection is the treatment of choice however can be difficult in cases with large and invasive tumors requiring careful surgical resection. We report a case of a 26-year-old male with a ruptured mediastinal cystic teratoma that invaded into the adjacent pericardium and anterior aortic arch, successfully managed via prompt radiographic diagnosis and surgical resection.

Clinical case

The patient is a 26-year-old hispanic male with no past medical history who presented to the emergency department complaining of midline, pleuritic chest pain radiating to the left

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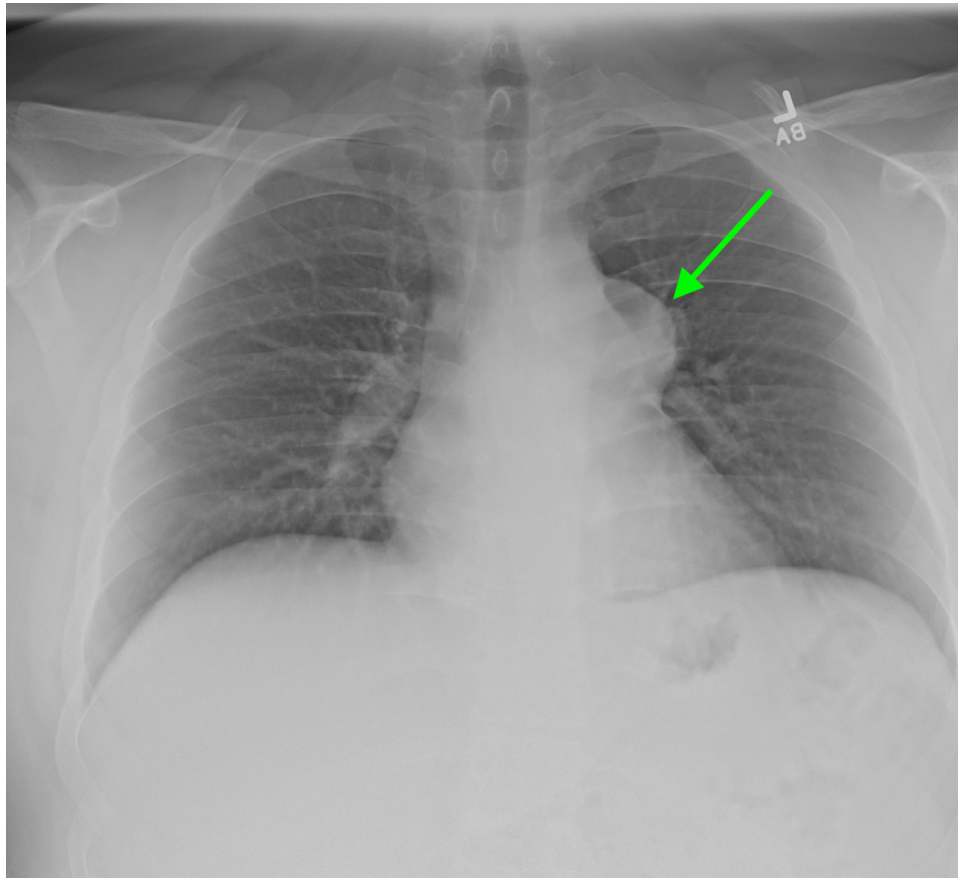


Fig. 1 – PA radiograph. Initial PA radiograph demonstrates widening of the left mediastinal silhouette (green arrow). (Color version of the figure is available online.)

arm, with associated numbness and tingling in the left arm for two days. Upon physical examination the patient was hypertensive (166/103 mmHg) and tachycardic (103 bpm).

Plain radiograph demonstrated an enlarged cardiomeastinal silhouette with convex contour of the left hilum (Fig. 1). CT angiogram of the chest demonstrated a $6.2 \times 6 \times 5.3$ cm peripherally enhancing partially calcified mass with internal fat density in the anterior superior mediastinum with surrounding subtle stranding suspicious for ruptured cystic teratoma potentially causing mediastinitis (Figs. 2a and 2b).

The patient was admitted to the cardiothoracic surgery service with a diagnosis of ruptured cystic mediastinal teratoma. Complete surgical resection of the mass was planned. Upon surgical exploration, a large mass was seen adherent to the left lobe of the thymus. The posterior portion of the mass was found to be densely adhered to the pericardium. The mass could not be separated from the pericardium, so the pericardial sac was entered where cloudy fluid was encountered and subsequently aspirated. Careful dissection was continued and the mass was also found to adhere to the anterior aortic arch. Upon dissection in this area, purulent fluid with small droplets of calcifications was noted to drain from the mass. The mass and pericardial sac were removed en bloc and the area was irrigated copiously. There were no intraoperative complications. Pathology report showed mature cystic teratoma with no immature elements seen, and no evidence of malignancy.

The patient had an uncomplicated postoperative course and was discharged home within one week.

Discussion

Germ cell tumors are a type of neoplasm most commonly found in the gonads [4] however the most common extragonadal primary site of germ cell tumors is the mediastinum, specifically the anterior superior portion [5]. Mature teratomas in particular account for approximately 75% of mediastinal germ cell tumors [6], and are generally benign [2]. They are typically found in adolescence and early adulthood, however they have also been reported in older adults [7]. Most patients with mature teratomas are asymptomatic unless the tumor is found to involve surrounding structures [3]. The most common symptom is chest pain, but other symptoms such as pain, cough, and dyspnea can also occur^{3,7}. Much less frequently, these tumors can adhere and invade surrounding structures including the pleural space, the pericardium, or the lung parenchyma [3].

A rare but serious complication of mature teratomas is perforation of the tumor. The etiology of perforation remains controversial, however several mechanisms have been proposed which include ischemia and infection [8]. Sommerlad et al. de-

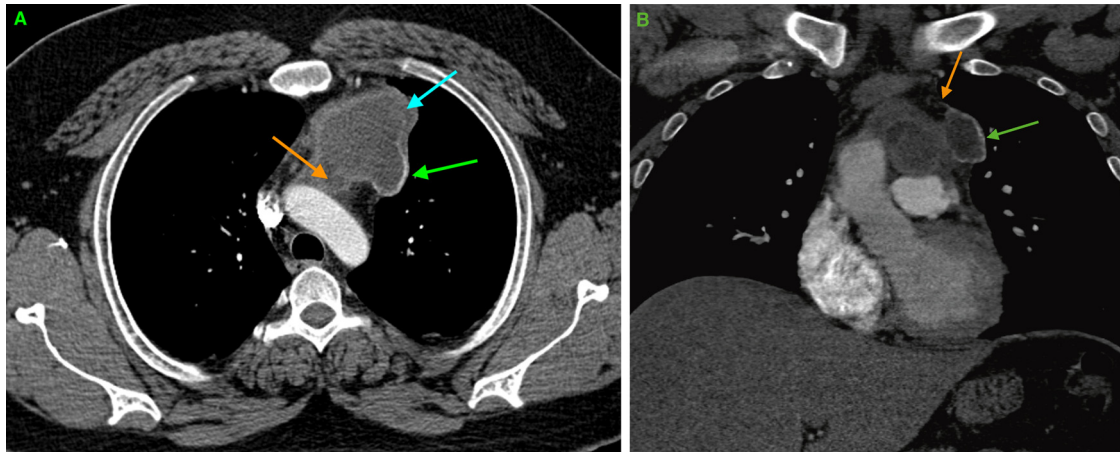


Fig. 2 – CT scan of chest. Axial CT images (A) demonstrate fat attenuation within the teratoma (orange arrow), peripheral calcifications (green arrow), and discontinuous wall with surrounding fluid (blue arrow) consistent with ruptured teratoma. Coronal CT images (B) once again demonstrate peripheral calcifications (green arrow), and discontinuous wall of the teratoma with surrounding fluid (orange arrow). (Color version of the figure is available online.)

scribe two cases of mediastinal teratomas with significant inflammation present, hypothesized to be due to the presence of digestive enzymes from pancreatic, intestinal, or salivary tissue [9]. Cystic teratomas may also secrete proteolytic enzymes that can lead to erosion and adhesion to surrounding structures [10]. In contrast to physiological makeup of the teratoma, size and wall thickness have not been found to be associated with rupture [8].

Perforation of the tumor can present with a wide range of symptoms depending on the location of the tumor. Hemoptysis and trichoptysis can be the presenting symptom of a teratoma that has ruptured and invaded the tracheobronchial tree [11]. This is pathognomonic of a mature teratoma. Teratomas can also rupture in the lung parenchyma and cause pneumonia [11]. In patients with tumors that rupture in the mediastinum, a common presenting symptom may be chest pain, as seen in our case.

There are several characteristic radiological findings that can be seen in patients with mature teratomas of the mediastinum. In one retrospective study, 92% of the participants were found to have an abnormality on chest radiograph, characterized as a mediastinal mass [12]. Computed tomography (CT) is the imaging modality of choice for the diagnosis of mature teratomas [3]. It allows for a more detailed description of tumor morphology and possible complications [13]. There are certain CT findings that are characteristic of such tumors which have been described in the literature at length. These include a heterogeneous appearance secondary to the various tissues present such as fat, soft tissue, fluid, or calcifications [14]. CT also frequently demonstrates cystic spaces containing either fat or fluid [12], as was seen in our case. Less frequently seen are fat-fluid levels, however these are essentially diagnostic of teratomas [12].

Radical surgical removal has been shown to be the only curative treatment for mature teratomas [15]. Delay in surgical resection increases the chance of tumor rupture and ma-

lignant transformation [15]. Our case emphasizes the importance of prompt radiologic diagnosis for early surgical planning after assessing the extent of tumor invasion in the mediastinum and its surrounding structures. Surgery is often complicated by adhesions to mediastinal structures like the phrenic nerve, aorta, vena cava, and pulmonary/supra aortic vessels [16].

Conclusion

We report a case of a 26 year old male with a ruptured mediastinal cystic teratoma successfully managed via complete surgical resection. Prompt radiological diagnosis via CT was crucial in evaluating the extent of tumor invasion, as well as aid in surgical planning for resection. Complete surgical resection is the only known curative treatment.

Patient consent

Specific informed consent for this case report publication was not directly obtained from the patient or next of kin. General hospital admission policies upon patient admission at University Medical Center gives permission for de-identified images and data to be used for educational and research purposes.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.radcr.2021.08.026](https://doi.org/10.1016/j.radcr.2021.08.026).

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