Management of complex growing teratoma syndrome in non seminomatous germ cell tumor: A Case Report with review of literature.

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Abstract

Background: Mediastinal teratoma is an uncommon disease, nevertheless they represent the most common mediastinal germ cell tumors. These tumors occur equally in men and women are generally benign, all forms of these tumors have a peak incidence in young adults. Determination of serum tumor markers (alpha-fetoprotein AFP and human beta-choriogonadotropin B-HCG) is important in the diagnosis and follow-up of mediastinal teratoma.

Case: A 24-year-old female had dull left sided chest pain, found to have large anterior mediastinal mass with mature teratoma histopathology on core biopsy but high AFP and B-HCG level. She received neoadjuvant cisplatin-based chemotherapy. Despite 3 cycles of therapy, her tumor size slightly increased but tumor markers level decreased. She underwent en block resection, postoperative course was uncomplicated. Her final pathology demonstrated mature teratoma.

Conclusions: This case report highlights the case of young female with pathological diagnosis of mature teratoma but raised tumor markers, which lead towards the suspicion of malignant component. This pattern leads to dilemma for proceeding to upfront surgery or neo-adjuvant chemotherapy.

Keywords: Mediastinal teratoma, tumor markers, surgical treatment

Introduction

Primary mediastinal malignant germ cell tumor is rare and represents 1%–4% of mediastinal tumors, of which 50%–70% are nonseminomatous germ cell tumors.[1] Non-seminomatous germ cell tumors (NSGCT) common subtypes are Yolk sac tumor, Teratoma, Choriocarcinoma, and Embryonal carcinoma.[2] The term ‘‘growing teratoma syndrome’’ (GTS) was first coined by Logothetis and colleagues,[3] reporting on patients with nonseminomatous testicular cancer and growing retroperitoneal or lung masses during observation after chemotherapy.

NSGCT exhibits excellent response to cisplatin-based chemotherapy, as shown by considerable reduction or normalization of serum tumor markers, alpha fetoprotein (AFP) and beta-human chorionic gonadotropin (B-HCG), and tumor shrinkage. However, 3%–8% of cases experienced enlarging tumor with compressive symptoms despite normalization of tumor markers after chemotherapy may indicate growing teratoma syndrome (GTS).[2]

GTS encompasses three criteria: (1) normalization of previously elevated tumor markers, AFP and B-HCG, after chemotherapy, (2) an increase in tumor size during or after chemotherapy with the presence of compressive symptoms, and (3) absence of NSGCT component other than mature

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teratoma in histopathology of the resected tumor.[4] Although histopathologically benign, teratoma is non chemo sensitive and can be locally aggressive which results in significant morbidity by compression on the nearby structures.[2]

Case report

A 24-year-old female, presented with dull aching left sided chest pain, non-radiating, without any postural relationship and shortness of breath. Occasional difficulty in swallowing was accompanying symptoms. Physical examination revealed decreased breath sounds in upper zone of left lung.

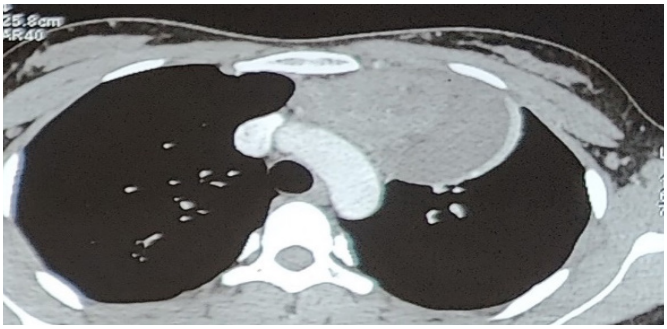

Figure 1: Contrast enhanced computed tomography axial plane shows 6.7*8.7*8.2 cm, heterogeneous anterior mediastinal mass abutting arch of aorta. (pre chemo)

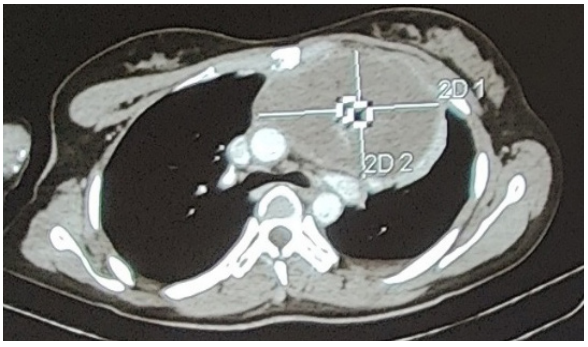

Figure 2: Contrast enhanced computed tomography axial plane shows 7.5*11*9 cm, heterogeneous anterior mediastinal mass abutting arch of aorta. (post chemo)

The contrast enhanced computed tomography (Figure 1) shows a 6.7*8.7*8.2 cm well-defined, heterogeneous (solid and cystic), anterior mediastinal mass predominantly on left side abutting pleura bilaterally, left internal mammary, 2nd/3rd left ribs, ascending aorta, arch of aorta, pulmonary trunk and left main pulmonary artery with atelectasis in anterior segment of left upper lobe, with no distinct fat plane.

The serum alpha fetoprotein (AFP) was 837.34 ng/ml (reference range 0.89-8.78 ng/ml), serum beta human chorionic gonadotropin (B-HCG) was 7.88 mIU/ml (reference range non pregnant <5) and LDH were normal, other laboratory tests was normal. A bilateral ultrasound of the ovary was normal. Core needle biopsy suggestive of mature teratoma however, her serum AFP level was very high and increased level of B-HCG, so a diagnosis of non seminomatous germ cell tumor was made and patient was subjected for neoadjuvant chemo therapy.

Tumor markers after chemotherapy improved remarkably with AFP of 3.90 ng/mL and B-HCG of 0.10 mIU/ml. Despite biochemical improvement, there was no tumor reduction upon reassessment of CT scan. She was decided for tumor debulking to reduce the tumor load. Patient was put on general anesthesia with double lumen ventilation. We performed video assisted thoracoscopic mobilization of tumor then for excision part left hemi clamshell incision was given. Intraoperatively, there was a large firm encapsulated mass about 10*7*6 cm with dense adhesion with pericardium, 2nd and 3rd ribs and adjacent intercostal muscles which was found to have fat plane maintained with left innominate vein, left pulmonary artery and left phrenic nerve, there was difficulty to differentiate tumor tissue and a portion of pericardium, and hence decision to partial excision of pericardium was made. The defect in pericardium was about 5*4 cm and was repaired with prolene mesh. The surgery went well without any complications.

Post-operative period was uneventful. Her final histopathology report of tumor was compatible with mature teratoma.

Discussion

The etiology of GTS is unknown but there are two must quoted hypotheses: chemotherapy cures immature malignant cells but remains untreated and grows the mature benign teratomatous elements; chemotherapy alters the cell kinetics toward transformation from a totipotent malignant germ cell toward a benign mature teratoma.[5] Surgery of mediastinal GTS is challenging with significant mortality and morbidity because the surgery involves resections of the lung, phrenic nerve, pericardium, great vessels, cardiac chambers, and meticulous postoperative care including fluid balance and respiratory support.[6] It is reported 4% of operative mortality secondary to pulmonary complications.[6] More than that, patients with mediastinal NSGCT have overall poor prognosis despite treatment, with 5-year survival rate between 30% and 48%.[7].

GTS is rare entity. Only case series have been reported. The majority of NSGCTs occur in young adult men. In 1997, Afifi and coworkers reported a patient with NSGCT who met the original GTS criteria patient received 4 cycles of cisplatin-based chemotherapy, cardiorespiratory deterioration secondary to tumor growth developed, and the patient underwent urgent surgery[2]. Similar case has been reported by Diong et al in 2020 where two patients underwent chemotherapy followed by surgical resection of GCT.[1] Our patient (female) received 4 cycles of cisplatin-based chemotherapy followed by surgery. We started with VATS mobilization of tumor. After the tumor was separated from major mediastinal structures thoracotomy and excision of mass along with major portion of pericardium was done. Pericardium was repaired by prolene mesh. We recommend Thoracoscopic mobilization of tumors in order to better visualization of tumors and major structures.

Conclusion

The surgical treatment of GTS presents significant challenges. Although these tumors are often large, achieving resection with tumor-free margins is feasible. Following recovery, completing the planned chemotherapy is advised. Long-term survival is achievable, but diligent monitoring is essential, as early detection and removal of recurrent disease can still be curative.

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