American Journal of Surgery Case Reports

Case Report

Mediastinal Tumor in Children; Case Report and Literature Review

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Abstract

Mediastinal tumors in children develop in a complex anatomical compartment containing the thymic residue, the digestive tract, the tracheobronchial tree, ganglion areas, and sympathetic nerve chains, thus bringing together a large histological variability of tumors, benign and malignant. Germline tumors account for 6% to 18% of mediastinal tumors in children, and they are the third most common neoplasms of the mediastinum after lymphomas and neurogenic tumors. The management of children with a mediastinal mass requires the planning of a multidisciplinary therapeutic strategy including pediatric surgeon, pediatric oncologist, radiologist and pathologist.

Keywords: Mediastinal tumors; Germ cell tumors; Teratoma

Introduction

Mediastinal tumors are uncommon and most often discovered incidentally during radiological examination in asymptomatic patients. Mediastinal tumors in children are cell proliferations developed at the expense of the mediastinal organs, grouping together a wide histological variability of tumors, benign or malignant.

The mediastinum is a complex anatomical compartment where sits the thymic residue, the digestive tract, the tracheobronchial tree, numerous ganglionic relays, and the latero-vertebral gutters with the sympathetic nervous chain [1]. Clinical examination and advances in imaging are important guiding elements. However, the diagnosis is anatomopathological and requires the analysis of large biopsy fragments by an experienced pathologist.

A better knowledge of the different pathologies and their means of exploration should allow the planning of an adequate therapeutic strategy, which requires multidisciplinary consultation including pediatric surgeon, pediatric oncologist, radiologist and pathologist [2,3].

We report a case of a mediastinal tumor in a 12-year-old child diagnosed by thoracic computed tomography and operated at the pediatric surgery department of military hospital of Oran.

Case Presentation

12-year-old child admitted to our department for a mediastinal tumor. The beginning of the symptoms went back to 3 months marked by the appearance of headaches, cough and chest pain, which motivated the patient to consult. The lateral chest X-ray showed an anterior mediastinal mass (Figure 1).

Thoracic CT concluded to a large mediastinal mass measuring 8 cm × 6 cm extended over a height of 10 cm of mixed density occupying the anterior mediastinum in its three levels, upper, middle and lower having connections with the vena cava. Inferior, ascending aorta and right pulmonary vein, suggesting a mediastinal teratoma (Figures 2 and 3).

Biologically, the dosage of B-HCG and Alpha-fetoprotein are correct (B-HCG=0.277 ml/uml, Alpha-fetoprotein= 1.05 IU/ml). The patient underwent an abdominopelvic ultrasound and an echocardiography for extension assessment, which came back without any particularities. After a preoperative assessment and pre-anaesthetic agreement, the indication for surgery was made. The patient was admitted to the operating room, under general anesthesia with a simple endo-tracheal intubation, a basithoracic wedge was used for optimal spacing of the intercostal space chosen for the thoracotomy.

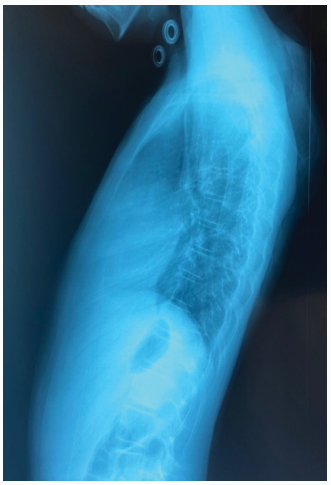

Figure 1: Lateral chest X-ray showing an anterior mediastinal mass.

Citation: Adjerid R, Djelad M, Sebaa F, Mazouzi C, Abdesslam M, Medjamia M. Mediastinal Tumor in Children; Case Report and Literature Review. Am J Surg Case Rep. 2022;3(1):1025.

Publisher Name: Medtext Publications LLC

Manuscript compiled: Apr 06th, 2022

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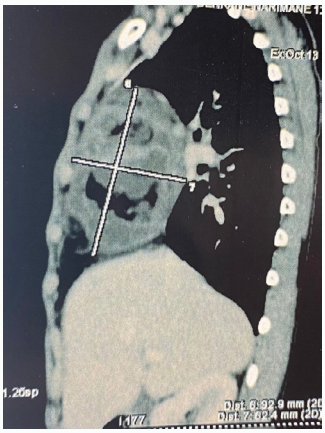

Figure 2: CT; Sagittal section showing the mediastinal tumor and its relationship with the inferior vena cava, the ascending aorta and the right pulmonary vein.

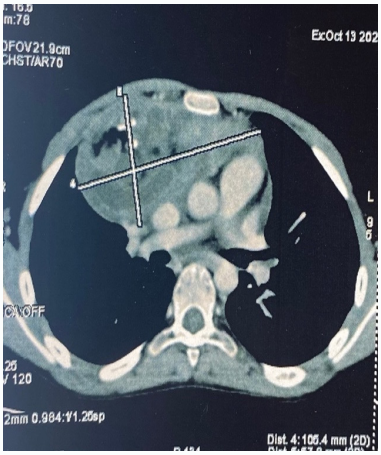

Figure 3: CT; Axial section of the mediastinal tumor.

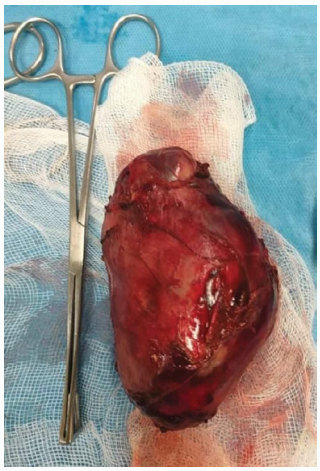

Figure 4: Mediastinal tumor.

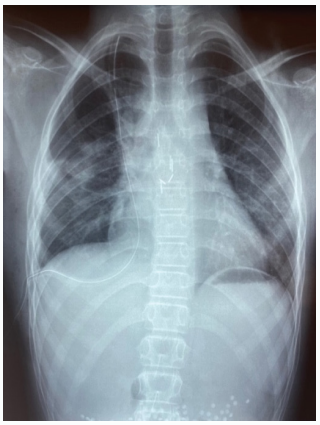

Figure 5: Postoperative chest X-ray: chest drain and radiopaque clips in place.

A trans-pleural right lateral thoracotomy was performed at the 5th intercostal space; the dissection of the tumor was laborious especially in its posterior side which came in intimate contact with the inferior vena cava, the ascending aorta and the right pulmonary vein. Resection of the mass was possible without fragmentation (Figure 4).

After haemostasis, titanium clips were placed on the tumor resection site. A CH 22 chest drain was inserted and the surgical specimen was sent to the pathological anatomy department.

Postoperatively, the patient received prophylactic antibiotic and an analgesic treatment (paracetamol) every 6 hours. The thoracic drain was removed on day 2 postoperative; the patient was discharged on the fourth postoperative day (Figure 5). The histopathological study concludes to a mature multi-tissue mediastinal teratoma without signs of malignancy or immature tissue. The patient is followed in consultation, she benefits from clinical, biological and radiological monitoring every 6 months.

Discussion

Tumors of the anterior mediastinum are largely dominated by tumors of the thymic compartment (20% of all mediastinum tumors) [2]. Germ cell tumors are the third most common neoplasia of the mediastinum after lymphomas and neurogenic tumors [4]. They represent 6% to 18% of anterior mediastinum tumors in children. Teratoma is the most common type of germ cell tumor divided into two types mature and immature. About 14% of mediastinal germ cell tumors are malignant (immature) [5,6].

The clinical expression of teratomas is not very suggestive, the most frequent symptoms are: chest pain, dyspnea and cough which are often related to compression of neighboring structures [7,8]. Their discovery is often fortuitous on the occasion of a chest X-ray which makes it possible to highlight a mediastinal mass responsible for a widening of the mediastinum. The mediastinal teratoma is often lateralized, well limited, rounded, ovoid or polylobed. The presence of visible calcifications in 20% of cases inside the mass is very suggestive of the diagnosis.

Computed Tomography (CT) makes it possible to evoke the diagnosis of teratoma in the majority of cases by showing several formations of different density (solid, liquid, fatty or calcium) inside the tumor [9,10]. Fat and calcium are absent in approximately 15% of mature teratomas. Invasion of adjacent mediastinal structures is suggestive of malignant germ cell tumors [11].

Biologically, the assay of markers (LDH, B-HCG, and Alpha-fetoprotein) can largely guide the diagnosis and must be systematically requested. The serum level of B-HCG and Alpha-fetoprotein is normal in benign mature teratomas; a high level of one of these two markers raises suspicion of the presence of immature cells or cells with malignant behavior [12].

The treatment of benign mature teratoma of mediastinum is exclusively surgical as soon as the diagnosis is made to prevent complications. A complete resection followed by a histopathological analysis of the entire surgical specimen by an experienced pathologist is the reference attitude. The detection of an immature or malignant contingent on histopathological examination necessarily implies adjuvant chemotherapy.

Incomplete surgical excision must be followed by regular and long-term clinical, radiological and biological monitoring (α FP, β HCG) to detect any recurrence or malignant transformation [13-15]. The minimally invasive approach can allow interesting accessibility to the anterior mediastinum but the surgeon must know the limits of these. Patients with tumors less than 5 cm in size and whose resectability, according to preoperative imaging data, seems easy, are good cases for minimally invasive approach. The interest minimally invasive approach is to reduce the length of hospital stay and promote faster postoperative rehabilitation, it has not been shown to benefit in terms of long-term survival for the management of tumors thymic for example [16,17].

Postoperative complications are exceptional (less than 2% of cases). The prognosis of mature teratomas of the mediastinum is excellent provided that surgical excision is complete.

Conclusion

The mature teratoma is a benign extra-gonadal tumor arising from the embryonic layers (endoderm, mesoderm and ectoderm). The tumor mass is multi-tissue without visualization of immature zones. The diagnosis is generally evoked in front of radiological criteria, in particular computed tomography. Tumor markers (AFP, B_HCG and LDH) are generally normal (AFP can be elevated up to 15 U/ml). The treatment of mature teratoma is surgical excision, by sternotomy or thoracotomy. The prognosis is excellent; these tumors do not recur after surgical excision.

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