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Case Report

Pure mediastinal seminoma about a case report[☆]

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ABSTRACT

Mediastinal Seminoma is one of the malignant germ cell tumors of the mediastinum. It is a rare tumor that represents only 1%-4% of mediastinal tumors. We report the case of a patient treated at the Oncology Center of Oujda for a pure primitive seminoma of the mediastinum, with a review of the literature to assess the epidemiological, clinical, therapeutic, and prognostic characteristics of this pathology. This is a 25-year-old man whose aunt is being treated for breast cancer and who complained of persistent dry cough with asthenia without any other associated signs. The initial imaging revealed a voluminous locally advanced tumor process in the anterior and middle mediastinum. Tumor markers Alpha-fetoprotein (AFP) and beta-subunit of chorionic gonadotrophic hormone (BHCG) were normal, as well as testicular ultrasound. The CT-guided transthoracic biopsy with anatomopathological study and immunohistochemistry was in favor of a pure seminoma. The treatment consisted of primary chemotherapy with BEP protocol. The response was favorable with a significant reduction in tumor size estimated at 90%. The residual tumor was inoperable due to its intimate contact with the vascular structures and was treated with external radiotherapy at a total dose of 36 Gy. The evolution at 20 months after treatment was in favor of a good clinical and radiological evolution.

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Introduction

Mediastinal germ cell tumors (MGT) are rare compared to gonadal tumors [1]. Apart from teratomas, which are almost exclusively benign, these malignant tumors are divided into 2 types; seminomas and nonseminomatous germ cell tumors

[1,4]. Pure primitive seminomas of the mediastinum are exceptional; few cases are found in the literature [2,3].

We report the case of a patient treated at the Oncology Center of Oujda for a pure primitive seminoma of the mediastinum with a review of the literature in order to evaluate the epidemiological, clinical, therapeutic, and prognostic characteristics of this pathology.

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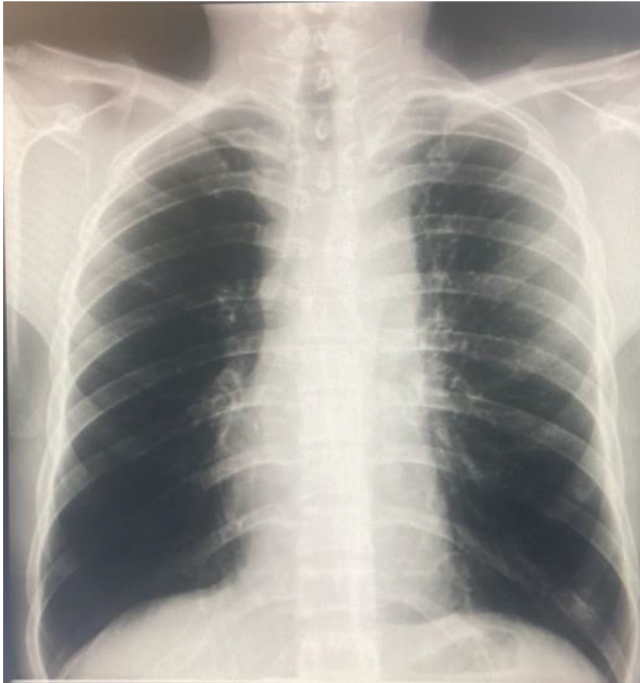


Fig. 1 – The chest X-ray showing a mediastinal tumor process.

Case report

This is a 25-year-old man who's has an aunt treated for breast cancer, and who complained of a persistent dry cough for 6 months with asthenia without any other associated signs. The clinical examination was normal.

A chest X-ray was initially performed, showing a mediastinal tumor process (Fig. 1). This was followed by a thoracic CT scan (Fig. 2) which showed a large locally advanced tumor process in the anterior and middle mediastinum with lobulated contours measuring 172 × 107 mm. CT scan showed no secondary locations and the testicular ultrasound was normal.

Tumor markers realized; Alpha-fetoprotein (AFP), beta subunit of chorionic gonadotropic hormone (BHCG), and lactate dehydrogenase (LDH) were normal.

Therefore, CT- a guided transthoracic biopsy of the mass was done with an anatomopathological and immunohistochemical study, which revealed a pure mediastinal seminoma: anti CD 117 antibodies were positive, anti PLAP antibodies positive and Oct three-fourth antibodies positive.

Treatment consisted of 3 courses of chemotherapy based on the BEP protocol (Bleomycin, Etoposide, Cisplatin).

The evaluation CT scan showed an important reduction in the size of the tumor process and no new progressive lesions (Fig. 3).

The tumor residue measured more than 3 cm. Therefore a PET scan was performed, which showed a very heterogeneous active tumor residue of the anterosuperior mediastinum (Fig. 4).

A thoracic magnetic resonance imaging (MRI) (Figs. 5 and 6) was also done, which showed that the tumor residue is intimately near the aortic arch, with the emergence of the supra-aortic trunks and the ascending aorta without a separation line. It also has intimate contact with the superior vena cava, the left nominated trunk, and the trunk of the pulmonary artery.

The tumor residue was inoperable due to its close contact with the vascular structures; then the treatment was completed with external radiotherapy at a total dose of 36 Gy in 18 fractions of 2 Gy.

The evolution at 20 months from the end of the radiation treatment was in favor of a good clinical and radiological evolution (Fig. 7).

Discussion

Pure mediastinal seminomas are rare malignant tumors; they represent only 1%-4% of mediastinal tumors [2,3]. They are part of the malignant germ cell tumors of the mediastinum of which they account for about 30%-40% [5-7]. They occur mainly in young men [2]. And they are characterized by a significant local extension and rarely give metastasis [8,9].

Mediastinal seminoma; as well as other types of germ cell tumors of the mediastinum; may manifest clinically with signs of mediastinal compression. These include chest pain, which is found in almost 50% of patients, and cough, which is noted in almost 1 in 3 cases. Superior vena cava compression can also reveal the disease in 10%-20% of patients. Dyspnea can also be found and is related either to the volume of the tumor or to a pleural effusion that exists in 25% of cases [4,5].

Sometimes there may be an alteration in the general condition with weight loss [4] and sometimes there may be gynecomastia, which indicates the presence of an associated choriocarcinomatous component [4].

It should be noted, of course, that some patients are asymptomatic in 20%-40% of cases and the tumor is then discovered fortuitously [1]. The clinical examination is usually poor [10].

Radiologically for seminomas and TGNS; it's about a voluminous tumor of the anterior and the middle mediastinum with almost 8-12 cm of length. In the scanner, pure mediastinal seminomas have a lobulated appearance, a uniform density with a very homogeneous character [1,11]. It should also be noted that in case of primary TGM the testicular ultrasound is normal [1].

TGNS are characterized by a constant elevation of the tumor markers AFP and HCG. In contrast to mediastinal seminoma where the dosage of these markers is normal [1]. Indeed, any elevation of these markers indicates the presence of a nonseminomatous contingent [1].

Biopsy with pathological and immunohistochemistry studies have a great interest to confirm the diagnosis of pure mediastinal seminoma [1].

The histological aspect is very characteristic with the presence of monomorphic parts of cells with clear cytoplasm, clear cytoplasmic boundaries and oval nuclei. An abundant

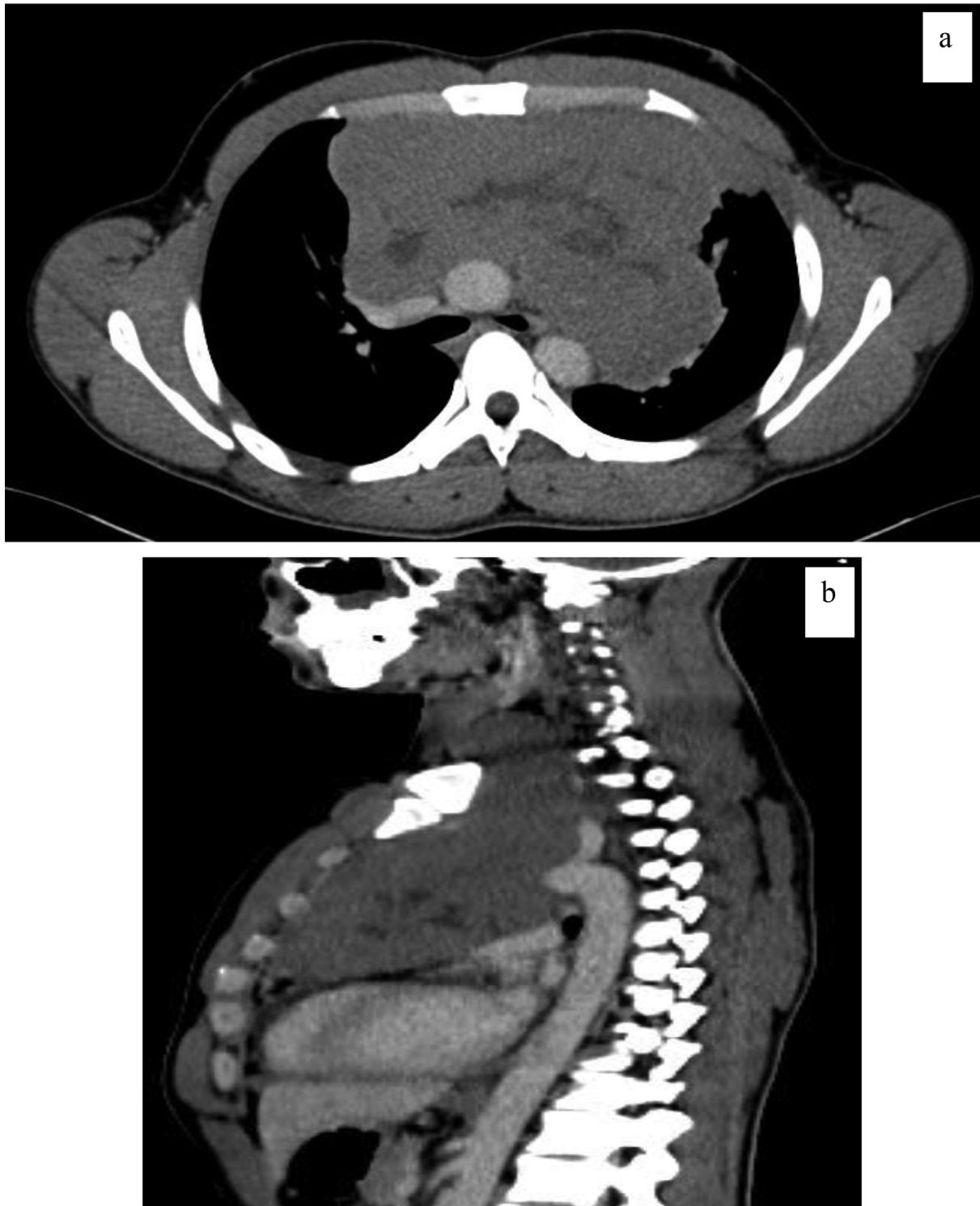


Fig. 2 - Axial (A) and coronal (B) slice of injected Thoracic CT, showing a voluminous tumoral process occupying the anterior and middle mediastinum, isodense, enhancing heterogeneously after injection of PDC measuring 172 x 107 mm.

inflammatory contingent is often present, most often lymphocytic but may include macrophagic granulomas [4]. The immunohistochemistry study is very important in order to confirm the diagnosis of seminoma with the positivity of the tumor cells for placental alkaline phosphatase (PAL) in

80%-90% of cases and for CD117 in the vast majority of cases [4,12].

In fact, the therapeutic approach to mediastinal seminoma has evolved in recent years. In the past, we did a surgical excision that was often incomplete, followed by radiotherapy.

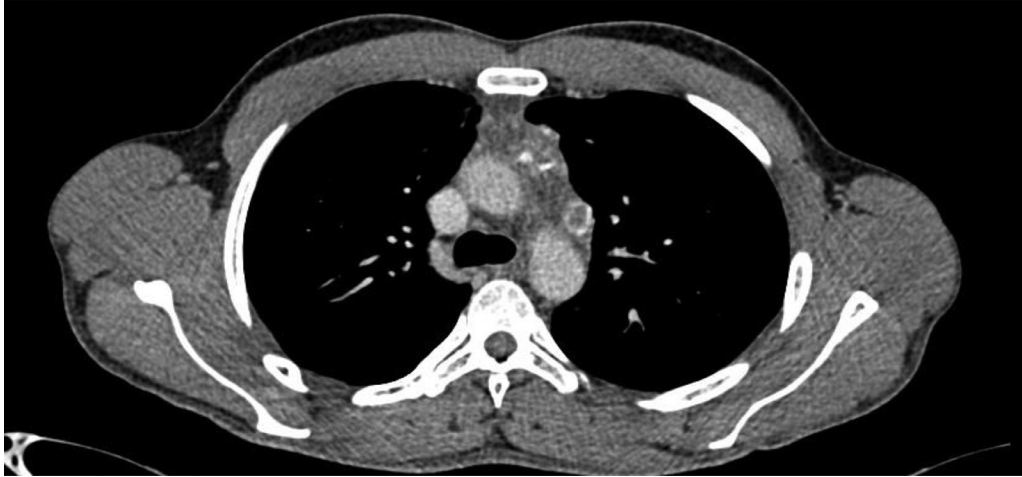


Fig. 3 – Axial slice of injected Thoracic CT, showing significant reduction in size of the isodense mediastinal tumoral process, enhancing heterogeneously after injection of PDC containing areas of necrosis and calcifications measuring 69 x 36 mm: CT appearance in favor of a favorable evolution of the mediastinal tumoral disease.

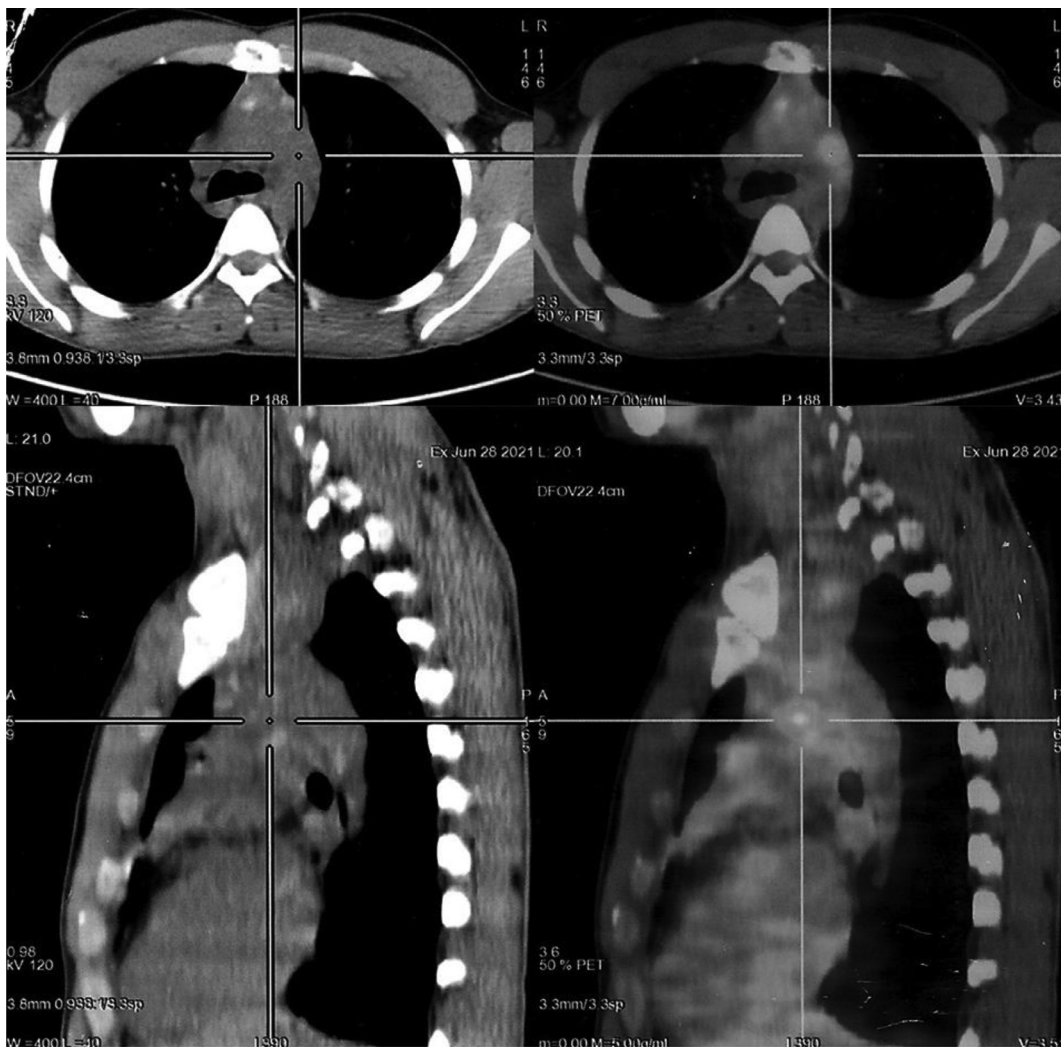


Fig. 4 – PET-CT examination with 18 FDG highlights a very heterogeneous hypermetabolic tumoral process (max SUV = 3.5) in the antero-superior mediastinum, predominant in the left prevascular area, measuring 55 x 44 in the major axes.

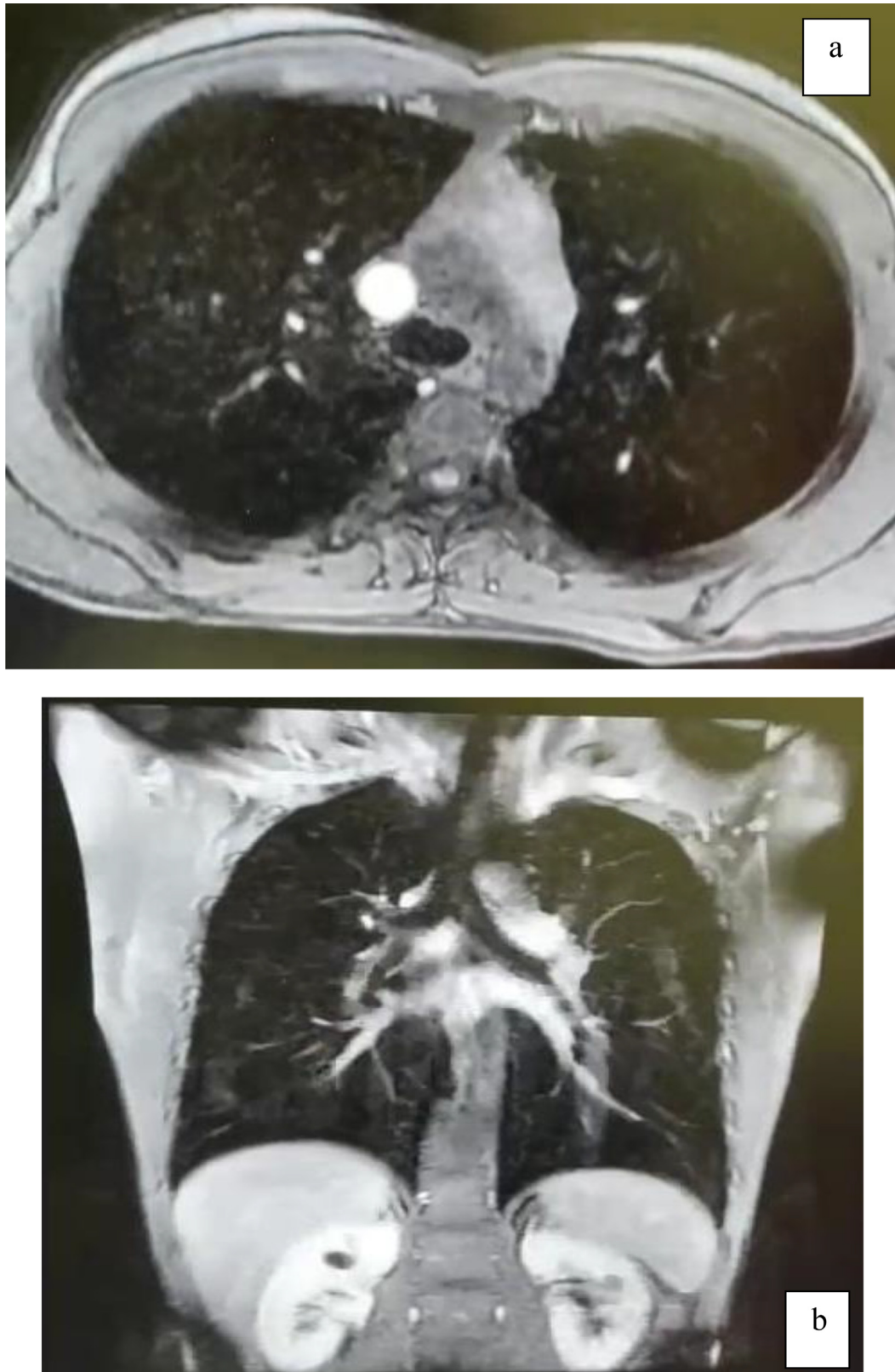


Fig 5 - Axial (A) and coronal (B) slice of Thoracic MR, showing an anterior mediastinal tumoral process, poorly limited, with irregular contours in isosignal T1, with close contact to the vascular structures.

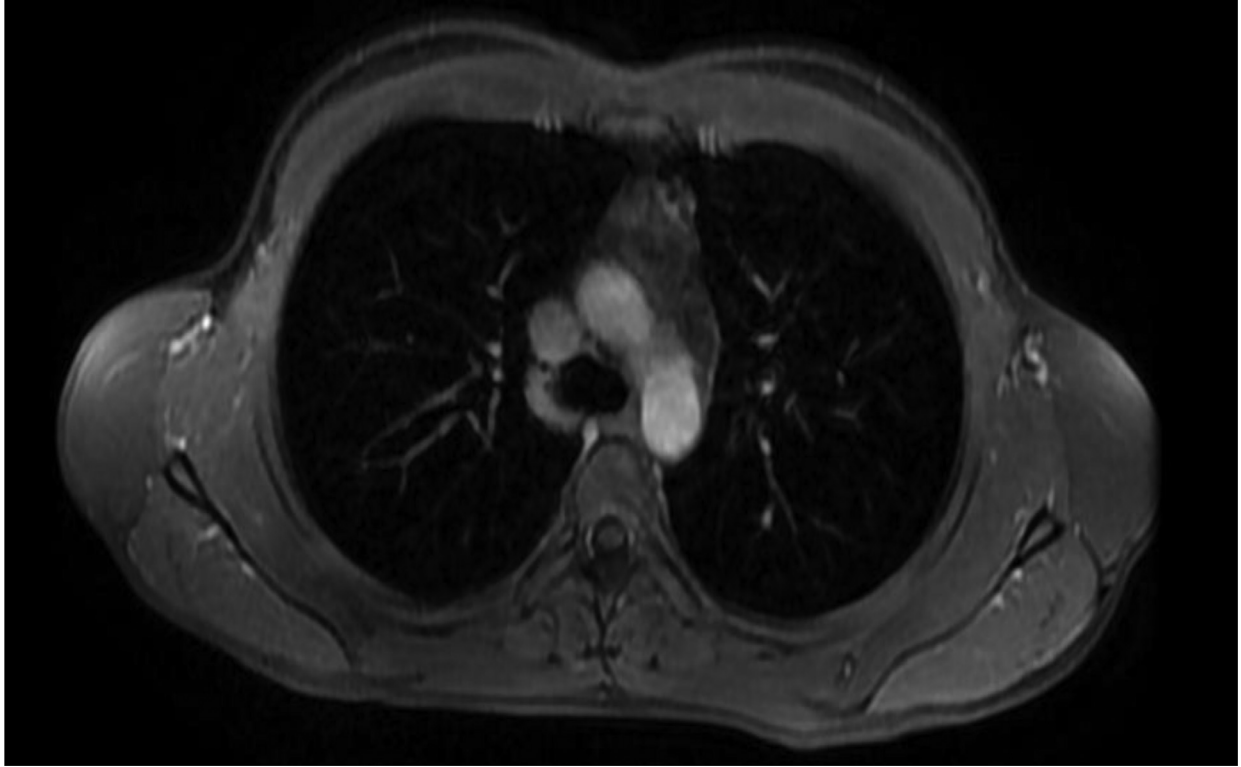


Fig. 6 – Axial slice of Thoracic MR, showing an anterior mediastinal tumoral process, poorly limited, heterogeneous signal in T2.



Fig. 7 – Axial slice of injected Thoracic CT, showing a decrease in size of the anterior mediastinal tumor process, containing calcifications and measuring 23 x 20 mm.

However, nowadays, and in view of the high chemosensitivity of seminomas has been demonstrated that a first multidrug therapy allows to obtain better results with a complete response in almost 95% of cases [4,13,14].

Thus, in the case of a pure mediastinal seminoma, 4 courses of chemotherapy (cisplatin-etoposide) are indicated [15]. At the end of these 4 courses, a scanner is realized to search for any residual lesions, which must be surgically resected if the tumor remains larger than 3 cm in diameter and is hypermetabolic on a PET scanner [15,16]. Radiotherapy is indicated only if a florid tumoral remnant persists [15].

Indeed, radiotherapy can be also administered after chemotherapy in case of unresectable tumor residue [17–19]; at a total dose of 36.0-50.4 Gy [6,17].

In general, mediastinal seminoma has a better prognosis compared to TGNS [18]. And in fact, its prognosis has improved recently with the new therapeutic recommendations with a 5-year survival of 90% [19,20].

Conclusion

Mediastinal seminomas are rare malignant tumors that affect mostly young men, their prognosis has remarkably improved with chemotherapy treatment. Hence, the interest is to conduct prospective randomized studies in order to improve the management and prognosis of this disease.

Patient consent

The patient has been informed and has given his consent.

REFERENCES

- [1] Lemarié E. Tumeurs germinales malignes du médiastin : diagnostic et traitement. *Rev PneumolClin* 2004;60(5, Part 2):79–85.
- [2] Yaegashi H, Nohara T, Shigehara K, Izumi K, Kadono Y, Makino T, et al. Survival outcomes of patients with primary mediastinal germ cell tumors: a retrospective single-institutional experience. *Cancer Diagn Progn* 2022;2(3):352–9.
- [3] Rampengan VRC, Bakhtiar A. A case of primary mediastinal seminoma with superior vena cava syndrome and large intracardiac thrombus. *Int J Surg Case Rep* 2022;97:107478.
- [4] Masson E. Les tumeurs germinales du médiastin : anatomopathologie, classification, tératomes et tumeurs malignes [Internet]. EM-Consulte 2010;66(1):63–70.
- [5] Sohn A, Moran CA. Primary mediastinal germ cell tumors. *Semin Diagn Pathol* 2023;40(1):37–46.
- [6] Zhai YR, Zhou Z, Wang S, Feng Q, Liu Y, Xiao Z, et al. Characteristics and treatment outcomes of primary mediastinal seminomas: a report of 30 cases from a single center. *Int J Radiat Oncol*. 2019;105(1, Supplement):E493.
- [7] Napieralska A, Majewski W, Osewski W, Miszczyk L. Primary mediastinal seminoma. *J ThoracDis* 2018;10(7):4335–41.
- [8] Masson E. Tumeurs germinales primitives du médiastin : expérience de l'Institut de cancérologie de Lorraine sur une période de 20 ans (1990-2012) [Internet]. EM-Consulte. <<https://www.em-consulte.com/article/962300/tumeurs-germinales-primitives-du-mediastin-experie>>; 2015 [accessed 5.9.2022].
- [9] Bishop MA, Kyriakopoulos C. Mediastinal seminoma. StatPearls [Internet], Treasure Island (FL): StatPearls Publishing; 2022. [accessed 5.9.2022] Available at: <http://www.ncbi.nlm.nih.gov/books/NBK563290/>.
- [10] Tahri A, Sahraoui S, Bouras N, Benchekroun N, Acharki A, Benider A, et al. Primitive seminoma of the mediastinum: a case report. *Ann Urol* 2001;35(1):64–6.
- [11] Strollo DC, Rosado de Christenson ML, Jett JR. Primary mediastinal tumors. Part 1: tumors of the anterior mediastinum. *Chest* 1997;112(2):511–22.
- [12] Copin MC. Pathologie du médiastin. Cas no 8. Séminome. *Ann Pathol* 2015;35(3):251–4.
- [13] Stram AR, Kesler KA. Mediastinal germ cell tumors: updates in diagnosis and management. *Surg Oncol Clin N Am* 2020;29(4):571–9.
- [14] Dechaphunkul A, Sakdejayont S, Sathitruangsak C, Sunpaweravong P. Clinical characteristics and treatment outcomes of patients with primary mediastinal germ cell tumors: 10-years' experience at a single institution with a bleomycin-containing regimen. *Oncol Res Treat* 2016;39(11):688–94.
- [15] Masson E. Les tumeurs médiastinales. EM-Consulte. [accessed 5.9.2022] Available at:<https://www.em-consulte.com/article/864109/les-tumeurs-mediastinales>
- [16] Sakaguchi Y, Isowa N. Successful resection of mediastinal seminoma evaluated the response to induction chemotherapy with fluorodeoxyglucose-positron emission tomography. *Ann Thorac Cardiovasc Surg* 2012;18(1):45–7.
- [17] Wang L, Zhao J, An T, Wang Y, Zhuo M, Wu M, et al. Clinical characteristics and outcomes of patients with primary mediastinal germ cell tumors: a single-center experience. *Front Oncol* 2020;10:1137.
- [18] Sadiq Q, Khan FA. Germ cell seminoma. StatPearls [Internet], Treasure Island (FL): StatPearls Publishing; 2022. [accessed 5.9.2022] Available at: <http://www.ncbi.nlm.nih.gov/books/NBK559241/>.
- [19] Singh S, Han W. Primary mediastinal seminoma found on evaluation for weight loss. *Chest* 2020;158(4, Supplement):A1217.
- [20] Stram AR, Kesler KA. Mediastinal germ cell tumors: updates in diagnosis and management. *Surg Oncol Clin N Am* 2020;29(4):571–9.