Case Report

A rare cause of exophthalmia: Osteoblastoma of the frontal sinus

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ABSTRACT

Osteoblastoma is a rare benign tumor arising predominantly in the vertebrae or long tubular bones. Its naso-sinusian origin is rare and can be responsible for ophthalmological complications [1].

We report the case of 19-year-old patient admitted to the Ophthalmology department for progressive right exophthalmia and ptosis evolving over 8 months.

The diagnosis of osteoblastoma was suspected on CT and MRI imaging and then confirmed by the anatomopathological studies. Total surgical excision was performed. Clinical and radiological evolution has been favorable.

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Introduction

Osteoblastoma is a rare benign tumor that accounts for less than 1% of all primary bone tumors. It usually arises in the vertebral column and long bones of young adults. Craniofacial involvement is extremely rare [1-3].

We report a case of osteoblastoma of the frontal sinus with ophthalmological complications.

Case report

A 19-year-old man without significant pathological history, presented to the Ophthalmology department for progressive right exophthalmia and ptosis evolving over 8 months.

Ophthalmologic examination showed a right supraduction limitation with a preserved visual acuity (Fig. 1).

Computed tomography (CT) of the head shows a well-defined expansile lesion of the right frontal sinus, measuring 52 × 35 mm, with sclerotic and fibrous component, that extends through the right orbital roof and causes mass effect on the superior rectus muscle, responsible for grade II exophthalmia (Fig. 2).

On magnetic resonance imaging (MRI), the sclerotic component seen on CT scan showed low signal intensity on T1W and T2W images and no enhancement. The soft tissue component seen on CT had intermediate T1W and T2W signal intensity and clearly showed enhancement after intravenous contrast administration (Fig. 3).

The diagnosis of osteoblastoma of the right frontal sinus was suspected on imaging data.
Fig. 1 – Eye movement examination: Adduction (A), Abduction (B), Supraduction (C), Infraduction (D), primary position (E): We notice a right supraduction limitation (B).

Fig. 2 – Computed tomography (CT) of the head shows a well-defined expansile lesion of the right frontal sinus, with sclerotic (asterixis) and fibrous component (white arrow), that extends through the right orbital roof and causes mass effect on the superior rectus muscle (black arrow), responsible for exophthalmia grade II.

Fig. 3 – MRI images through the frontal sinuses, at same level of the displayed CT images in Fig. 2. Axial noncontrast spin echo T1W image (A), axial non contrast fast spin echo T2W image (D), Axial and coronal postcontrast spin echo T1W images (B and C): The sclerotic component on CT scan shows low signal intensity (asterixis) on T1W and T2W images and no enhancement. The soft tissue component seen on CT (Fig. 2) (white arrow) has intermediate T1W and T2W signal intensity and clearly shows enhancement after intravenous contrast administration.
Tumor has been surgically removed with tumor-free margins, and the orbital structures were saved. Postoperative CT scan was not indicated.

The anatomopathological study confirms the diagnosis of benign osteoblastoma.

**Discussion**

Osteoblastoma is a rare primary osseous tumor arising predominantly in the vertebrae or long tubular bones. Around 18% of osteoblastomas are located in the craniofacial region. Their nasosinusian origin is rare [1]. Young age and male predominance are noted in the literature [2].

Commonly the lesion has a slow evolution, but it can sometimes be rapid simulating an infectious or malignant origin [2]. When frontal sinus is affected, clinical symptoms are related to orbital involvement such as exophthalmos, epiphoria, and orbital pain, as in our case [3].

Radiographically, there is no pathognomonic sign of osteoblastoma. The lesion is fairly well-circumscribed without significant bone lysis. It tends to have a dense sclerotic part and a fibrous part associated with calcifications. On MRI, osteoblastoma has a heterogeneous appearance. The sclerotic component of the lesion shows signal void and no contrast enhancement, and the fibrous component, have low to intermediate signal intensity on both T1W and T2W images and intense enhancement after the administration of intravenous contrast [1,4].

In our case, MRI allowed us to accurately assess the involvement of adjacent vital structures mainly the intraorbital ones. The main differential diagnosis is fibrous dysplasia due to its relatively higher incidence but the mixed osseous and fibrous aspect in addition to the nodular and organized appearance tends to evoke osteoblastoma [1,3].

Clinical context and a meticulous radiological analysis allow us to evoke the diagnosis of osteoblastoma. However, the certainty diagnosis is based on the anatomopathological examination [1].

Surgery remains the only effective treatment with complete resection. The role of local tumor irradiation is controversial. It can be used after incomplete surgical excision [1,5].

Their transformation into osteosarcoma is extremely rare and post-treatment recurrence rates ranged between 16% and 20% [5].

**Conclusion**

Osteoblastoma is a benign and unusual primary bone tumor, involving mainly the vertebrae and long tubular bones, rarely seen in craniofacial bones. CT scan and MRI are the 2 medical imaging methods that guide the diagnosis, which needs to be confirmed by anatomopathological study. Their treatment is only surgical. Complete resection is recommended to prevent the possibility of postoperative recurrence and malignant transformation.

**Patient consent statement**

Written informed consent for publication was obtained from the patient.

**References**

1. Vella O, Cuny F, Robard L, Bazille C. Exophtalmie révélatrice d’un ostéoblastome du sinus maxillaire d’un enfant. Ann Françaises Oto-rhino-laryngol 2016;133:251–3.
2. Y. Mouzari, H. Ait Elhaj, Y. Boui and M. Kriet. Exophtalmie révélatrice d’un ostéoblastome fronto-orbitaire. Int J Adv Res. 4(10), 724–727.
3. Sidani Charif A, Karam Adib R, Bruce Jocelyn H, Sklar Evelyn. Osteoblastoma of the frontal sinuses presenting with headache and blurred vision: case report and review of the literature. J Radiol Case Rep 2010;4(6):1–7.
4. Batay F, Savas A, Ugur HC, Kanpolat Y, Kuzu I. Benign osteoblastoma of the orbital part of the frontal bone: case report. Acta Neurochir (Wien) 1998;140:729–30.
5. Wang Kun, Yu Feidan, Chen Keng, Niu Huanjiang, Wang Yirong, Yang Shuxu, et al. Osteoblastoma of the frontal bone invading the orbital roof. Medicine 2018;97:42.