Case report

Osteoblastoma of the temporal bone – A familiar tumour at an uncommon site

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(Received: January 2022 Revised: February 2023 Accepted: March 2023)

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ABSTRACT

Osteoblastoma is a benign bone tumour arising from the non-odontogenic epithelium. This tumour predominantly affects the vertebral column and long tubular bones such as the femur and tibia. Herein, we report a case of Osteoblastoma affecting temporal bone. Radiologically, it was thought to be an intraosseous meningioma, hemangioma, or eosinophilic granuloma. Histopathological examination of the tumour showed woven bone arranged in sheets and micro trabecular array, rimmed by a single layer of osteoblast, surrounded by lamellar bone. Intertrabecular spaces were composed of richly vascular fibrotic stroma, consistent with the diagnosis of osteoblastoma.

Keywords: Osteoblastoma; temporal bone; osteoid osteoma; histopathology;surgery.

INTRODUCTION

Osteoblastoma is a rare, benign osteoid forming tumour. It accounts for 1% of all bone tumours (1).It commonly occurs in young adults between their second and third decades of life, more commonly in males. This tumour predominantly affects the vertebral column and long tubular bones such as the femur and tibia. Skull involvement is rare, and particularly temporal bone involvement is even rarer (2,3). Clinical features include swelling and progressive pain, which is not relieved on non-steroidal anti-inflammatory drugs (NSAID). Radiological investigations which can help in diagnosis and management include ultrasonography (USG), magnetic resonance imaging (MRI), and computed tomography (CT) scan. Mainstay treatment is surgical excision of the tumour (4). Histopathology is confirmatory and shows interconnecting trabeculae of woven bone rimmed by plump osteoblasts and richly vascularized fibroblastic stroma (5). The prognosis is excellent, and recurrences are unusual (6). Herein, we present a 16-year-old boy with swelling on the right temporal region of the skull for one year, which was histopathologically diagnosed to be an osteoblastoma.

Case report

A 16-year-old boy presented with a swelling over the right temporal region of one-year duration. Initially, the swelling was small but gradually increased to the present size of about 5 cm x 4 cm. There was no history of pain, headache, or seizures. Computed tomography scan of the head showed an expansile mass in the skull vault with sunray and trabecular pattern over the right temporoparietal convexity (Fig. 1) measuring 4 cm x 2.7 cm x 3.8 cm with a probable diagnosis of skull vault haemangioma.

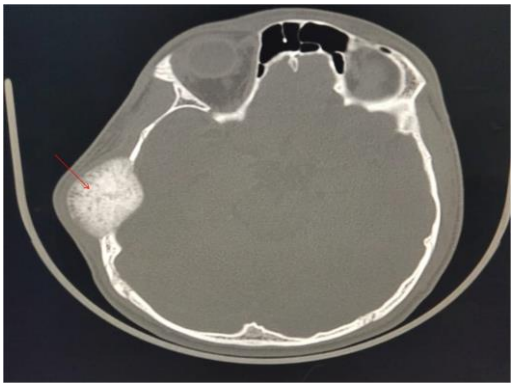

Fig. 1: Preoperative CT scan of the brain showing an expansile mass in the skull vault over the right temporoparietal convexity (arrow).

An MRI of the head also was done in another center showed well defined, oval-shaped expansile lesion centered over the right squamous temporal bone with heterogeneous contrast enhancement. Differential diagnosis of eosinophilic granuloma and primary intraosseous meningioma was considered. Routine laboratory investigations were within normal limits. Surgical excision of the bony swelling was performed.

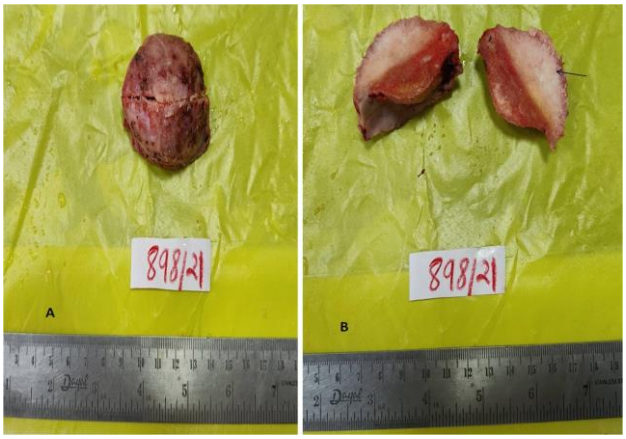

Fig. 2: A- gross specimen showing a nodular tumour over the segment of the temporal bone. B- Cut surface showing a pale white to pale brown, bony hard tumour.

Grossly, the specimen showed a nodular tumour measuring 4.9 cm x 4 cm x 2.5 cm over the segment of the temporal bone. The cut surface of the tumour was solid and hard in consistency with an ill-defined margin (Figs. 2A and 2B).

Histopathology of the tumour showed woven bone arranged in sheets and a micro trabecular array that was grey-brown, rimmed by a single layer of osteoblast. They were surrounded by lamellar bone (Figs. 3A and 3B).

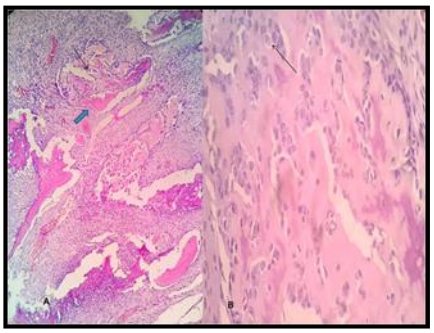

Fig. 3: A- Microscopy showing woven bone arranged in micro trabecular array, rimmed by osteoblast (arrow) surrounded by lamellar bone (arrowhead) H&E, 100x. B- osteoid surrounded by osteoblast (arrow), H&E, 400x

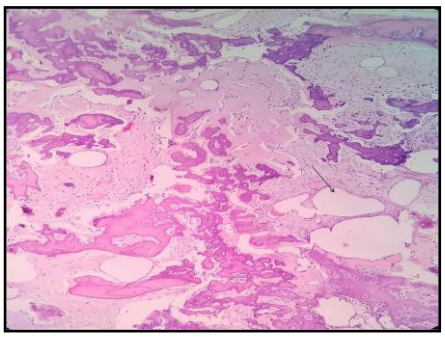

Fig. 4: Intertrabecular spaces composed of richly vascular fibrotic stroma (arrow), H&E, 100x

Intertrabecular spaces were composed of richly vascular fibrotic stroma (Fig. 4). Vessels were ectatic. At the periphery, there was a sclerotic bone with periosteal reaction (Fig. 5).

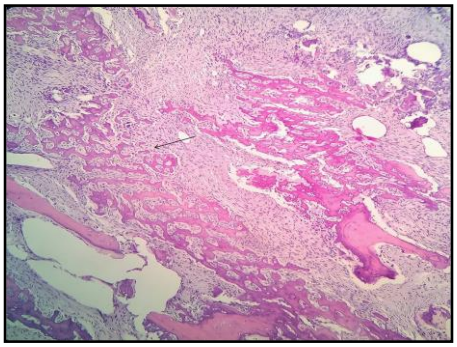

Fig. 5: Periphery of the tumour showing periosteal reaction (arrow), H&E, 100x

The tumour was abutting the inner cortical surface. Features were suggestive of osteoblastoma. Postoperative CT scan showed complete clearance of tumour (Fig. 6). Currently, the patient is on regular follow-up and is doing well.

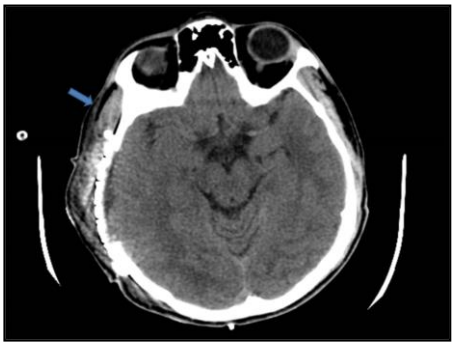

Fig. 6: Postoperative CT scan showing complete clearance of tumour (arrowhead)

DISCUSSION

Skull involvement of osteoblastoma is very rare, with an incidence being 2% to 4%. Most cases are intraosseous in the metaphyseal region, but a small percentage can occur on the periosteal surface (2,4). In the present case, the tumour was on the right temporal area of the scalp.

On X-ray, osteoblastoma appears as an irregularly shaped radiolucent lesion surrounded by a thin shell of reactive bone. The lesion may show various degrees of ossification, increasing as the lesion matures. Large tumours produce aneurysmal bone cyst-like changes. Less than 30% of the cases may have focal areas of calcification indicative of tumour bone mineralization. A CT scan of the head helps localize a lytic lesion and better visualize the internal matrix mineralization. On MRI, the tumour appears hypointense to isointense with areas of decreased intensity on T1 and isointense to hypointense with foci of calcification on T2 (3). Our patient did not have an X-ray. However, he had his CT scan and MRI of his head done at another centre before presenting to our hospital.

En-bloc resection of the tumour is the treatment of choice. This procedure involves the removal of a portion of bone containing the tumour. Curettage and bone grafting with bone chips from another bone or donor bone graft can also be done (7). In our case, En bloc resection of the tumour was performed with reconstruction using dura mesh.

Histopathologically, the tumour is composed of woven bone spicules or trabeculae, which are haphazardly arranged and are lined with a single layer of osteoblasts. The intervening fibro collagenous tissue is highly vascular, showing extravasated erythrocytes. In our case, histopathological features confirmed osteoblastoma (8).

The differential diagnosis includes osteoid osteoma, osteoma, ossifying fibroma, and low-grade osteosarcoma. Genetically, osteoid osteoma and Osteoblastoma share the same molecular alterations, namely FOS and, to a lesser extent, FOSB rearrangements, representing the same disease (9). Hence, histological features of Osteoid osteoma and Osteoblastoma are similar. Osteoid osteomas are small

(<2 cm), often cortical-based tumours commonly seen in long bones, particularly the proximal femur. Radiologically, radiolucent nidus is surrounded by sclerotic bone. Pain associated with tumour reduces on taking NSAIDs (10).

Osteomas are small (<2 cm), radio dense tumours commonly occurring in the calvarium, facial bone, and jawbones and rarely occurring outside the skull. Histologically, osteomas are predominantly composed of lamellar bone, compact, spongious, and mixed subtypes. In cancellous areas, the bone is lined by active and inactive osteoblasts within the well-vascularised fibrous stroma, mimicking osteoblastoma (11).

Low-grade central osteosarcoma commonly occurs in long bones, predominantly distal femur and proximal tibia. Histologically, spindle-shaped tumour cells are arranged in fascicles or interlacing bundles that permeate surrounding cortical or cancellous bone with variable osteoid production (12). The prognosis of osteoblastoma is excellent with complete surgical excision. With incomplete surgical excision, recurrence rates range from 15% to 25% (1).

CONCLUSION

Osteoblastoma is a rare benign bone-forming tumours. Skull involvement is rare, with very few cases reported in the literature. Hence, clinicians should be aware of osteoblastoma as a differential diagnosis when a patient comes with a long-standing history of a hard, bony mass in the skull. Histopathological examination is the gold standard for diagnosis.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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