International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(CASE REPORT)

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Osteosarcoma of the cranial bone: A case report in an elderly female in a specialist hospital using computed tomography

Vivian Ndidi Akagbue [1,*] and Chidinma Wekhe [2]

[1] *Department of Radiology, Rivers State University Teaching Hospital, Port Harcourt, Nigeria.*
[2] *Department of Radiology/Senior Lecturer RSU, Rivers State University Teaching Hospital, Port Harcourt, Nigeria.*

International Journal of Science and Research Archive, 2025, 17(01), 1012-1015

Publication history: Received on 15 September 2025; revised on 25 October 2025; accepted on 27 October 2025

Article DOI: https://doi.org/10.30574/ijsra.2025.17.1.2888

Abstract

The head and neck region osteosarcomas are rare and typically present in the thirty-forty years of age. Though, they are extremely rare in the pediatric population as well as the elderly population. Interestingly, primary involvement of the cranial vault, excluding the mandible and maxilla, is an extremely infrequent phenomenon; hence, the number of clinical studies published in the literature is limited. Complete resection may be difficult to achieve due to the anatomy of the head. Besides, an aggressive surgical approach can cause a substantial functional impairment or cosmetic flaw. We report the case of a 66-year-old patient with an aggressive tumor in the left side of the skull accompanied with a severe headache and brain mass at presentation.

Keywords: Cranial Bone; Osteosarcoma; Computed Tomography; Case Report

1. Introduction

Osteosarcoma accounts for roughly 20% of all primary bone malignancies. Note that, only 5–10% are sited in the craniofacial bones and most of those are found in the maxilla or mandible. Remarkably, less than 1% are found in the cranial vault, and there have been only a few reported cases of osteosarcoma at the base of the skull, reflecting the low occurrence of that site (1–7). It is worthy of note, that the osteoid and bone matrix of an osteosarcoma are made up of malignant connective tissue cells. Furthermore, most osteosarcomas are of unknown cause and can consequently be designated idiopathic or primary (1,2,4,6). Once it is related to a known predisposing factors for malignancy, such as Paget's disease, fibrous dysplasia, and external ionizing radiation, are denoted as secondary osteosarcomas (1–8). The conventional osteosarcoma is the most common type, the prevalence peak in patients in the second decade of life and the frequency of which is slightly higher among males than among females (1,2).

Overall, patients present with bone pain, infrequently accompanied by a mass or by soft tissue edema (1,6). The distinct radiological characteristics of conventional osteosarcoma are bone marrow lesions, cortical bone destruction, an aggressive periosteal reaction, a soft tissue mass, and a tumor matrix in the destructive lesion, as well as within the soft tissue mass. While the tumors can present as purely sclerotic or purely osteolytic, most are a combination of the two. Notably the margins are largely blurry, with a broad zone of transition. Bony destruction is rarely geographic but mostly infiltrative, with a "moth-eaten" appearance. The commonest forms of periosteal reaction seen in osteosarcomas are the spiculated (sunburst) type and Codman's triangle, the laminated (onion-skin) type being less common (1,2,5–8).

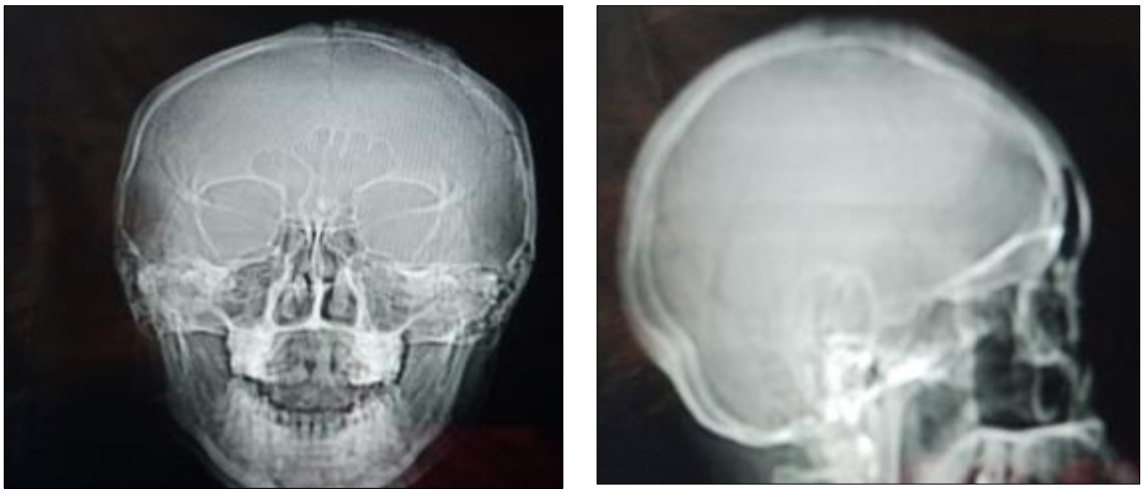
* Corresponding author: Vivian Ndidi Akagbue

Aim/objective

To report the rarity of this form of presentation of cranial osteosarcoma in our setting as well as further contribute on the already existing knowledge of the usefulness of computed tomography in confirming the diagnosis of this infrequent condition.

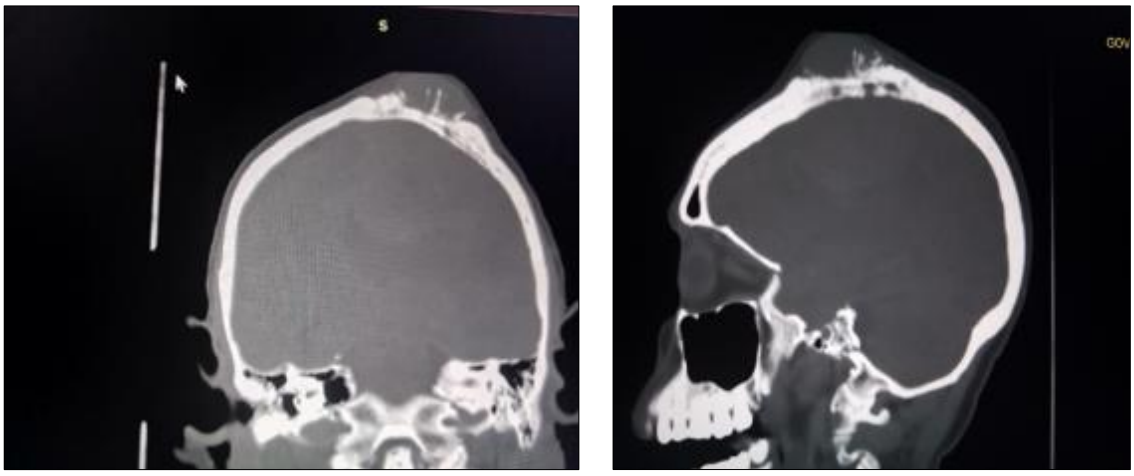
2. Case report

A 66-year-old female patient presented with a headache and a mass that had been growing in the cranial vault for eight months. The mass was hardened and was approximately 4.21 cm in diameter on the coronal view. A scanogram of the skull showed a discretely sclerotic lesion in the left parietal region, accompanied by an aggressive spiculated periosteal reaction (Figure 1). A computed tomography scan revealed a hyperdense mass in the left parietal bone, with intracranial and extracranial involvement (Figure 3).



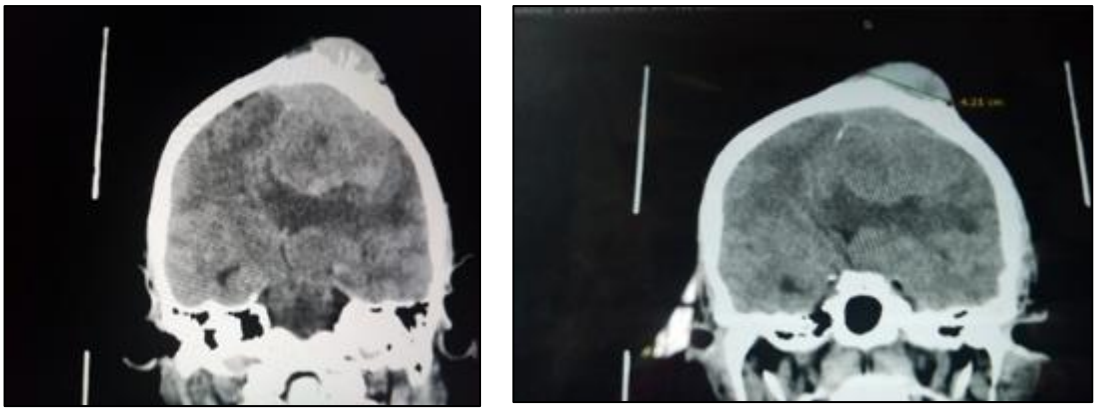
A B

Figure 1a and 1b are scanogram images of the computed tomogram showing spiculated/sun ray periosteal reaction of the left parietal bone



A B

Figure 2a and 2b are coronal and sagittal reformatted views bone window, showing the sunray appearance, sclerotic changes and cortical breech of the left parietal bone



A B

Figure 3a and 3b is a coronal reformatted contrast enhanced computed tomogram and non-Contrast enhanced computed tomogram, showing the hyperdense lesion in the left parietal bone and the intracranial involvement with associated perilesional oedema and mid-line shift

3. Discussion

At this juncture, we report a case of primary osteosarcoma of the skull, an exceedingly rare neoplasm at that site. Nearly 100 cases have been documented in the literature (2,4,5,7). Notably, the prognosis is worse than is that of osteosarcoma involving the bones of the appendicular skeleton, osteosarcoma of the skull presenting a lower response to aggressive multimodal therapy, with a five-year survival rate below 10% (1–6).

In a clinical setting in which the patient presents bone pain associated with a soft tissue mass, with suspected aggressive lesion, the examination should commence with conventional radiology, since it can reveal important characteristics of osteosarcoma, such as a cortical bone destruction and periosteal reaction. Cross-sectional imaging such as computed tomogram are done in order to describe the dissemination of the tumor into the medullary cavity, as well as to provide images of the calcified neoplastic component, as well as of the involvement of the soft tissue and cortical bone, which are vital to the surgical scheduling.

Interestingly, Magnetic resonance imaging (MRI) has become an efficient modality for assessing such tumors, mostly for charting the intraosseous/intracranial spread of the tumor, involvement of the neurovascular bundle and involvement of the soft tissues. The appearances on images on MRI is based on the sequences done. The solid, non-mineralized portions of osteosarcoma generally appear as areas of low-to-medium and high signal intensity on the T1- and T2 weighted images respectively. (1,6). The characteristic enhancement pattern of the lesion is one of intense heterogeneous impregnation.

Differential diagnoses of osteosarcoma based on imaging findings include hemangioma, which is categorized by multilocular lytic foci or coarse vertical striations; metastases from cancer of the thyroid or digestive tract, which can present as expansile lesions accompanied by bone destruction and invading the soft tissues; giant cell tumor, which is typically well-circumscribed but can cause thinning of the cortical bone and usually manifests as a lytic lesion and atypical meningioma, in which there is cortical bone destruction and extradural involvements. Notwithstanding their likeness to osteosarcoma, all of those diseases are older (3,5,8,9).

Above all, osteosarcoma of the skull is very rare, it is hard to make the definitive/absolute diagnosis on the basis of imaging data. Nevertheless, the knowledge that it is a destructive lesion coupled with a soft tissue mass and an aggressive periosteal reaction can facilitate the diagnosis (2). Complete surgical resection of the lesion, with tumor-free margins, as well as chemo therapy and radiotherapy are all treatment forms for osteosarcoma (1–6, 8).

4. Conclusion

This case report has shown that radiological investigations are important in the management of cranial swelling. In this case report, computed tomography (CT) was used to confirm the diagnosis. Also, magnetic resonance imaging (MRI) is of extreme value due to its non-ionizing radiation and excellent soft tissue imaging advantage. The only pitfall is that,

not all center has this imaging modality and those who have find it difficult to maintain as well as its claustrophic effects make patients uncooperative

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

Ethical approval was obtained.

Statement of informed consent

Verbal/written consent was obtained.

Authors contribution

VNA- Manuscript conceptualization, reviewed the manuscript, performed and interpreted the radiological studies, CW- manuscript conceptualization, reviewed and edited the manuscript, also assisted with the interpretation of the radiological studies.

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