



Intraosseous cavernous hemangioma of parietal bone: A case report and literature review

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Abstract

Introduction and background: Intraosseous Hemangiomas or Primary Intraosseous Hemangiomas (PIH) are slow-growing innocuous blood vessel tumors that make up less than 1% of all bone malignancies [1-4]. These lesions are estimated to account for 0.2 percent of all benign skull tumors [4-8], with a clear female predisposition (3:1) [2]. Prior trauma to the region is thought to be the most prevalent cause of intraosseous hemangiomas. They bleed profusely when removed or biopsied; therefore, preoperative diagnosis of the lesion's vascular character is critical [8]. They are most frequently seen in the vertebral skeleton, although they can also be found in the calvarium and facial bones. The temporal bone is the most prevalent place in the head after the vertebral skeleton, followed by the parietal, mandible, malar, and zygomatic areas [8]. In this case report, we discuss the case of a 9-year-old male who presented with a large soft mass in his right parietal region.

Case report: A 9-year-old boy was brought into OPD by his parents after they noticed a scalp swelling 2 months back. The swelling has progressively increased in size in the last 2 months. There was no history of trauma to the scalp, vertigo, vomiting, headaches, or fits. An ultrasound examination of the scalp revealed a large, well-defined, heterogeneous soft tissue mass lesion in the right parietal region with an underlying bone osteolytic appearance, a hyperechoic sclerotic rim, and thickened bone trabeculae with internal hypervascularity in Doppler examination. The CT scan showed a large lytic expansile skull bone lesion at the right parietal bone, approximately 55x50x48 mm in AP, transverse and CC dimensions, respectively. It showed a well-margined outline with an incomplete sclerotic rim with erosions of both internal and external tables and displayed radiating trabecular thickening (spoke wheel appearance). Dense enhancement was noted after IV contrast vascular. It showed smooth extracranial and intracranial bulges with localized mass effects seen in the form of effacement to the right parietal lobe. An angiogram of the lesion was also done, showing filling by the posterior division of the right superficial temporal artery.

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The patient was prepared for surgery after having given informed consent. An incision was made around the swelling, the flap was raised, and a craniotomy was done around the lesion. The bone flap was carefully separated from the dura, which was intact. Hemostasis was secured and layered closure was done.

Discussion and conclusion: The signal characteristics of vertebral PIHs differ significantly from those of skull PIHs on radiography. On cross-sectional computed tomography scans, in thin cuts of bone window, vertebral hemangiomas appear as well-circumscribed expansile regions with bone remodeling in the form of a pathognomic "polka dot" pattern [17]. Hemangiomas of the skull do not have this distinctive pattern. The quantity of venous flow and lipid content within a lesion considerably influences MRI characteristics, resulting in the mottled heterogeneous signal seen on T1- and T2-weighted sequences [17,18].

Introduction

Intraosseous hemangiomas or Primary Intraosseous Hemangiomas (PIH) are slow-growing innocuous blood vessel tumors that make up less than 1% of all bone malignancies [1]. Histologically, hemangiomas are divided into two types: capillary and cavernous. The cavernous form (cavernomas) accounts for the majority of cranial hemangiomas, whereas capillary hemangiomas account for the majority of spinal hemangiomas [2,3]. Although Heckl et al. gathered 125 documented cases by the year 2000, cavernous hemangiomas of the cranial vault remain uncommon. These lesions are estimated to account for 0.2 percent of all benign skull tumors [4], with a clear female predisposition (3:1) [2].

Calvarial cavernous hemangiomas are cavernous hemangiomas that develop from arteries in the diploic space and are fed by branches of the external carotid artery. The primary blood supply of the arteries are the middle meningeal and superficial temporal arteries [5]. Calvarial hemangiomas usually affect the outer table of the skull and the diploe, with the inner table remaining relatively unaffected [6]. It's rare for the inner table and extradural area to be so involved [7]. Prior trauma to the region is thought to be the most prevalent cause of intraosseous hemangiomas. They bleed profusely when removed or biopsied, therefore preoperative diagnosis of the lesion's vascular character is critical [8]. There are four different variants of hemangiomas: Capillary type, Cavernous type, Mixed variant, and Scirrhus type [8]. They are most frequently seen in the vertebral skeleton, although they can also be found in the calvarium and facial bones. The temporal bone is the most prevalent place in the head, followed by the parietal, mandible, malar, and zygomatic areas [8].

In this case report we discuss the case of 9 years old male who presented with a large soft mass in its right parietal region.

Case report

A 9-year-old boy was brought into OPD by his parents after they noticed a scalp swelling 2 months back. The swelling has progressively increased in size in the last 2 months. There was no history of trauma to the scalp, vertigo, vomiting, headaches, or fits.

On examination, there was an active, alert child with a right parietal swelling. It was 6x6 cm in dimension, present in the right parietal region, firm in consistency, and the overlying skin normal with no marks, punctum, or striae. Skin was adherent to swelling, and swelling was adherent to bone. His neurological examination was unremarkable.



Figure 1: Showing scalp swelling.

An ultrasound examination of the scalp revealed a large, well-defined, heterogeneous soft tissue mass lesion in the right parietal region with an underlying bone osteolytic appearance, a hyperechoic sclerotic rim, and thickened bone trabeculae with internal hypervascularity in Doppler examination.

A CT scan of the brain with contrast was advised, which showed a large lytic expansile skull bone lesion at the right parietal bone, approximately 55x50x48 mm in AP, transverse, and CC dimensions, respectively. It showed a well-margined outline with an incomplete sclerotic rim with erosions of both internal and external tables and a radiating trabecular thickening (spoke wheel) appearance. Dense enhancement was observed following IV contrast vascular. It showed smooth extracranial and intracranial bulges with localized mass effects seen as effacement to the right parietal lobe, but no midline shift was seen. The findings likely represented an aneurysmal bone cyst.

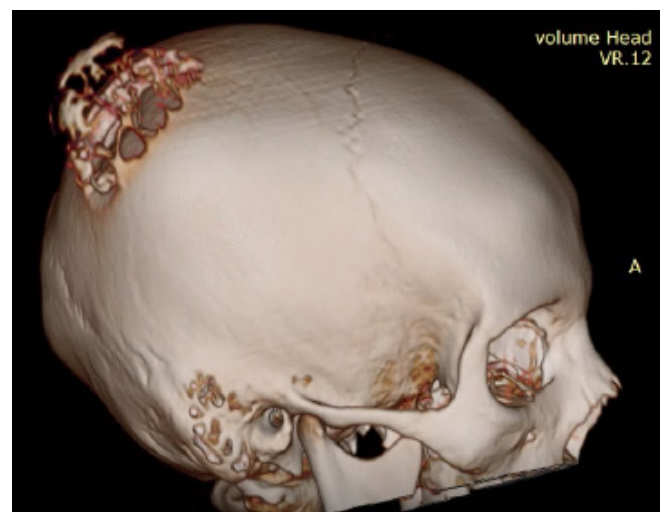


Figure 2: Showing CT brain 3D reconstructed.

An MRI examination was also done and was consistent with CT findings, but no fluid levels were seen, making the diagnosis of an aneurysmal bone cyst less likely.

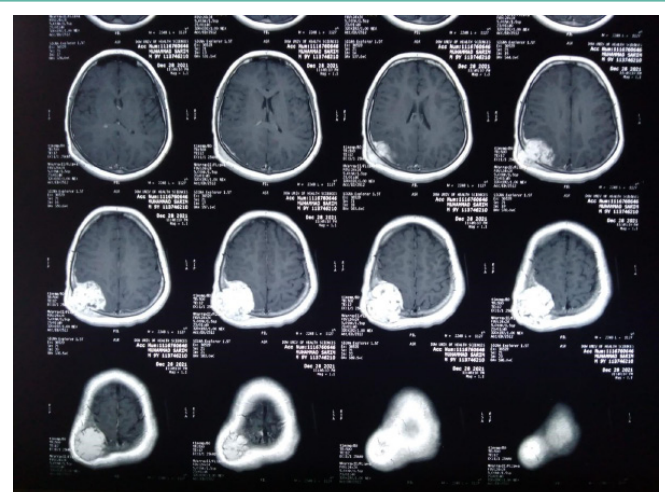


Figure 3: Showing MRI brain axial cuts.

An angiogram of the lesion was also done, showing filling by the posterior division of the right superficial temporal artery.

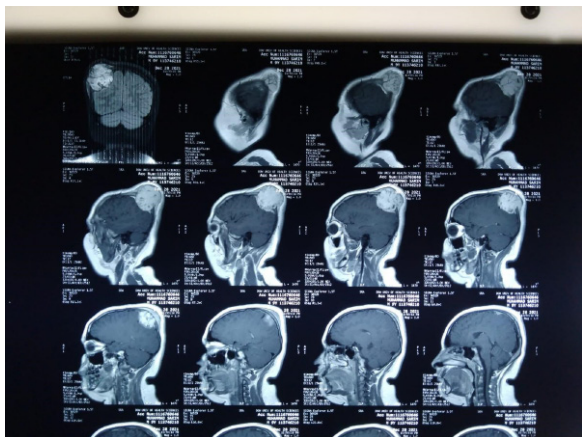


Figure 4: Showing MRI brain sagittal cuts.



Figure 7: Showing patient position and incision.

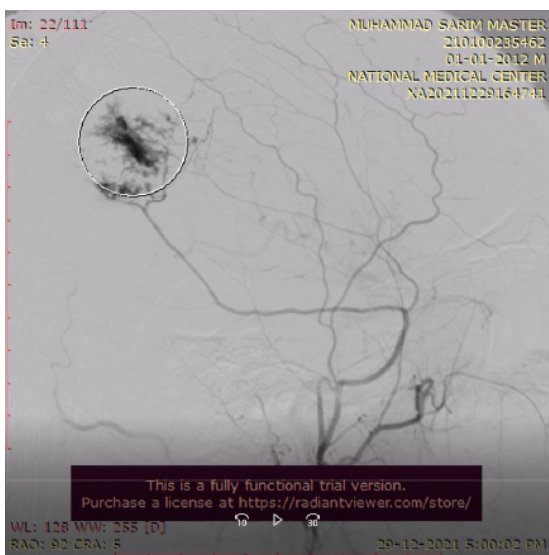


Figure 5: Shows angiogram.

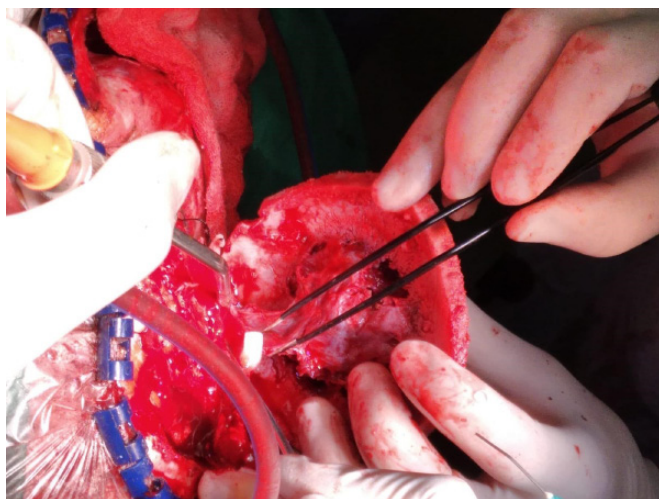


Figure 8: Shows bone flap being separated from dura.

The patient was prepared for surgery after having given informed consent. An incision was made around the swelling, a flap was raised, and a craniotomy was performed around the lesion. The bone flap was carefully separated from the dura, which was intact. Hemostasis was secured and layered closure was done.

The post-operative stay of the patient was uneventful. A biopsy showed an intrasosseous cavernous hemangioma.



Figure 9: Shows removed lesion in bone with dimensions.

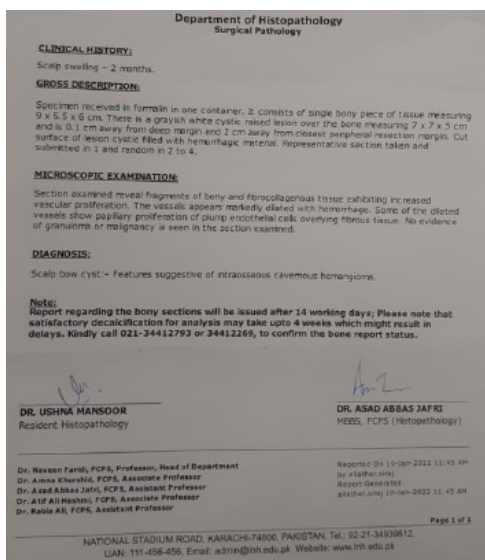


Figure 6: Histopathological report.



Figure 10: Shows inside of bone flap.

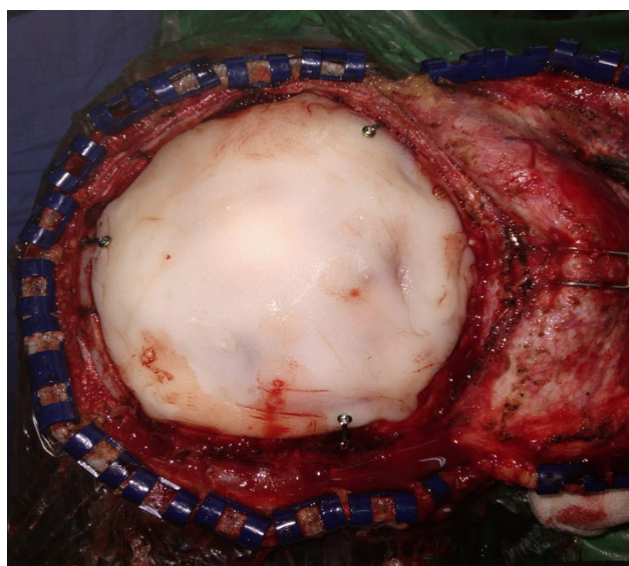


Figure 11: Final wound after cranioplasty with bone cement.

Discussion

Vasoformative tumors encompass a wide range of benign and malignant neoplasms. Hemangiomas are benign localized tumors that arise from the endothelium of blood vessels [9]. These are further classified based on the size of the proliferating vascular areas, which range from minor to major: capillary, cavernous, and cellular. Large, dilated, blood-filled cavities with a flattened endothelium lining are the pathologic look of cavernous hemangiomas [9]. It's crucial to rule out malignant vasoformative tumors like angiosarcoma or spindle cell hemangioma by obtaining a pathologic diagnosis of these diseases [9].

Toynbee documented a vascular tumor growing inside the boundaries of the parietal bone in 1845, which was the first description in the English literature [10]. The temporal bone is assumed to be the most typically afflicted, followed by the parietal bone and the temporal and occipital bones, which are affected less frequently [11]. They are generally solitary [2]. In-

traosseous cavernous hemangiomas are slow-growing lesions that most commonly affect women in their second to fourth decades [6,12,13]. Only 9% of cases are discovered in the first ten years [14]. There is also one rare presentation of a Cavernoma along with hemangioma in a 72 years old lady [15]. Pain and a visible or palpable bony hard mass that is slowly expanding and covered by normal skin are the most common symptoms [12]. Because these tumors tend to develop externally, neurologic impairments are uncommon, but intracranial enlargement has also been described in rare cases [16].

The signal characteristics of vertebral PIHs differ significantly from those of skull PIHs on radiography. On cross-sectional computed tomography scans, in thin cuts of bone window, vertebral hemangiomas appear as well-circumscribed expansile regions with bone remodeling in the form of a pathognomic "polka dot" pattern [17]. Hemangiomas of the skull do not have this distinctive pattern. The quantity of venous flow and lipid content within a lesion considerably influences MRI characteristics, resulting in mottled heterogeneous signal seen on T1- and T2-weighted sequences [17,18]. The delayed contrast blush is seen in larger PIHs of the skull, but not in smaller lesions, especially those affecting the base of the skull [18].

On radiologic examination, a calvarial cavernous hemangioma's classic sunburst appearance is attributable to osteoblastic remodeling with trabecular bone after tumor osteoclastic activity [16,19]. Preoperative diagnosis is challenging, and histology is required for a definite diagnosis [1,11]. The cavernous variety accounts for the majority of calvarial hemangiomas [20]. The cavernous type is made up of a cluster of massive, dilated blood arteries separated by fibrous tissue, which matched our observations. Vertebral hemangiomas, on the other hand, are most commonly capillary in nature, with no fibrous septa and a smaller vascular lumen [21]. Mixed-type hemangiomas comprise components of both cavernous and capillary forms [16]. Capillary hemangiomas have the potential to develop into cavernous hemangiomas [22].

PIHs do not naturally retreat, necessitating a decisive therapy. Surgery, radiation, and embolization prior to surgery are all possibilities for treating cranial hemangiomas [23]. Because imaging results are not specific, total excision of the lesion is the treatment with the best prognosis [11]. Histopathologic diagnosis is also required because imaging findings are not specific [11]. The risk of bleeding is reduced when total resection is performed with an acceptable normal bone margin [2,11,23,24]. Preoperative embolization has also been observed to minimize intraoperative blood loss by several researchers [19,25,26]. Radiotherapy can slow the development of tumors but cannot remove them [11].

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