Unusual lesion of the clivus: diagnosis and discussion

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Diagnosis

Based on the imaging findings, the diagnosis of a primary intraosseous cavernous hemangioma of the clivus was made, which was confirmed after biopsy and surgical removal of the lesion.

Discussion

Primary intraosseous cavernous hemangiomas (PICHs) of the skull are rare benign tumors that account for about 0.2–1% of all benign neoplasms of [1, 2]. They are typically located in the parietal and frontal bones of the calvarium, whereas location in the craniofacial bones is less common (zygoma, maxilla, mandible, and vomer) [1, 2]. PICHs of the skull base and the clivus are extremely rare [1, 2].

PICHs are usually solitary and most commonly occur in women in the second through fifth decades [1, 2]. Histologically, hemangiomas are classified as cavernous

and capillary hemangiomas [2]. Cavernous hemangiomas are composed of large dilated blood vessels separated by fibrous tissue, whereas capillary hemangiomas lack fibrous septa and have smaller vascular lumens. Calvarial hemangiomas are usually of the cavernous type, whereas vertebral hemangiomas are most frequently of the capillary type [3].

The lesion is often discovered as an incidental finding on CT or MRI scan of the brain done for other reasons. Other symptoms include pain and visible or palpable bony hard mass of the calvarium or neurologic deficits in case of intracranial expansion. Some patients present with periodic dull headaches that may increase as the hemangioma expands [1].

CT scan shows an intraosseous mass with a honeycomb or sunburst pattern, very similar to a vertebral hemangioma. Expansion of the cortical bone may occur, but the periosteum remains intact [1, 2]. Fatty tissue may be seen between the thickened trabeculae.

The signal intensity on MRI is variable, depending on the quantity of slow-moving venous blood and on the ratio of red marrow to converted marrow present within the lesion [1, 2]. Lesions with a high fatty content are of high signal intensity on T1-weighted images (WI), such as in our case. Larger lesions tend to have a low signal intensity on T1-WI [1]. On T2-WI, a high signal intensity may be caused by pooling of blood or slow-flowing blood. Correlation between MR appearance on T1- and T2-weighted images and histological findings from autopsy specimens has only been performed in studies with a limited number of patients [4]. Cavernous hemangiomas typically enhance after administration of gadolinium contrast [1, 2].

CT scan is more helpful than MRI in planning surgery because the extent of the lesion is better evaluated on bone windows [5]. PICHs of the clivus may mimic other more common tumors of the skull base, particularly when the classic imaging features are absent [2].

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However, when the typical imaging findings on CT-scan (honeycomb pattern and fatty attenuation between the thickened trabeculae) and MRI (high signal intensity on T1-WI, and vivid enhancement) are seen, the radiologist should consider the potential diagnosis of a PICH.

The main differential diagnosis of clivus lesions includes chordoma, chondroma, chondrosarcoma, osteosarcoma, osteoblastoma, and metastasis [2]. These lesions lack the typical sunburst pattern on CT and the signal intensity is of low to intermediate compared to normal bone marrow on T1-weighted images. Chordoma, chondrosarcoma, osteosarcoma, and metastasis present as more aggressive lesions and have ill-defined borders [2]. Osteoblastoma is a common primary benign tumor of the osseous spine that rarely involves the clivus. It presents as an expansile sclerotic lesion in the clivus [6].

Preoperative awareness of the vascular nature of the lesion is important, as biopsy and curettage may lead to significant hemorrhage.

The preferred treatment of symptomatic lesions is complete tumor removal. Embolization before surgery is helpful in preventing excessive bleeding if sufficiently large feeding vessels are present [2]. In our case, preoperative angiography revealed only very tiny meningohypophyseal

feeding arteries and therefore preoperative embolization was technically not feasible.

The final diagnosis is often made after biopsy and/or histological examination of the resection specimen.

Conflict of interest The authors declare that they have no conflict of interest.

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