

Radionuclide Blood Pool Imaging of Calvarial Hemangioma

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A patient with new onset seizures was found to have radiographic findings of a calvarial hemangioma. Because of the history, additional diagnostic tests were employed, which excluded cerebral lesions. Findings characteristic of hemangioma on blood pool imaging were felt to confirm the diagnosis.

Discussion

HEMANGIOMA OF BONE is one of the rarer benign primary bone tumors. When located in the skull, this lesion has typical radiographic findings that are usually specific. Occasionally, the lesion can be confused with other benign and malignant lesions. In these cases, more extensive diagnostic examinations or surgery may be necessary. We report a case where the use of radionuclide blood pool imaging helped confirm the suspected diagnosis of calvarial hemangioma and alleviated the need for further diagnostic studies.

Hemangioma is a benign primary tumor composed of formed blood vessels. Classified as cavernous or capillary, depending on the basis of size of vessels' lumen, they make up less than 1% of primary bone tumors (1-3). Most of these are seen in the spine and skull.

Case Report

Characteristically, a well circumscribed blister or bleb off the outer table of the skull, with prominent vertical trabeculations in a honeycomb or sunburst appearance, are present. Tangential views are best in showing the findings. The differential diagnosis may include metastasis, multiple myeloma, osteogenic sarcoma, calvarial changes from meningioma, epider-

A 70-year-old man was admitted for new onset of seizures. He had a history of heart disease complicated by hypertension with congestive heart failures and arrhythmias. Eventually, the seizures were attributed to the cardiac abnormalities.

In the initial evaluation, radiographs revealed a left frontal calvarial lesion (Figs. 1A, B). This was interpreted as a hemangioma of the skull. However, the history of seizures prompted further investigation. Cerebral CT scan was normal. Tc-99m glucoheptonate brain imaging revealed a rounded area of increased activity peripherally over the left frontal region (Fig. 2). Tc-99m methylene diphosphonate bone imaging revealed equal uptake in the lesion as in surrounding bone (Fig. 3). A study with in vivo technetium labeled RBCs revealed an area of activity on blood flow studies and increasing accumulation of activity with time in the bony lesion on static images (Fig. 4). This helped confirm the diagnosis and completed evaluation of the lesion.

Fig. 1A. AP radiograph. Left frontal supraorbital well-circumscribed circular radiolucent lesion with smooth elevation of outer table of skull. Thin rim of sclerosis is present around lytic area.



Fig. 1B. Lateral view. Multiple thickened bony trabeculations seen on end.



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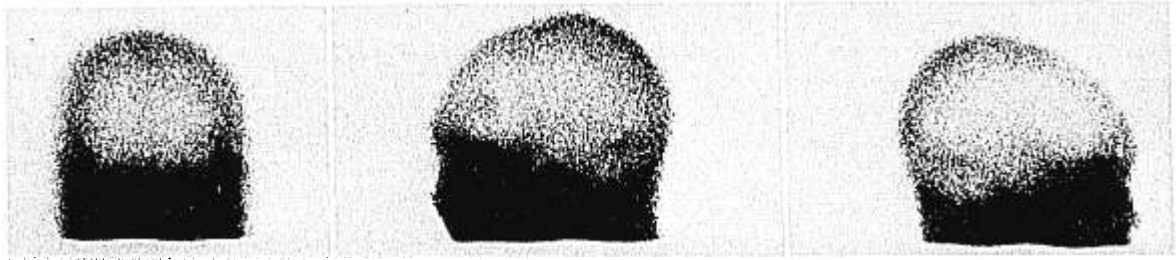


Fig. 2. Brain imaging. Left to right: Anterior left lateral, and right lateral views. Peripheral localized uptake in area of lesion as seen on radiographs.

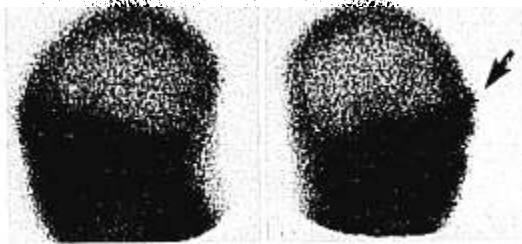


Fig. 3. Bone imaging. Left lateral and LAO tangential view of palpable lesion. Area of smooth irregularity in area of bone lesion seen only on this view (arrow).

moid, osteoma, and fibrous dysplasia. With the characteristic radiographic findings and clinical history, the diagnosis can be made without difficulty (1,3). In unusual cases, angiography and even surgery have been performed in the evaluation of the lesion (4-6).

Hemangiomas elsewhere in the body, particularly in the liver, have been shown to have characteristic findings of little to no activity on radionuclide angiograms with slow accumulation of activity in the tumor over time (7-8). These findings were also present in our case. The little activity during angiography is thought to be caused by hemodilution of the bolus of tagged RBCs in the larger non-tagged blood pool of the lesion secondary to slow flow or small afferent feeding vessels. This is a manifestation of perfusion of the lesion. Theoretically, larger lesions or tumors with larger affe-

rent vessels could have increased activity during radionuclide angiography (6-8).

Over time, activity accumulates in this vascular lesion as tagged and non-tagged RBCs completely mix in the blood pool. Thus, a totally thrombosed hemangioma should not show increasing activity (7-8).

Calvarial hemangioma usually has characteristic radiographic findings. In the unusual lesion or in a patient with questionable symptoms related to the bony abnormality, blood pool imaging may be of value in confirming that one is dealing with this benign tumor.

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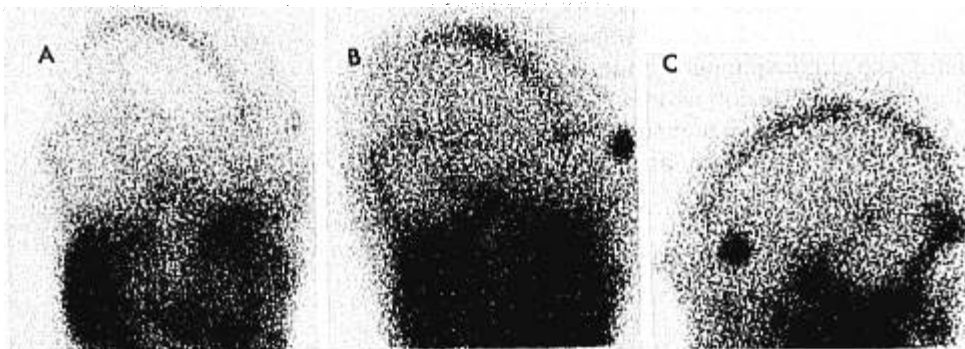


Fig. 4. Blood pool study. Immediate image (A). LAO position; focal area of increased activity seen over bony lesion. Delayed image LAO (B). Increase in activity compared to earlier image in lesion. Left lateral view (C). Area of increased activity is in same location as lesion on radiographs.