

# Neuroimaging Highlight

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## Calcified Brain Metastases from Osteosarcoma

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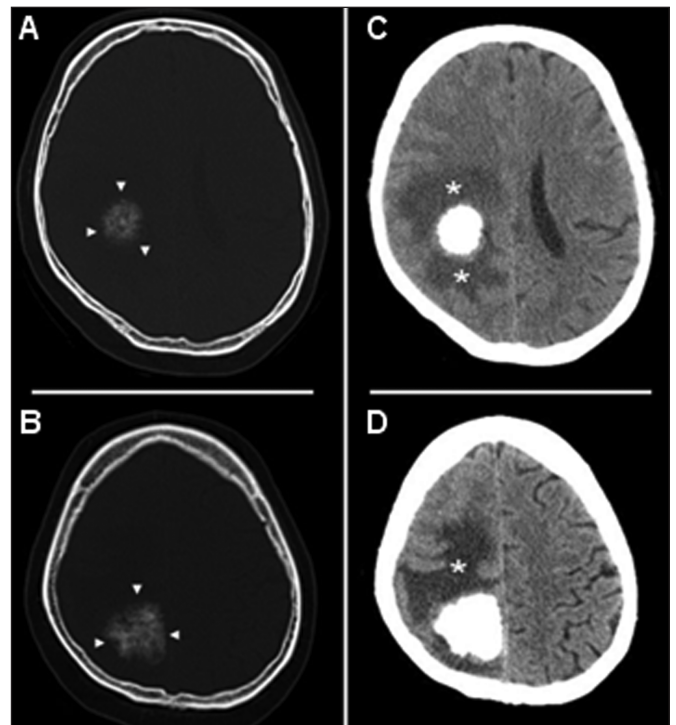
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Brain metastases are the most frequent intracranial lesions but they rarely contain calcium. Calcium deposits were microscopically found in only 6.6% of patients in classic histopathological series<sup>1</sup>. They are even rarer in routine clinical practice and they are described in the literature as isolated case reports or case series. Despite the lack of recent studies with modern scans, they were identified on computed tomography in up to 5.8% of 121 patients<sup>2</sup>. Calcification patterns are often described as punctuate, curvilinear or heterogenous. We report a patient with brain metastases from an osteosarcoma of the mandible with unusual extensive homogeneous calcification.

### CASE REPORT

A 48-year-old male presented with subacute left side weakness progressing over a few days. One year before, he had been diagnosed with osteogenic osteosarcoma of the mandible confirmed histologically. Further investigations, including a computed tomography of the body, revealed lung and bone metastases. Neuroimaging was not performed at that time due to the lack of neurological symptoms. Despite treatment with aggressive surgical resection of the mandibular lesion and neoadjuvant chemotherapy with different regimens, subsequent imaging investigations showed evident progression in size and number of the metastatic lesions affecting bones and lungs.

On examination he presented mild weakness affecting the left limbs with associated ipsilateral brisk reflexes and upgoing plantar response. Brain computed tomography showed two large round lesions in the right centrum semiovale with an extensive homogeneous calcification resembling 'stones' and associated surrounding edema and mass effect (Figure). These abnormal radiological findings were consistent with calcified brain metastases from osteosarcoma of the mandible. The patient received palliative treatment and passed away a few days after his admission. No post-mortem histological examination of the lesions was performed.



**Figure:** Axial computed tomography brain images showing two hyperdense well-edged lesions in right centrum semiovale. Bone window images (A-B) revealed a densely calcified matrix (arrowheads) and brain window images (C-D) showed associated mass effect and surrounding edema (asterisks). These findings are consistent with calcified brain metastases.

### DISCUSSION

Calcium deposits are more common in benign cysts or slow-growing tumors but brain metastases rarely calcify. This is thought to be due the long period of time required to develop calcium deposition. Therefore calcification of brain metastases

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has been proposed as an indicator of slow progression and longer survival<sup>3</sup>, although results in the literature remain controversial<sup>4</sup>. Pulmonary adenocarcinoma has been consistently reported as the most common primary tumor<sup>4</sup> though calcification seems to be especially associated with metastases from osteogenic osteosarcoma<sup>5</sup>. In the case described here, the presence of associated mass effect and surrounding edema on neuroimaging is in keeping with a metastatic origin of the lesions; the confirmed osteogenic osteosarcoma the likely primary tumor. However, the diagnosis was not histologically confirmed with a post-mortem examination of the lesions. On computed tomography, the metastases showed a rare extensive homogeneous calcification pattern, not previously described, which gave a striking stone-like appearance to the lesions.

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