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# Epithelioid Hemangioma of Vertebra Mimicking Metastasis on FDG PET/CT in a Patient With Renal Cell Cancer

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**Abstract:** Vertebral epithelioid hemangioma is a rare vascular tumor composed of the many vessels lined by distinct epithelioid endothelial cells. We present the case of a patient with renal cell cancer (RCC) and suspicious vertebral metastasis presenting with back pain, who was later found to have epithelioid hemangioma. FDG PET/CT demonstrated uptake of FDG not only in RCC, but also in the sixth thoracic vertebral body. The SUVmax of the vertebra was more than twice as high as RCC. This report indicates importance of quantitative assessment of FDG uptake, as well as combined use of MRI.

**Key Words:** epithelioid hemangioma, FDG PET/CT, SUVmax, vertebra

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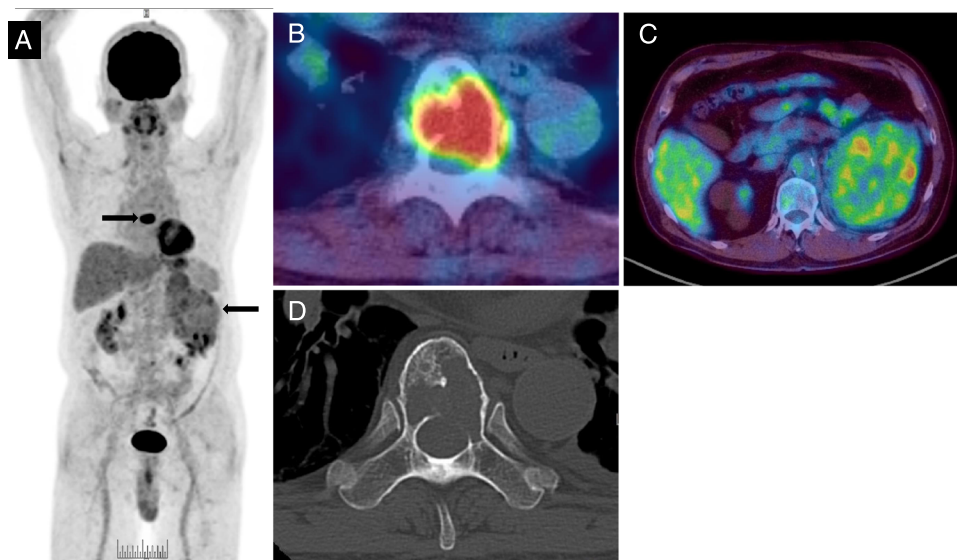
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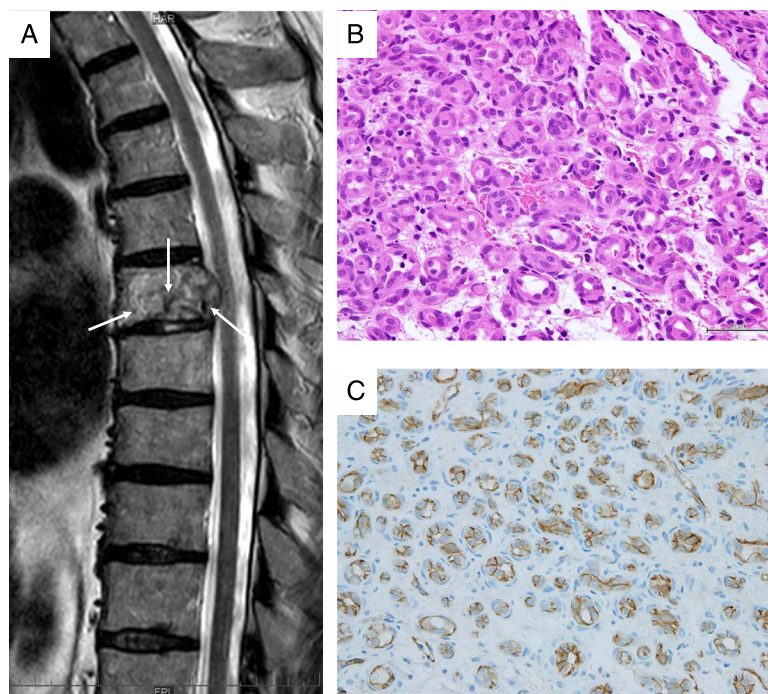
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**FIGURE 1.** A 61-year-old man with back pain was admitted to our hospital. CT reveals a large renal cell carcinoma (RCC). FDG PET/CT was examined for staging RCC. FDG MIP (A, arrows) and fusion images (B, C) demonstrate high uptake of FDG not only in RCC but also in the thoracic vertebral body, indicating vertebral metastasis. Transverse CT (D) shows the osteolytic lesion with a cortical disruption but no extraosseous expansion. The SUVmax of the vertebral tumor is 11.4, whereas that of RCC is 4.5.



**FIGURE 2.** On MRI, the vertebral lesion shows isointensity relative to the muscle on T1-weighted images and hyperintensity accompanying vascular flow voids on T2-weighted images (A, arrows). Histological diagnosis was derived from the biopsy of the lesion. Hematoxylin-eosin stain of the specimen shows a vascular proliferation composed predominantly of well-formed capillary channels lined by epithelioid endothelial cells that appeared to protrude into the vascular lumina (B). Immunohistochemical staining reveals that the endothelial cells were positive for CD31 (C). The diagnosis of an epithelioid hemangioma (EH) of the bone is made, and RCC is a clear cell cancer. Considering a history of large RCC and the osteolytic appearances and FDG uptake of an EH in this case, EH can be clinically and radiologically confused with a malignant bone tumor, especially vertebral metastasis.<sup>1</sup> Epithelioid hemangioma is a rare intermediate vascular tumor with a ubiquitous location, including soft tissue and bone.<sup>2-5</sup> The World Health Organization recommends separating EH from conventional hemangiomas because of its local aggression and high recurrence.<sup>6,7</sup> There are several reports of high FDG accumulation of the vertebral hemangiomas.<sup>8,9</sup> To our knowledge, only one report showed high uptakes of FDG in EHs of skeletal lesions.<sup>10</sup> The FDG uptake in EH can be caused by its characteristics of high cellularity and local aggression.<sup>10</sup> In this case, the SUVmax of the vertebra was more than twice as high as RCC. The uptake was too high for metastasis of RCC: the uptake of RCC was relatively low because of the lower glucose metabolism.<sup>11</sup> In addition, MRI indicated the vascular lesion showing high intensity and flow voids on T2-weighted images. This case highlights the potential to misdiagnose vertebral EH as metastasis from RCC on FDG PET/CT. Nonetheless, the careful interpretation of SUVmax and MRI can help differentiating the lesion from metastasis from RCC, even if we could not make the diagnosis of EH.