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FDG PET/CT of Benign Psammomatous Meningioma Effacing the Medulla

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Abstract: A 62-year-old woman had progressively developing throbbing right neck pain for 1 year. The pain radiated to the right suboccipital area, sometimes accompanied by breathlessness. To rule out cancer, patient received FDG PET/CT, which showed an intraspinal cord intense FDG-avid calcified mass at the level of the first cervical spine, mimicking malignancy. MRI showed it effacing the medulla; surgery is probably a challenge. She received laminectomy with tumor removal; pathology showed psammomatous meningioma, World Health Organization grade I. This case suggests that benign spinal cord psammomatous meningioma with calcification may show high FDG uptake, mimicking malignancy.

Key Words: FDG PET/CT, psammomatous meningioma, spinal cord

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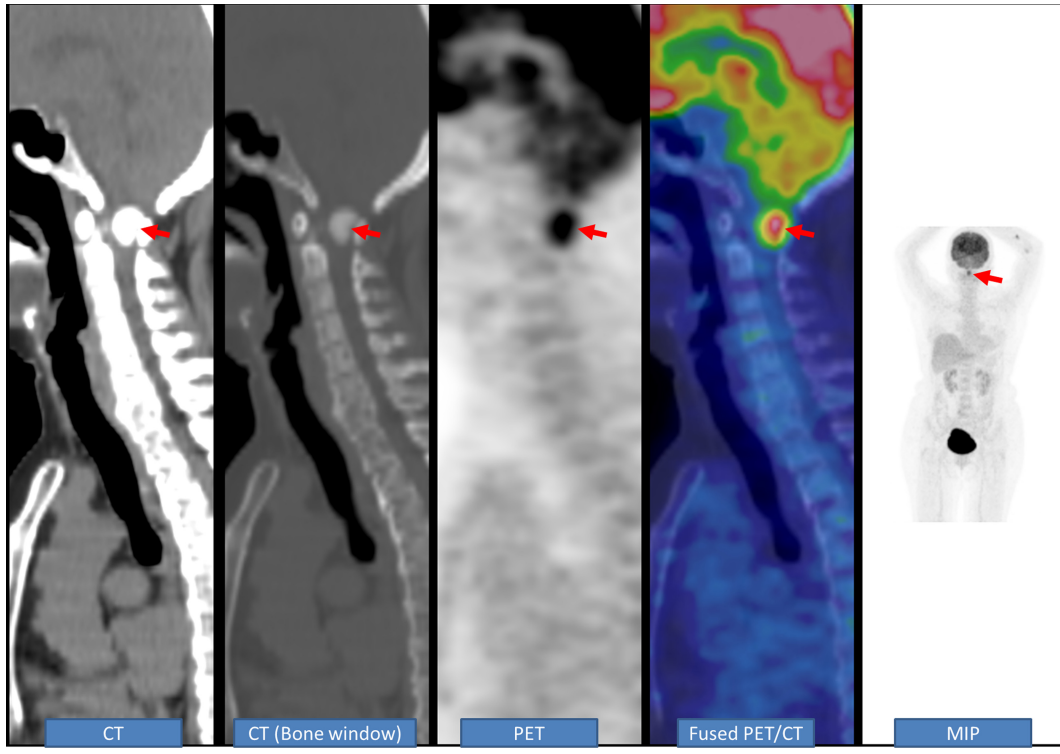

FIGURE 1. A 62-year-old woman had progressively developing throbbing right neck pain for 1 year. The pain, radiation to the right suboccipital area, sometimes included breathlessness. The episodes became more frequent within the last 3 months. Symptoms improved after taking medication from a local clinic. To detect cancer, patient received FDG PET/CT, which showed an intraspinal cord FDG-avid calcified mass (arrow) at the level of the first cervical spine, SUVmax 7.9 (initial), 8.2 (delayed).

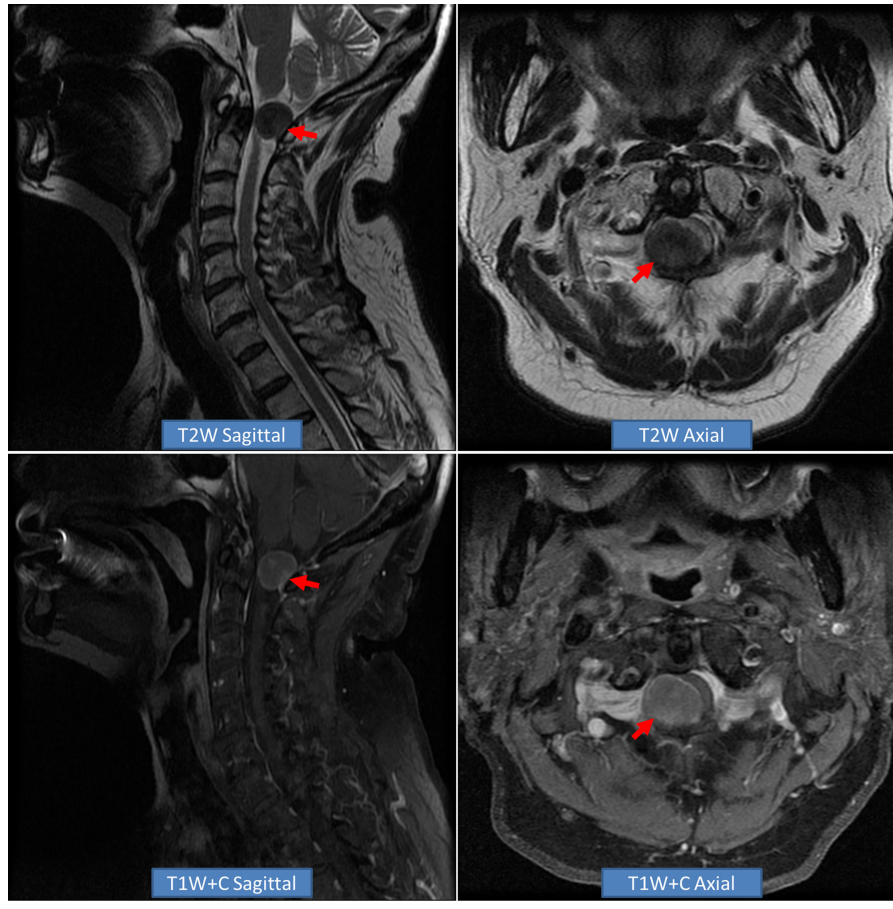

FIGURE 2. MRI showed an extramedullary, intracanalicular oval mass (arrow) at the C1 level, displacing and compressing the cord to the left anterior aspect and effacing the medulla. Hypointense on T1-weighted imaging (T1WI), T2WI, and short-tau inversion recovery images, it exhibited mild parenchymal enhancement and stronger rim enhancement after IV gadolinium administration. Patient received laminectomy with tumor removal; pathology showed tumor with many calcified psammoma bodies within proliferative meningothelial cells, indicating psammomatous meningioma, World Health Organization (WHO) grade I. A meningioma is a tumor arising from the leptomeninges, the protective lining of the brain and spinal cord; most are benign.[1] The majority of meningiomas are benign (WHO grade I), exhibit slow growth, and have a low recurrence rate (5-year overall recurrence rate of ~5% following complete resection).[2] In contrast, WHO grade II (atypical) and WHO grade III (malignant) meningiomas may show more aggressive clinical behavior.[3] Meningiomas account for approximately 25% of spinal canal tumors.[4,5] Spinal meningiomas represent ~12% of all meningiomas.[6] Most patients present with motor deficits because of spinal cord compression.[7,8] Less common presentations include sensory deficits, pain, and sphincter dysfunction.[9,10] If the medulla is damaged, it will affect breathing, heart rate, and blood pressure.[11] On T1WI and T2WI MRIs, meningiomas have variable signal intensity,[12] with intense and homogeneous enhancement after injection of gadolinium gadopentetate.[10,12] Of patients with calcified meningiomas, 15% are hypointense on T1WI and T2WI; T1-weighted images with gadolinium showed immediate and moderate homogeneous enhancement or only minimal contrast enhancement.[13] Edema may be more apparent on MRI than on CT scanning.[14] FDG PET is commonly used in patients with primary brain tumors to grade tumors, determine patient prognosis, and distinguish tumor recurrence from radiation necrosis.[15–17] Studies also show correlation between FDG uptake and (1) histopathological grade and (2) biological aggressiveness of the intracranial meningioma.[18,19] FDG PET, although not useful for tumor delineation, may help differentiate benign from malignant meningiomas.[18,20] The major drawback of FDG in the brain is its high uptake in normal gray matter.[21] The tumor-to-background contrast of FDG should be more favorable in the spinal cord than in cortical brain regions.[22,23] Psammomatous meningioma is a histologic subtype of meningioma usually presenting as a heavily calcified intracranial or spinal mass.[24] Recurrence rates after surgery are associated with patient age (<50 years), incomplete resection, multiple lesions, calcification extension, and ossification.[25] At the spinal level, molecular imaging may help detect the multiplicity of lesions and the progression or recurrence of metastatic disease after surgery.[23] In this interesting case of intense FDG-avid (SUVmax ~8) psammomatous meningioma at the spinal cord classified as a benign meningioma (WHO grade I), imaging showed no recurrence in 8 years of follow-up.