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## Identification of incidental brain tumors in prostate cancer patients via PSMA PET/CT

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## Abstract

**Purpose:** Brain metastases are rare in patients with prostate cancer and portend poor outcome. Prostate-specific membrane antigen positron emission tomography (PSMA PET)/CT scans including the brain have identified incidental tumors. We sought to identify the incidental brain tumor detection rate of PSMA PET/CT performed at initial diagnosis or in the setting of biochemical recurrence.

**Methods:** An institutional database was queried for patients who underwent <sup>68</sup>Ga-PSMA-11 or <sup>18</sup>F-DCFPyL (<sup>18</sup>F-piflufolastat) PET/CT imaging at an NCI-designated Comprehensive Cancer Center from 1/2018 to 12/2022. Imaging reports and clinical courses were reviewed to identify brain lesions and describe clinical and pathologic features.

**Results:** Two-thousand seven hundred and sixty-three patients underwent 3363 PSMA PET/CT scans in the absence of neurologic symptoms. Forty-four brain lesions were identified, including 33 PSMA-avid lesions: 10 intraparenchymal metastases (30%), 4 dural-based metastases (12%), 16 meningiomas (48%), 2 pituitary macroadenomas (6%), and 1 epidermal inclusion cyst (3%) (incidences of 0.36, 0.14, 0.58, 0.07, and 0.04%). The mean parenchymal metastasis diameter and mean SUVmax were 1.99 cm (95%CI:1.25-2.73) and 4.49 (95%CI:2.41-6.57), respectively. At the time of parenchymal brain metastasis detection, 57% of patients had no concurrent extracranial disease, 14% had localized prostate disease only, and 29% had extracranial metastases. Seven of 8 patients with parenchymal brain metastases remain alive at a median 8.8 months follow-up.

**Conclusion:** Prostate cancer brain metastases are rare, especially in the absence of widespread metastatic disease. Nevertheless, incidentally detected brain foci of PSMA uptake may represent previously unknown prostate cancer metastases, even in small lesions and in the absence of systemic disease.

Keywords: 18F-piflufolastat; 68Ga-PSMA-11; Brain metastasis; PSMA PET/CT scan; Prostate cancer.

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