

Subacute Cerebellar Infarction with uptake on 68Ga-PSMA PET/CT

Geon Oh, MBBS, and Kenneth Miles, MD, FRCR

**From the Department of Molecular Imaging, Princess Alexandra Hospital, Brisbane,
Queensland, Australia.**

Conflicts of interest and sources of funding: none declared.

**Correspondence to: Geon Oh, MBBS, Department of Molecular Imaging, Princess Alexandra
Hospital, Ipswich Rd, Woolloongabba, Queensland, 4102, Australia. E-mail:**

geon.oh@uqconnect.edu.au

Abstract: We report a case of subacute cerebellar infarction mimicking metastasis on PSMA PET/CT. A 77-year-old man with prostate cancer treated with androgen deprivation therapy and radiotherapy with rising PSA was referred for 68Ga-PSMA PET/CT. Apart from PSMA expressing tumour of the left prostate, PSMA PET/CT demonstrated radiotracer uptake in the right cerebellar hemisphere. This finding corresponded to a site of sub-acute infarction as shown on an MRI of the brain performed 35 days previously. As cerebellar infarcts are considerably less common than cerebral infarcts, they may not be anticipated as a potential cause for false positive radiotracer uptake on PSMA-PET.

Key Words: PSMA, PET/CT, Cerebral metastasis, ischemic stroke, MRI

FIGURE 1. A 77-year-old man with prostate cancer treated with androgen deprivation therapy and radiotherapy with rising prostate specific antigen was referred for 68Ga- Prostate-specific membrane antigen (PSMA) positron emission tomography/computed tomography (PET/CT). PSMA PET/CT performed 45 mins after intravenous injection of 68Ga-N,N'-bis-[2-hydroxy-5-(carboxyethyl)benzyl]ethylenediamine-N,N'-diacetic acid (HBED-CC) for the investigation for prostate cancer recurrence showed increased PSMA uptake in the left prostate, confirming residual disease (not shown). 68Ga-HBED-CC is an investigational product increasingly being used for the purpose of PET imaging in prostate cancer. **(A)** PET image of the head showed radiotracer uptake in the right cerebellar hemisphere. (Incidental sub-cutaneous occipital lipoma noted.) **(B)** No structural abnormality is seen on the corresponding low dose CT. Review of magnetic resonance imaging (MRI) performed 35 days prior to PET showed **(C)** a T2 fluid-attenuated inversion recovery (FLAIR) hyperintensity in the right cerebellar hemisphere with **(D)** a corresponding area of high signal on b1000 diffusion weighted imaging (DWI), indicating sub-acute infarction rather than cerebellar metastasis. Visualization of sub-acute cerebellar infarction on PSMA PET/CT may potentially mimic

cerebellar metastasis which have previously been reported to show radiotracer uptake on PSMA-PET [1,2,3]. Although HBED-CC uptake has been reported in acute and subacute cerebral infarcts [4,5], cerebellar infarcts are relatively rare, representing only 2% (range 1.5-2.3%) of all strokes [6,7]. Therefore cerebellar infarcts may be less likely to be anticipated as a potential cause for false positive uptake on PSMA PET. A potential mechanism for HBED-CC uptake in areas of ischemic stroke is increased permeability of the blood brain barrier which has also been proposed as a mechanism for HBED-CC uptake in intracranial metastasis from non-prostate cancer malignancies [8]. However, this hypothesis requires further investigation.

REFERENCES

1. Chakraborty PS, Kumar R, Tripathi M, et al. Detection of brain metastasis with 68Ga-labeled PSMA ligand PET/CT: a novel radiotracer for imaging of prostate carcinoma. *Clin Nucl Med.* 2015;40:328-329.
2. Chan M, Hsiao E. Cerebellar metastases from prostate cancer on 68Ga-PSMA PET/CT. *Clin Nucl Med.* 2017;42:193-194.
3. Dureja S, Thakral P, Pant V, et al. Rare sites of metastases in prostate cancer detected on Ga-68 PSMA PET/CT scan—a case series. *Indian J Nucl Med.* 2017;32:13-15.
4. Noto B, Vrachimis A, Schäfers M, et al. Subacute stroke mimicking cerebral metastasis in 68Ga-PSMA-HBED-CC PET/CT. *Clin Nucl Med.* 2016;41:e449-e451.
5. Chan M, Hsiao E. Subacute cortical infarct showing uptake on 68Ga-PSMA PET/CT. *Clin Nucl Med.* 2017;42:110-111.
6. Macdonell RA, Kalnins RM, Donnan GA. Cerebellar infarction: natural history, prognosis and pathology. *Stroke.* 1987;18:849-855.
7. Tohgi H, Takahashi S, Chiba K et al. Cerebellar infarction. Clinical and neuroimaging analysis in 293 patients. The Tohoku Cerebellar Infarction Study Group. *Stroke.* 1993;24:1697-1701.

8. Sasikumar A, Joy A, Pillai MR, et al. Diagnostic Value of ⁶⁸Ga PSMA-11 PET/CT Imaging of Brain Tumors-Preliminary Analysis. *Clin Nucl Med*. 2017;42:e41-e48

