Role of ^{68}Ga–Prostate-Specific Membrane Antigen PET/CT in Disease Assessment in Glioblastoma Within 48 Hours of Surgery

Manoj Gupta, DRM, FEBNM, Partha Sarathi Choudhury, DNB,* Ishwar Chandra Premsagar, MCH,† Munish Gairola, MD,‡ and Parveen Ahlawat, DNB‡*

Abstract: Within 48 hours after surgery, disease assessment in glioblastoma is a challenge for both the clinician and the radiologist. Certain technical and logistical issues prevail in this period. ^{68}Ga–prostate-specific membrane antigen PET/CT is a known molecular imaging marker in prostate cancer. Its role in high-grade gliomas has been recently discussed. We present a case of a 39-year-old man with recurrence glioblastoma of the right frontal lobe and underwent resurgery. After surgery, ^{68}Ga–prostate-specific membrane antigen PET/CT showed residual disease along the posterior and inferior margin of the postoperative cavity.

Key Words: ^{68}Ga-PSMA PET/CT, glioblastoma, postsurgery, residual disease

(*Clin Nucl Med* 2020;45: 204–205)

Received for publication April 23, 2019; revision accepted October 12, 2019.

From the Departments of *Nuclear Medicine, †Neuro & Spine Oncology Services, and ‡Radiotherapy, Rajiv Gandhi Cancer Institute and Research Centre, Delhi, India.

Conflicts of interest and sources of funding: none declared.

Correspondence to: Manoj Gupta, DRM, FEBNM, Department of Nuclear Medicine, Rajiv Gandhi Cancer Institute and Research Centre, Sector 5, Rohini, New Delhi, India 110085. E-mail: docmanojgupta@yahoo.com.

ISSN: 0363-9762/20/4503–0204
DOI: 10.1097/RLU.0000000000002893

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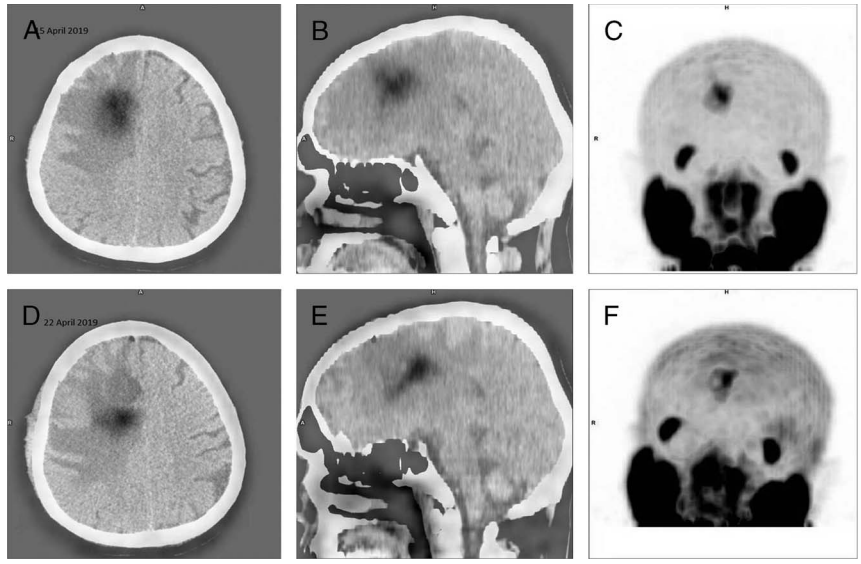

FIGURE 1. A 39-year-old man was diagnosed with glioblastoma of the right frontal lobe in June 2018, for which he underwent surgery and concurrent chemoradiotherapy and was on temozolomide. Now, he presented with on and off headache for 15 days and slurring of speech for 1 week. MRI of the brain showed few nodular enhancements along the posterior-inferior aspect of the postoperative cavity with perilesional edema. MR spectroscopy revealed increased choline peak, reduced *N*-acetylaspartate, and choline-to-creatinine ratio reaching up to 2 in the region of focal nodular enhancement. In this highly suspected recurrent disease, a ^{68}Ga–prostate-specific membrane antigen (PSMA) 11 PET/CT scan was done, which corroborated with the MRI findings (**A**–**C**). Patients underwent a second uneventful surgery. He was referred for a check ^{68}Ga-PSMA-11 PET/CT scan within 48 hours of surgery, which revealed the residual PSMA-avid lesion along the posterior-inferior margin of the postoperative cavity (**D**–**F**). Prostate-specific membrane antigen is a type II membrane protein, with folate hydrolase enzymatic activity primarily presented in prostatic epithelium. Immunohistochemistry studies showed normal expression of PSMA protein in nonprostatic tissues including renal tubules, duodenum, and colon. Studies have also documented the absence of PSMA expression in normal brain tissue including cerebral cortices and cerebellum.[1] Prostate-specific membrane antigen overexpression has been reported in neovasculatures of many tumors including high-grade gliomas.[2–4] In a recent pilot study, 9 of 10 patients with suspected glioblastoma recurrence was found to be true positive on ^{68}Ga-PSMA PET/CT scan.[5] However, we have not seen any research article depicting the role of ^{68}Ga-PSMA PET/CT scan in assessing disease status in glioblastoma in the immediate postoperative period. MRI is the standard of imaging in this setting; however, many a time, it is technically difficult to perform MRI in the immediate postoperative period because of the long imaging time and nonspecific findings.[6] Many novel PET tracers have been studied and found useful as well; however, their availability is a major limitation.[7,8] We found that this case can be an opening of a new research area for ^{68}Ga-PSMA PET/CT scan to assess residual disease in high-grade gliomas in the immediate postoperative period.