Interesting Image
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Cerebellar Metastases from Prostate Cancer Detected by PET/CT with ^{18}F-Choline

^{18}F-Kolin PET/BT ile Saptanan Prostat Kanserinin Serebellar Metastazları

Luca Filippi[1], Antonella Fontana[2], Francesco Guerrini[3], Angelo Pompucci[3], Oreste Bagni[1]

[1]*Santa Maria Goretti Hospital, Nuclear Medicine Unit, Latina, Italy*
[2]*Santa Maria Goretti Hospital, Radiotherapy Unit, Latina, Italy*
[3]*Santa Maria Goretti Hospital, Neurosurgery Unit, Latina, Italy*

Abstract

A 76-year-old male, previously submitted enucleation renal-cell carcinoma (pT1) and prostatectomy for prostate cancer (Gleason score 3+5, pT3b pN0 pMx), was submitted to positron emission/computed tomography (PET/CT) with ^{18}F-choline for restaging due to raised levels of prostate-specific antigen. PET/CT scan showed increased tracer incorporation corresponding to bone metastases in the left ischio-pubic ramus, also revealing 2 areas of increased tracer uptake in the cerebellum, subsequently confirmed by brain magnetic resonance imaging. The patient was urgently submitted to neurosurgery. Post-operative histology was positive for brain metastases from prostate cancer.

Keywords: Prostate neoplasm, positron emission tomography, molecular imaging, neurosurgery, personalized medicine

Öz

Daha önce renal hücreli karsinoma (pT1) için enükleasyon ve prostat kanseri nedeniyle prostatektomi (Gleason skoru 3+5, pT3b pN0 pMx) uygulanan 76 yaşındaki bir erkek hasta, prostat spesifik antijen seviyelerinin yükselmesi nedeniyle yeniden evreleme için ^{18}F-kolin kullanılarak yapılan pozitron emisyon tomografisi/bilgisayarlı tomografiye (PET/BT) gönderildi. PET/BT taraması, sol ischio-pubik ramustaki kemik metastazlarına karşılık gelen radyofarmasötik tutulumunda artış gösterdi. Ayrıca beyincikte 2 alanda radyofarmasötik tutulumunda artış görüldü ve sonrasında uygulanan beyin manyetik rezonans görüntüleme ile doğrulandı. Hasta acilen beyin cerrahisine sevk edildi. Ameliyat sonrası histoloji, prostat kanserinden beyin metastazı için pozitifti.

Anahtar kelimeler: Prostat neoplazmı, pozitron emisyon tomografisi, moleküler görüntüleme, beyin cerrahisi, kişiselleştirilmiş tıp

Address for Correspondence: Luca Filippi MD, Santa Maria Goretti Hospital, Nuclear Medicine Unit, Latina, Italy
Phone: +393921247921 **E-mail:** l.filippi@ausl.latina.it ORCID ID: orcid.org/0000-0003-4423-5496
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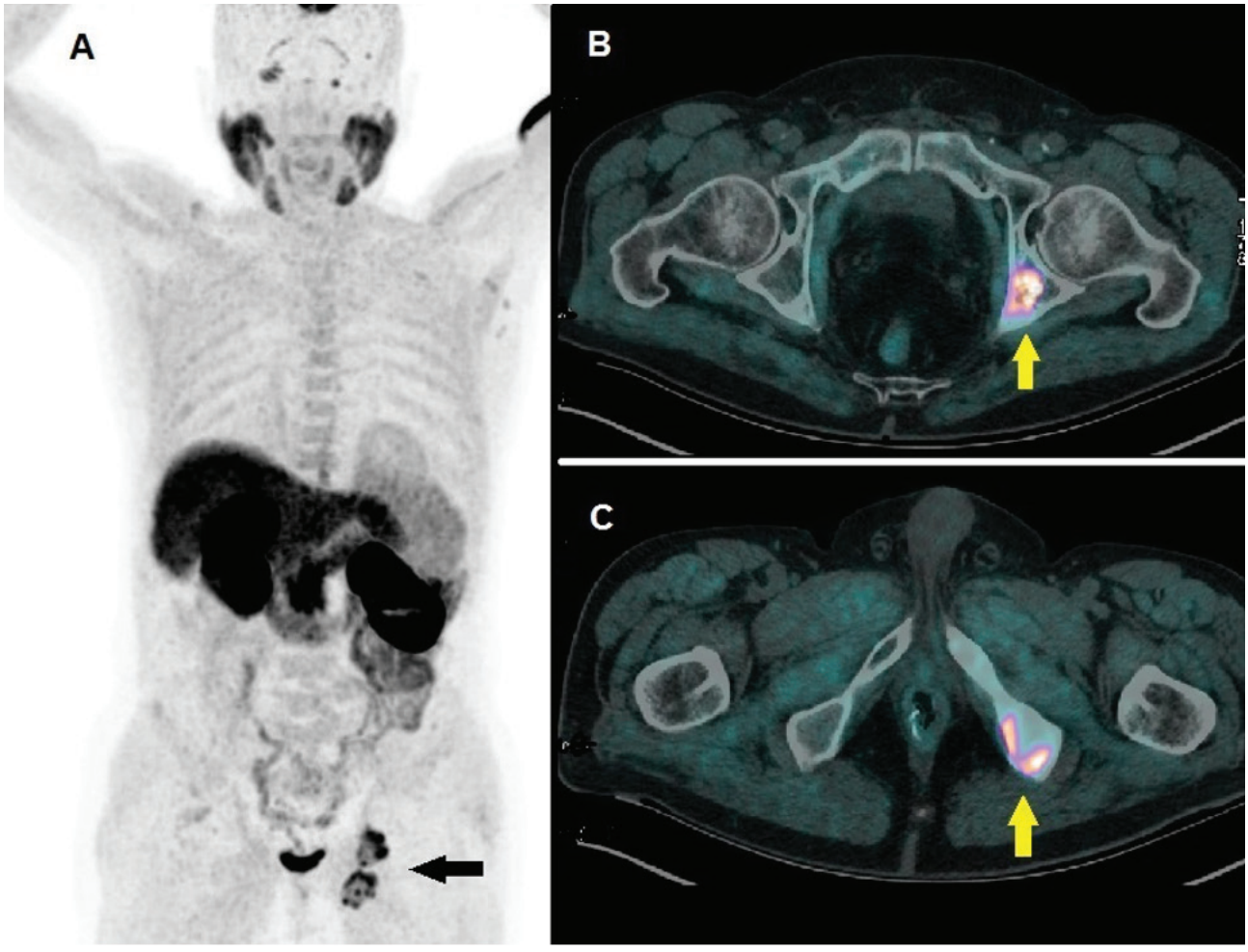

Figure 1. In 2003, a 76-year-old male patient was contextually submitted for prostatectomy due to prostate cancer (PCa) (pT3b pN0 pMx) and enucleation of a tumor mass in the right kidney resulted in renal cell-carcinoma (pT1m). He received adjuvant radiotherapy and was then monitored for the following years by clinical and laboratory examination. In 2018, due to raising values prostate-specific antigen (PSA) level, he was submitted to positron emission tomography/computed tomography (PET/CT) with ^{18}F-choline that was positive for bone metastases. He underwent radiotherapy on the skeletal lesions and started androgen deprivation therapy with complete PSA response. After 12 years, a further progressive increase in PSA level up to a value of 4.8 ng/mL was registered. Therefore, the patient underwent a further PET/CT with ^{18}F-choline for restaging. Maximum intensity projection demonstrated highly intense tracer incorporation in the bones of the left pelvis (A, black arrow). Fused corresponding axial PET/CT images showed ^{18}F-choline in the para-acetabular region of the left ischium [B, yellow arrow; standardized uptake value (SUV_{max}): 18.8] and in the ipsilateral ischio-pubic ramus (C, yellow arrow, SUV_{max}: 11.8).

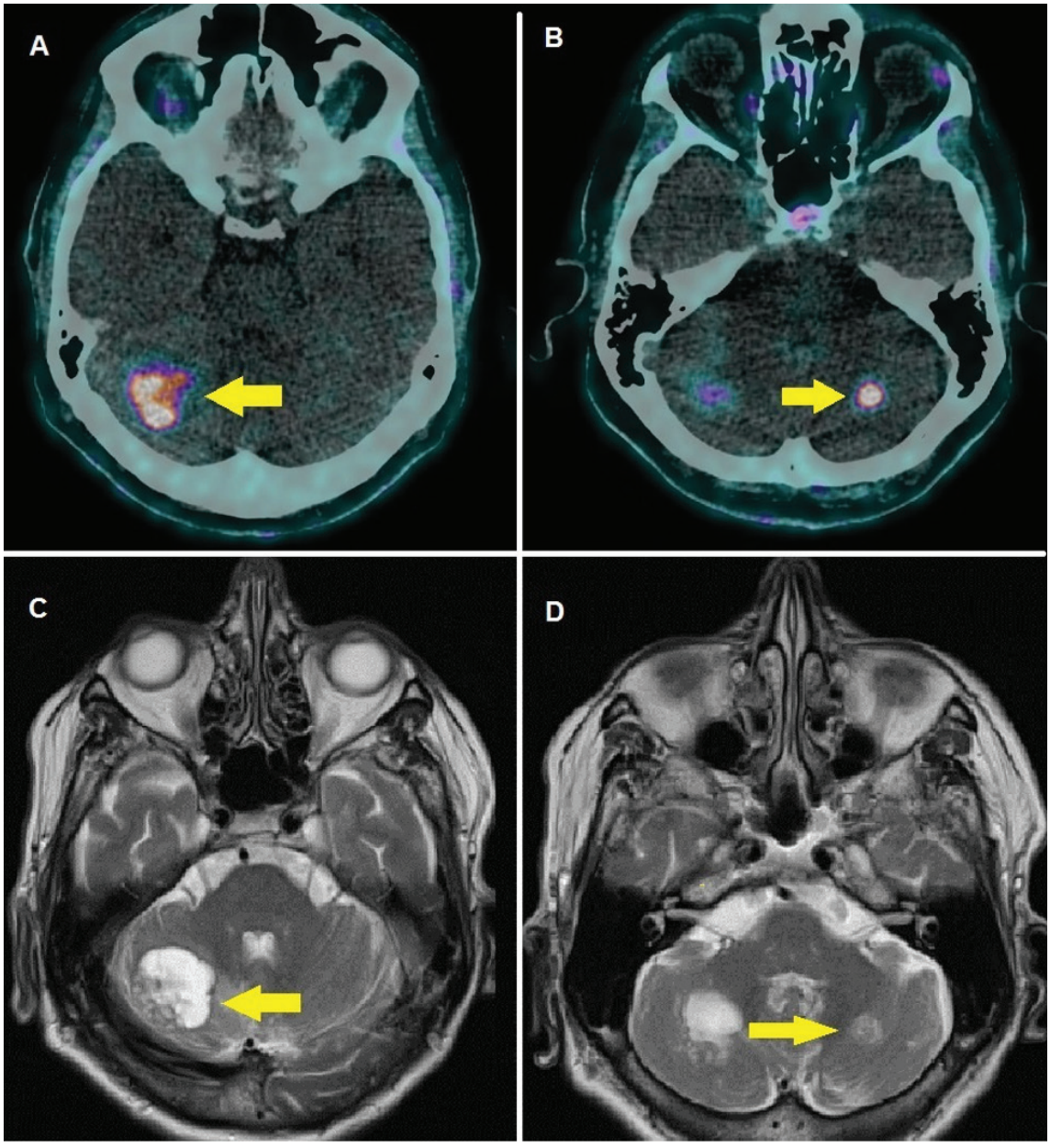

Figure 2. PET/CT images of the cranial region demonstrate 2 unexpected areas of increased tracer uptake in the right (A, yellow arrow; SUV_{max}: 7.7) and left (B, yellow arrow; SUV_{max}: 8.9) posterior fossa, highly suspected for cerebellar metastases. The patient underwent brain magnetic resonance imaging, whose T2-weighted sequences showed hyperintense lesions in the right cerebellar hemisphere (C, yellow arrow) and in the contralateral one (D, yellow arrow), with maximum transverse diameters of 32 mm and 13 mm, respectively. The subject was promptly submitted to neurosurgery of the largest lesion in the right cerebellar hemisphere. Definitive histology showed a glandular pattern of PSA-positive cells, compatible with PCa brain metastasis. The patient is in good clinical condition, actually undergoing gamma knife on the lesion in the left cerebellar hemisphere. Brain metastases from PCa cancer are rarely reported (1). In a published retrospective study including a large cohort of 2,194 subjects affected by PCa, only 1 case having brain metastases was identified (2). PET/CT with ^{18}F-choline is routinely used for the imaging of PCa recurrence and monitoring the response to treatment, but it has also been successfully applied for detecting brain tumors (3,4). Gizewska et al. (5) reported the case of a patient, affected by metastatic castration-resistant prostate cancer treated with docetaxel, diagnosed with brain metastases through ^{18}F-choline PET/CT, although a histological confirmation was not obtained. It must be highlighted that, in contrast with the case described in the aforementioned paper, our patient was chemotherapy-naïve and completely asymptomatic for both bone pain and neurological signs. Furthermore, aside PCa, our patient had undergone surgery for renal-cell carcinoma, thus neurosurgery and subsequent histology was crucial to achieve an unambiguous diagnosis. Our report highlights that when reading PET/CT scans with ^{18}F-choline, particular attention should be paid to brain evaluation, for the early detection of eventual primitive or secondary lesions.

Ethics

Informed Consent: Each patient must sign a written consent authorizing the use of anonymous data for research purpose before performing PET/CT scan.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: L.P., A.F., F.G., A.P., O.B., Concept: L.P., A.F., F.G., A.P., O.B., Design: L.P., A.F., F.G., A.P., O.B., Data Collection or Processing: L.P., A.F., F.G., A.P., O.B., Analysis or Interpretation: L.P., A.F., F.G., A.P., O.B., Literature Search: L.P., A.F., F.G., A.P., O.B., Writing: L.P., A.F., F.G., A.P., O.B.

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