

# Cavernous Hepatic Hemangioma at 18F-Choline Positron Emission Tomography–Computed Tomography: Be Aware of the Pitfall

## Abstract

We report a case of a patient performing a positron emission tomography–computed tomography (PET-CT) scan with [18F]F-Choline for biochemical relapse (Prostate specific antigen (PSA) 1.2 ng/ml) of prostate cancer. Two large areas of focal uptake with a cold core within the liver were observed. A contrast-enhanced ultrasound scan performed after the PET scan characterized these lesions as cavernous hepatic hemangiomas, and therefore, a biopsy was not performed; 3 years of follow-up and PET and MRI finding stability confirmed the benignity of their nature.

**Keywords:** 18F-choline positron emission tomography–computed tomography, cavernous hepatic hemangiomas, contrast-enhanced ultrasound, hepatocellular carcinoma, positron emission tomography–computed tomography, prostate cancer

A 66-year-old man diagnosed with prostate cancer (PCa) underwent radical prostatectomy and pelvic lymph node dissection in July 2018 (pT4 pN1 pMx, Gleason score 5 + 4). Adjuvant therapy was then prescribed. Afterward, a progressive rising of PSA values was noted, and the patient was, therefore, scheduled for a positron emission tomography–computed tomography (PET-CT) scan with [18F] F-Choline (PSA trigger 1.2 ng/ml). The study demonstrated two large areas of focal uptake within the liver, respectively, at the VII and II segments [Figure 1]. Transaxial PET-CT images showed a ring of elevated tracer uptake surrounding a central area of low metabolism. These findings, of doubtful significance, were considered worthy of further investigations, mainly to exclude hepatocellular carcinoma<sup>[1]</sup> or PCa metastases.<sup>[2]</sup> A contrast-enhanced ultrasound was performed, and the findings were considered compatible with hepatic cavernous hemangioma.

Hepatic cavernous hemangiomas are venous malformations containing a fibrous stroma with a size ranging from millimeters to more than 10 cm.<sup>[3]</sup> They are very common and often asymptomatic and incidentally discovered. In larger cavernous hemangiomas, the central portion can contain fibrosis, thrombosis, collagen scar,

or calcification, thus explaining the low metabolism of the lesion's core shown on our PET examination.

With this type of diagnosis, biopsy should be avoided due to the risk of hemorrhage; thus, the diagnosis is purely radiological. After 3 years of clinical and imaging follow-up (four PET-CT scans with [18F]F-Choline and an upper abdomen magnetic resonance imaging), the findings were stable, supporting their benign nature. While it is well-known that hepatic hemangiomas are not FDG avid,<sup>[4]</sup> to the best of our knowledge, this is the first case reporting of hepatic cavernous hemangioma at [18F]F-Choline PET-CT. Although relatively uncommon, visceral metastases from PCa can occur in the liver, heavily affecting the patient's prognosis.<sup>[5]</sup> Therefore, their detection is very relevant for the patient's tailored therapy.

Nevertheless, the physiological elevated hepatic tracer uptake at [18F]F-choline PET-CT determines a low detection rate of small metastases.<sup>[6]</sup> Moreover, the breathing artifacts may affect the upper part of the liver (the so-called “banana artifact”),<sup>[7]</sup> reducing the diagnostic accuracy of lesions localized at the hepatic dome.

Considering the relatively high incidence of hepatic hemangioma in the population (0.4% to 20%),<sup>[8]</sup> the nuclear

**Anna Margherita Maffione,  
Luca Urso,  
Modonesi Caterina<sup>1</sup>,  
Sotirios Chondrogiannis,  
Gaia Grassetto,  
Paola Bartoletti,  
Maria Cristina Marzola**

Department of Nuclear Medicine Unit, AULSS5 Polesana, Santa Maria Della Misericordia Hospital, Rovigo, <sup>1</sup>Oncology Unit, AULSS6 Euganea, Ospedali Riuniti Padova Sud, Monselice, PD, Italy

## Address for correspondence:

Dr. Luca Urso,  
Department of Nuclear Medicine, AULSS5 Polesana, Santa Maria Della Misericordia Hospital, Rovigo, Italy.  
E-mail: luca.urso@aulss5.veneto.it

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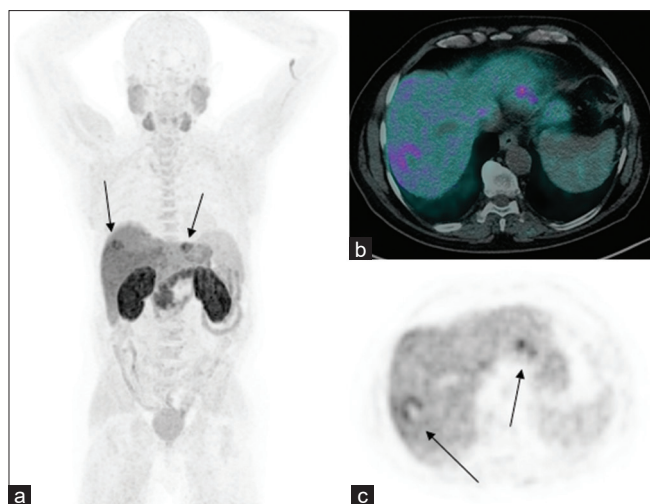
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**Figure 1:** Maximum intensity projection shows two areas of focal [18F] F-Choline uptake within the right and left hepatic lobes (indicated by arrows) (a) Transaxial fused positron emission tomography (PET)–computed tomography (b) and emissive PET (c) images show two rings of elevated tracer uptake at the VII and II liver segments (diameter of 3 cm and 2.8 cm, respectively), surrounding a core of low metabolism

medicine physician should be aware of this pitfall, avoiding to report a potential false-positive finding.

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published, and due efforts will be made to his conceal identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.

#### References

1. Bertagna F, Bertoli M, Bosio G, Biasiotto G, Sadeghi R, Giubbini R, *et al.* Diagnostic role of radiolabelled choline PET or PET/CT in hepatocellular carcinoma: A systematic review and meta-analysis. *Hepatol Int* 2014;8:493-500.
2. Ghedini P, Bossert I, Zannoni L, Ceci F, Graziani T, Castellucci P, *et al.* Liver metastases from prostate cancer at 11C-choline PET/CT: A multicenter, retrospective analysis. *Eur J Nucl Med Mol Imaging* 2018;45:751-8.
3. Bajenaru N, Balaban V, Săvulescu F, Campeanu I, Patrascu T. Hepatic hemangioma –Review. *J Med Life* 2015;8:4-11.
4. Prashanth A, Datta D, Kumar R, Taywade S, Chandran R, Pandey R. Sub-diaphragmatic haemangioma suspected on F-18 Fdg Pet/Ct confirmed by Rbc scintigraphy. *Indian J Nucl Med* 2022;37:189-91.
5. Pezaro C, Omlin A, Lorente D, Rodrigues DN, Ferraldeschi R, Bianchini D, *et al.* Visceral disease in castration-resistant prostate cancer. *Eur Urol* 2014;65:270-3.
6. Urso L, Lancia F, Ortolan N, Frapoli M, Rauso M, Artioli P, *et al.* 18F-Choline PET/CT or PET/MR and the evaluation of response to systemic therapy in prostate cancer: Are we ready? *Clin Transl Imaging* 2022;10:687-95.
7. Shim H, Hyun H, Kim CK. Discrete decreased activity in the lower thoracic spine on FDG PET/CT: Another respiration-related artifact. *Clin Nucl Med* 2015;40:394-6.
8. Ishak KG, Rabin L. Benign tumors of the liver. *Med Clin North Am* 1975;59:995-1013.