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Mol Imaging Radionucl Ther 2026;35(2):142-144 **DOI:***10.4274/mirt.galenos.2026.83097*

^{18}F-FDG-PET/MRI Demonstration of Extensive Spinal Cord Metastases in a Patient with Ovarian Carcinoma

Over Karsinomlu Bir Hastada Yaygın Spinal Kord Metastazlarının ^{18}F-FDG-PET/MRG ile Görüntülenmesi

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Abstract

Spinal cord involvement is a rare manifestation of metastatic ovarian carcinoma. We report a case of high-grade serous ovarian cancer initially diagnosed in 2020. After cytoreductive surgery and multiple chemotherapy regimens, the patient developed brain metastases followed by small hypermetabolic foci along the spinal canal detected on ^{18}F-fluorodeoxyglucose positron emission tomography/magnetic resonance imaging (^{18}F-FDG PET/MRI). These lesions, primarily located in the cervical region, were confirmed by contrast-enhanced spinal MRI but were more clearly visualized on ^{18}F-FDG PET/MRI. Intramedullary spinal cord metastases are extremely rare and often underdiagnosed. While MRI remains the standard for anatomical assessment, ^{18}F-FDG PET/MRI demonstrated superior lesion detection and definition in this case. This highlights the potential of hybrid imaging for improved diagnostic sensitivity in patients with suspected central nervous system involvement.

Keywords: ^{18}F-FDG PET/MRI, ovarian carcinoma, spinal cord metastasis, hybrid imaging

Öz

Spinal kord tutulumu, metastatik over karsinomunun nadir bir bulgusudur. Bu yazıda, 2020 yılında tanı almış yüksek dereceli seröz over karsinomlu bir olgu sunulmaktadır. Sitoredüktif cerrahi ve çoklu kemoterapi rejimlerinin ardından hastada önce beyin metastazları gelişmiş, sonrasında ise ^{18}F-florodeoksiglukoz pozitron emisyon tomografisi/manyetik rezonans görüntüleme (^{18}F-FDG PET/MRG) görüntülemede spinal kanal boyunca hipermetabolik odaklar saptanmıştır. Bu lezyonlar, ağırlıklı olarak servikal bölgede yerleşimli olup kontrastlı spinal MRG ile doğrulanmış, ancak ^{18}F-FDG PET/MRG görüntülemede daha net olarak izlenmiştir. İntramedüller spinal kord metastazları son derece nadir olup sıklıkla gözden kaçabilmektedir. Anatomik değerlendirme için MRG standart yöntem olmaya devam etmekle birlikte, bu olguda ^{18}F-FDG PET/MRG daha üstün lezyon saptama ve tanımlama sağlamıştır. Bu bulgular, santral sinir sistemi tutulumu şüphesi olan hastalarda hibrit görüntülemenin tanısal duyarlılığı artırma potansiyeline işaret etmektedir.

Anahtar Kelimeler: ^{18}F-FDG PET/MRG, over karsinomu, spinal kord metastazı, hibrit görüntüleme

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Received: 17.12.2025 **Accepted:** 19.02.2026 **Epub:** 06.03.2026 **Publication Date:** 04.06.2026

Cite this article as: Güneren C, Asa S, Sayman HB. ^{18}F-FDG-PET/MRI demonstration of extensive spinal cord metastases in a patient with ovarian carcinoma. Mol Imaging Radionucl Ther. 2026;35(2):142-144.

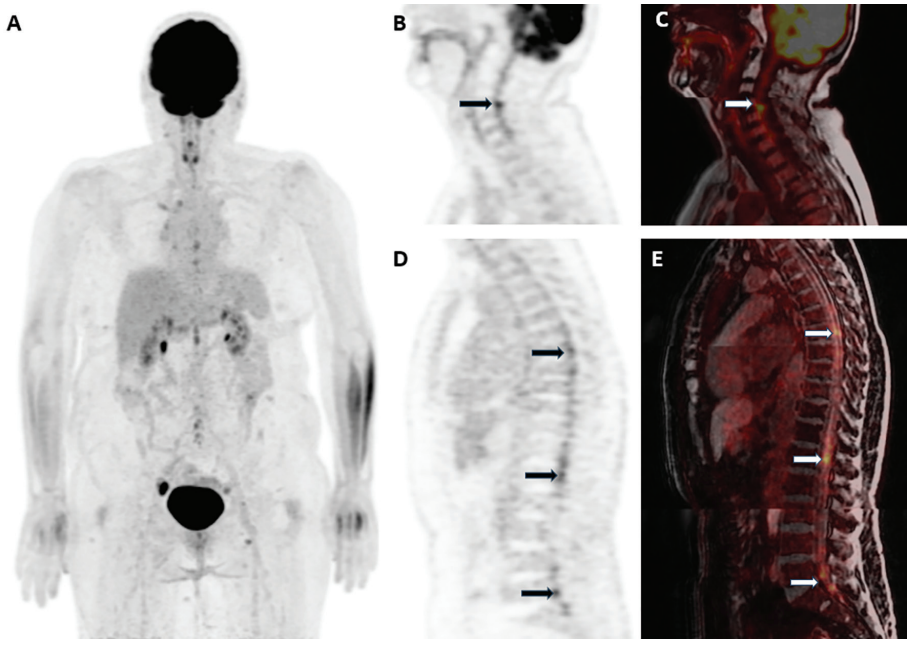

Figure 1. Hypermetabolic spinal cord metastases are observed in the cervical and thoracolumbar regions of a patient under follow-up for high-grade serous ovarian carcinoma [A: maximum intensity projection; sagittal B: positron emission tomography (PET), black arrow; C: fused PET/magnetic resonance imaging (MRI), white arrow; sagittal D: PET, black arrow; E: fused PET/MRI, white arrow]. Following intravenous administration of 3.75 mCi ^{18}F-fluorodeoxyglucose (^{18}F-FDG) PET/MRI imaging from the vertex to the upper thighs was performed 50 minutes post-injection using a 3-Tesla time-of-flight PET/MRI system available at our institution (GE Signa PET/MRI, GE Healthcare, Waukesha, WI, USA). For anatomical correlation and attenuation correction, MRI-based attenuation correction images were acquired, and vertex-to-upper-thigh, T1-weighted, three-dimensional, dual-echo, fast spoiled gradient-recalled echo liver-accelerated volume acquisition sequences were used for PET/MRI fusion imaging.

Central nervous system (CNS) involvement is an uncommon manifestation of metastatic ovarian carcinoma. Though the liver is the most frequent site of distant spread, spinal cord metastases remain rare. The anatomical distribution of metastases is an independent prognostic factor (1). We present a case of spinal cord metastasis from high-grade serous ovarian carcinoma, emphasizing the diagnostic value of ^{18}F-FDG PET/MRI compared to conventional MRI.

The patient was a 42-year-old female initially diagnosed in 2020 with high-grade serous ovarian carcinoma following cytoreductive surgery that included total hysterectomy, bilateral salpingo-oophorectomy, omentectomy, and excision of multiple peritoneal implants. Based on surgical pathology, the disease was classified as FIGO stage IIIC. Between 2020 and 2024, the patient received multiple lines of systemic chemotherapy, including carboplatin–paclitaxel, gemcitabine, and bevacizumab-based regimens. During follow-up in 2024, brain metastases developed; palliative whole-brain radiotherapy was administered at a total dose of 30 Gy in 10 fractions. Subsequently, ^{18}F-FDG PET/MRI revealed small hypermetabolic foci along the spinal canal particularly in the cervical region adjacent to the spinal cord, suggestive of metastases. Contrast-enhanced spinal MRI confirmed nodular enhancement in the corresponding regions. Contrast-enhanced spinal MRI on post-contrast T1-weighted images demonstrated nodular, contrast-enhancing lesions within the spinal canal along the spinal cord and interspersed between the cauda equina nerve roots, consistent with intraspinal metastatic spread, compatible with leptomeningeal disease. However, compared with the hypermetabolic foci observed on ^{18}F-FDG PET/MRI, precise anatomical delineation of individual lesions was challenging on MRI alone. PET/MRI provided complementary value to spinal MRI by improving lesion detection and delineation through the addition of metabolic imaging. Based on the PET/MRI findings, targeted radiotherapy was initiated.

Spinal cord metastases are extremely rare, occurring in 0.9-2.1% of cancer autopsies and accounting for 8.5% of all CNS metastases. Ovarian cancer cases with spinal involvement are rarely reported and are mostly identified by MRI (2-5). Nevertheless, several case reports have demonstrated the contribution of ^{18}F-FDG PET/computed tomography to detecting spinal cord metastases in ovarian cancer and other malignancies (6-8). While MRI remains the gold standard for anatomical evaluation and surgical planning (9), ^{18}F-FDG PET/MRI adds diagnostic value, especially for detecting subtle or widespread lesions. As demonstrated in this patient, PET/MRI may represent a diagnostically superior modality in selected clinical contexts.

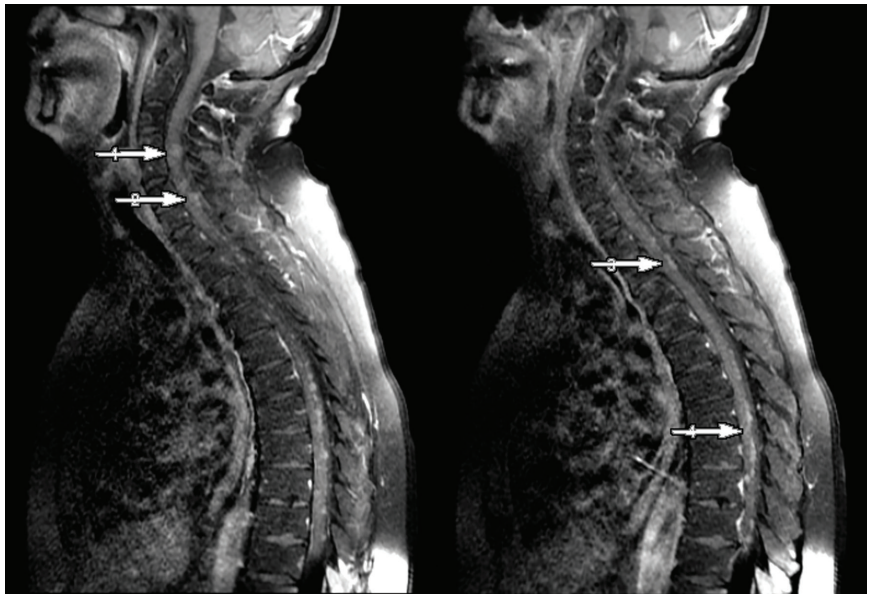

Figure 2. Post-contrast sagittal T1-weighted spinal magnetic resonance imaging (MRI), images of the same patient reveal subtle nodular contrast enhancement (white arrows) in the cervical and thoracic spinal cord, corresponding to the hypermetabolic foci observed on [18]F-fluorodeoxyglucose positron emission tomography/MRI, although lesion conspicuity is limited.

Ethics

Informed Consent: Informed consent was obtained from the patient for publication.

Footnotes

Authorship Contributions

Concept: C.G., S.A., H.B.S., Design: C.G., S.A., H.B.S., Data Collection or Processing: C.G., Literature Search: C.G., Writing: C.G., S.A., H.B.S.

Conflict of Interest: No conflicts of interest were declared by the authors.

Financial Disclosure: The authors declare that this study has received no financial support.

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