



# Multiple Subcutaneous $^{18}\text{F}$ -FDG-avid Granulomas Due to Enoxaparin Injection

Enoksaparin Enjeksiyonuna Bağlı Gelişen Yoğun  $^{18}\text{F}$ -FDG Tutan Multipl Subkütan Granülomlar

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## Abstract

A 67-year-old female patient with metastatic gastric adenocarcinoma was referred to  $^{18}\text{F}$ fluorine-fluorodeoxyglucose ( $^{18}\text{F}$ -FDG) positron emission tomography/computed tomography (PET/CT) for restaging. PET/CT revealed liver metastasis and the patient received six-cycles of chemotherapy. On control  $^{18}\text{F}$ -FDG PET/CT the liver lesion disappeared but newly formed multiple foci of increased uptake in the subcutaneous adipose tissues of the abdominal wall were detected. The uptake was related to nodular lesions resulting from an idiosyncratic reaction to enoxaparin and from local trauma through repeated injections.

**Keywords:** Enoxaparin, granuloma,  $^{18}\text{F}$ -FDG PET/CT

## Öz

Metastatik mide adenokarsinomu tanılı 67 yaşında kadın hastaya yeniden evreleme amacıyla  $^{18}\text{F}$ flor-florodeoksiglukoz ( $^{18}\text{F}$ -FDG) pozitron emisyon tomografisi/bilgisayarlı tomografi (PET/BT) çekimi yapıldı. PET/BT'de karaciğer metastazı saptandı ve hasta altı kür kemoterapi aldı. Kontrol  $^{18}\text{F}$ -FDG PET/BT'de karaciğer lezyonu kayboldu, ancak karın duvarında subkütan yağlı dokularda yeni oluşan çok sayıda artmış  $^{18}\text{F}$ -FDG tutulum odağı tespit edildi. Artmış tutulum, enoksaparine bağlı reaksiyondan kaynaklanan nodüler lezyonlarla ve ayrıca tekrarlanan enjeksiyonlara bağlı lokal travmayla ilişkili bulundu.

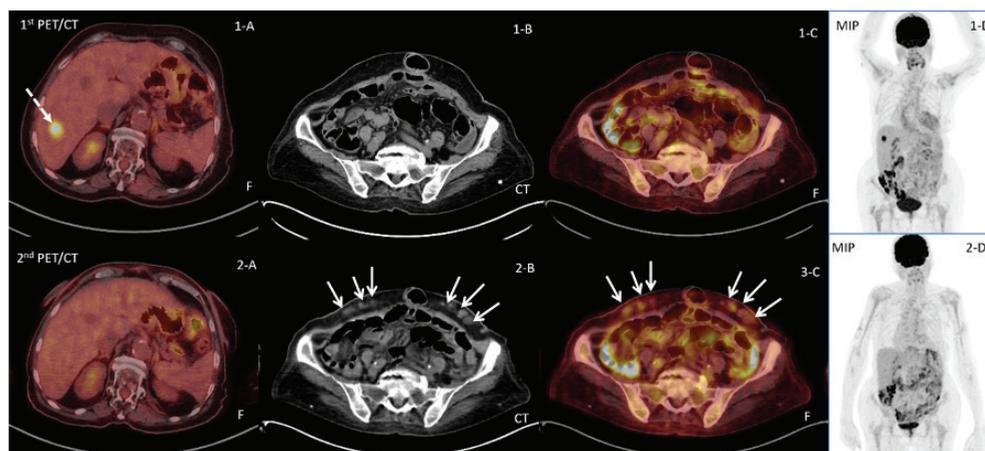
**Anahtar kelimeler:** Enoksaparin, granülom,  $^{18}\text{F}$ -FDG PET/BT

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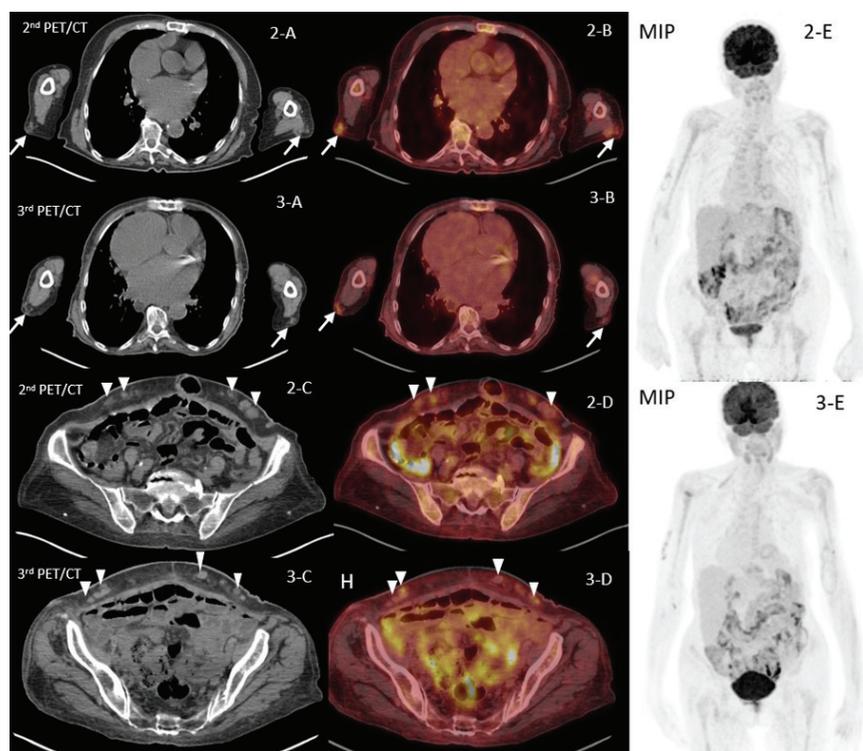
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**Figure 1.** A 67-year-old female patient with metastatic gastric adenocarcinoma was admitted to our hospital for restaging <sup>18</sup>fluorine-fluorodeoxyglucose (<sup>18</sup>F-FDG) positron emission tomography/computed tomography (PET/CT). The patient had undergone total gastrectomy (T2N2M0) 18 months earlier and then received radiotherapy. PET/CT revealed one <sup>18</sup>F-FDG-avid metastatic lesion in the liver (1<sup>st</sup> PET/CT; dashed arrow). After six-cycles of chemotherapy, the second PET/CT imaging was performed for therapy response. In this imaging, metastatic lesion disappeared in the liver, but PET/CT demonstrated newly formed multiple focal increased uptakes of <sup>18</sup>F-FDG in the subcutaneous adipose tissues of the abdominal wall with the largest dimension of 2.1 cm and the highest maximum standardized uptake value of 4.5 (2<sup>nd</sup> PET/CT; arrows).



**Figure 2.** The patient continued to receive chemotherapy and after 7 months, a third follow-up <sup>18</sup>F-FDG was performed. There were no new metastatic lesion in whole body, however the subcutaneous hypermetabolic lesions remained existed on the anterior abdominal wall (arrowheads) and bilateral arms (arrows) at different localizations from the second PET/CT related to continuing enoxaparin injection. Subcutaneous metastasis from gastric cancer is a rare manifestation, with a reported incidence of 0.8-1.0% (1). The most commonly reported origins of cutaneous metastasis are lung, breast and colon cancer, melanoma, squamous cell carcinoma of the oral cavity and renal cell carcinoma (2). The patient had a history of mitral valve replacement and switched from injection therapy with heparin to enoxaparin between the first and second PET/CT imaging. Although these nodules can simulate metastasis, in this case, since the liver lesion was disappeared after chemotherapy, the increased <sup>18</sup>F-FDG uptake at the subcutaneous injection sites was not evaluated in favor of metastasis. These nodular lesions may result from an idiosyncratic reaction to enoxaparin and from local trauma through repeated injections as a promoting factor (3). A careful and detailed clinical history is needed to prevent misdiagnosis in PET/CT evaluation.

### Ethics

**Informed Consent:** The written and verbal consent has been received before the PET/CT scan.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: Ö.E.F., N.E., E.B., R.Ş., T.F.Ç., Concept: Ö.E.F., N.E., E.B., R.Ş., T.F.Ç., Design: Ö.E.F., N.E., E.B., R.Ş., T.F.Ç., Data Collection or Processing: Ö.E.F., N.E., E.B., R.Ş., T.F.Ç., Analysis or Interpretation: Ö.E.F., N.E., E.B., R.Ş., T.F.Ç., Literature Search: Ö.E.F., N.E., E.B., R.Ş., T.F.Ç., Writing: Ö.E.F., N.E., E.B., R.Ş., T.F.Ç.

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