



Comparison of ^{68}Ga -FAPi-04 and ^{68}Ga -PSMA in a Case of Interstitial Lung Disease

İnteristisyel Akciğer Hastalığı Olgusunda ^{68}Ga -FAPi-04 ve ^{68}Ga -PSMA'nın Karşılaştırılması

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Abstract

We present the ^{68}Ga -prostate-specific membrane antigen (PSMA) and ^{68}Ga -fibroblast activation protein inhibitor (FAPi)-04 positron emission tomography/computed tomography (PET/CT) findings comparatively of a 76-year-old man with a history of progressive dyspnea and evidence of interstitial lung disease (ILD) abnormalities on high-resolution CT. Moderate PSMA uptake was observed in areas with ILD abnormalities on ^{68}Ga -PSMA PET/CT. ^{68}Ga -FAPi-04 PET/CT showed relatively higher FAPi-04 uptake in these regions. These findings offer the potential to assess disease activity at the cellular and molecular levels. This approach may provide valuable insight into the pathophysiology of ILD beyond the structural changes captured by traditional imaging methods.

Keywords: Fibroblast activation protein inhibitor, interstitial lung disease, PSMA, PET

Öz

İlerleyen dispne öyküsü ve yüksek çözünürlüklü bilgisayarlı tomografide (BT) interstisyel akciğer hastalığı (İAH) bulgusu bulunan 76 yaşındaki erkek hastanın ^{68}Ga -prostat spesifik membran antijeni (PSMA) ve ^{68}Ga -fibroblast aktivasyon protein inhibitörü (FAPi)-04 pozitron emisyon tomografisi (PET)/BT bulgularını karşılaştırmalı olarak sunmaktayız. ^{68}Ga -PSMA PET/BT'de İAH anormallikleri olan bölgelerde orta düzeyde ^{68}Ga -PSMA tutulumu gözlemlendi. ^{68}Ga -FAPi-04 PET/BT'de, bu bölgelerde ^{68}Ga -PSMA PET/BT'ye göre nispeten daha yüksek ^{68}Ga -FAPi-04 tutulumu gözlenmektedir. Bu bulgu, hastalık aktivitesini hücre ve moleküler düzeyde değerlendirme potansiyeli sunarak, geleneksel görüntüleme yöntemleriyle yakalanan yapısal değişikliklerin ötesinde İAH'nın patofizyolojisi hakkında değerli bilgiler sağlayabilir.

Anahtar kelimeler: Fibroblast aktivasyon protein inhibitörü, interstisyel akciğer hastalığı, PSMA, PET

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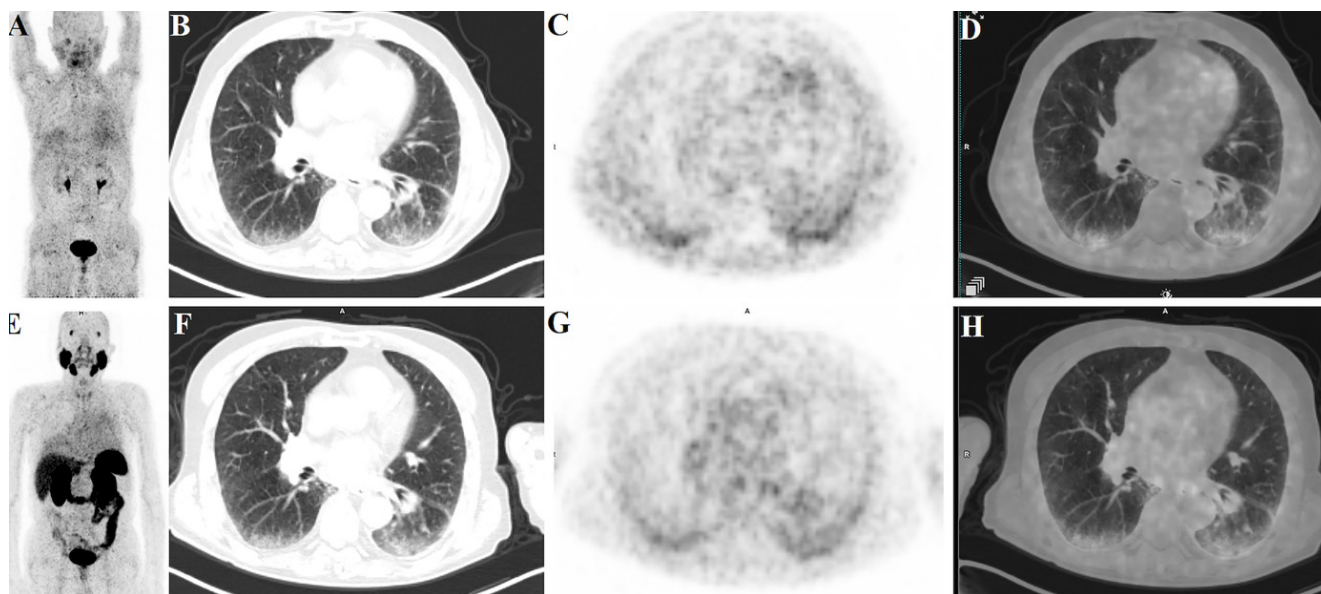


Figure 1. A 76-year-old man diagnosed with interstitial lung disease (ILD) presented with newly diagnosed prostate carcinoma with a Gleason score of 4+3. ^{68}Ga -prostate specific membrane antigen (PSMA) positron emission tomography/computed tomography (PET/CT) was performed for staging. Dependent atelectasis, subpleural reticular density increase, and traction bronchiectasis were observed in the lower lobes of both lungs, showing moderate PSMA uptake in both lungs (E, PSMA PET MIP; F, axial CT image; G, axial PET image, and H axial PET/CT fusion image). There was no evidence of prostate cancer residue or metastasis. Subsequently, the patient underwent a ^{68}Ga -fibroblast activation protein inhibitor (FAPI)-04 PET/CT scan as part of the prospective research conducted at our clinic. The patient provided written informed consent. In ILD findings where PSMA uptake (SUV_{max} : 4.8) was observed, FAPI-04 uptake (SUV_{max} : 6.4) was at a relatively higher uptake to PSMA on ^{68}Ga -FAPI-04 PET/CT (A, FAPI-04 PET MIP; B, axial CT image; C, axial PET image, and D axial PET/CT fusion image). ILD is a heterogeneous group of parenchymal lung disorders characterized by inflammation and fibrosis (1). High-resolution computed tomography has been the cornerstone of imaging in ILD, providing detailed anatomical information and aiding disease classification (2). However, the quest for more precise and comprehensive imaging techniques has led to exploring molecular imaging modalities such as PET using novel radiotracers. PSMA has garnered interest in non-prostatic diseases due to its increased expression in neoangiogenesis associated with inflammation and fibrosis (3). Similarly, FAPI, targeting fibroblast activation, has shown promise in visualizing and monitoring fibrotic lung diseases (4,5,6,7,8,9). These emerging PET tracers have the potential to assess disease activity at the cellular and molecular level, providing valuable insights into the pathophysiology of ILD beyond structural changes captured by conventional imaging modalities. This report underscores the potential of PET imaging with novel radiotracers as useful adjuncts to traditional diagnostic modalities, which may offer a deeper understanding of disease pathogenesis and pave the way for targeted therapies in patients with ILD.

Ethics

Informed Consent: The patient provided written informed consent.

Footnotes

Authorship Contributions

Surgical and Medical Practices: H.Ö., A.K., Concept: H.Ö., A.K., Design: H.Ö., A.K., Data Collection or Processing: H.Ö., A.K., Analysis or Interpretation: H.Ö., A.K., Literature Search: H.Ö., A.K., Writing: H.Ö., A.K.

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References

- Mendes RG, Castello-Simões V, Trimer R, Garcia-Araújo AS, Gonçalves Da Silva AL, Dixit S, Di Lorenzo VAP, Archiza B, Borghi-Silva A. Exercise-Based Pulmonary Rehabilitation for Interstitial Lung Diseases: A Review of Components, Prescription, Efficacy, and Safety. *Front Rehabil Sci.* 2021;2:744102.
- Rodriguez K, Ashby CL, Varela VR, Sharma A. High-Resolution Computed Tomography of Fibrotic Interstitial Lung Disease. *Semin Respir Crit Care Med.* 2022;43:764-779.
- de Galiza Barbosa F, Queiroz MA, Nunes RF, Costa LB, Zaniboni EC, Marin JFG, Cerri GG, Buchpiguel CA. Nonprostatic diseases on PSMA PET imaging: a spectrum of benign and malignant findings. *Cancer Imaging.* 2020;20:23.
- Rosenkrans ZT, Massey CF, Bernau K, Ferreira CA, Jeffery JJ, Schulte JJ, Moore M, Valla F, Batterton JM, Drake CR, McMillan AB, Sandbo N, Pirasteh A, Hernandez R. [(68) Ga]Ga-FAPI-46 PET for non-invasive detection of pulmonary fibrosis disease activity. *Eur J Nucl Med Mol Imaging.* 2022;49:3705-3716.
- Dendl K, Koerber SA, Kratochwil C, Cardinale J, Finck R, Dabir M, Novruzov E, Watabe T, Kramer V, Choyke PL, Haberkorn U, Giesel FL. FAP

- and FAPI-PET/CT in Malignant and Non-Malignant Diseases: A Perfect Symbiosis? *Cancers (Basel)*. 2021;13:4946.
6. Yang P, Luo Q, Wang X, Fang Q, Fu Z, Li J, Lai Y, Chen X, Xu X, Peng X, Hu K, Nie X, Liu S, Zhang J, Li J, Shen C, Gu Y, Liu J, Chen J, Zhong N, Su J. Comprehensive Analysis of Fibroblast Activation Protein Expression in Interstitial Lung Diseases. *Am J Respir Crit Care Med*. 2023;207:160-172.
 7. Sviridenko A, di Santo G, Virgolini I. Imaging Fibrosis. *PET Clin*. 2023;18:381-388.
 8. Mori Y, Kramer V, Novruzov E, Mamlins E, Röhrich M, Fernández R, Amaral H, Soza-Ried C, Monje B, Sabbagh E, Florenzano M, Giesel FL, Undurraga Á. Initial results with [(18)F]FAPI-74 PET/CT in idiopathic pulmonary fibrosis. *Eur J Nucl Med Mol Imaging*. 2024;51:1605-1611.
 9. Röhrich M, Leitz D, Glatting FM, Wefers AK, Weinheimer O, Flechsig P, Kahn N, Mall MA, Giesel FL, Kratochwil C, Huber PE, Deimling AV, Heußel CP, Kauczor HU, Kreuter M, Haberkorn U. Fibroblast Activation Protein-Specific PET/CT Imaging in Fibrotic Interstitial Lung Diseases and Lung Cancer: A Translational Exploratory Study. *J Nucl Med*. 2022;63:127-133.