Fibroblast Activation Protein–Specific PET/CT Imaging in Fibrotic Interstitial Lung Diseases and Lung Cancer: A Translational Exploratory Study

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Interstitial lung diseases (ILDs) comprise over 200 parenchymal lung disorders. Among them, fibrosing ILDs, especially idiopathic pulmonary fibrosis, are associated with a poor prognosis, whereas some other ILDs, such as sarcoidosis, have a much better prognosis. A high proportion manifests as fibrotic ILD (fILD). Lung cancer (LC) is a frequent complication of fILD. Activated fibroblasts are crucial for fibrotic processes in fILD. The aim of this exploratory study was to evaluate the imaging properties of static and dynamic fibroblast activation protein (FAP) inhibitor (FAPI) PET/CT in various types of fILD and to confirm FAP expression in fILD lesions by FAP immunohistochemistry of human fILD biopsy samples and of lung sections of genetically engineered (Nedd4-2−/−) mice with an idiopathic pulmonary fibrosilike lung disease. Methods: PET scans of 15 patients with fILD and suspected LC were acquired 10, 60, and 180 min after the administration of 150-250 MBq of a 68Ga-labeled FAPI tracer (FAPI-46). In 3 patients, dynamic scans over 40 min were performed instead of imaging after 10 min. The SUVmax and SUVmean of fibrotic lesions and LC were measured and CT-density–corrected. Target-to-background ratios (TBRs) were calculated. PET imaging was correlated with CT-based fibrosis scores. Time-activity curves derived from dynamic imaging were analyzed. FAP immunohistochemistry of 4 human fILD biopsy samples and of fibrotic lungs of Nedd4-2−/− mice was performed. Results: fILD lesions as well as LC showed markedly elevated 68Ga-FAPI uptake (density-corrected SUVmax and SUVmean 60 min after injection: 11.12 ± 6.71 and 4.29 ± 1.61, respectively, for fILD lesions and 16.69 ± 9.35 and 6.44 ± 3.29, respectively, for LC) and high TBR (TBR of density-corrected SUVmax and SUVmean 60 min after injection: 2.30 ± 1.47 and 1.67 ± 0.79, respectively, for fILD and 3.90 ± 2.36 and 2.37 ± 1.14, respectively, for LC). SUVmax and SUVmean increased over time, with a stable TBR for fILD and a trend toward an increasing TBR in LC. Dynamic imaging showed differing time–activity curves for fILD and LC. 68Ga-FAPI uptake showed a positive correlation with the CT-based fibrosis index. Immunohistochemistry of human biopsy samples and the lungs of Nedd4-2−/− mice showed a patchy expression of FAP in fibrotic lesions, preferentially in the transition zone to healthy lung parenchyma. Conclusion: 68Ga-FAPI PET/CT imaging is a promising new imaging modality for fILD and LC. Its potential clinical value for monitoring and therapy evaluation of fILD should be investigated in future studies.

Key Words: fibroblast activation protein; interstitial lung disease; lung cancer

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Intersitial lung diseases (ILDs) comprise over 200 parenchymal lung disorders. Among them, fibrosing ILDs, especially idiopathic pulmonary fibrosis (IPF), are associated with a poor prognosis, whereas some other ILDs, such as sarcoidosis, have a much better prognosis (1,2). A high proportion manifests as fibrotic ILD (fILD), and despite conventional therapy, fILD has a potential for disease progression, which is associated with worsened lung function and quality of life as well as early death (3). IPF is a subtype of fILD with a typically chronic, irreversible, and progressive clinical course (4,5); a variable disease course; and a poor prognosis (4,6,7). But also in other fILDs, including rheumatoid arthritis–associated ILD (8), systemic sclerosis–associated ILD (9), and unclassifiable ILD (10), progression has been observed in a proportion of patients. Lung cancer (LC), a frequent complication of fILD, crucially contributes to the poor prognosis of these patients (11).

The standard imaging technique for the assessment of fILD is high-resolution CT (7). CT is an essential component for the diagnosis of ILD, and radiologic patterns are predictors for outcomes and therapy effects (12). Yet, CT is unable to assess disease activity in fILDs. Next to CT, 18F-FDG PET/CT is used for the imaging of fILDs, based on increased glucose metabolism in fibrotic pulmonary lesions (13–16), and may add value to CT for risk stratification and evaluation of antifibrotic therapies (13). But both CT and 18F-FDG PET have inherent limitations for the evaluation of fILDs, as CT can show only morphologic changes of the lung, which occur relatively...
late during fibrosis \((J4)\), and \(^{18}\)F-FDG PET/CT depicts inflammatory reactions but not an activated fibrotic process itself \((17,18)\).

There is growing evidence that activated fibroblasts play a crucial role in the pathogenesis and progression of fibrotic processes in fILD \((15,19–21)\). Activated fibroblasts contribute to various physiologic and pathologic processes, including fibrosis, inflammation, and cancer \((22,23)\). They are characterized by expression of fibroblast activation protein (FAP). It has been shown that FAP can be specifically targeted by radioactive tracer molecules \((24,25)\). The first pilot studies showed elevated uptake of FAP inhibitor (FAPI) tracers in various tumor entities \((25,26)\). In these studies, elevated tracer uptake was observed not only in tumors but also in reactive processes, fibrotic lesions, and inflammatory lesions \((27)\).

On the basis of these findings, we hypothesized that \(^{68}\)Ga-FAPi PET/CT may be a useful imaging and diagnostic tool for fILD. The aim of our analysis was to evaluate the imaging properties of static and dynamic \(^{68}\)Ga-FAPi PET/CT in various types of fILD and to confirm FAP expression of fILD lesions by FAP immunohistochemistry of human fILD biopsy samples and of lung sections of genetically engineered \((\text{Nedd4-2}^{-/-}\)) mice with IPF.

**MATERIALS AND METHODS**

**Study Design and Patient Characterization**

This was an exploratory, hypothesis-generating retrospective translational study. The institutional review board approved this study (study number S-115/2020), and all subjects gave written informed consent.

Between July 2018 and August 2019, 15 patients (aged 56–80 y; average, 71.2 y) with different fILD subtypes were examined by \(^{68}\)Ga-FAPi PET/CT. These patients were selected from 1,135 patients with suspected LC who were examined in our institution between July 2018 and August 2019. Of these, 1,104 (97.3%) were examined by \(^{18}\)F-FDG PET/CT and 31 (2.7%) by \(^{68}\)Ga-FAPi PET/CT, including the 15 patients with fILD who were retrospectively analyzed in this study. In all these patients, the clinical indication for \(^{68}\)Ga-FAPi PET/CT imaging was suspected LC. The individual decision for \(^{68}\)Ga-FAPi PET/CT and not \(^{18}\)F-FDG PET/CT for these patients was made by a local interdisciplinary tumor board because of our previous experiences with \(^{68}\)Ga-FAPi PET/CT in LC \((28)\) and the potential diagnostic benefit for fILD. lILD diagnoses were made by an interdisciplinary team on the basis of the clinical presentation and the radiologic pattern on CT and, in 8 of the 15 patients, on additional lung biopsy—before PET imaging according to international guidelines \((8)\). Biopsy samples of sufficient size for immunohistochemistry were available for 4 patients. Details on the clinical and pathologic characteristics and imaging protocols for each patient are given in Supplemental Table 1 (supplemental materials are available at http://jnm.snmjournals.org).

**Static and Dynamic FAP-Specific PET/CT Imaging**

Diagnostic imaging was performed under the conditions of the updated Declaration of Helsinki, § 37 (“Unproven Interventions in Clinical Practice”) and in accordance with the German Pharmaceuticals Law, §13 (2b), for medical reasons. The radiotracer FAPi-46 labeled with \(^{68}\)Ga as previously described \((29)\) was applied intravenously \((80 \text{ nmol/GBq})\). Static PET/CT scans of 12 patients were obtained 10, 60, and 180 min after tracer administration with a Biograph mCT Flow PET/CT Scanner (Siemens Medical Solutions) using the following parameters: slice thickness of 5 mm, increment of 3–4 mm, soft-tissue reconstruction kernel, and CARE Dose4D. Immediately after CT scanning, a whole-body PET scan was acquired in 3 dimensions \((\text{matrix}, 200 \times 200)\) in FlowMotion at 0.7 cm/min. The emission data were corrected for randoms, scatter, and decay.

Reconstruction was performed with an ordered-subset expectation maximization algorithm with 2 iterations and 21 subsets and Gauss-filtered to a transaxial resolution of 5 mm in full width at half maximum. Attenuation correction was performed using the low-dose nonenhanced CT data. For dynamic PET/CT scans of 3 patients, a list-mode acquisition of 40 min was performed as previously described \((30,31)\), followed by static imaging after 60 and 180 min.

**CT**

Nonenhanced full end-inspiratory thin-section low-dose CT was routinely performed with the patient supine as previously described \((32)\). Patients were scanned on a 128-slice Definition AS scanner (Siemens Healthcare AG) with a dose-modulated protocol at 120 kV, 40 mAs (effective), a collimation of 0.6 mm, and a pitch of 0.8.

**Image Analysis and Quantification**

**Volumes of Interest (VOIs) in PET Data.** SUVs were quantitatively assessed by an experienced nuclear physician (who had read more than 3,000 PET examinations), a medical student, and a board-certified nuclear physician working in consensus and using a VOI technique. For the VOI in fibrotic areas, a 20-mm sphere was drawn within a total of 55 lesions with a morphologically typical fibrotic appearance on CT. Tumor VOIs were defined by an automatic isocontour with a cutoff at 50% of SUVmax. The SUVs of fibrotic areas and tumors were corrected for healthy-appearing lung parenchyma as background.

**Density Correction of SUVs.** To correct the signal intensity in \(^{68}\)Ga-FAPi PET according to CT density, the SUVs of each voxel were corrected for the tissue fraction within the CT scans that were acquired during the PET/CT scan according to a method already published and validated \((33,34)\).

**Dynamic PET Imaging Analysis.** Time-activity curves of \(^{68}\)Ga-FAPi uptake were obtained by applying the VOIs of 14 fibrotic lesions and 3 tumors to the entire dynamic dataset. The times to peak value (minutes from the beginning of the dynamic acquisition to the SUVmax of the lesion) were derived from the time–activity curves. Dynamic data analysis was done using PMOD software (PMOD Technologies Ltd.).

**CT-Based Automatic Lobe Segmentation and Fibrosis (FIB)/Ground-Glass Opacity (GGO) Indices.** Lungs and individual lobes were fully automatically segmented on inspiratory nonenhanced thin-section CT images by the in-house program YACTA (version 2.7.1.3) as described in previous publications \((35,36)\). We defined the FIB index as the percentage of lung voxels greater than \(-775 \text{ HU}\) and the GGO index as the percentage of voxels in the HU interval \(-885\) to \(-775\). The FIB index and the GGO index were calculated for each lobe separately.

**Coregistration Studies of \(^{68}\)Ga-FAPi PET/CT Images and CT Images.** To achieve anatomically identical segments of \(^{68}\)Ga-FAPi PET/CT images and diagnostic CT images, both were coregistered using 3DSlicer, version 4.6.2 (www.slicer.org). First, the low-dose CT images of the PET/CT scan were intramodally coregistered with the CT images on the basis of 11 manually selected anatomic landmarks using affine transformation. Second, the transformation was applied to the PET images to achieve intermodal coregistration. Coregistered PET images and CT images were loaded into the PMOD software, and SUVmean was extracted from the same CT-based pulmonary lobe segmentations as were used for GGO and FIB indexing. A representative example of the intermodal coregistration of high-resolution CT and \(^{68}\)Ga-FAPi PET images is shown in Supplemental Figure 1.

**Animal Studies**

The animal studies were approved by the animal welfare authority responsible for the University of Heidelberg (Regierungspräsidium Karlsruhe). We used Nedd4-2\(^{-/-}\) mice, an established animal model of an IPF-like lung disease \((37)\). To induce the conditional deletion of Nedd4-2, 4- to 6-wk-old mice were exposed to a 1 mg/mL solution of doxycycline...
hydrochloride (Sigma) dissolved in a 5% sucrose solution supplied as drinking water in light-protected bottles. Doxycycline solutions were prepared freshly and changed at least every 3 d. For immunohistochemical studies, 4- to 6-wk-old mice were treated for 3–4 mo with doxycycline until clinically symptomatic and then killed for tissue collection. The mice were housed in a specific pathogen-free animal facility and had free access to food and water.

**Immunohistochemistry of Human and Mouse Tissue**

Biopsy yielded sufficient fILD tissue in 4 patients. The interval between biopsy and 68Ga-FAPI PET/CT was 15.50 ± 10.96 mo. All samples were provided by the Tissue Bank of the National Center for Tumor Diseases, in accordance with the regulations of the tissue bank and the approval of the ethics committee of Heidelberg University.

In human tissue, we used the primary anti-FAP antibody ab207178 (EPR20021; Abcam) diluted 1:100 and the primary anti-α-smooth muscle actin (SMA) antibody ab5694 (Abcam) diluted 1:200, and staining was performed as previously described (38). For animal tissue, we used the rabbit anti-FAP antibody ab53066 (Abcam), and staining was performed as previously described (37). For FAP and α-SMA immunohistochemistry, negative controls were obtained by omitting the primary antibody. All images were scanned and digitalized using a NanoZoomer S60 digital slide scanner (Hamamatsu Photonics).

**Statistical Analysis**

We performed descriptive analyses for patients and their characteristics. For determination of SUVs, median and range were used. The SUVs for fILD and LC were calculated as the mean of the SUV of all pixels, normalized to the injected activity, divided by the injected activity per kilogram body weight. The SUVs for fibrosis were calculated as the mean of the SUV of all pixels within the fibrosis region, normalized to the injected activity, divided by the injected activity per kilogram body weight. The SUVs for tumor were calculated as the mean of the SUV of all pixels within the tumor region, normalized to the injected activity, divided by the injected activity per kilogram body weight.

A positive correlation between 68Ga-FAPI uptake within or outside the tumor and SUVs was observed. For determination of SUVs, median and range were used. The SUVs for fILD and LC were calculated as the mean of the SUV of all pixels, normalized to the injected activity, divided by the injected activity per kilogram body weight. The SUVs for fibrosis were calculated as the mean of the SUV of all pixels within the fibrosis region, normalized to the injected activity, divided by the injected activity per kilogram body weight. The SUVs for tumor were calculated as the mean of the SUV of all pixels within the tumor region, normalized to the injected activity, divided by the injected activity per kilogram body weight.

**RESULTS**

**Static PET Imaging**

In static imaging, both fILD and LC lesions showed considerably elevated tracer uptake after 10, 60, and 180 min. The density-corrected SUVmax and SUVmean of fILD and LC lesions decreased over time, with the decrease being more pronounced in fILD than in LC (Figs. 1A and 1B). Because of decreasing background activity over time (Supplemental Fig. 2), fILD showed relatively stable target-to-background ratios (TBRs), whereas the TBR (SUVmax and SUVmean) of LC showed a tendency to increase over time (Figs. 1C and 1D). A lesionwise overview of all SUVs and TBRs is given in Supplemental Table 2. The 68Ga-FAPI uptake and TBRs (60 min after injection) of IPF did not significantly differ from those of fILDs (Supplemental Fig. 3). Figure 2 shows an exemplary case—a patient with clinically progressive rheumatoid arthritis–associated ILD and non–small cell lung carcinoma. In this patient, fILD lesions were found in the middle lobe of the right lung and in the basal parts of the right lung. Both of these lesions showed elevated tracer uptake, with the uptake in the middle lobe being much greater than that in the basal parts, potentially indicating that fILD was activated in the middle lobe. The tumor lesion was intensively 68Ga-FAPI–positive (Figs. 2A and 2B).

**Dynamic PET Imaging**

Time–activity curves for fILD and LC differed significantly. fILD lesions showed an early peak correlating with the aortic perfusion peak, followed by a slowly decreasing signal intensity over time.
time. In contrast, LC showed an increasing time–activity curve with a delayed peak, followed by a gradual washout phase (Fig. 3A). These differences are reflected by delayed times to peak value in LC, compared with fILD lesions (Fig. 3B).

**Correlation Between PET Imaging and FIB/GGO Indices of Pulmonary Lobes**

To correlate 68Ga-FAPI PET signal intensities with CT-morphology–based parameters, we correlated the SUV\text{mean} of 75 pulmonary lobes with corresponding FIB/GGO indices. Density-corrected SUV\text{mean} showed a moderately positive correlation ($r = 0.57$) with the FIB index (Fig. 4A). The correlations of SUV\text{mean} and GGO index were moderately negative ($r = -0.44$) (Fig. 4B). Additional quartilewise analysis of SUV\text{mean} and FIB/GGO indices also displayed these correlations (Supplemental Fig. 4). Analysis of SUV\text{max} and FIB/GGO indices showed similar tendencies relative to the correlation of SUV\text{mean} and FIB/GGO indices but no strong or moderate correlations ($r = 0.13$ for SUV\text{max} vs. FIB index and $-0.19$ for SUV\text{max} vs. GGO index). Of note, the correlation of FIB index and GGO index was strongly negative ($r = -0.75$) in our dataset (Fig. 4C).

**Immunohistochemistry of Human fILD Biopsies**

In human fILD sections, we observed FAP-positive areas in the transition zone between healthy lung tissue and fibrotic areas. FAP-positive cells and α-SMA–positive cells were widely inversely distributed within the fibrotic sections. Of note, blood vessels in the fibrotic areas were FAP-negative. Figures 5A–5C show exemplary images of a FAP-positive fibrotic spot in a biopsy punch.

**FAP Expression in Fibrotic Lungs of Nedd4-2\textsuperscript{−/−} Mice**

Immunohistochemistry of whole lung sections of Nedd4-2\textsuperscript{−/−} mice with IPF-like lung disease showed differential expression of FAP in fibrotic lesions and in healthy lung parenchyma. Although healthy lung parenchyma showed low FAP expression, fibrotic areas showed inhomogeneous FAP positivity (Supplemental Fig. 5A). Next to perivascular FAP positivity (Supplemental Fig. 5B), we found FAP overexpressed predominantly in the transition zone to normal parenchyma (Supplemental Fig. 5C), similarly to the expression in human fILD tissue.
progressive fibrosis, as suggested by Figure 2. 18F-FDG PET/CT has frequently been applied in patients with fILD (13,33,39). 18F-FDG PET/CT is of prognostic value for fILD patients (13,15). However, it has recently been demonstrated that 18F-FDG uptake does not change after therapy with the antifibrotic drugs nintedanib or pirfenidone and that 18F-FDG uptake cannot predict treatment response (33). As 68Ga-FAPI PET does not display elevated glucose metabolism but visualizes reactive fibroblasts (a key player in fibrosis), 68Ga-FAPI PET may be more suitable for the imaging of fibrotic activity and the evaluation of therapy response than is 18F-FDG PET, which depicts only the inflammatory component (17,18). In a recent pilot study, Bergmann et al. could demonstrate in 21 patients with the fILD subtype systemic sclerosis–associated ILD that tracer accumulation in 68Ga-FAPI PET/CT is associated with disease progression independently of established predictors of progression and that 68Ga-FAPI uptake decreases after antifibrotic treatment (40). These findings strongly support the hypothesis that 68Ga-FAPI PET/CT imaging reflects fibrotic activity in fILD and therefore is an extremely promising imaging modality for this disease. For future systematic evaluation of 68Ga-FAPI PET/CT for fILDs, preclinical experiments that include treatment and evaluation of the therapy response must precede human studies. The Nedd4-2−/− mouse model could be useful for such experiments, as it showed 68Ga-FAPI–positive fibrotic pulmonary lesions with an expression pattern similar to that in human fILD. Next to imaging of the fibrotic process itself, 68Ga-FAPI PET/CT may serve as an excellent all-in-one monitoring tool for the detection of LC in fILD patients, as recent studies showed the value of 68Ga-FAPI PET/CT for the assessment of LC (26,41), and this value is confirmed by our data.

**Imaging at Different Time Points**

68Ga-FAPI PET/CT is a promising imaging modality both for malignancies and for nontumorous conditions. However, to date, the optimal time point for acquisition of 68Ga-FAPI PET/CT images is not clear. In our study, we observed the highest tracer uptake by LC and fibrotic lesions at the earliest time point (10 min) and a decreasing uptake after 60 and 180 min. However, the TBR of LC tended to increase over time, and fibrotic lesions showed a relatively stable TBR over time. This finding indicates that washout is slower in LC lesions than in lung tissue and that the washout kinetics in the fibrotic lesions and in lung tissue do not differ significantly. These findings are in line with our recently published study in which we evaluated 68Ga-FAPI uptake over time in pancreatic ductal adenocarcinomas and pancreatitis (27). There, over time, we observed slightly decreasing uptake but increasing TBRs in the tumors and decreasing uptake in the pancreatitis. The results of these studies on tumors and chronic inflammatory or fibrotic processes indicate that imaging and analysis of TBR at different time points could be helpful for discriminating between malignant and chronic inflammatory or fibrotic 68Ga-FAPI–positive lesions.

**Dynamic Imaging**

Next to imaging at different time points, dynamic PET imaging can deliver important information additional to that from static PET imaging, as it allows evaluating tracer uptake over time and washout processes for the characterization of PET-positive lesions. In brain tumor imaging with amino acid tracers, dynamic imaging is of great value for the differentiation of low-grade versus high-grade tumors and progress versus pseudoprogression (42,43). In
this project, we published the first (to our knowledge) clinical experiences with dynamic 68Ga-FAPI PET/CT—experiences that must be considered preliminary as they are based on a small number of patients. But 2 hypotheses can be generated from our dynamic data on LC and fILD.

The first thesis is that the peak of the uptake in LC lesions is between about 10 and 30 min and that washout in the blood is relatively fast in the first minutes, after which the time–activity curve for the blood volume slowly decreases. Therefore, it seems likely that the optimal imaging time point with the highest SUVs and best TBR for tumor lesions could be significantly earlier than 60 min after injection, which has been used in most studies in analogy to the common acquisition time point in 18F-FDG PET/CT. Imaging time points later than 60 min after injection may lead to decreased SUVs but an even improved TBR. With respect to clinical practice, later time points are less favorable if the detection rate of tumor lesions is not better than at earlier time points. Analyses of the detection rates and TBR at different time points up to 180 min after injection are ongoing to define the optimal imaging time point for 68Ga-FAPI PET/CT.

The second thesis is that time–activity curves based on dynamic imaging data show that the activity in fibrotic lesions decreases relatively quickly, comparable to the activity decrease in the blood volume. In contrast, LC lesion activity peaked at about 10–30 min after injection and then slowly decreased over time. Thus, a significantly decreasing activity over time, within the first 40 min, may indicate that a lesion is more likely to be fibrotic than malignant, and a stable or only slightly decreasing activity may indicate that a lesion is more likely to be malignant.

Both theses need to be evaluated by future prospective dynamic 68Ga-FAPI PET/CT imaging studies that include higher numbers of individuals with malignant tumors and noncancer lesions.

Limitations

Despite the promising results of this analysis, several limitations must be mentioned. First, because the total number of patients, 15, was relatively small and the number of patients examined by dynamic 68Ga-FAPI PET/CT was only 3, our data must be considered preliminary and conclusions can be drawn only with caution. Another major limitation is that there was a certain heterogeneity in the patient population because we included various types of fILDs. However, many fILDs have detrimental outcomes similar to those of IPF when it comes to a progressive phenotype, thus underscoring the need to visualize disease activity in fILDs. Moreover, subgroup analysis (68Ga-FAPI uptake and TBR of IPF vs. other fILDs, Supplemental Fig. 3) of our dataset showed no significant differences between different types of fILDs. Nevertheless, our results need confirmation by studies with larger cohorts of fILD patients. Next, the patients underwent 68Ga-FAPI PET/CT but not a corresponding 18F-FDG PET/CT study, as 2 PET/CT examinations using ionizing radiation were not possible in the clinical setting of this project. Nevertheless, a systematic intrindividual comparison of 68Ga-FAPI PET/CT and 18F-FDG PET/CT in fILD would be an interesting and relevant topic for future studies, especially as previous studies showed significant differences between these 2 tracers for the evaluation of malignant and nonmalignant diseases (18,41,44). Another limitation is that biopsies of fILD tissue significantly preceded 68Ga-FAPI PET imaging; we therefore could not determine whether there was a correlation between 68Ga-FAPI PET signal intensities and immunohistochemical expression of FAP. 68Ga-FAPI–guided biopsies of fILD tissue and radiologic–pathologic correlations would be a promising approach for future studies on 68Ga-FAPI PET in fILD.

CONCLUSION

68Ga-FAPI PET/CT is a promising new imaging modality for fILD and LC displaying activated fibroblasts that are involved in fibrotic processes, as well as in desmoplastic reactions in tumors. Imaging at different time points and dynamic imaging provide additional information on tracer kinetics and may be helpful for discriminating malignant from nonmalignant 68Ga-FAPI–positive lesions. The clinical value of 68Ga-FAPI PET/CT for fILD as a potential predictor of prognosis and therapy response should be evaluated in future studies.

DISCLOSURE

This work was funded by the Federal Ministry of Education and Research, grant 13N 13341. Uwe Haberkorn, Clemens Kratochwil, and Frederik Giesel have filed a patent application for quinoline-based FAP-targeting agents for imaging and therapy in nuclear medicine and have shares of a consultancy group for iTheranos. No other potential conflict of interest relevant to this article was reported.

KEY POINTS

QUESTION: Is 68Ga-FAPI PET/CT a potential new imaging method for patients with fibrotic interstitial diseases?

PERTINENT FINDINGS: We did a retrospective analysis of 68Ga-FAPI PET imaging of 15 patients with fILD and suspected LC. Fibrotic areas and tumor lesions both showed elevated 68Ga-FAPI uptake but had different tracer kinetics.

IMPLICATIONS FOR PATIENT CARE: 68Ga-FAPI PET/CT is a promising imaging method for patients with fILDs and should be further investigated.

REFERENCES


