^{68}Ga FAPI PET/CT: Tracer Uptake in 28 Different Kinds of Cancer

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Take-Away Points

- Major focus: Assessing the clinical effectiveness of quinolone-based fibroblast-activated protein inhibitors (FAPIs) as PET radiotracers in a range of cancers.
- Key result: Uptake of FAPI is cancer dependent. The low hepatic background and minimal nonspecific uptake may improve the detection of hepatic metastatic lesions and challenging epithelial cancers.
- Impact: FAPI PET/CT may provide a complementary imaging strategy to fluorodeoxyglucose PET/CT in highly inflamed or fibrotic tumors.

Fluorodeoxyglucose (FDG) PET/CT is the primary imaging modality for cancer diagnosis, staging, and management. However, in cancers with high background uptake, inflammation, or low metabolic activity, FDG uptake is not as effective at tumor delineation and identifying metastatic lesions. An attractive complementary imaging target is the fibroblast-activated protein (FAP), which is preferentially expressed in cancer-associated fibroblasts. FAP overexpression is linked to increased local inflammation, suppression of lymphocyte activity, and poor prognosis in epithelial cancers. Quinolone-based FAP inhibitors (FAPIs) constitute a new strategy for targeting the tumor stroma and have been adapted as radiopharmaceuticals. However, while preliminary studies have demonstrated preclinical and clinical safety and efficacy, testing in a larger, more diverse clinical setting is required to identify specific applications for FAPI-based tracers. In their article, Kratochwil et al conducted a retrospective analysis of 80 patients, with 28 different epithelial carcinomas, who received a gallium 68–conjugated quinoline-based FAPI tracer (^{68}Ga-FAPI-04). There was differential uptake of ^{68}Ga FAPI based on the carcinoma type, although there was no statistically significant difference between primary and metastatic lesions. Larger cohort sizes and cancer-specific imaging are likely required to highlight any uptake effects between lesions. Highest uptake was seen in sarcomas, breast, esophageal, and salivary gland cancers, while maximum standardized uptake value was low in renal, gastric, and prostate cancers. Interestingly, metastatic liver and lung lesions were highlighted against a low background, which suggests a promising venue for using FAPI PET/CT in metabolically active tissues. These results suggest that FAPI-based PET/CT may provide a complementary imaging strategy to FDG PET/CT for identifying highly fibrotic tumors and metastatic lesions.

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Highlighted Article

Kratochwil C, Flechsig P, Lindner T, et al. ^{68}Ga-FAPI PET/CT: tracer uptake in 28 different kinds of cancer. J Nucl Med. 2019;60(6):801–805. doi: 10.2967/jnumed.119.227967. [Epub 2019 Apr 6].