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Diagnostic Accuracy of ^{68}Ga-FAPI Versus ^{18}F-FDG PET in Patients with Various Malignancies

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To assess the diagnostic accuracy of ^{68}Ga-labeled fibroblast activation protein inhibitor (FAPI) and ^{18}F-labeled FDG PET for the detection of various tumors, we performed a head-to-head comparison of both imaging modalities across a range of tumor entities as part of our ongoing ^{68}Ga-FAPI PET observational trial. **Methods:** The study included 115 patients with 8 tumor entities who received imaging with ^{68}Ga-FAPI for tumor staging or restaging between October 2018 and March 2022. Of those, 103 patients received concomitant imaging with ^{68}Ga-FAPI and ^{18}F-FDG PET and had adequate lesion validation for accuracy analysis. Each scan was evaluated for the detection of primary tumor, lymph nodes, and visceral and bone metastases. True or false positivity and negativity to detected lesions was assigned on the basis of histopathology from biopsies or surgical excision, as well as imaging validation. **Results:** ^{68}Ga-FAPI PET revealed higher accuracy than ^{18}F-FDG PET in the detection of colorectal cancer (n = 14; per-patient, 85.7% vs. 78.6%; per-region, 95.6% vs. 91.1%) and prostate cancer (n = 22; per-patient, 100% vs. 90.9%; per-region, 96.4% vs. 92.7%). ^{68}Ga-FAPI PET and ^{18}F-FDG PET had comparable per-patient accuracy in detecting breast cancer (n = 16, 100% for both) and head and neck cancers (n = 10, 90% for both modalities). ^{68}Ga-FAPI PET had lower per-patient accuracy than ^{18}F-FDG PET in cancers of the bladder (n = 12, 75% vs. 100%) and kidney (n = 10, 80% vs. 90%), as well as lymphoma (n = 9, 88.9% vs. 100%) and myeloma (n = 10, 80% vs. 90%). **Conclusion:** ^{68}Ga-FAPI PET demonstrated higher diagnostic accuracy than ^{18}F-FDG PET in the diagnosis of colorectal cancer and prostate cancer, as well as comparable diagnostic performance for cancers of the breast and head and neck. Accuracy and impact on management will be further assessed in an ongoing prospective interventional trial (NCT05160051).

Key Words: FAPI; FDG; PET; oncology; theranostic; accuracy

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Imaging is fundamental in the treatment of malignancies, with varying detection rates depending on the tumor entity and diagnostic modality. PET of cancer cells using ^{18}F-FDG PET acquires additional molecular information useful for the detection of disease recurrence and metastases, response assessment, disease management, and prognostication (*1–6*). However, drawbacks of ^{18}F-FDG include false-positive findings due to physiologic uptake or inflammatory responses, as well as false-negative findings due to elevated serum blood glucose levels. As such, targeting of cancer cells using alternative radioisotopes has been an area of growing interest.

Cancer-associated fibroblasts, a constituent of the tumor microenvironment, are involved in tumor growth, migration, and progression (*7*). Fibroblast activation protein (FAP) α is expressed by cancer-associated fibroblasts, a marker associated with protumorigenic functions (*8–12*) and, therefore, a suitable target for diagnostic and therapeutic purposes. Multiple preclinical and clinical studies have shown the promise of FAP-directed therapies, including radiolabeled FAP inhibitors (FAPIs), which exhibit favorable properties in cancer diagnosis and therapy (*13–18*). These properties include, but are not limited to, fast imaging times, high contrast in tumor lesions, and no dietary requirements with regard to

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imaging, as well as acceptable side effects and long tumor retention times with regard to therapy.

Because of the favorable characteristics of this imaging modality, patients were referred for clinical ^{68}Ga-FAPI PET staging, both at initial diagnosis and for reevaluation, and were offered subsequent enrollment in our prospective observational ^{68}Ga-FAPI registry.

In this report, we assess the diagnostic accuracy of ^{68}Ga-FAPI compared with ^{18}F-FDG PET separately for various tumor entities by analyzing sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy on per-patient and per-region bases.

MATERIALS AND METHODS

Study Design and Participants

Until March 2022, adult patients who underwent clinical ^{68}Ga-FAPI PET were offered the possibility to consent to a prospective observational trial for correlation and clinical follow-up of PET findings (NCT04571086). Patients signed a written informed consent form, and evaluation of data was approved by the ethics committee of the University Duisburg–Essen (20-9485-BO and 19-8991-BO). We previously reported data on ^{68}Ga-FAPI PET uptake and accuracy in sarcoma (n = 47 (*19*)), as well as ^{68}Ga-FAPI PET uptake in mixed cohorts (n = 69 (*20*), n = 91 (*21*), and n = 324 (*22*)). Patients with sarcoma, pancreatic cancer, and pleural mesothelioma have been excluded from this analysis since the results have already been or will be published separately. Moreover, solid tumor entities with fewer than 10 patients per entity for ^{68}Ga-FAPI PET accuracy assessment were excluded from this analysis.

Details of data collection (*23*,*24*), imaging and administration of radioligands (*20*,*25*,*26*), imaging analysis, lesion validation, follow-up (*27*), and statistical analysis are provided in the supplemental materials (available at http://jnm.snmjournals.org).

RESULTS

Patient Characteristics

We identified 133 patients, of whom 115 with adequate lesion validation were included in this analysis. In total, 8 tumor entities and 313 regions were analyzed; patient characteristics (n = 115) are outlined in Table 1. The median age was 63 y (interquartile range, 17 y). The most common tumor entities were prostate cancer (22/115, 19%), head and neck cancers (18/115, 16%), breast cancer (16/115, 14%), colorectal cancer (15/115, 13%), and bladder cancer (12/115, 10%). Most patients (81/115, 70%) underwent ^{68}Ga-FAPI PET imaging for restaging purposes. A total of 103 (90%) patients underwent concomitant imaging via ^{68}Ga-FAPI and ^{18}F-FDG PET and had adequate lesion validation for the accuracy analysis, and this set of patients was included in the composite analysis.

TABLE 1
Patient Characteristics (n = 115)

Variable	Data
Sex	
Male	71 (62%)
Female	44 (38%)
Median age at ^{68}Ga-FAPI scan (y)	63 (17)
Tumor entities	
Prostate	22 (19%)
Head and neck	18 (16%)
Breast	16 (14%)
Colorectal	15 (13%)
Bladder	12 (10%)
Myeloma	12 (10%)
Kidney	10 (9%)
Lymphoma	10 (9%)
Regional detection with ^{68}Ga-FAPI scan*	
No evidence of disease	15 (13%)
Primary or local disease detected	42 (37%)
Lymph node metastases detected	28 (24%)
Visceral metastases detected	38 (33%)
Bone metastases detected	24 (21%)
Scanning purposes	
Staging at initial diagnosis	34 (30%)
Restaging after therapy	81 (70%)
Prior therapy received*	
None	35 (30%)
Surgery	65 (57%)
Chemotherapy	53 (46%)
Radiation therapy	31 (27%)
Immune therapy	20 (17%)
Hormone therapy	16 (14%)
Radionuclide therapy	3 (3%)
Median uptake time (min)	
^{68}Ga-FAPI	15 (25)
^{18}F-FDG	65 (21)
Median time between ^{68}Ga-FAPI and ^{18}F-FDG (d)	0 (2)

*Different combinations are possible; hence, values do not add to 100%.

Qualitative data are number and percentage; continuous data are median and interquartile range.

Composite Analysis: Higher Diagnostic Accuracy with ^{68}Ga-FAPI PET Than with ^{18}F-FDG PET

^{68}Ga-FAPI PET showed higher diagnostic accuracy than ^{18}F-FDG PET in the diagnosis of colorectal cancer and prostate cancer as listed in Table 2.

At a per-patient level in colorectal cancer, ^{68}Ga-FAPI PET was superior to ^{18}F-FDG PET in accuracy (85.7% vs. 78.6%), sensitivity (90.9% vs. 81.8%), and NPV (66.7% vs. 50%). At a per-region level, ^{68}Ga-FAPI PET was superior to ^{18}F-FDG PET in accuracy (95.6% vs. 91.1%), sensitivity (94.1% vs. 88.2%), and PPV (94.1% vs. 88.2%).

Furthermore, at a per-patient level in prostate cancer, ^{68}Ga-FAPI PET was superior to ^{18}F-FDG PET in accuracy (100% vs. 90.9%) and sensitivity (100% vs. 90.9%). At a per-region level, ^{68}Ga-FAPI PET was superior to ^{18}F-FDG PET in sensitivity (94.3% vs. 88.6%) and NPV (90.9% vs. 83.3%).

Composite Analysis: Comparable Diagnostic Accuracy Between ^{68}Ga-FAPI PET and ^{18}F-FDG PET

^{68}Ga-FAPI PET was comparable to ^{18}F-FDG PET in the diagnosis of breast cancer and head and neck cancers as listed in Table 3.

TABLE 2
Comparison of Diagnostic Efficacy Between ^{68}Ga-FAPI and ^{18}F-FDG PET (Per-Patient and Per-Region Analysis) for Tumors in Which ^{68}Ga-FAPI Outperformed ^{18}F-FDG PET

Tumor entity	*n*	Stratification	PET-positive/total	Sensitivity	Specificity	PPV	NPV	Accuracy
^{68}Ga-FAPI PET								
Colorectal	14	Per-patient	11/14	90.9 (58.7–99.8)	66.7 (9.4–99.2)	90.9 (66.6–98)	66.7 (20.8–93.9)	85.7 (57.2–98.2)
		Per-region	17/45	94.1 (71.3–99.9)	96.4 (81.7–99.9)	94.1 (69.9–99.1)	96.4 (80.1–99.5)	95.6 (84.9–99.5)
Prostate	22	Per-patient	22/22	100 (84.6–100)	—	100	—	100
		Per-region	33/55	94.3 (80.8–99.3)	100 (83.2–100)	100	90.9 (72.3–97.5)	96.4 (87.5–99.6)
^{18}F-FDG PET								
Colorectal	14	Per-patient	10/14	81.8 (48.2–97.7)	66.7 (9.43–99.2)	90 (63.9–97.9)	50 (18.4–81.6)	78.6 (49.2–95.3)
		Per-region	17/45	88.2 (63.6–98.5)	92.9 (76.5–99.1)	88.2 (66.1–96.7)	92.9 (77.9–98)	91.1 (78.8–97.5)
Prostate	22	Per-patient	20/22	90.9 (70.84–98.9)	—	100	—	90.9
		Per-region	31/55	88.6 (73.3–96.8)	100 (83.2–100)	100	83.3 (66.53–92.63)	92.7 (82.41–97.98)

Data in parentheses are 95% CI.

At a per-patient level in breast cancer, ^{68}Ga-FAPI PET and ^{18}F-FDG PET showed equal accuracy, sensitivity, specificity, PPV, and NPV (all 100%). At a per-region level, ^{68}Ga-FAPI PET showed accuracy (97.9% vs. 100%) and sensitivity (96.6% vs. 100%) comparable to those of ^{18}F-FDG PET but lower NPV (94.7% vs. 100%).

At a per-patient level in head and neck cancers, ^{68}Ga-FAPI PET and ^{18}F-FDG PET showed equal accuracy (90%), sensitivity (100%), and PPV (90%). At a per-region level, ^{68}Ga-FAPI PET showed accuracy (90.3% vs. 93.6%) and specificity (86.7% for both) comparable to those of ^{18}F-FDG PET but lower sensitivity (93.8% vs. 100%) and NPV (92.9% vs. 100%).

Composite Analysis: Lower Diagnostic Accuracy with ^{68}Ga-FAPI PET Than with ^{18}F-FDG PET

^{68}Ga-FAPI PET showed lower accuracy than ^{18}F-FDG PET in the diagnosis of bladder and kidney cancers, lymphoma, and myeloma as shown in Table 4.

At a per-patient level in bladder cancer, ^{68}Ga-FAPI PET showed lower accuracy (75% vs. 100%), sensitivity (72.7% vs. 100%), and NPV (25% vs. 100%) than ^{18}F-FDG PET. At a per-region level, ^{68}Ga-FAPI PET showed lower accuracy (89.2% vs. 94.4%), sensitivity (78.6% vs. 92.3%), and NPV (88% vs. 95.7%) than ^{18}F-FDG PET.

At a per-patient level in kidney cancer, ^{68}Ga-FAPI PET showed sensitivity comparable to that of ^{18}F-FDG PET (87.5% for both) but lower accuracy (80% vs. 90%), specificity (50% vs. 100%), and PPV (87.5% vs. 100%). At a per-region level, ^{68}Ga-FAPI PET showed accuracy (90.3% vs. 93.6%), sensitivity (92.9% for both), and NPV (93.8% vs. 94.1%) comparable to those of ^{68}Ga-FAPI PET but lower specificity (88.2% vs. 94.1%) and PPV (86.7% vs. 92.9%).

At a per-patient level in lymphoma, ^{68}Ga-FAPI PET showed lower accuracy (88.9% vs. 100%), sensitivity (87.5% vs. 100%), and NPV (50% vs. 100%) than ^{18}F-FDG PET. At a per-region level, ^{68}Ga-FAPI PET showed lower accuracy (90% vs. 96.7%), sensitivity (78.6% vs. 100%), and NPV (84.2% vs. 100%) than ^{18}F-FDG PET.

Finally, for myeloma at per-patient and per-region levels, accuracy (80% vs. 90%) and sensitivity (75% vs. 87.5%) were lower with ^{68}Ga-FAPI PET than with ^{18}F-FDG PET.

Histopathology-Only Analysis

In a subgroup of 45 patients and 5 tumor entities, accuracy was assessed by histopathology validation only (Supplemental Table 1). In line with the findings of the composite analysis, ^{68}Ga-FAPI PET demonstrated higher accuracy than ^{18}F-FDG PET for prostate cancer, comparable accuracy for breast cancer and colorectal cancer, and lower accuracy for bladder and kidney cancers.

DISCUSSION

Here, we compare the diagnostic accuracy of ^{68}Ga-FAPI and ^{18}F-FDG PET for various tumors. Tumor validation by a composite reference standard revealed that the diagnostic accuracy of ^{68}Ga-FAPI PET was higher than that of ^{18}F-FDG PET in colorectal cancer and prostate cancer, comparable in breast cancer and head and neck cancer, and lower in bladder and kidney cancers, lymphoma, and myeloma. Histopathology-only analysis revealed that the diagnostic accuracy of ^{68}Ga-FAPI PET was higher than that of ^{18}F-FDG PET in prostate cancer, comparable in breast and colorectal cancers, and lower in bladder and kidney cancers.

For cancers of the abdomen and pelvis, ^{68}Ga-FAPI uptake was low in normal parenchyma, such as bowel (SUV_{max} range, 0.08–3.56), liver (SUV_{max} range, 0.47–2.91), and spleen (SUV_{max} range, 0.64–2.81) (*15*,*28*,*29*). This improves tumor delineation,

TABLE 3
Comparison of Diagnostic Efficacy Between ^{68}Ga-FAPI and ^{18}F-FDG PET (Per-Patient and Per-Region Analysis) for Tumors in Which ^{68}Ga-FAPI Was Comparable to ^{18}F-FDG PET

Tumor entity	*n*	Stratification	PET-positive/total	Sensitivity	Specificity	PPV	NPV	Accuracy
^{68}Ga-FAPI PET								
Breast	16	Per-patient	15/16	100 (78.2–100)	100 (2.5–100)	100	100	100 (79.4–100)
		Per-region	28/47	96.6 (82.2–100)	100 (81.5–100)	100	94.7 (72.4–99.2)	97.9 (88.7–100)
Head and neck	10	Per-patient	10/10	100 (66.4–100)	0 (0–97.5)	90 (90)	—	90.0 (55.5–99.8)
		Per-region	17/31	93.8 (69.8–99.8)	86.7 (59.5–98.3)	88.2 (67.2–96.5)	92.9 (65.9–98.9)	90.3 (74.3–98)
^{18}F-FDG PET								
Breast	16	Per-patient	15/16	100 (78.2–100)	100 (2.5–100)	100	100	100 (79.4–100)
		Per-region	28/47	100 (88.1–100)	100 (81.5–100)	100	100	100 (92.5–100)
Head and neck	10	Per-patient	10/10	100 (66.4–100)	—	90 (90)	—	90.0 (55.5–99.8)
		Per-region	18/31	100 (79.4–100)	86.7 (59.5–98.3)	88.9 (68.8–96.7)	100	93.6 (78.6–99.2)

Data in parentheses are 95% CI.

with absolute and tumor-to-liver uptakes being higher on ^{68}Ga-FAPI PET than on ^{18}F-FDG PET, which may lead to superior diagnostic accuracy (*22*). This is particularly relevant in abdominal surgery, for example, after which patients are required to take nothing by mouth until bowel recovery. Also, the prevalence of coexisting diabetes (≤15.5% in patients with colon cancer, for instance (*30*)) poses limitations for molecular imaging with ^{18}F-FDG PET. ^{68}Ga-FAPI PET in such a context has protocol advantages, given that no diet or fasting is required in preparation for imaging, and image acquisition can take place a few minutes after tracer application. ^{68}Ga-FAPI PET, therefore, has the potential to replace ^{18}F-FDG for abdominal staging.

Our findings are corroborated by other studies that have also shown ^{68}Ga-FAPI PET to have diagnostic accuracy superior to that of ^{18}F-FDG PET in breast cancer (*31–33*) and head and neck cancers (*34–36*). Moreover, reports have shown that ^{68}Ga-FAPI PET can detect PSMA-negative prostate cancer lesions (*37–39*), which can aid in the diagnostic process, with potential therapeutic implications.

With regard to lymphoma and myeloma, several studies have shown that ^{68}Ga-FAPI PET is inferior to (or at best, not superior to) ^{18}F-FDG PET (*40–43*). For example, in comparison to colorectal cancer, lymphoma lesions show lower uptake with ^{68}Ga-FAPI than with ^{18}F-FDG PET (*22*,*41*,*44*), higher background uptake, and, thus, lower tumor-to-background values (e.g., median SUV_{max} of 7.4 vs. 22.5 and median liver tumor-to-background ratio of 6.4 vs. 10.5 for ^{68}Ga-FAPI vs. ^{18}F-FDG PET, respectively (*22*)). Taking this a step further, using systematic lesion validation and follow-up, our study revealed ^{68}Ga-FAPI to be less accurate than ^{18}F-FDG PET in lymphoma and myeloma.

An ongoing prospective clinical trial at our department (NCT05160051) is exploring the diagnostic accuracy of ^{68}Ga-FAPI-46 PET and its effect on patient management and interreader reproducibility for different tumor entities. An interim analysis of findings has shown that ^{68}Ga-FAPI PET is associated with a lower rate of false-positive findings, especially in lymph node assessments (*44*).

With high tumor and low organ uptakes (*22*), as well as diagnostic accuracy across various tumor entities, ^{68}Ga-FAPI PET has a role as a gatekeeper for FAP-directed radioligand therapy. Feasibility of FAP radioligand therapy has been reported for ^{90}Y- and ^{153}Sm-labeled compounds in breast (*13*) and ovarian (*45*) cancer, as well as sarcomas and pancreatic cancers (*17*,*46*). ^{177}Lu-labeled compounds have also been used in multiple advanced and refractory tumors, including thyroid cancer (*16*,*47–49*). In patients with intense FAP expression on ^{68}Ga-FAPI PET, ^{90}Y-FAPI-46 radioligand therapy led to disease control in about one third of patients with initially progressive sarcomas, pancreatic cancer, and other cancers (*50*), and the novel dimeric ^{177}Lu-labeled FAPI radioligand (^{177}Lu-DOTAGA.(SA.FAPi)$_2$) led to disease control in almost half the patients with radioiodine-refractory differentiated thyroid cancer who had progressed on tyrosine kinase inhibitors (*49*). FAPI imaging therefore has the potential to enhance drug development with targeted clinical applications.

One notable example of a FAP-targeting drug that has shown clinical promise is talabostat, which has demonstrated tumor control in 21% of patients with colorectal cancer (*51*). Moreover, targeting FAP with chimeric antigen receptor T cells has shown promise in preclinical studies and case reports (*52*,*53*), and there is potential for combination with cancer vaccines or immune checkpoint inhibitors (such as PD-1 inhibitors), which would lead to further blockade of immunosuppressive factors (*52*). Another promising approach is using cancer vaccines that successfully target FAP,

TABLE 4
Comparison of Diagnostic Efficacy Between ^{68}Ga-FAPI and ^{18}F-FDG PET (Per-Patient and Per-Region Analysis) for Tumors in Which ^{68}Ga-FAPI Underperformed in Comparison to ^{18}F-FDG PET

Tumor entity	*n*	Stratification	PET-positive/total	Sensitivity	Specificity	PPV	NPV	Accuracy
^{68}Ga-FAPI PET								
Bladder	12	Per-patient	8/12	72.7 (39–94)	100 (2.5–100)	100	25 (11.3–46.7)	75 (42.8–94.5)
		Per-region	12/37	78.6 (49.2–95.3)	95.7 (78.1–99.9)	91.7 (61.34–98.7)	88 (72.8–95.3)	89.2 (74.6–97)
Kidney	10	Per-patient	8/10	87.5 (47.4–99.7)	50 (1.26–98.7)	87.5 (63.1–96.6)	50 (9.13–90.9)	80 (44.4–97.5)
		Per-region	15/31	92.9 (66.1–99.8)	88.2 (63.6–98.5)	86.7 (63.7–96)	93.8 (69.2–99)	90.3 (74.3–98)
Lymphoma	9	Per-patient	7/9	87.5 (47.4–99.7)	100 (2.5–100)	100	50 (13.8–86.2)	88.9 (51.8–99.7)
		Per-region	11/30	78.6 (49.2–95.3)	100 (79.4–100)	100	84.2 (66.2–93.6)	90 (73.5–97.9)
Myeloma	10	Per-patient	6/10	75 (34.9–96.8)	100 (15.8–100)	100	50 (23.1–76.9)	80 (44.4–97.5)
		Per-region	6/10	75 (34.9–96.8)	100 (15.8–100)	100	50 (23.1–76.9)	80 (44.4–97.5)
^{18}F-FDG PET								
Bladder	12	Per-patient	11/12	100 (71.5–100)	100 (2.5–100)	100	100	100 (73.5–100)
		Per-region	13/36	92.3 (64–99.8)	95.7 (78.1–99.9)	92.31 (63.7–98.8)	95.7 (77–99.3)	94.4 (81.3–99.3)
Kidney	10	Per-patient	7/10	87.5 (47.4–99.7)	100 (15.8–100)	100	66.7 (24.2–92.6)	90 (55.5–99.8)
		Per-region	14/31	92.9 (66.1–99.8)	94.1 (71.3–99.9)	92.9 (65.9–98.9)	94.12 (70.7–99.1)	93.55 (78.6–99.2)
Lymphoma	9	Per-patient	8/9	100 (63.1–100)	100 (2.5–100)	100	100	100 (66.4–100)
		Per-region	15/30	100 (76.8–100)	93.8 (69.8–99.8)	93.33 (67.7–98.9)	100	96.7 (82.8–99.9)
Myeloma	10	Per-patient	7/10	87.5 (47.4–99.7)	100 (15.8–100)	100	66.7 (24.2–92.6)	90 (55.5–99.8)
		Per-region	7/10	87.5 (47.4–99.7)	100 (15.8–100)	100	66.7 (24.2–92.6)	90 (55.5–99.8)

Data in parentheses are 95% CI.

particularly the genome of stromal fibroblasts (*54*). As such, future drug development and its potential clinical applications may be enhanced through ^{68}Ga-FAPI imaging, which aids in selecting patients whose tumors exhibit high ^{68}Ga-FAPI uptake and who would potentially benefit from FAP-directed therapy. This theranostic approach also has the potential to improve clinical trial design.

Our study is limited by its retrospective design and the small number of patients included per tumor entity. Histopathology was not available for all patients, as tissue sampling is not routinely performed, and biopsy of metastatic lesions may be difficult because they may be small or remote. Thus, most lesion follow-up was based on correlative or follow-up imaging with known intrinsic limitations. Despite these limitations, the study provided valuable systematic information on the diagnostic efficacy of ^{68}Ga-FAPI PET from an ongoing registry study evaluating ^{68}Ga-FAPI and ^{18}F-FDG PET, using a composite reference standard with adequate follow-up time ($\leq\sim$6 mo) and across a wide range of tumor entities, thereby adding to the growing pool of theranostic data.

CONCLUSION

When compared with ^{18}F-FDG PET, ^{68}Ga-FAPI PET demonstrated higher accuracy in the diagnosis of colorectal cancer and prostate cancer, as well as comparable diagnostic performance for cancers of the breast and head and neck. ^{68}Ga-FAPI has the potential for improved staging or theranostic screening, particularly for these tumor entities.

DISCLOSURE

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KEY POINTS

QUESTION: How does ^{68}Ga-FAPI compare with ^{18}F-FDG PET in the diagnosis of various malignancies?

PERTINENT FINDINGS: We compared the diagnostic accuracy of ^{68}Ga-FAPI and ^{18}F-FDG PET for the detection of various tumors. Tumor validation by a composite reference standard revealed higher diagnostic accuracy for ^{68}Ga-FAPI PET in colorectal and prostate cancers, comparable diagnostic performance for cancers of the breast and head and neck, and lower diagnostic accuracy for bladder and kidney cancers, lymphoma, and myeloma.

IMPLICATIONS FOR PATIENT CARE: ^{68}Ga-FAPI PET is particularly suited for the diagnosis of colorectal cancer, prostate cancer, and cancers of the breast and head and neck. ^{68}Ga-FAPI PET offers theranostic screening and has the potential for more precise staging and management of patients who have these entities than is possible with ^{18}F-FDG PET.

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