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# [$^{68}$Ga]Ga-DOTATATE vs. [$^{18}$F]FDG PET/CT in radioiodine-refractory differentiated thyroid cancer: An exploratory pilot study of uptake patterns and potential implications for peptide receptor radionuclide therapy

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## ABSTRACT

**Introduction:** Patients with radioiodine-refractory differentiated thyroid carcinoma (RAIR-DTC) may require alternative therapeutic approaches. This study aimed to characterize somatostatin receptor uptake using [$^{68}$Ga]Ga-DOTATATE PET/CT, compare the findings with [$^{18}$F]FDG PET/CT, and explore potential implications for peptide receptor radionuclide therapy (PRRT).

**Methods:** This exploratory pilot study included 10 patients with RAIR-DTC who had undergone [$^{18}$F]FDG PET/CT within the preceding two months. [$^{68}$Ga]Ga-DOTATATE PET/CT was performed approximately 60 minutes after intravenous administration of 3–7 mCi of the radiotracer. Uptake parameters were compared between the two modalities, and potential imaging-based suitability for PRRT was evaluated using an adapted modified Krenning scoring system.

**Results:** No statistically significant differences in lesion SUVmax were observed between the two modalities across the evaluated anatomical sites. In pulmonary metastases, [$^{18}$F]FDG uptake was numerically higher than [$^{68}$Ga]Ga-DOTATATE uptake (median SUVmax: 4.1 vs. 1.7; $p = 0.069$). Blood-pool SUVmax was significantly lower with [$^{68}$Ga]Ga-DOTATATE than with [$^{18}$F]FDG ($p = 0.005$). Based on dominant lesion uptake, nine patients had modified Krenning scores of 0–1, while one patient had a score of 2. No patient demonstrated a score of 3 or 4.

**Conclusion:** In this exploratory pilot study, [$^{68}$Ga]Ga-DOTATATE uptake was generally low and heterogeneous in patients with RAIR-DTC. Most patients did not meet conventional imaging thresholds considered favorable for PRRT in neuroendocrine tumors. However, these criteria have not been validated in RAIR-DTC, and the findings cannot

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establish ineligibility or lack of therapeutic benefit. Larger prospective studies are needed to clarify the role of SSTR imaging in this population.
**Keywords:** Radioiodine-refractory differentiated thyroid carcinoma; [$^{68}$Ga]Ga-DOTATATE; [$^{18}$F]FDG PET/CT; Somatostatin receptor imaging; Peptide receptor radionuclide therapy

## INTRODUCTION

Thyroid cancer accounts for more than 90% of malignancies of the endocrine system [1]. Ninety percent of thyroid cancers are differentiated thyroid cancer (DTC), which itself is categorized into different subtypes including papillary thyroid carcinoma (PTC) (80%), follicular thyroid carcinoma (FTC) (15%), and Hurthle cell carcinoma [2]. In general, PTC is treated with surgery, followed by radioactive iodine (RAI) therapy [3]. Although most patients with DTC have a favorable prognosis following initial treatment, a subset develop persistent or metastatic disease that becomes refractory to RAI. Radioiodine refractoriness is multifactorial and may involve tumor dedifferentiation, reduced expression or impaired membrane localization of the sodium-iodide symporter, and alterations in oncogenic signaling pathways. The prognosis of RAIR-DTC is heterogeneous and depends on factors such as tumor burden, disease progression, and clinical characteristics[4]. Based on one definition (according to SELECT trial), patients with radioiodine-refractory DTC include: 1. Those with metastatic disease that does not take up RAI at the time of first treatment. 2. Those with lesions that previously took up RAI but have lost this ability. 3. Those with lesions that show RAI uptake in only “some” lesions. 4. Those with metastatic disease that progresses despite RAI uptake. 5. Those with progressive disease despite receiving more than 600 mCi of RAI [5].

Management of RAIR-DTC depends on disease burden, symptoms, and progression. Patients with asymptomatic and stable or slowly progressive disease may undergo active monitoring, whereas systemic therapy is considered for patients with clinically significant progressive or symptomatic disease. Treatment options include selective targeted therapies for patients with certain actionable molecular alterations and multikinase inhibitors, particularly lenvatinib, when appropriate. Although these treatments improve progression-free survival, treatment-related adverse events, including hypertension, fatigue, diarrhea, and proteinuria, are common and may necessitate dose reductions or treatment interruptions [4, 6, 7].

Endocrine tumors may express somatostatin receptor (SSTR), and this feature can be used not only for diagnosis but also for their treatment through labeling of somatostatin analogs with radioactive isotopes [8]. Peptide Receptor Radionuclide Therapy (PRRT) has emerged as a potential therapeutic approach for RAIR-DTC patients, and current literature offers hope for the use of PRRT in these patients [9]. In a systematic review involving 157 patients with RAIR-DTC, Maghsoomi et al. reported biochemical and objective response rates of 25.3% and 10.5%, respectively [10]. Similarly, a meta-analysis by Lee et al. involving 67 patients with DTC demonstrated an objective response rate of 15.6% and a disease control rate of 53.9% [11]. Nevertheless, the available evidence remains limited and heterogeneous, highlighting the need for larger prospective studies.

Despite advances in systemic therapies, additional treatment strategies remain of interest for patients with RAIR-DTC, particularly when established treatment options are unsuitable or poorly tolerated. Therefore, the primary objective of this pilot study was to evaluate somatostatin receptor expression using [$^{68}$Ga]Ga-DOTATATE PET/CT in patients with RAIR DTC and to assess their

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potential eligibility for PRRT. A secondary objective was to compare lesion uptake characteristics between [$^{68}$Ga]Ga-DOTATATE PET/CT and recent [$^{18}$F]FDG PET/CT scan.

## METHODS

In this pilot study, 10 adult RAIR DTC patients (over 18 years of age) who had undergone [$^{18}$F]FDG PET/CT scans within the last two months were included in the study after a full explanation of the study procedures and after completing and signing an informed consent form. Patients with pregnancy and lactation, history of cancer other than DTC, acute illnesses, infectious and inflammatory diseases and recent surgery (last three months related or unrelated to underlying disease) were excluded. RAIR-DTC was defined as the presence of at least one structurally identifiable tumor lesion without radioiodine uptake on the last post treatment radioiodine whole-body scan, regardless of radioiodine uptake in other lesions. Disease status was assessed based on available clinical records, serum thyroglobulin measurements, and structural imaging studies, including neck ultrasonography, chest CT, and MRI when clinically indicated. Among the ten included patients, six demonstrated no radioiodine uptake in their documented tumor lesions, whereas four exhibited heterogeneous radioiodine uptake patterns, with uptake in some sites but absent uptake in other known lesions. This study was designed as an exploratory imaging study to evaluate the intensity of somatostatin receptor uptake in patients with RAIR-DTC and to assess whether their uptake patterns met conventional imaging criteria considered favorable for PRRT. Patients were not selected based on an established clinical indication for PRRT, and no formal assessment of the need for PRRT was performed as part of the study.

Patients underwent [$^{68}$Ga]Ga-DOTATATE PET/CT in our department from September 2024 to December 2025. After quality control, the radiopharmaceutical [$^{68}$Ga]Ga-DOTATATE was injected intravenously at a dose of 3–7 mCi. Sixty minutes later, imaging was performed according to the standard protocol.

Imaging findings were reviewed and interpreted individually by two nuclear medicine specialists in the volume viewer software on the ADW 4.7 workstation, and in cases of disagreement, the opinion of a third specialist was used. In the scan report, areas with increased radiotracer uptake more than background, which are not related to physiological and normal uptake of the radiopharmaceutical and could potentially be relevant and suggestive of tumoral involvement, with or without a clear anatomical correspondence, were reported as an abnormal uptake. The foci of increased uptake were classified based on the intensity of uptake and modified Krenning scoring system, adapted from previously published criteria [12, 13] as follows: less than blood pool (grade 0), more than blood pool and less than liver (grade 1), slightly less than or equal to liver (grade 2), more than liver and less than spleen (grade 3), and more than spleen (grade 4). For patients with multiple lesions within the same organ, the lesion with the highest uptake was selected for quantitative analysis to minimize clustering effects. Finally, patients were categorized according to their potential benefit from PRRT as follows: grade 0-1: non-beneficial, grade 2: equivocal, grade 3-4: highly beneficial. Maximum standardized uptake value (SUVmax) of each lesion was measured and normalized to the blood pool and liver SUVmax. Baseline patient information, including demographic data and histopathological characteristics of the primary tumor, was also recorded. The results of [$^{18}$F]FDG scans performed within 2 months before the [$^{68}$Ga]Ga-DOTATATE scan were recorded and reported, and compared with the scan findings. As this pilot study primarily focused on quantitative uptake characterization rather than comprehensive lesion

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detection, systematic lesion-by-lesion enumeration and matching between the two imaging modalities were not performed.

Due to the limited sample size and non-normal distribution of variables, the non-parametric Wilcoxon signed-rank test was used to compare pairwise SUVmax values and the SUVmax lesion-to-blood pool ratios between [$^{68}$Ga]Ga-DOTATATE and [$^{18}$F]FDG PET/CT scans. Finally, values were reported as medians (minimum–maximum) and a p-value less than 0.05 was considered significant.

All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by Research Ethics Committee of Tehran University of Medical Sciences (IR.TUMS.IKHC.REC.1403.229). In addition, no additional costs were imposed on the patients.

## RESULTS

### Demographic data

The study included 10 adult patients with radioiodine-refractory DTC, consisting of five males and five females (Table 1). The patients ranged in age from 33 to 82 years with a median age of 61.5 years. Eight patients had PTC pathology, four of which had classic subtypes and one with a subtype reported as "poorly differentiated" in the original pathology report, and in three cases, the pathology subtype was not reported. The other two patients had FTC pathology. TSH-stimulated Tg levels were above 300 ng/ml in eight patients and 52 ng/ml and 136 ng/ml in the other two patients. The number of RAI therapy sessions ranged from one to three times, and the cumulative dose ranged from 200 to 600 mCi. Three patients had a history of treatment with TKIs.

### Lesion based analysis

The most common involved site was the lung (8/10 patients), followed by thyroid bed (6/10) and cervical lymph nodes (5/10). Bone metastases were seen in 3 patients, while mediastinal and skeletal muscle involvement each occurred in one patient (Table 2).

In the thyroid bed and cervical lymph nodes, no significant differences were observed between [$^{68}$Ga]Ga-DOTATATE and [$^{18}$F]FDG PET/CT in terms of SUVmax or lesion-to-blood-pool ratio (p-value > 0.05 for all comparisons). In pulmonary metastases, [$^{18}$F]FDG uptake was numerically higher than [$^{68}$Ga]Ga-DOTATATE uptake (median SUVmax 4.1 vs 1.7), although statistical significance was not reached (p=0.069). In bone metastases, no significant differences were found, despite numerically higher [$^{68}$Ga]Ga-DOTATATE uptake. As expected, blood pool SUVmax was significantly higher on [$^{18}$F]FDG than on [$^{68}$Ga]Ga-DOTATATE (p-value = 0.005). Mediastinal and skeletal muscle lesions (n = 1 each) were reported descriptively only. These findings are also illustrated in Figure 1.

### Patient based analysis and eligibility for PRRT

For each patient, the lesions that were most important in terms of disease outcome and were dominant in terms of number and distribution on the scan were considered as dominant lesions. SUVmax of the dominant lesions as well as SUVmax of the lesions with the highest uptake on [$^{18}$F]FDG and [$^{68}$Ga]Ga-DOTATATE scans are reported in Table 3, and eligibility for PRRT was determined for each patient based on the modified Krenning score.

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In seven patients, the uptake values of [$^{18}$F]FDG were greater than [$^{68}$Ga]Ga-DOTATATE in the dominant lesions, and in three patients, the uptake of [$^{68}$Ga]Ga-DOTATATE in the dominant lesions was greater than [$^{18}$F]FDG (patients D, G and I). A comparison of F-[$^{18}$F]FDG and [$^{68}$Ga]Ga-DOTATATE uptake in the dominant lesions of each patient is also presented in Figure 2 and maximum intensity projection (MIP) images of both PET/CT scans are shown in Figure 3.
Given that in five patients the location of the dominant lesions was the same as the location of the lesions with maximum uptake, and in the other 5 patients, although the dominant lesions were in the lung, the maximum uptake was in the thyroid bed and mediastinum - and considering that the potential benefit of PRRT for these patients was related to lung metastases (not to thyroid bed uptake) - the Krenning score was finally reported according to the SUVmax of the dominant lesions. Accordingly, the Krenning score was 0 in three patients (uptake below blood pool), 1 in six patients (uptake between blood pool and liver), and 2 in one patient (uptake almost equivalent to the liver). No patient demonstrated uptake exceeding that of the liver or spleen. Consequently, in terms of eligibility for PRRT, nine patients were categorized as non-beneficial, and only one patient (patient I) was considered equivocal.

## DISCUSSION

### Clinical implications of [$^{68}$Ga]Ga-DOTATATE in lesion detection

In this study, median SUVmax was generally higher with [$^{18}$F]FDG than with [$^{68}$Ga]Ga-DOTATATE in most involved sites; however, none of the site-specific comparisons reached statistical significance, including pulmonary metastases ($p = 0.069$). These findings are broadly consistent with those reported by Vrachimis et al. [14], although differences in study design and patient populations should be considered. However, by calculating the tumor to blood pool uptake ratio, the median target-to-background (T/B) ratio was higher for [$^{68}$Ga]Ga-DOTATATE than for [$^{18}$F]FDG in most areas, although this finding was not statistically significant. This finding likely reflects significantly lower blood pool uptake on [$^{68}$Ga]Ga-DOTATATE scan than on [$^{18}$F]FDG scan. In addition, among the dominant lesions in seven patients, uptake was generally higher in [$^{18}$F]FDG than with [$^{68}$Ga]Ga-DOTATATE, whereas in three patients, uptake was higher with [$^{68}$Ga]Ga-DOTATATE. Previous studies have suggested a potential complementary role for SSTR PET imaging in selected patients with DTC, including those with TENIS syndrome (Thyroglobulin Elevated Negative Iodine Scintigraphy) [15-17]. However, the diagnostic detection performance of SSTR PET was not formally evaluated in our study and larger studies are needed to establish its clinical utility.
Heterogeneity of uptake was also observed on both scans, among different patients as well as within lesions of each patient. In this study, the small sample size did not allow examination of the relationship of this heterogeneity and various factors; therefore, the findings were just reported descriptively. This issue can be addressed in future studies with larger sample sizes.

### Clinical implications of [$^{68}$Ga]Ga-DOTATATE in patient selection for PRRT

The principal finding of this study was the low prevalence of uptake meeting conventional PRRT-favorable imaging thresholds in RAIR DTC. Using modified Krenning-based assessment, none of the patients demonstrated uptake greater than liver activity, and only one patient achieved an equivocal score. These findings suggest that unselected RAIR DTC patients are unlikely to represent ideal candidates for PRRT using currently accepted neuroendocrine tumor selection

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criteria. Recently, Watanabe et al. reported positive SSTR imaging in 4 of 14 patients with recurrent or metastatic DTC using [$^{111}$In]In-pentetreotide SPECT/CT. However, differences in imaging modalities, patient populations, and positivity criteria limit direct comparison with our findings [18].

A minimum Krenning score of 3 has been shown in various studies to predict benefit from PRRT in neuroendocrine tumors, and it has been suggested that in patients with metastatic or inoperable neuroendocrine tumors, scores of 3 or 4 indicate high somatostatin receptor expression and these patients are suitable candidates for PRRT [19]. However, for DTC, the number of studies is limited, and a proven criterion for the Krenning score threshold to predict treatment benefit has not been defined. Given the low and heterogeneous uptake in these patients, it seems that if DTC patients are considered eligible for PRRT with similar criteria as neuroendocrine tumors, very few patients will be included. It is noteworthy that somatostatin receptor expression in DTC appears to be generally low and heterogeneous. In a small series of five patients with RAIR-DTC treated with [$^{177}$Lu]Lu-DOTATATE, Roll et al. reported heterogeneous treatment outcomes, including one partial response and three cases of progressive disease, despite documented SSTR uptake on PET/CT [20]. These findings highlight the uncertainty regarding the relationship between pretherapeutic SSTR uptake and treatment response in RAIR-DTC. Therefore, the predictive value of Krenning score thresholds established for neuroendocrine tumors remain uncertain in these patients. Although several systemic treatment options are available for patients with progressive RAIR-DTC, their use may be limited by treatment-related toxicities or contraindications. Whether patients with low-level SSTR uptake (Krenning scores 1–2) may benefit from PRRT remains uncertain and warrants further investigation in prospective clinical trials. This study has several limitations. First, the small sample size and single-center design limit the generalizability of our findings. Second, the two PET/CT examinations were performed up to two months apart, potentially introducing temporal variability. Third, histopathological confirmation was not available for all lesions, and no independent reference standard was available to assess diagnostic performance. Consequently, conventional diagnostic accuracy measures, such as sensitivity and specificity, could not be reliably calculated. Given the exploratory nature of this pilot study, our analyses primarily focused on describing radiotracer uptake patterns, comparing quantitative uptake parameters between the two imaging modalities, and assessing potential imaging-based suitability for PRRT. Furthermore, the modified Krenning score has not been validated in RAIR-DTC, and its application was extrapolated from neuroendocrine tumor imaging. Finally, PRRT treatment outcomes were not assessed; therefore, the predictive value of [$^{68}$Ga]Ga-DOTATATE uptake for treatment response could not be determined.

## CONCLUSION

In this exploratory pilot study of patients with RAIR-DTC, [$^{68}$Ga]Ga-DOTATATE uptake was generally low and heterogeneous, with most patients demonstrating uptake insufficient to meet conventional imaging thresholds considered favorable for PRRT in neuroendocrine tumors. However, these thresholds have not been validated in RAIR-DTC, and our findings should not be interpreted as definitive evidence of PRRT ineligibility or lack of therapeutic benefit. Larger prospective studies incorporating treatment-response assessment are needed to establish the clinical utility of SSTR imaging and criteria for appropriate patient selection for PRRT in RAIR-DTC.

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**Table 1.** Baseline clinical characteristics

| Patient | Age | Sex | Pathology | Subtype | Tg | No. of RAI Tx | Ac.D (mCi) | TKI |
|---|---|---|---|---|---|---|---|---|
| **A** | 60 | F | FTC | - | >300 | 2 | 400 | Yes |
| **B** | 63 | F | PTC | classic | 52 | 3 | 600 | No |
| **C** | 57 | M | PTC | - | >300 | 1 | 200 | No |
| **D** | 33 | M | PTC | classic | >300 | 2 | 400 | No |
| **E** | 78 | M | PTC | - | >300 | 3 | 575 | Yes |
| **F** | 59 | F | PTC | classic | 136 | 3 | 450 | No |
| **G** | 70 | F | PTC | Poorly Differentiate[#] | >300 | 3 | 425 | No |
| **H** | 57 | F | FTC | - | >300 | 2 | 400 | Yes |
| **I** | 63 | M | PTC | classic | >300 | 1 | 200 | No |
| **J** | 82 | M | PTC | - | >300 | 3 | 450 | No |
| **Overall** | 61.5 (33-82)[*] | F=50% M=50% | PTC=80% FTC=20% | - | - | - | - | No=70% Yes=30% |

F: Female; M: Male; FTC: Follicular thyroid carcinoma; PTC: Papillary thyroid carcinoma; RAI: Radioactive iodine; TB: Thyroid bed; Tg: Thyroglobulin; Ac.D: Accumulative dose; TKI: Tyrosine kinase inhibitor; TSH: stimulated thyroglobulin; Tx: Treatment.

[*]median (range)

–, Histological subtype information not available.

#, For patient G, the primary histopathological diagnosis was PTC, with "poorly differentiated" recorded as the subtype in the original pathology report.

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**Table 2.** Comparison of [$^{18}$F]FDG and [$^{68}$Ga]Ga-DOTATATE uptake indices in lesions at different sites

| | SUVmax | | | Lesion SUVmax to blood pool ratio | | |
|---|---|---|---|---|---|---|
| | [$^{68}$Ga]Ga-DOTATATE | [$^{18}$F]FDG | p-value | [$^{68}$Ga]Ga-DOTATATE | [$^{18}$F]FDG | p-value |
| Thyroid bed (n=6) | 3.8 (3-4.7)* | 3.9 (2.2-28.3) | 0.600 | 4.8 (3.7-6) | 2 (0.9-16.6) | 0.345 |
| Cervical lymph node (n=5) | 2.5 (1.8-6) | 3.1 (1.4-26.7) | 0.684 | 3.6 (2.3-8.6) | 1.6 (0.6-14.8) | 0.893 |
| Mediastinal lymph node (n=1) | 3.5 | 24 | - | 5.8 | 10.4 | - |
| Lung (n=8) | 1.7 (0.7-5.7) | 4.1 (0.9-22) | **0.069** | 2.3 (0.8-8.1) | 2 (0.4-9.6) | 0.674 |
| Bone (n=3) | 6.6 (1.4-8.6) | 4.3 (3-23.1) | 0.593 | 8.2 (2-12.3) | 2.1 (1.8-11) | 0.593 |
| Skeletal muscle (n=1) | 6.6 | 3.8 | - | 9.4 | 1.9 | - |
| Blood pool (n=10) | 0.7 (0.6-1) | 2 (1.7-2.5) | **0.005** | - | - | - |

SUV: Standardized uptake value; SUVmax: Maximum standardized uptake value
*median (range)

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**Table 3.** Comparison of [$^{68}$Ga]Ga-DOTATATE and [$^{18}$F]FDG uptake in dominant lesions of each patient and assessment of PRRT eligibility

| Patient | DL [$^{68}$Ga]Ga-DOTATATE SUVmax (region) | DL [$^{18}$F]FDG SUVmax (region) | HL [$^{68}$Ga]Ga-DOTATATE SUVmax (region) | HL [$^{18}$F]FDG SUVmax (region) | Modified Krenning score* | Eligibility for PRRT |
|---|---|---|---|---|---|---|
| A | 2.5 (lung) | 15.7 (lung) | 3.2 (TB) | 28.3 (TB) | 1 | Non-beneficial |
| B | 0.7 (lung) | 1.7 (lung) | 3 (TB) | 4 (TB) | 0 | Non-beneficial |
| C | 2.8 (lung) | 22 (lung) | 3.5 (MED) | 24 (MED) | 1 | Non-beneficial |
| D | 4.5 (CER) | 3.1 (CER) | 4.5 (CER) | 3.1 (CER) | 1 | Non-beneficial |
| E | 1 (lung) | 3.3 (lung) | 4.7 (TB) | 6.2 (TB) | 0 | Non-beneficial |
| F | 0.7 (lung) | 0.9 (lung) | 4.4 (TB) | 3 (TB) | 0 | Non-beneficial |
| G | 5.7 (lung) | 2.5 (lung) | 5.7 (lung) | 2.5 (lung) | 1 | Non-beneficial |
| H | 6.6 (bone) | 23.1 (bone) | 6.6 (bone) | 23.1 (bone) | 1 | Non-beneficial |
| I | 8.6 (bone) | 4.3 (bone) | 8.6 (bone) | 5 (lung) | 2 | Equivocal |
| J | 6 (CER) | 26.7 (CER) | 6 (CER) | 26.7 (CER) | 1 | Non-beneficial |

DL: Dominant lesion; HL: Hottest lesion; CER: Cervical lymph node; MED: Mediastinal lymph node; PRRT: Peptide receptor radionuclide therapy; SUV: Standardized uptake value; SUVmax: Maximum standardized uptake value; TB: Thyroid bed.
*Based on dominant lesion

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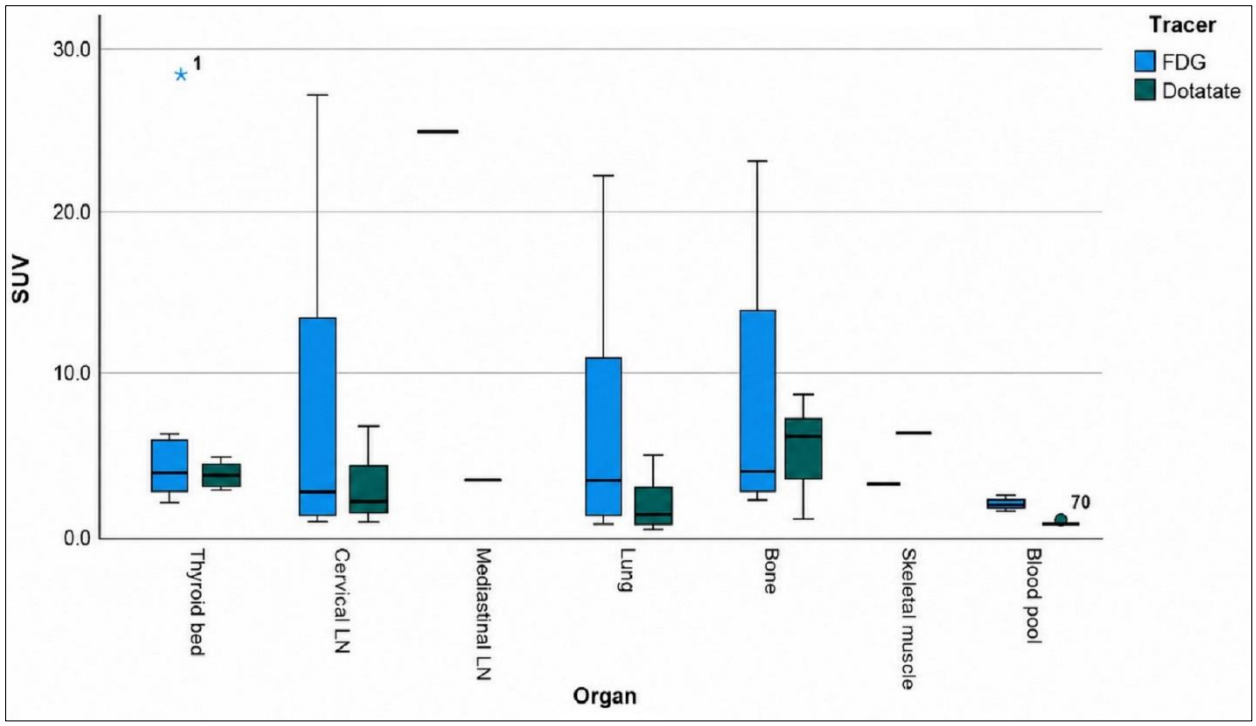



**Figure 1.** Comparison of maximum standardized uptake values (SUVmax) between [$^{18}$F]FDG and [$^{68}$Ga]Ga-DOTATATE PET/CT across different anatomical sites of disease involvement and the blood pool. Boxplots illustrate the distribution of SUVmax values, with horizontal lines indicating medians and boxes representing interquartile ranges. Blue and green represent [$^{18}$F]FDG and [$^{68}$Ga]Ga-DOTATATE, respectively. For sites with only one observation, individual values are displayed as horizontal lines

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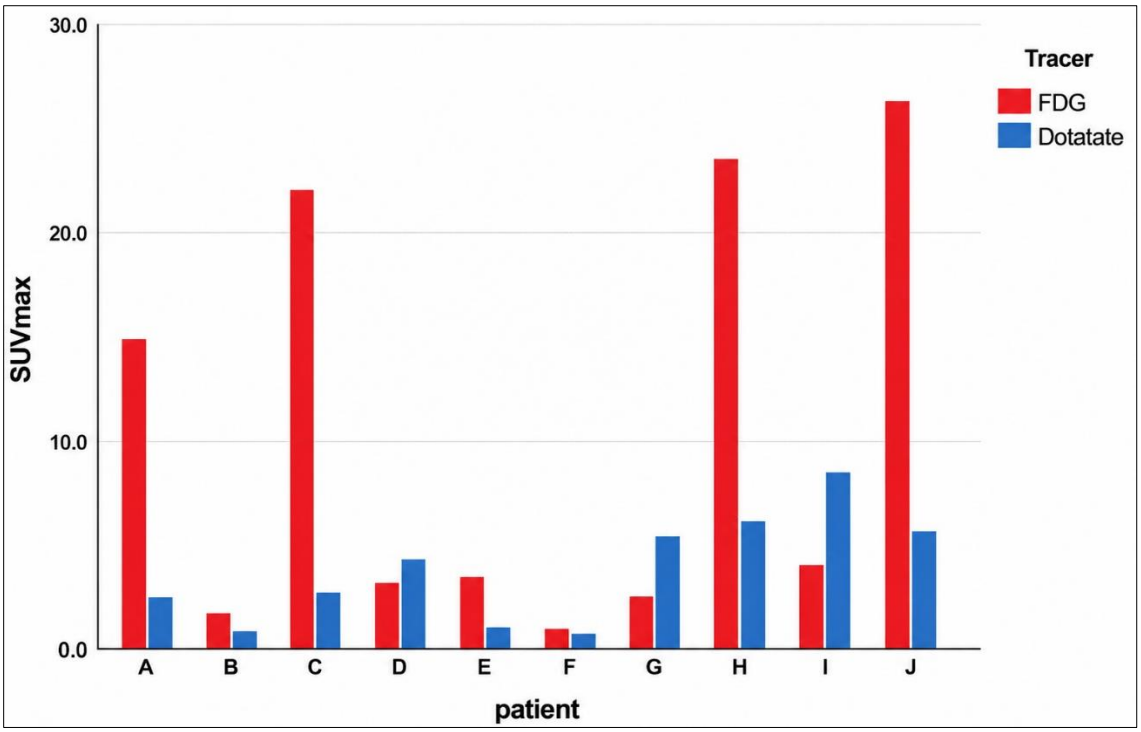



**Figure 2**. Patient-based comparison of maximum standardized uptake values (SUVmax) in dominant lesions on [$^{18}$F]FDG and [$^{68}$Ga]Ga-DOTATATE PET/CT in ten patients with radioiodine-refractory differentiated thyroid cancer. Red and blue bars represent [$^{18}$F]FDG and [$^{68}$Ga]Ga-DOTATATE uptake, respectively. Patients are labeled A–J, corresponding to the patient identifiers in Table 1 and 3

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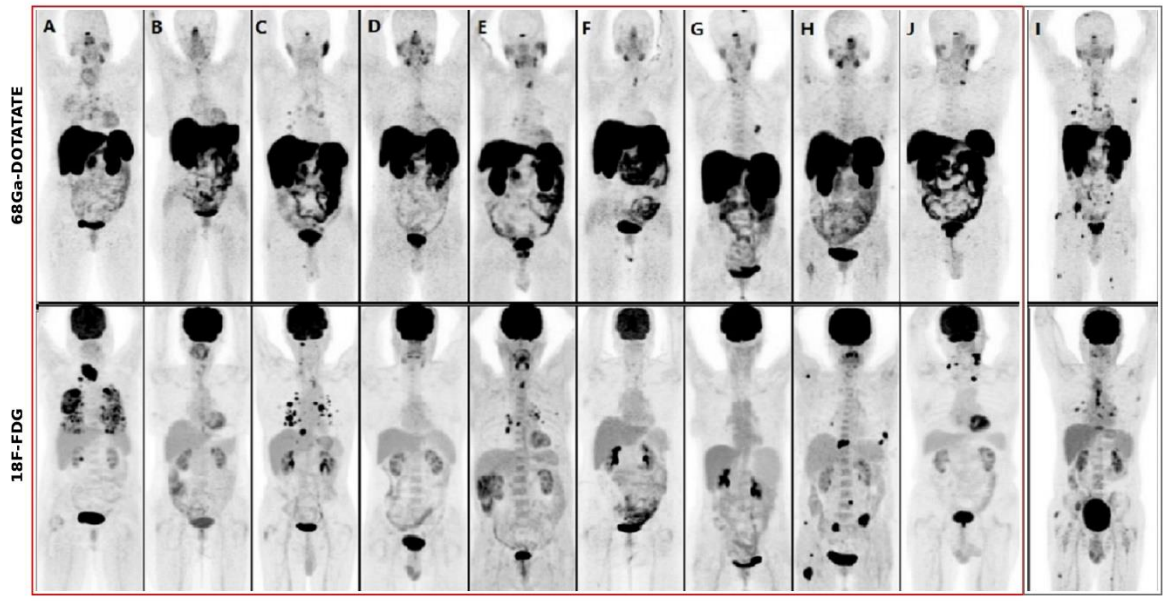



**Figure 3.** Maximum intensity projection (MIP) images of [$^{68}$Ga]Ga-DOTATATE (upper row) and [$^{18}$F]FDG (lower row) PET/CT scans in ten patients with radioiodine-refractory differentiated thyroid cancer (RAIR-DTC). Patients are arranged from left to right as A–H, J, and I. The red box encompasses nine patients classified as non-beneficial for PRRT based on dominant-lesion modified Krenning scores of 0–1, while the gray box highlights patient I, who was classified as equivocal (score 2). These classifications reflect imaging-based assessment rather than confirmed therapeutic outcomes