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Role of F18-FDG PET in Management of Differentiated Thyroid Cancers (TENIS) Patients

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Abstract : Background: Thyroid cancer has 586,000 cases per year worldwide, and this translates to 3% of all tumor diagnoses. 90% of the cases fall under differentiated thyroid carcinoma (DTC), which includes follicular thyroid cancer (FTC) and papillary thyroid cancer (PTC). During their illness, 10% of patients develop distant metastases, and two-thirds of them develop resistance to radioactive iodine (RAI) treatment. It has been shown that in some circumstances, like DTC with high TG levels and negative 131I whole-body scintigraphy (TENIS), [18F] FDG-PET-CT is an effective imaging technique. This study determines the role of [18F] FDG-PET-CT in the treatment of TENIS patients. Methods: 16 patients (n = 12 female; 4 males, age 45 ± 15 years) with histologically proven thyroid cancer (Differentiated and poorly differentiated) and high TG with negative iodine scans were included in this prospective study from January 2024 to June 2024. They underwent scanning in state-of-the-art (GE Discovery MI) [18F] FDG-PET-CT for re-staging or diagnostics of recurrent disease using a standardized protocol. All DTC subtypes and PDTC were included. The referring physicians completed standardized questionnaires both before and after PET-CT to prospectively determine the examination's effect on clinical decision-making. Patient outcomes were measured by analysis of medical records. Moreover, after PET-CT, a change in the pre-PET-CT planned therapies was documented in 32% of cases and additional invasive diagnostic procedures could be waived in 37.5 % of cases. TG levels under TSH stimulation were significantly higher in patients showing PET-CT metastases compared to patients without such findings (68.75%). Results: Without PET-CT, physicians referring to the doctors had not established a complete treatment plan for 45% of patients with thyroid carcinoma. 12/16 patients showed FDG avidity in cervical lymph nodes that were not Iodine avid previously, 2 patients had FDG avid disease in the lungs. In the process, PET-CT helped plan patient management and created a clear plan for treatment in 68.75% of patients. Conclusions: This study confirms that [18F] FDG-PET-CT used in a routine clinical setting has a very important impact on the management of patients with thyroid cancer when TG levels are persistently high in the presence of negative Iodine Scans by initiating treatments and replacing additional imaging and invasive tests.

Keywords : PET-CT, TENIS, role, FDG
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