SPECT/CT and I131 Therapy of Brain Metastases From Follicular Variant Papillary Thyroid Carcinoma (FVPTC)

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The patient was diagnosed at age 9 years with stage II follicular variant papillary thyroid carcinoma, with metastases to lymph nodes, lung, and bone, and was treated with thyroidec-tomy, regional node dissection, and I131 (85 mCi). She presented at age 15 for follow-up and was asymptomatic. She underwent an I123 whole-body scan (WBS), and her stimulated thyroglobulin was 10.8 ng/mL. Planar images demonstrated new activity in the head, and SPECT/CT was then performed to localize the activity (Figure 1). Magnetic resonance imaging (MRI) was performed the same day and demonstrated two parietal lobe lesions (Figure 2A). The patient was treated with 154 mCi of I131. The lesions resolved on an MRI 4 months later (Figure 2B), at which time her thyroglobulin had decreased to 1.3 ng/mL.

Metastases from papillary thyroid carcinoma are most common in regional lymph nodes, with distant metastases occurring in 1–7% of patients, most often to lung and bone (1). Brain metastases are rare and have been associated with high mortality rate (2). Risk factors for brain metastases have not been reported, and standard treatment protocols have not been developed.

SPECT/CT allows for improved localization of radioiodine activity seen on planar scans. Diagnostic value of SPECT/CT for lesions outside of the neck is high, but it is of little value in patients without abnormal findings on planar imaging (3). A recent meta-analysis demonstrated that SPECT/CT improved the diagnosis in 47.6–88% of cases and modified therapeutic strategies in 23.5–25% of patients (4). SPECT/CT may be useful for localization of activity identified in the head on I123 planar scans.

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Abbreviations: MRI, magnetic resonance imaging; WBS, whole-body scan.
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References