

# Unexpected finding on [<sup>131</sup>I]iodine scintigraphy: Warthin tumor in a patient with toxic nodular goiter referred for radioiodine treatment

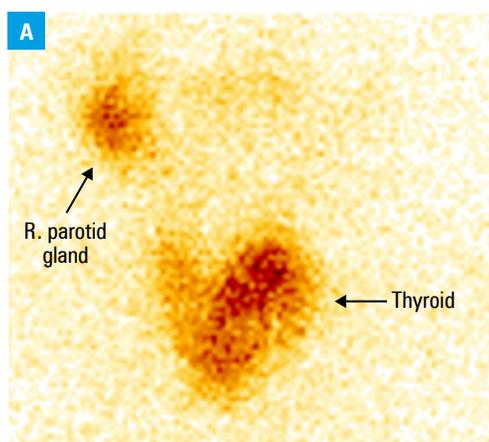
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Radioactive iodine <sup>131</sup>I is the oldest radiopharmaceutical used for theranostics. To this day it is used in diagnosis and therapy of both benign and malignant thyroid conditions.<sup>1</sup> Radioiodine scintigraphy is an invaluable tool for assessment of thyroid diseases, including detection of metastatic lesions of differentiated thyroid carcinoma (DTC). Accumulation of <sup>131</sup>I outside of the thyroid is highly suggestive of disseminated thyroid cancer; however, in rare cases, its uptake can also be detected in other lesions. Warthin tumor (cystadenoma lymphomatosum) is one of such lesions, possibly due to sodium/iodide symporter expression in the tumor and its impaired excretory function, as compared with a normal salivary gland.<sup>2</sup> Other causes of <sup>131</sup>I accumulation in salivary glands include retention of saliva in the glands or ducts, sialadenitis, and oncocytoma.<sup>3</sup>

An 81-year-old woman with toxic nodular goiter was referred for [<sup>131</sup>I]iodine scintigraphy

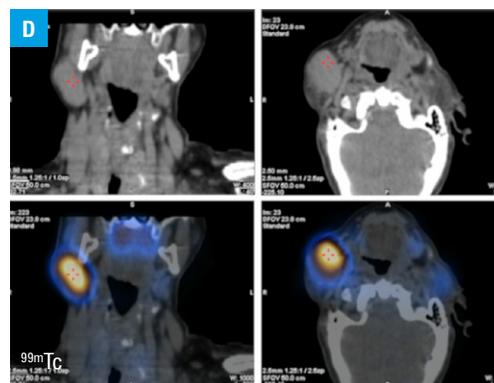
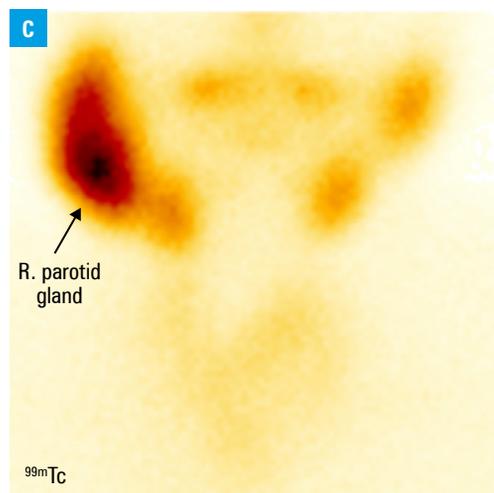
to measure iodine uptake in the thyroid before a planned radioiodine treatment. A total of 4 MBq of [<sup>131</sup>I]sodium iodide was administered orally, and the study was carried out according to a standard protocol. The thyroid iodine uptake value, measured on planar scintigraphy images in the anterior projection, acquired 24 hours after administration of the radiopharmaceutical, was 22%. However, apart from the uptake in the thyroid, the scan also revealed an unexpected accumulation of <sup>131</sup>I in the right parotid gland, significantly exceeding physiological uptake in the salivary glands (FIGURE 1A). Radioiodine uptake value within the parotid gland was 4%. The patient had no history of thyroid malignancy; however, such a finding is always highly suspicious, and in this case, it could correspond to a metastatic lesion of a previously undiagnosed thyroid cancer, especially considering the presence of multiple nodules in the goiter.



**FIGURE 1** A – extrathyroidal uptake of radioiodine found on [<sup>131</sup>I]iodine scintigraphy; B – a hypoechoic solid lesion revealed on the ultrasound scan of the right (R) parotid salivary gland

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**FIGURE 1 C, D** – uptake of  $^{99m}\text{Tc}$ -pertechnetate in Warthin tumor on planar (C) and single-photon emission computed tomography/low-dose computed tomography scans (D)



Due to this unexpected finding, scintigraphy was immediately followed by ultrasonography of the right parotid gland, which revealed an ovoid, solid, mostly hypoechoic, nonhomogeneous lesion with partially ill-defined margins, measuring 26 mm × 36 mm × 45 mm (FIGURE 1B). The ultrasound pattern of this nodule could be indicative of parotid malignancy; however, when combined with increased radioiodine uptake, it could also correspond to a metastatic focus of DTC. The possibility of a salivary gland lesion was still taken into consideration, and differential diagnosis was carried out. The patient was referred for salivary gland scintigraphy, which was carried out according to a routine protocol after intravenous administration of 111 MBq of  $^{99m}\text{Tc}$ -pertechnetate. Single-photon emission computed tomography/low-dose computed tomography hybrid imaging showed an increased uptake of the radiopharmaceutical in the tumor (FIGURE 1C and 1D). No radiopharmaceutical washout was observed after stimulation with citric acid. Such a pattern of  $^{99m}\text{Tc}$ -pertechnetate accumulation, combined with ultrasound findings, is characteristic of Warthin tumor, which can also accumulate  $^{131}\text{I}$ .<sup>4</sup>

On follow-up evaluation, Warthin tumor was confirmed by fine-needle aspiration biopsy. However, the patient was not referred for surgical treatment due to existing comorbidities.

DTC has a high incidence, and in some populations, larger tumors can form distant metastases in almost 30% of cases.<sup>5</sup> Therefore, differential diagnosis of extrathyroidal  $^{131}\text{I}$  uptake using complementary diagnostic techniques is vital.

## ARTICLE INFORMATION

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