Papillary thyroid carcinoma in cervical lymph nodes with vanished thyroid gland after ablation of Graves' disease by radioactive iodine

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ABSTRACT

Primary thyroid carcinoma after thyroid ablation by radioactive iodine is rare. We present a very rare condition of lateral apparent papillary thyroid carcinoma eight years after receiving radioactive iodine for thyrotoxicosis, which led to complete anatomical and functional involution of the thyroid gland.

KEYWORDS

Thyroid Neoplasms – Thyrotoxicosis – Iodine Radioisotopes – Neck Dissection

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Introduction

Radioactive iodine is one of the commonly used treatment modalities for management of thyrotoxicosis. Development of thyroid cancer after its usage is rare. The commonest type is papillary thyroid carcinoma.^{1,2} We report a case of involvement of cervical lymph nodes with papillary thyroid carcinoma with no evidence of any detectable primary or even the gland itself eight years after being treated with radioactive iodine for Graves' disease.

Case history

A 63-year-old man with a previous history of aortic valve replacement for aortic valve disease, and of receiving radioactive iodine as treatment for thyrotoxicosis eight years before presentation. The patient presented with a left-lateral neck swelling. Neck ultrasound described an absent thyroid gland in its anatomical position, as well as enlarged left middle and lower deep cervical lymph nodes with distorted shape and faint hilum. The largest measured 2.1 × 1.5 cm in diameter. The thyroid was not visualised in its anatomical position nor in any suspected ectopic locations on post-contrast neck computed tomography (CT), but did show multiple enlarged left upper and middle cervical lymph nodes.

Fine-needle aspiration of the cervical lymph node was performed and was not diagnostic, so an excisional biopsy was taken from the upper deep cervical lymph node.

Microscopic examination revealed a near-total loss of nodal architecture with infiltration by malignant tumoral proliferation formed of papillary and microfollicular structures. These were covered by epithelial cells having overlapped large nuclei with ground-glass appearance, irregular contour and focal nuclear grooving. Immunohistochemical studies showed diffuse positive thyroid transcription factor 1 (TTF 1) and thyroglobulin in the neoplastic cells. This led to the diagnosis of metastatic papillary thyroid carcinoma. A chest CT was normal and a thyroid scan showed no radioactive uptake at the anatomical bed of thyroid gland, which was within normal uptake for both submandibular glands (Fig 1). Neck exploration revealed a 15-mm left pretracheal hard mass, probably a central lymph node, which was excised followed by left central neck dissection (level VI) and selective left lateral neck dissection levels (II–IV). Exploration of the thyroid bed revealed no thyroid tissue (Fig 2). Microscopic examination of the specimens revealed infiltration of 10 out of 10 central lymph nodes (including the pretracheal node) and 5 out of 10 lateral lymph nodes by papillary thyroid carcinoma (Fig 3). The patient was discharged on the fifth postoperative day after resuming oral anticoagulant therapy with uneventful postoperative course. The patient received radioactive iodine 120 mCi, started L-troxine suppressive therapy and followed by radioactive iodine 150 mCi six months later. The patient was kept on suppressive L-troxine with free neck ultrasound 20 months postoperatively.

Figure 1 Thyroid scan: 74 MBq of ^{99m}Tc -pertechnetate were injected intravenously and imaging was performed 20 minutes after tracer administration. There was no radioactive uptake at the anatomical bed of thyroid gland as well as within normal uptake of both submandibular glands.

Discussion

Radioactive iodine, antithyroid drugs and surgery are the available modalities for treatment of toxic goitre. The choice of the most appropriate modality for each case depends on patient, physician and cost-related factors.³

Figure 3 Microscopic examination of the slides. a) Metastatic papillary thyroid carcinoma in lymph nodes. Lymph nodes showing effaced architecture and infiltration by malignant tumoral proliferation formed of papillary and microfollicular structures (haematoxylin and eosin $\times 4$). b) The papillary structures are covered by overlapped atypical epithelial cells with nuclei showing ground glass appearance and focal nuclear grooving (haematoxylin and eosin $\times 40$). c) Diffuse positive staining of thyroid transcription factor 1 in the neoplastic cells (immunoperoxidase-3,3'-diaminobenzidine $\times 4$). d) Diffuse positive staining of thyroglobulin in the neoplastic cells (immunoperoxidase-3,3'-diaminobenzidine $\times 4$).

Figure 2 Surgical steps. a) Left strap muscles hold by Babcock forceps, the trachea is seen in the centre, as well as the parathyroid glands. b) Dissection of the left upper paratracheal swelling. c) Central lymph node. d) Final view with bare trachea without thyroidectomy.

The incidence of thyroid carcinoma after treatment with radioactive iodine for Graves' disease is rare, with an incidence of 1.3%. The most common type is papillary thyroid carcinoma. It is supposed that radioactive iodine leads to increasing in the thyroid antibodies, which in turn favours thyroid angiogenesis and carcinogenesis. Rearranged during transfection receptor tyrosine kinase proto-oncogene rearrangement is reported to be the most common molecular mutation in these cancers. Radioactive iodine causes cellular atypia and metaplasia in the thyroid cells, which increase the malignancy risk. This does not justify avoiding the use of radioactive iodine in treating thyrotoxicosis or doubting its safety, but it indicates the importance of active surveillance for patients who received this mode of treatment.^{1,2,4-6}

What is unique in this case report is radiological and clinical complete absence of the thyroid tissue in its anatomical position after radioactive iodine ablation, as well as presentation of the disease as nodal metastasis despite the absence of any detectable primary and even the gland itself.

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