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Hyperthyroidism Due to Papillary Carcinoma of the Thyroid – A Case Report

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ABSTRACT

A rare case of papillary carcinoma of the thyroid producing hyperthyroidism is presented. A young patient presented seven years after a thyroid operation with metastatic disease in the cervical lymph nodes and a history of deteriorating vision in the left eye. He also had a lesion in the base of the skull which could not be established to be metastasis from the thyroid cancer. There was clinical and biochemical evidence of hyperthyroidism. Radionuclide scan revealed uptake in the residual thyroid tissue and patchy uptake by the cervical lymph nodes. The patient underwent a complete thyroidectomy and radical neck dissection of the left side and 'berry-picking' of the lymph nodes on the right side. Although the patient became euthyroid post-operatively, his general condition deteriorated and he rapidly lost vision in both eyes before any ablative therapy could be instituted for the tumour in the base of the skull. The patient was lost to follow-up.

Keywords: thyroid neoplasm, hyperthyroidism, radionuclide scanning, pathology, treatment

INTRODUCTION

Prior to 1946, Leiter et al described the first case of hyperthyroidism associated with thyroid cancer[1]. The fact that such a condition could occur in any patient was questionable; thus, by 1964 only 13 such cases had been reported[2] since thyroid cancers are considered relatively inefficient producers of hormones and a considerable amount of autonomously functioning thyroid tissue must be present to produce sufficient hormone to cause hyperthyroidism[3]. This view has been challenged by a few authors[4] who regard this coexistence as more than fortuitous citing experimental data to suggest that neoplasia often follows hyperplasia, arguing that hyperthyroidism does not protect against cancer. However, this coexistence still remains rare and Paul and Sisson could compile the particulars of only 48 cases of hyperthyroidism due to thyroid cancer until 1990 and in only five of these was a mixed histology with papillary and follicular elements described[5].

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CASE REPORT

A 19-year-old male was admitted with a history of having been operated for a thyroid disorder seven years earlier. The particulars of the clinical features or the operative findings were not available. He received no medication after discharge from the hospital.

One and a half years prior to his present admission, the patient noticed swelling on both sides of the neck which gradually increased in size. For five months the patient detected hoarseness of voice with a dry cough without haemoptysis. The patient complained of rapid loss of weight and within a period of two months prior to his admission, had lost 50% of his weight. This was associated with headache, but no vomiting. Physical examination revealed an emaciated, pale, normotensive young man. The resting pulse rate was 112/min, regular. There were fine tremors of both hands and tongue. There was no exophthalmos or lid lag, but the patient had a squint with palsy of the left lateral rectus muscle. He could only perceive light with his left eye; his vision in the right eye was normal. Examination of the neck revealed a transverse scar due to a previous surgery. A hard, non-tender, fixed, 4 x 3 cm nodule was present in the left lobe of the thyroid gland; the skin over the swelling was free and the carotids could be felt separately from the swelling. There was a 14 x 6 cm firm, non-tender mass of matted lymph nodes in the left anterior triangle of the neck. Lymph nodes in the left posterior triangle were multiple, firm, discrete and non-tender with the largest node measuring 2 cm. Mostly discrete, firm, non-tender lymph nodes were also present in both triangles of the neck on the right side; the largest lymph node measured 2.5 x 1.5 cm. Systemic examination was normal.

Investigations revealed a haemoglobin of 10 gm/dL; a total leukocyte count of 7500 mm^3 with polymorphs 68%, lymphocytes 30% and eosinophils 2%. The erythrocytic sedimentation rate was 60 mm. Serum T_3 was 170 ng/dL (n: 80 – 120 ng/dL); serum T_4 was 21 μg/dL (n: 8 – 12 μg/8L); serum TSH was 0.2 mu/dL (n: 0 – 6.5 mu/dL). The serum alkaline phosphatase was 210 IU/L (n: 90 – 110 IU/L). Other liver function tests and routine biochemistry were normal. Skull X-ray showed a widening of the pituitary fossa with destruction of the left petrous bone. CAT scan of the skull revealed

mass causing destruction of the medial and apical portions of the left petrous ridge extending up to the middle and posterior cranial fossae and compressing the left side of the pons and medulla; the ventricles were normal. ^{99m}Tc scan revealed uptake by the thyroid tissue and there was a patchy uptake of the isotope by the cervical lymph nodes on both sides of the neck; there was no uptake of the isotope by the lesion in the skull or any other part of the body. Ultrasound examination of the abdomen was normal.

The hyperthyroid condition was controlled by giving neomercazole and propranolol. The patient subsequently underwent a complete thyroidectomy with a classical block dissection of the neck on the left side and 'berry picking' of the lymph nodes on the right side. The immediate post-operative recovery was uneventful and the patient soon became euthyroid without medication.

A post-operative whole body isotope scan was arranged but the patient left the hospital against medical advice.

Histopathology of the excised thyroid tissue was reported as papillary carcinoma of the thyroid (Fig 1) with complete replacement of the excised lymph node tissue with metastatic tumour (Fig 2).

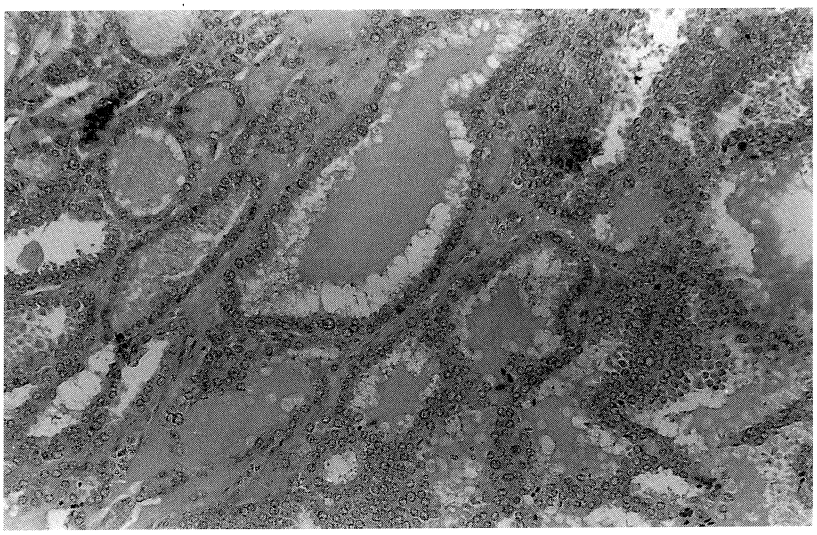

Fig 1 – Photomicrograph of the thyroid highlighting the orphan Annie nuclei of papillary carcinoma. Also seen is scalloping of colloid (feature of hyperfunction). H & E x 400.

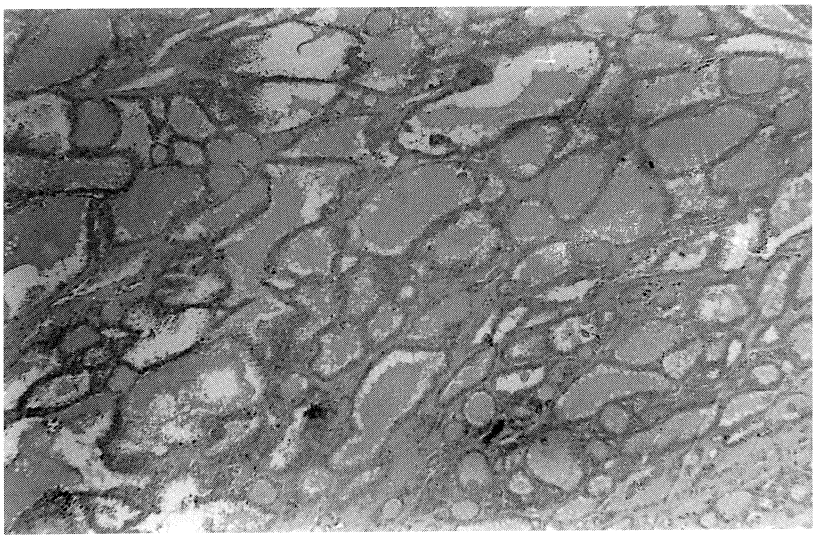

Fig 2 – Photomicrograph of the lymph node showing complete replacement of the lymphoid tissue by metastatic tissue from papillary carcinoma of the thyroid. H & E x 100.

One week later, the patient again reported to the outpatient department with complaints of severe headache, complete loss of vision in his left eye and marked loss of vision in his right eye; there was no other localising neurological deficit. Clinically, the patient was euthyroid. However, before any form of therapy could be started, the patient absconded and has since been lost to follow-up.

DISCUSSION

Studies have revised the previously held view that hyperthyroidism was almost an assurance against the development of thyroid cancer[4]. These studies have actually suggested the reverse, citing the prevalence of thyroid cancer in patients with hyperthyroidism of 0.15% to 21.5%[4,6] which is higher than that of 0.001% to 0.1% in the general population[4]. Yeo et al from Singapore reported a prevalence rate of thyroid cancer in patients with hyperthyroidism as 1.25% versus an estimated 0.004% in the general population. They suggested that the prevalence rate will be more if total thyroidectomy is performed instead of subtotal thyroidectomy[4].

The features of hyperthyroidism in patients with thyroid cancer exhibit the usual symptoms and a diagnosis can be made on the basis of clinical and laboratory findings. In 83.3% of cases, the primary and/or the metastatic lesion was reported as follicular cancer; in 10.4%, the lesion was mixed papillary and follicular cancer, while in 6.3%, it was reported as a follicular cancer with anaplastic components[5]. Unlike the present report, the disease occurs in a similar age range as that of follicular cancer and is thus primarily a disease of older patients, occurring predominantly in females (M:F, 1:2)[5]. In the majority of cases, hyperthyroidism may be diagnosed simultaneously with thyroid cancer[5].

Of special interest is the occurrence of T_3 toxicosis in patients with thyroid cancer producing hyperthyroidism, especially in patients with metastatic follicular cancer[4]; however, the mechanism of T_3 predominance is not well understood[5,7].

Wade stated that there was no accepted record of a thyroid cancer without secondaries producing hyperthyroidism[8]. In their review of 48 cases, Paul and Sisson reported distant metastases to be present in 83% of the patients at the time of diagnoses of hyperthyroidism[5]. They reported cases of metastases to the bones in 70%, to the lungs in 69%, to the soft tissues in 38% (and in 93% of these cases, the soft tissue involvement was adjacent to areas of bone involvement); to the brain in 5%, and to the cervical and/or mediastinal lymph nodes in 16%[5].

The infrequent occurrence of hyperthyroidism in thyroid cancer may be due to the fact that the malignant thyroid tissue is functionally less effective than normal thyroid tissue as evidenced by the need to ablate the remaining thyroid tissue after surgery with radioactive iodine prior to a whole body scan to detect and treat any metastatic thyroid tissue. Thus, a large bulk of this functionally inefficient malignant thyroid tissue is required to cause so much production

of thyroid hormone resulting in hyperthyroidism. Besides, the metastatic cells must remain sufficiently well differentiated as to be able to entrap iodine and produce thyroid hormones[5,7]. It has been suggested that previous thyroid surgery may predispose to this disease by removing the competition of normal thyroid tissue for iodine and, thus, providing the metastatic tissue with increased substrate for thyroxin production, as well as stimulating increased TSH production, leading to further stimulation of metastatic thyroid tissue[2]. Similar to the present case, in a report in 1964, 6/13 patients underwent thyroid surgery 6 – 45 years prior to presentation with hyperthyroidism[1].

A good therapeutic response is achieved with appropriate treatment which consists of surgical ablation of the primary tumour and excision of any accessible metastatic tissue, and subsequent radio-iodine therapy of the remaining metastatic tumour. However, 5/48 patients died as a result of hyperthyroidism before radioactive iodine could be administered[5]. Favourable response to radioactive therapy depends on the capacity of the metastatic tumour to concentrate radio-iodine[5]. However, treatment by radio-iodine or surgery seldom destroys all malignant tissue, probably because of the radio-resistant cells[1].

Of the 48 cases reviewed by Paul and Sisson, 20% of the patients died one week to 20 months after the diagnosis of hyperthyroidism, 16% of the patients died of metastasis, while 4% died of unrelated causes[5]. The remaining 60% were alive three months to 16 years of the follow-up period and the survival rate was reported to be similar for metastatic follicular cancer of the thyroid with or without coexisting hyperthyroidism[5].

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