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Surgery-induced thyroiditis following laryngectomy

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Abstract
A 77-year-old euthyroid man developed atrial fibrillation on the fourth post-operative day following a total laryngectomy and right radical neck dissection including a hemi-thyroidectomy for a squamous cell carcinoma of the larynx with nodal metastases. The episode of atrial fibrillation coincided with an elevated serum free thyroxine of 3.36 ng/dl (43.3 pmol/L) (reference values: 0.71–1.85 ng/dl or 9.1–23.8 pmol/L), normal total triiodothyronine of 104 ng/dl (1.6 nmol/L) (reference values: 46–137 ng/dl or 0.7–2.1 nmol/L) and a suppressed thyroid-stimulating hormone (TSH) of 0.05 mIU/L (reference values: 0.35–5.0 mIU/L). These values, in relation to those prior and subsequent, suggested a surgery-induced thyroiditis. The limited literature about this controversial entity is reviewed.

Key words: Laryngeal Neoplasms; Neoplasm Metastasis; Surgical Procedures, Operative; Thyroiditis

Introduction

In 1975 it was suggested by Carney *et al.*[1] that trauma to the thyroid gland may cause thyroiditis in some cases. This can manifest itself as either a hyperthyroxinaemia or more severely as clinical hyperthyroidism. However, there is very little published evidence to support this suggestion. We describe a case of transient thyroiditis following a total laryngectomy and radical neck dissection including a hemi-thyroidectomy.

Case report

A 77-year-old man, a retired bartender who gave up smoking 14 years ago, presented to his local ENT department with a four-week history of a painful throat and dysphonia. Clinical examination, including fibre-optic nasendoscopy, revealed a lesion in the right piriform fossa and a 3 cm right level II neck node. Biopsy of his piriform fossa lesion confirmed a diagnosis of moderately differentiated squamous carcinoma. He was referred to the regional oncology/head and neck centre. Fine needle aspirate cytology of a level II/III neck node confirmed metastatic squamous carcinoma. Computed tomography (CT) scanning demonstrated invasion of both para-glottic and pre-epiglottic spaces. TNM classification was $T_3N_{2a}M_0$. The patient underwent a total laryngectomy with preservation of the left thyroid lobe and a radical right neck dissection. The surgical procedure was uneventful and the patient made a good initial recovery after a 24-hour period of observation in ITU. However, on the fourth post-operative day, the patient was noted to have increased secretions from his tracheostomy and it was thought that Galfer syrup had been emerging from the tracheostomy tube as well. On auscultation diffuse coarse breathing sounds were heard but there were no focal abnormalities. He was maintaining his O_2 saturation on five litres of oxygen/min and was haemodynamically stable. It was assumed that the patient had aspirated from his feeding tube, so stomagastric feeding was stopped. Later that day, the patient desaturated to 70 per cent on five litres of oxygen/min, with a heart rate of 145 bpm, and a blood pressure of 125/85 mmHg. On auscultation he had diffuse coarse rhonchi. An ECG showed him to be in fast atrial fibrillation. Chest X-ray was unremarkable. He was transferred to the High Dependency Unit and commenced on intravenous antibiotics to treat possible pneumonia and was loaded with i.v. digitalis (1 mg) and frusemide. After two and a half hours this was followed by amiodarone (300 mg over one hour followed by 900 mg over 23 hours). As shown in Figure 1, the patient had rising levels of serum free thyroxine (FT4), a reduction in serum thyroid-stimulating hormone (TSH) and a normal total triiodothyronine (TT3). (All were measured by immunoassay on an Abbott Architect analyzer.) Serum thyroid peroxidase autoantibodies (by an Organtec ELISA method) were 5 IU/mL (reference values 0–82) and thyrotrophin receptor antibodies (by a Brahms TRAK chemiluminescence/immunoassay method) were <0.9 IU/L (0–1.5). The FT4 peaked on the fourth to the fifth post-operative day and declined to normal by day 16. The patient's condition gradually improved and he was discharged home on the 23rd post-operative day.

Discussion

Prior to surgery, the patient was clinically euthyroid and had no history of thyroid disease. Pathology of the excised thyroid demonstrated 'benign nodularity and no evidence of malignancy'–normal findings in a 77-year-old man. The patient had no auto-antibodies to thyroid peroxidase or thyrotrophin receptor. The thyroid function tests on the second post-operative day showed a minor decrease in TSH but TT3 and FT4 were both normal. On the fourth–fifth post-operative day, the FT4 peaked at 3.36 ng/dl (43.3 pmol/L) and TSH had decreased to 0.05 mIU/L, consistent with thyroiditis. His atrial fibrillation occurred when his FT4 was maximal. A causal relationship between this patient's atrial fibrillation and hyperthyrox-

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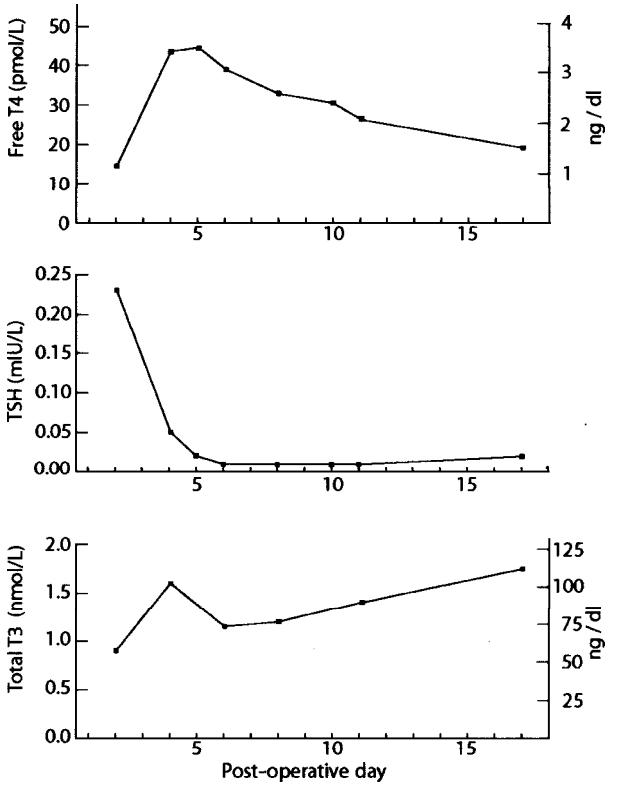

FIG. 1

Thyroid function tests following surgery. Reference values are the following: for free thyroxine (FT4): 0.71–1.85 ng/dl or 9.1–23.8 pmol/L; for total T3 (TT3): 46–137 ng/dl or 0.7–2.1 nmol/L and thyrotrophin (TSH): 0.35–5.0 mIU/L.

inaemia cannot be confirmed, but this case is suggestive of a possible association. As such, it can only be speculated that treatment of the hyperthyroxinaemia might have prevented the development of atrial fibrillation. Amiodarone can cause both hyper- or hypothyroidism[2] but this was given after the FT4 had risen. There is little information in the literature about any effects that amiodarone may have on the thyroid when given over a short period (e.g. 24 hours), but when given for 10 days, effects became manifest only after four days of therapy.[3]

- **There are few cases reported of thyroiditis following neck surgery**
- **In this case a patient developed thyroiditis-like symptoms following laryngectomy and neck dissection**
- **The limited literature on this subject is presented and discussed**

It is well recognized that radical neck surgery and irradiation often lead to hypothyroidism.[4,5] The occurrence of possible thyroiditis following neck surgery is controversial. Thyroid tissue, removed at laryngectomy often shows lesions consistent with damage due to surgical trauma to the thyroid.[1] But similar histological changes are also found in other conditions.[6] Transient thyroiditis has been described after needle aspiration of the thyroid,[7] and after parathyroidectomy.[8] Cases have been reported following laryngopharyngoesophagectomy for squamous cell carcinoma of the right hypopharynx[9] or total laryngectomy for a subglottic tumour,[10] with preservation of the thyroid in both cases. Both cases showed a similar clinical course to the patient that we have presented. Tachycardia occurred slightly earlier in these cases (on the second post-operative day). When surgery involves the removal of thyroid tissue from a patient with Grave's disease, the patient is properly prepared to block the effects of thyroid hormones released during the operation or from any residual thyroid tissue. This is not the normal practice for other neck operations in which some or all of the thyroid may be removed. Perhaps any post-operative rise in FT4 is minimized if there is total removal of the thyroid gland. We have recently had a male patient, similar to the index case, also 77-years-old, who was treated with a tracheotomy and a full neck dissection, including a total thyroidectomy. Unlike the index case, his FT4 decreased and TSH increased post-operatively until he was frankly hypothyroid on day 10 post-operation, prior to starting thyroxine replacement therapy. Perhaps there is an increased FT4 in patients with an intact or residual thyroid, which was manipulated during surgery or which adjoins (or is irritated by) tracheostomy tubes. Such patients, who are often elderly and frail, may benefit from suitable treatments to counteract transient hyperthyroxinaemia.

References

1 Carney JA, Moore SB, Northcutt RC, Woolner LB, Stillwell GK. Palpation thyroiditis (multifocal granulomatous folliculitis). *Am J Clin Pathol* 1975;**64**:639–47
2 Bogazzi F, Bartalena L, Gasperi M, Braverman LE, Martino E. The various effects of amiodarone on thyroid function. *Thyroid* 2001;**11**:511–9
3 Iervasi G, Clerico A, Bonini R, Manfredi C, Berti S, Ravani M, *et al.* Acute effects of amiodarone administration on thyroid function in patients with cardiac arrhythmia. *J Clin Endocrinol Metab* 1997;**82**:275–80
4 Vrabec DP, Heffron TJ. Hypothyroidism following treatment for head and neck cancer. *Ann Otol Rhinol Laryngol* 1981;**90**:449–53
5 Smolarz K, Malke G, Voth E, Scheidhauer K, Eckle HE, Jungehulsing M, *et al.* Hypothyroidism after therapy for larynx and pharynx carcinoma. *Thyroid* 2000;**10**:425–9
6 Hwang TS, Park SH. Histopathologic study of the so called 'palpation thyroiditis'. *J Korean Med Sci* 1988;**3**:27–9
7 Kobayashi A, Kuma K, Matsuzuka F, Hirai K, Fukata S, Sugawara M. Thyrotoxicosis after needle aspiration of thyroid cyst. *J Clin Endocrinol Metab* 1992;**75**:21–4
8 Walfish PG, Caplan D, Rosen IB. Postparathyroidectomy transient thyrotoxicosis. *J Clin Endocrinol Metab* 1992;**75**:224–7
9 Calle RA, Cohen KL. Transient thyroiditis due to surgical trauma. *Am J Med* 1993;**95**:546–8
10 McDermott A, Onyeaka CV, Macnamara M. Surgery-induced thyroiditis: fact or fiction? *Ear Nose Throat J* 2002;**81**:408–10

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