The Journal of Laryngology & Otology
August 2004, Vol. **118,** pp. 653–654

Somatostatin analogues have no role in the treatment of advanced differentiated thyroid cancer

O. Alhamarneh, M.B. Ch.B., J. Murphy, M.R.C.S., S. L. Atkin, F.R.C.P., R. J. A. England, F.R.C.S.

Abstract
Somatostatins are neuropeptides that have a downregulatory effect on various physiological processes. Their use in the management of certain endocrine tumours is well recognized. Their use in thyroid cancer is not established, although there is some evidence to suggest that they have a role in advanced metastatic disease. We report a case of a patient with advanced metastatic follicular thyroid cancer which demonstrated strong octreotide uptake with reduced avidity for I^{131}. Treatment with the somatostatin analogue octreotide, however, failed to achieve a significant response. We feel this case is important as it suggests that although octreotide provides a useful further imaging modality in differentiated thyroid cancer, it has no therapeutic role.

Key words: Somatostatin; Thyroid Neoplasms

Introduction

Thyroid cancer is the commonest endocrine cancer, representing 1 per cent of all solid malignancies.[1] The main treatment modality in the management of differentiated thyroid cancer is surgery with radioactive iodine. However, in certain tumour types, such as Hurthle cell carcinoma, I^{131} may confer little benefit as iodine is not concentrated by the tumour cells. In addition, as some tumours dedifferentiate they lose their avidity for I^{131}, hence decreasing any therapeutic effect.

Somatostatin analogues have proven effects in the management of certain neoplastic processes. However, their role in thyroid cancer is unproven, and there is some evidence to suggest they have a therapeutic role. We describe a case of a patient with advanced metastatic thyroid cancer who underwent octreotide therapy as the tumour was losing iodine avidity. Although pretreatment scans demonstrated extensive octreotide uptake, therapy had no effect on the tumour. We believe that octreotide may have no therapeutic role in differentiated thyroid cancer.

Case report

A 62-year-old woman presented with an asymptomatic scalp mass. Incision biopsy showed it to be a bony metastatic deposit from a primary follicular thyroid cancer. The patient subsequently underwent total thyroidectomy with radioiodine ablation therapy.

Over the following six years, the patient received multiple therapeutic doses of radioiodine. Postablation radioiodine scanning repeatedly showed residual uptake in the scalp, mediastinum and left hip. The patient's thyroglobulin dropped from 7000 μg/l to a low of 16 μg/l. Thyroid function tests were monitored regularly and the patient's thyroid-stimulating hormone (TSH) level was adequately suppressed at <0.05 mU/l, with physiological thyroid hormone (T4) and tri-iodothyronine (T3) levels maintained.

After six years of radioiodine treatment the thyroglobulin levels ceased to fall significantly in response to treatment, with further doses suggesting that the tumour was losing avidity for iodine. A chest X-ray (Figure 1) and subsequent magnetic resonance imaging scan showed extensive mediastinal disease. The patient was offered a thoracotomy to debulk the tumour, with a view to maximizing the effect of further radioiodine treatment. However, due to the small but significant mortality rate of the procedure, the patient refused treatment. An octreotide scan was carried out which showed strong uptake particularly in the right mediastinum, with further areas of enhancement in the neck, right femur and left iliac crest (Figure 2).

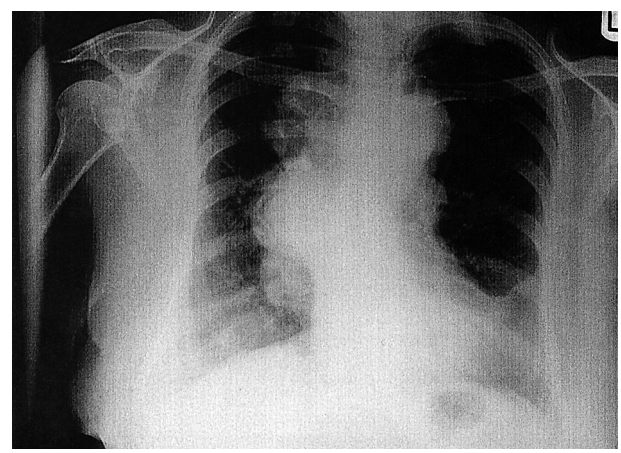

Fig. 1
Chest X-ray.

From the Department of Otolaryngology Head and Neck Surgery, Hull Royal Infirmary, Hull, UK.
Accepted for publication: 15 April 2004.

A three-month course of octreotide was therefore commenced in an attempt to control the disease process. However, the patient's thyroglobulin levels continued to rise, to a peak of 17 000 μg/l, and after sustaining a pathological fracture of the right femur, the patient died. Chest radiography at the time of her final admission showed mediastinal progression compared to the X-rays of six months previous. Octreotide therapy had failed to affect the disease, and the patient died seven months after commencing the treatment.

- **Somatostatins such as octreotide are peptides that have proven useful in the management of various neoplasms, although their role in thyroid malignancy has not been proven**
- **In this case octreotide was used in a patient with differentiated and advanced thyroid malignancy in an attempt to control the disease**
- **Although uptake was extensive, the disease process was not altered**
- **Literature on this subject is limited. Some have demonstrated a therapeutic effect using octreotide, but these authors suggest it may have a role in imaging but not in routine therapy**

Discussion

Differentiated thyroid cancer is known to have a good prognosis in the majority of patients. Somatostatin analogues inhibit cell growth and hormone secretion and have been successfully used in the management of a variety of endocrine tumours, including carcinoid tumours and gastrinomas.[2] The commonest commercially available somatostatin analogue is octreotide (SMS 201-995). Radiolabelled octreotide uptake has been demonstrated in papillary, follicular (including Hurthle cell variant) and anaplastic thyroid cancer.[3,4] A previous study by Diez and Iglesis suggested that radiolabelled octreotide may be useful for both imaging and monitoring disease in patients with non-iodine-avid thyroid carcinoma.[5]

The evidence for a therapeutic role for somatostatin analogues in thyroid cancer is limited. In vitro, levothyroxine has been shown to inhibit TtT-97 murine thyrotrophic tumours, a process that involves somatostatin receptor messenger ribonucleic acid upregulation and enhanced receptor binding.[6] Limited in vivo evidence has suggested a possible therapeutic benefit. Two patients with advanced differentiated thyroid tumours, one unresponsive to I^{131} and the other not demonstrating I^{131} uptake, demonstrated a reduction in tumour volume on serial FDG-PET scanning during three-month courses of octreotide.[7] Our case supports the view that octreotide has potential as an imaging modality in differentiated thyroid cancer, which may be extremely relevant both in tumours that do not concentrate I^{131} and tumours that are losing their iodine avidity. However, no therapeutic role was demonstrated in this case.

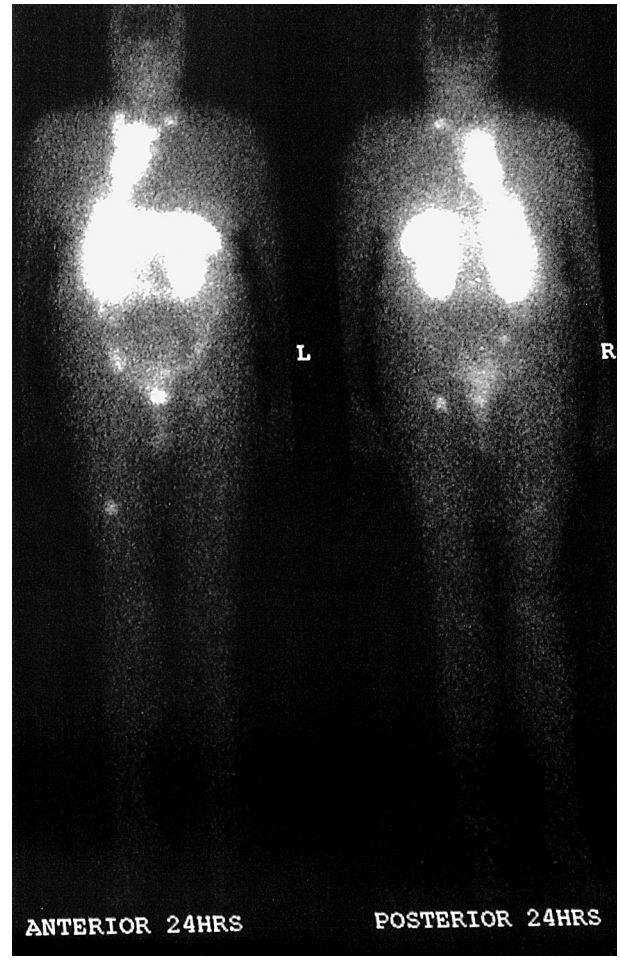

FIG. 2
Octreotide scan.

References

1 Burkitt HG, Quick CRG (eds). Disorders of the thyroid and parathyroid glands. In *Essential Surgery*. 3rd edn. Edinburgh: Churchill Livingstone, 2002;579
2 Zlock DW, Greenspan FS, Clark OH, Higgins CB. Octreotide therapy in advanced thyroid cancer. *Thyroid* 1994;**4**:427–31
3 Postema PTE, Deherder WW, Reubi JC, Oei HY, Kwekkeboom DJ, Bruining HJ. Somatostatin receptor scintigraphy in non-medullary thyroid cancer. *Digestion* 1996;**1**:36–7
4 Gulec SA, Serafini AN, Sridhar KS, Peker KR, Gupta A, Goodwin WJ. Somatostatin receptor expression in Hurthle cell cancer of the thyroid. *J Nucleic Med* 1998;**39**:243–5
5 Diez JJ, Iglesis P. Somatostatin analogues in the treatment of medullary thyroid carcinoma. *J Endocrinol Invest* 2002;**25**:773–8
6 Woodmansee WW, Gordon DF, Dowding JM, Stolz B, Lloyd RV, James RA. The effect of thyroid hormone and a long–acting somatostatin analogue on TtT-97 murine thyrotropic tumours. *Thyroid* 2000;**10**:533–41
7 Robbins RJ, Hill RH, Wang W, Macapinlac HH, Larson SM. Inhibition of metabolic activity in papillary thyroid carcinoma by a somatostatin analogue. *Thyroid* 2000;**10**:177–83

Address for correspondence:
Dr Osama Alhamarneh,
33 Appledore Close,
Hull HU9 1PZ, UK.

E-mail: galag120@hotmail.com

Dr O. Alhamarneh takes responsibility for the integrity of the content of the paper.
Competing interests: None declared