supported by the British Diabetic Association and MP by the British Heart Foundation.

References

- ¹ Page, M McB, and Watkins, P J, *Diabetes*, in press.
- ² Miles, D W, and Hayter, C J, *Clinical Science*, 1968, 34, 419.

- ³ French, E B, and Kilpatrick, R, *Clinical Science*, 1955, 14, 639.
- ⁴ Wheeler, T, and Watkins, P J, *British Medical Journal*, 1973, 4, 583.
- ⁵ Levin, A B, *American Journal of Cardiology*, 1966, 18, 90.
- ⁶ Schneider, E C, and Truesdell, D, *American Journal of Physiology*, 1922, 61, 429.
- ⁷ Lawrence, W H, Autian, J, and Misra, P K, *New England Journal of Medicine*, 1975, 292, 1356.
- ⁸ Elisberg, E I, *Journal of the American Medical Association*, 1963, 186, 200.

Thyroid disease and sebaceous function

S K GOOLAMALI, D EVERED, SAM SHUSTER

British Medical Journal, 1976, 1, 432-433

Summary

Sebum excretion rates (SER) were measured before and after treatment in patients with hypothyroidism and thyrotoxicosis. The mean SER in the former was significantly less than that in normal controls but there was no correlation between SER and the severity of the disease as indicated by serum thyroid-stimulating hormone levels. After treatment with L-thyroxine the SER increased but remained subnormal. By contrast the SER was not increased in patients with thyrotoxicosis and it was unaffected by treatment. The human sebaceous gland seems to respond to thyroid hormone mainly in the hypothyroid range

Introduction

The endocrine control of the sebaceous glands has been less well established in man than in the rodent.^{1,2} In particular, the influence of the thyroid is unknown although thyroidectomy decreases and thyroid hormones increase sebum secretion in the rat.³ We therefore measured the sebum excretion rate (SER) before and after treatment in patients with hypothyroidism and thyrotoxicosis.

Patients and methods

We studied 25 female and three male patients aged 11-72 years with primary hypothyroidism and 13 women and nine men aged 21-65 years with thyrotoxicosis. In each patient the clinical diagnosis was confirmed by the appropriate endocrine investigations. Serum thyroid-stimulating hormone (TSH) concentration was measured by radioimmunoassay⁴ in 23 of the hypothyroid patients before treatment. The patients with hypothyroidism received L-thyroxine as replacement therapy and all those with thyrotoxicosis were treated with carbimazole apart from two men who were given ¹³¹I treatment. The SER was measured on the forehead by the method of Strauss and Pochi⁵ as modified by Cunliffe and Shuster.⁶ The measurements were made before and after treatment (6-42 weeks in hypothyroid patients and 6-35 weeks in thyrotoxic patients); the results were expressed as a percentage of the age- and sex-matched means from 105 female and 70 male controls.

Results

In hypothyroidism the mean SER ($\pm$ SE of mean), was $61.7 \pm 9.2\%$ in the women and $31.1 \pm 2.4\%$ in the men (fig 1) with a group mean of $58.5 \pm 8.4\%$ ($P < 0.001$). Serum TSH ranged from 5.9 to 115 mU/l (mean 39.7 ± 5.7 mU/l) and there was no correlation between TSH and SER values in the 23 patients in whom both measurements were made. After treatment with L-thyroxine the SER increased in most of the 20 patients in whom it was again measured (fig 2). Although the mean increased significantly ($P < 0.02$), the SER remained lower than normal, rising from $66.1 \pm 10.6\%$ of normal before treatment to $82.2 \pm 10\%$ after treatment. The size of the increase after treatment was not related to the size of the decrease before treatment.

FIG 1—Sebum excretion rate in patients with hypothyroidism.

FIG 2—Percentage change in sebum excretion with treatment in patients with hypothyroidism and thyrotoxicosis.

University Departments of Dermatology and Medicine, Royal Victoria Infirmary, Newcastle upon Tyne NE1 4LP

S K GOOLAMALI, MD, MRCP, senior registrar, department of dermatology
D EVERED, MD, MRCP, consultant physician
SAM SHUSTER, PHD, FRCP, professor of dermatology

FIG 3—Sebum excretion rate in patients with thyrotoxicosis.

In patients with thyrotoxicosis the SER was $130.0 \pm 18.3\%$ in women and $96.8 \pm 10.8\%$ in men (fig 3). These values were not statistically different from normal. After treatment with carbimazole or ^{131}I the mean SER in the 17 patients in whom it was remeasured decreased slightly but not significantly, even when the single high value was excluded (fig 2). There was no consistent decrease in SER in those in whom it was increased before treatment.

Discussion

The decreased SER in hypothyroidism was not surprising in view of the appearance of the skin, and findings in the rat.³ While this "sebomeia" is presumably due to the decrease in

circulating thyroid hormone it is not clear why thyroxine only partially restored the SER to normal. Persistent hypothyroidism seems unlikely both on clinical grounds and because serum TSH became normal after treatment. Possibly hypothyroid human sebaceous glands, unlike those of the rat,³ respond slowly to thyroid hormone. This failure of complete restoration of SER and the lack of correlation between SER and the severity of hypothyroidism (as assessed by serum TSH level) suggests that sebum production is a poor index of the tissue response to thyroid hormone in man.

In contrast to the findings in hypothyroidism no consistent increase in SER was found in hyperthyroidism and there was no consistent change after treatment, though further studies will be required to exclude changes in delivery of sebum⁶—for example, due to sweating. Our findings suggest that the sebaceous gland is responding maximally to thyroid hormone in the euthyroid state. Hence probably the human sebaceous gland responds equally to minor and major degrees of hypothyroidism but not to increases in thyroid function. A tentative explanation is that the response of the human sebaceous gland to thyroid hormone occurs mainly in the early hypothyroid range; the possibility of such a limited range of control requires further study.

We are grateful to Professor R Hall and Dr F Clark for referring patients and to the Medical Research Council and the North of England Cancer Campaign for grants.

References

- Shuster, S, and Thody, A J, *Journal of Investigative Dermatology*, 1974, **62**, 172.
- Thody, A J, and Shuster, S, *Journal of Endocrinology*, 1975, **64**, 503.
- Thody, A J, and Shuster, S, *Nature*, 1972, **237**, 346.
- Hall, R, Amos, J, and Ormston, B, *British Medical Journal*, 1971, **1**, 582.
- Strauss, J S, and Pochi, P E, *Journal of Investigative Dermatology*, 1961, **36**, 293.
- Cunliffe, W J, and Shuster, S, *British Journal of Dermatology*, 1969, **81**, 697.

SHORT REPORTS

Whole-gut perfusion for therapeutic purgation

Whole-gut perfusion is a technique for gut cleansing in which an isotonic solution of electrolytes is introduced at about 4.5 l/h via a fine nasogastric tube into the stomach.¹ Most patients prefer this to drinking the same amount at such a rate. Whole-gut perfusion may be better than an enema for the preoperative preparation of an unobstructed large bowel,² and is less unpleasant for the patient.

We report here the successful use of whole-gut perfusion in two cases presenting intractable problems that called for evacuation of the gut contents.

Case reports

(1) A healthy 24-year-old man was admitted after swallowing over 300 lead airgun pellets. Despite an initial stomach washout followed by two-hourly oral magnesium sulphate purgation and frequent bowel actions, none of the pellets had been recovered after 36 hours. Most of the pellets were then in the ileum and caecum. Serum lead levels had risen at one stage to $6.6 \mu\text{mol/l}$ ($136 \mu\text{g}/100 \text{ ml}$), and after treatment with intravenous sodium calcium edetate they remained consistently above $3.9 \mu\text{mol/l}$ ($80 \mu\text{g}/100 \text{ ml}$). Whole-gut perfusion for two hours resulted in the immediate recovery of 289 pellets; 28 of the remaining 30 were passed within six hours. One month later he was well with a serum lead level of $2.4 \mu\text{mol/l}$ ($49 \mu\text{g}/100 \text{ ml}$).

(2) A 34-year-old English-born housewife presented with a 29-year history of intermittent threadworm infestations, more frequent in the previous six years. Despite many repeated courses of piperazine and viprynum

together with vigorous purgation and fastidious attention to personal hygiene, relapse invariably occurred within two months. Her family and even the pet cat, though symptom free, had also received regular prophylactic antihelminth

Case 1 Radiograph of abdomen showing lead pellets 1 hour before whole-gut perfusion.