

of the impacted safety pin had clearly ceased. Also the pin had caused epigastric pain and a small haemorrhage, and required removal. In view of the previous abnormalities in the right upper abdomen and the patients' cardiac status, laparotomy and duodenotomy would have been technically difficult and of considerable risk to the patient.

Fibre-optic endoscopy has found a number of diagnostic and therapeutic applications in diseases of the upper digestive tract. Although the second part of the duodenum is accessible using the endoscope, the special devices marketed for the removal of foreign bodies were of little use in this case because of the extreme flexion of the tip required. Fortunately, the biopsy forceps fitted the loop of the ingested safety pin and the pin was lying the appropriate way for its retrograde removal. The advantages of endoscopic removal in this case are clear, but the obviation of general anaesthesia, laparotomy, and a period of postoperative recovery apply equally to the fit patient.

If the patient had presented at hospital while the pin was still in the stomach its removal would have been much easier. Ingested foreign bodies that are likely to impact in the bowel should be removed from the stomach as a matter of urgency when endoscopy is to be used.

<sup>1</sup> Equen, M, *Annals of Otolaryngology, Rhinology and Laryngology*, 1963, 72, 991.

<sup>2</sup> Fyser, B, *Lancet*, 1972, 1, 76.

<sup>3</sup> Gross, R E, *The Surgery of Infancy and Childhood*. Philadelphia, W B Saunders, 1953.

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## Oestrogen and androgen receptors in breast cancer and response to endocrine therapy

We have treated 51 cases of breast cancer with endocrine therapy since 1973, when we began to assay androgen (DHT) receptor in the tumour. The response to treatment in these cases has been studied to evaluate the clinical significance of the presence of the receptor.

### Patients, methods, and results

Cytosols of the tumour tissues were prepared as recommended at the EORTC workshop in 1972.<sup>1</sup> Oestrogen ( $E_2$ ) receptor and DHT receptor in the cytosol were measured by Wagner's method<sup>2</sup> using agar gel electrophoresis. Incubation with the labelled hormone was continued for about 16 hours. The binding of  $E_2$  or DHT was expressed as cpm/g tissue protein (counting efficiency 45%).

All the patients had progressive advanced breast cancer and were selected, investigated, treated, and evaluated according to strict criteria.<sup>3</sup> Receptor-positive, receptor-negative, and intermediate tumours were distinguished by statistical evaluation of the hormone-binding capacities of benign and malignant tumours. The procedure for  $E_2$  receptors has previously been described.<sup>3</sup> A similar procedure was followed for DHT receptors. Intermediate DHT receptor values were regarded as positive.

$E_2$  and DHT receptors were found with about equal frequency but were apparently independent in distribution. The table shows the results of treatment with oestrogens or by castration in the 51 patients. The presence of  $E_2$  receptor had a significant predictive value for response to ethinyl-

Correlation of response to presence of  $E_2$  or DHT receptor, or both

Treatment	Receptors present	No of patients		
		Responding	Not responding	Total
Castration	$E_2$ and DHT	1	1	2
	Only $E_2$	0	1	1
	Only DHT	3	1	4
	No receptor	0	12	12
Ethinyl-oestradiol	$E_2$ and DHT	6	1	7
	Only $E_2$	7	2	9
	Only DHT	1	6	7
	No receptor	1	8	9

oestradiol but the presence of DHT receptor did not. There was a significant correlation between response to castration and presence of DHT receptor (no response in 13 patients without DHT receptor, 4 remissions in 6 patients with DHT receptor;  $P=0.004$ ).

### Discussion

The results in our small series of patients confirm the importance of  $E_2$  receptor in relation to oestrogen therapy in cases of postmenopausal breast cancer. Our findings are in addition to those we presented at the National Cancer Institute Workshop in 1974.<sup>3</sup> The results also indicate that DHT receptor may be an important factor in the response to castration in premenopausal patients.

Determination of receptors for hormones other than oestrogens may help to gain a better understanding of the hormone responsiveness of breast cancer. Determination of both  $E_2$  and DHT receptors seems to give a more accurate prediction of response to castration; absence of both receptors predicts a very poor response.

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<sup>1</sup> EORTC Breast Cancer Co-operative Group, *European Journal of Cancer*, 1973, 9, 379.

<sup>2</sup> Wagner, R K, *Hoppe-Seyler's Zeitschrift für Physiologische Chemie*, 1972, 353, 1235.

<sup>3</sup> Korsten, C B, Engelsman, E, and Persijn, J P, *Estrogen Receptors in Human Breast Cancer*, ed W L McGuire, P P Carbone, and E P Volmer, p 93. New York, Raven Press, 1975.

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## Hypokalaemic periodic paralysis complicating thyrotoxicosis

Periodic paralysis associated with thyrotoxicosis is rare, most cases having been reported from Japan.<sup>1</sup> This is the first case of thyrotoxic periodic paralysis to be reported from Britain.

### Case report

A 30-year-old Scottish man was referred because of weight loss, palpitations, tremulousness, sweating, and heat intolerance over the previous 18 months. Over the previous year he had also experienced about 25 attacks of episodic weakness of the legs, which had been labelled as "functional." The attacks usually occurred half-an-hour after he awoke, but could also come on at any time of the day, and always when he was awake, each attack lasting from 2 to 37 hours. Sometimes when he felt his legs stiffening he learnt that he could usually "work off" an impending attack by walking around for 20 minutes. The attacks bore no relation to exercise, carbohydrate content of meals, alcohol, emotional upsets, or cold.<sup>2</sup> During the attacks there was no sphincter disturbance, and often he had to be taken to the lavatory to defaecate or micturate. He had no pain or sensory disturbance, and between the attacks of paralysis no residual weakness. The attacks did not follow a period of prolonged rest, as he experienced episodic weakness after sitting for only ten minutes. There was no family history of periodic paralysis.

He had clinical evidence of thyrotoxicosis, with bilateral exophthalmos, lid lag, and retraction; a diffusely enlarged thyroid gland, with a loud bruit; and brisk tendon reflexes. Thyroid function tests confirmed the diagnosis. Two days after admission he collapsed, and examination showed severe bilateral weakness of the legs with a complete flaccid paralysis from the waist down. The reflexes in the legs were absent, and there was no pain or muscle tenderness. His sensorium was intact, and there was no disturbance of phonation, deglutition, or sphincter function. The results of investigations at the time of paralysis showed a serum potassium level of 1.8 mmol/l (mEq/l); ECG showed evidence of hypokalaemia. He recovered completely six hours later, and examination showed no evidence of weakness, brisk tendon