plasma sodium increased to 414 mg. per 100 ml. and the chloride to 719 mg. per 100 ml. There was a fall in the serum potassium to 14 mg. per 100 ml. These figures show sodium and chloride retention. Oliguria persisted for a further three days, his oedema became worse, and his general condition deteriorated still further. Intake of fluids meanwhile was 2-3 litres a day. Urea, 60 g. a day, was then given as a diuretic for three consecutive days, and produced a good response. The urine output increased to 3 litres a day and the oedema lessened. The blood electrolytes fell to normal limits.

With the return of his blood chemistry to normal, his condition began to improve steadily; his temperature settled and the antibiotic dosage was reduced. Nine days after the second operation testosterone and thyroid were started, while the A.C.T.H. was gradually reduced in dosage each day, being finally discontinued two weeks later. During the following month his fluid and electrolyte balance remained satisfactory with a normal diet, and blood electrolyte estimations from time to time showed normal figures. Testosterone and D.C.A. were continued, but he remained lethargic and rather uncooperative in spite of his hormone treatment. Cortisone was not available.

Discussion

In this case A.C.T.H. substitution therapy appeared to be successful in tiding the patient over the stress of the operation on the pituitary cyst. After cessation of the treatment he slowly lapsed into the form of stupor characteristic of "endocrine failure." This was accompanied by a fall of blood pressure and loss of body sodium and chloride; in fact, a high concentration of chloride in the urine together with a normal fluid excretion had been observed during the period before the collapse, but the significance of this was not then recognized. Daily estimations of the amount of salt excreted therefore appear to be important in such a case.

Concurrently with his deterioration the patient developed a hemiparesis of the side opposite to that of the surgical approach. Focal epileptic attacks followed. These phenomena may have been due to local thrombosis, but it is strange that they improved so suddenly once the electrolyte balance was restored and A.C.T.H. recommenced.

Re-exploration of the operation field did not reveal adequate cause for the late deterioration, and failed to produce an immediate improvement. The level of consciousness and the blood pressure improved after the replacement of body salt and the administration of A.C.T.H.

The second relapse was associated with elevation of plasma sodium and chloride, oedema, and respiratory infection. This responded to restriction of salt and the use of a diuretic and antibiotics.

An abnormal water and electrolyte metabolism is often found in hypopituitarism, and is essentially similar to that occurring in Addison's disease and in adrenalectomized animals; there is failure of normal water diuresis, deficiency of sodium and chloride, and accumulation of potassium in the body. These features were present in the case described. Although the secretion of the electrolyte-regulating hormones of the adrenal cortex is not under the influence of the anterior pituitary to the extent, for example, of the hormones controlling carbohydrate and protein metabolism, in the absence of the adeno-hypophysis the adrenal cortex is unable to regulate the reabsorption of electrolytes by the renal tubules so as to preserve the constancy of the internal environment when confronted by physiological changes, variations in diet, and stress (Sayers, 1951). An interesting feature is that throughout the period of observation of this patient in hospital before and after operation, and also while he was being given A.C.T.H., most of his urine was passed at night, a reversal of the normal diurnal rhythm. This is in keeping with previous observations in hypopituitarism (Robertson, 1951).

Summary

A case of hypopituitarism due to a pituitary cyst is described in which A.C.T.H. was given before and after operation.

Several days after cessation of treatment with A.C.T.H. the development of hemiparesis, epileptic attacks, and stupor was associated with sodium and chloride depletion.

Rapid improvement followed correction of the electrolyte depletion and resumption of A.C.T.H. therapy.

Onset of respiratory infection and oedema, with sodium and chloride retention, was associated with a relapse. This was relieved with antibiotics and induction of a diuresis.

The pituitary-adrenal relationship is discussed.

It is concluded that constant attention to electrolyte balance is important in the management of such a case.

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MYOCARDIAL CALCIFICATION ASSOCIATED WITH PITUITARY ADENOMA AND OBESITY

BY

P. G. CRONK, M.B., B.Chir.

Lieutenant, R.A.M.C., Late House-physician, King George Hospital, Ilford

Myocardial calcification without evidence of extensive tuberculous, rheumatic, or ischaemic heart disease is not common, and few cases have been reported. In the following case the gross obesity and large pituitary tumour add to the interest.

Clinical History

A woman aged 64 was admitted to hospital on a Saturday afternoon and died 36 hours later, before radiological or pathological investigations could be undertaken. Owing to her poor mental state an accurate history was out of the question, but her relatives said that her legs had been swollen for some 30 years and that more recently she had been short of breath. Nevertheless, in spite of her increasing disability—she had virtually been confined to bed for two years—she had refused to allow her doctor to see her. She had not had diphtheria or tuberculosis, nor had she been abroad. There was a family history of obesity, both parents and three siblings being overweight, and two of these had died of heart failure.

Examination was made difficult on account of her vast size and rather bovine mentality. Her weight was estimated

at 23–25 st. (146–159 kg.) and her obesity was generalized. However, her legs appeared to be the most affected. The skin on her legs was hard and irregular, with gross hyperkeratosis and some hard pitting oedema, somewhat resembling elephantiasis at first sight (Fig. 1).

On examination the pulse rate was 100, regular, and of fair volume, and the blood pressure was 160/120 mm. Hg.

FIG. 1.—Pseudo-elephantiasis and proci-dentia.

The heart sounds were of fair volume and seemed normal, although there was a harsh apical systolic bruit. Both lung bases were very congested. Complete proci-dentia was present, and there were many intertriginous areas in the groins and buttocks; the axillary and pubic hair was scanty. Unfortunately the optic fundi and visual fields were not examined on admission, as the pituitary adenoma was unsuspected. Digitalis folium, 1 gr.

(65 mg.) twice daily, mersalyl, and a reducing diet were prescribed. While in hospital the patient appeared to suffer from polyuria. She was not able to do very much for herself, partly on account of her size; she was therefore nursed on a mattress on the floor, as her weight was such that the combined efforts of four nurses were necessary to move her. She died rather suddenly for no apparent reason during her second night in hospital.

Post-mortem Examination

Her height was 5 ft. 3½ in. (161 cm.) and her weight 26 st. 4 lb. (167 kg.). A smooth firm solid adenoma of the pituitary was found in a deep and wide pituitary fossa measuring ¾ by 1 in. (1.9 by 2.5 cm.); the tumour weighed 4.1 g. (normal weight about 0.5 g.), and was closely attached

FIG. 2.—Myocardial calcification and caseation.

to the left optic nerve and internal carotid artery and had indented the hypothalamus. The cerebral arteries showed advanced atheroma without evidence of thrombosis.

Several nodules about the size of a pea were found in the space behind the posterior lobes of the thyroid and in the superior mediastinum, but

none of them contained parathyroid tissue and they showed only lymphatic tissue on sectioning. The thyroid, ovaries, adrenals, kidneys, and gastro-intestinal tract were macroscopically and microscopically normal. The lungs showed no evidence of new or old tuberculous infiltration, there was no apical fibrosis or calcification, and pleural adhesions were absent. The spleen was congested but normal histologically and weighed 450 g.; the liver weighed 2,150 g.

and was of normal texture, with no fatty degeneration histologically. The gall-bladder contained a large cholesterol stone.

The heart weighed 950 g. when stripped of the very abundant surrounding fat. The pericardium was normal in colour and thickness, and there was very little pericardial fluid. The coronary arteries were patent throughout with only minimal atheroma, and their openings into the aorta were not stenosed. There was moderate aortic atheroma. The heart valves were all normal, with no fibrotic thickening or calcification, and the chordae tendineae were not shortened or thickened. On sectioning the ventricles three or four large calcific masses (¾ by ¾ in.—1.3 by 1.9 cm.—in diameter) with central areas of white caseous material (Fig. 2) were cut across with difficulty. Stained films of this caseous matter revealed no acid-fast bacilli. The calcareous masses extended from behind one of the mitral valve cusps (but not continuous with it) about 2 in. (5 cm.) downwards in the interventricular and left ventricular walls; the masses were quite separate from each other and from the pericardium and epicardium. The myocardium between these masses looked healthy and was not fatty. Prolonged search was made for areas of calcification in other organs, especially the kidneys, lungs, and stomach, but no other calcified foci were found. The long bones were not examined, although the skull seemed normal.

The histology of the pituitary adenoma was reported on as “lightly staining cells forming a poorly organized tumour of the chromophobe type.” The heart contained “caseous lesions in the myocardium into which extensive calcareous deposits have been laid down; there is a foreign body reaction around these calcified lesions with occasional foreign body giant cells, but no sign of a reaction suggestive of a specific granuloma.”

After the necropsy the husband was interviewed, and in response to specific questions said his wife had had polyuria and polydipsia for three to four years. Her eyesight had been failing for the past two years; and for the past three months she had had severe frontal headaches and had been drowsy in the daytime but wakeful at night. She had always been rather obese but had put on much weight since the age of 35. About a week previously he thought she had coughed up a little blood. Her periods had ceased at the age of 59. She had had no previous illnesses except “bronchitis.”

I wish to thank the Director-General, R.A.M.C., and Dr. R. B. Niven, under whose care the patient was admitted, for permission to publish this case record. I am grateful to Dr. T. B. Dunn, senior medical registrar, for his invaluable advice and criticism in the preparation of this report; to Dr. J. Spencer, pathologist, for the histological report; and to Lieutenant-Colonel J. B. Neal, for office facilities.

All surgical operations likely to cause pain to animals must be carried out under an anaesthetic according to the Protection of Animals (Amendment) Bill published on July 30. The effect of the Bill, which was formally introduced as a private member's Bill by Lord Stamp, is to repeal the Animals (Anaesthetics) Act, 1919, an extends the scope of the Protection of Animals Acts, 1911 to 1933. The Bill does not apply to operations performed on birds, fowls, fish, or reptiles. It covers “any operation with or without the use of instruments which involves any surgical interference with the sensitive tissues or the bone structure of an animal.” Operations excluded from this ruling include any experiment to which the Cruelty to Animals Act, 1876, applies; first aid in emergencies; docking dogs' tails before their eyes are open; castrating domestic animals before they reach the prescribed age; and any minor operation which, because it is quick or painless, is not normally performed by a veterinary surgeon. The Bill is being put forward because of the great advances in the development of anaesthetics since the 1919 Act was passed.