HYponatraemia with Carcinoma of the Bronchus

J. J. Daly, M.A., M.D.(Cantab.), M.R.C.P. M. A. Nelson, M.B., B.S.(Lond.), F.R.C.S.(Eng.)
Lecturer in Medicine Registrar in Orthopædics
D. P. Rose, M.B., Ch.B.(Sheff.) Registrar in Clinical Pathology
From the Departments of Medicine, Orthopædics and Chemical Pathology, The Royal Hospital, Sheffield

Several previous reports have described the occurrence of hyponatraemia with carcinoma of the bronchus, and inappropriate secretion of antidiuretic hormone was suggested as the mechanism accounting for the low serum sodium. (Schwartz, Bennett, Curelop and Bartter 1957, Roberts 1959, Turner and Williams, 1962.) Rees, Rosalki and Maclean (1960), described a case of carcinoma of the bronchus in which they considered renal tubular damage accounted for the low serum sodium, in the absence of evidence of excessive secretion of antidiuretic hormone. We wish to report a further case of carcinoma of bronchus with hyponatraemia, in which there was evidence of renal tubular damage. In addition, there was evidence of adrenal hyperactivity.

Case Report
A postman, aged 49, attended the out-patient department in January 1962, with a six months' history of intermittent substernal pain occurring at rest. He was a heavy cigarette smoker. There were no abnormal physical signs; a barium-meal examination revealed a hiatus hernia. His symptoms improved with diet and antacids. In June 1962 the patient complained of increasingly severe backache radiating to the right thigh. There was loss of lumbar movement and wasting of the right thigh and calf, with anaesthesia over the distribution of segments L2 and L3. He was admitted to hospital.

Investigations. Chest X-ray: There was pleural calcification over the right upper lobe and a shadow at the left hilum. Hb. 17.9 g./100 ml., ESR 3 mm./hr. Plasma sodium 110 mEq./l., potassium 4.4 mEq., chloride 86 mEq., and alkali reserve 25 mEq. per litre. Blood urea 20 mg./100 ml. Serum calcium 8.6 mg. and inorganic phosphate 1.6 mg./100 ml., serum alkaline phosphatase 21 King units. Total serum protein 5.5 g./100 ml., albumin 4.2 g. globulin 1.3 g. A fasting blood sugar was 92 mg./100 ml.
The urine contained a moderate amount of albumin and 1% glucose. Microscopy showed numerous red and white cells. Culture was sterile. Urinary sodium 42 mEq., calcium 137 mg., and glucose 3.6 g., all per 24 hours. Urinary steroids: 17-ketosteroids 20.5 mg., 17-ketogenic steroids 89 mg., and 17-hydroxycorticosteroids 104 mg. per 24 hours. Chromatography of the urine showed generalized aminoaciduria.

Progress. On the thirteenth hospital day urinary retention developed and 24 hours later paraplegia was present with a sensory level at D9-10. Myelography showed a block at this level and subsequent laminectomy on June 16 revealed an extensive extra-dural metastasis. The patient's condition deteriorated rapidly and he died on June 29.

Autopsy findings. An oat-celled carcinoma was present in the left upper lobe main bronchus. There were metastases in the hilar lymph nodes and liver. Both kidneys appeared normal. Histology revealed metastases in both adrenals and the pituitary. The kidneys were normal microscopically.

Comment
In the present case a serum sodium level of 110 mEq./l. was accompanied by a urinary excretion of 42 mEq./24 hours suggesting that failure of renal conservation of sodium contributed to the hyponatraemia. The possibility that excessive secretion of antidiuretic hormone was a factor cannot however be excluded. In addition to the hyponatraemia, proximal renal tubular damage was suggested by glycosuria in the presence of a normal fasting blood sugar, aminoaciduria and hypophosphataemia.

The association of carcinoma of the bronchus and adrenal overactivity is well recognized. (Allott and Skelton, 1960, Bagshawe, 1960a and b.) Our patient showed no clinical features of Cushing's syndrome and the serum potassium was normal. However, the urinary level of corticosteroids was higher than those previously reported in cases of carcinoma of the bronchus with hyponatraemia.

The case described by Rees and others (1960) showed histochemical evidence of adrenal overactivity. Thus the present case more closely resembles that described by these workers as regards both the adrenal and renal abnormalities, than the cases in which an abnormality of antidiuretic hormone secretion has been postulated as a cause for hyponatraemia.

Summary
A case of hyponatraemia with carcinoma of bronchus in a man, aged 49, is described. Glycosuria and aminoaciduria were present. These were interpreted as being evidence of impaired renal tubular function which probably accounted for the low serum sodium. The urinary excretion of corticosteroids was increased but there was no clinical evidence of Cushing's syndrome.

We would like to express our thanks to Professor C. H. Stuart-Harris and Mr. F. W. Taylor for permission to publish details of this case. Our thanks are also due to Mr. A. Jefferson for details of the findings at operation.
Clinical Trial

A CLINICAL TRIAL OF FLUPEROLONE:
A NEW TOPICAL STEROID

NAPIER THORNE, M.D., M.R.C.P.

Physician-in-Charge, Skin Departments, Prince of Wales's General Hospital, Mile End Hospital, and St. Andrew's Hospital, Bow.

For the evaluation of a new topical steroid, flupero- 

lone (P-1742: Methral; Pfizer) a clinical trial was 

planned in four phases. First, in order to obtain a 

clinical impression, ointments of both 0.25% and 

1.0% and spray pack preparations, were used for the 

treatment of a variety of commonly occurring 

dermatoses. Secondly, following encouraging 

results from this pilot trial and favourable reports 

from another centre (Sneddon, 1962), a double 

blind comparative trial was undertaken with prepara-

tions containing either 0.25% flupero- lone or 1.0% 

hydrocortisone. Both were of identical appearance 

and consistency, and were dispensed in a water 

miscible base. In this phase of the trial, patients 

were given, in a blind, random manner, one of the 

two preparations, but at the first follow-up visit 

after one week, the preparation was changed. The 

randomization was such that approximately equal 

numbers of patients commenced therapy with both 

preparations. The third phase of this trial was also 

a double blind study, planned in an identical 

manner, but comparing 0.1% flupero- lone and 1.0% 

hydrocortisone. Lastly, in the fourth phase, 

patients with various types of eczema were treated 

with 0.1% flupero- lone but at the first follow-up 

visit the preparation was changed to 0.01% flupero-

lone, to see whether this low concentration would 

be adequate to maintain the improvement observed 

during treatment with the 0.1% preparation. The 

patient was unaware that the second preparation 

was of a lower concentration than the original.

Chemically this compound is of interest both due 

to inclusion of a fluorine atom, and to the modi-

fication of one of the side chains by the introducti

on of a methyl grouping at position C21. The struc-

ture of flupero- lone can be described as 21-methyl-9x 

flouro-prednisolone acetate (Fig. 1).

![Flupero- lone structure](image-url)

**FIG. 1.**—Flupero- lone: note inclusion of fluorine atom at C, and methyl group at position C21.
Hyponatremia with Carcinoma of the Bronchus

J. J. Daly, M. A. Nelson and D. P. Rose

doi: 10.1136/pgmj.39.449.158

Updated information and services can be found at:
http://pmj.bmj.com/content/39/449/158.citation

These include:

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/