Inappropriate secretion of antidiuretic hormone treated with frusemide

GUY DECAUX, YVES WATERLOT, FRANÇOISE GENETTE, ROGER HALLEMANS, JEAN CLAUDE DEMANET

Abstract
Seven out of nine patients with chronic inappropriate secretion of antidiuretic hormone were successfully treated with 40 mg frusemide daily. One patient needed 80 mg, and the remaining patient achieved only a small increase in diuresis after 40 mg frusemide; this was probably related to his low creatinine clearance. In order to maintain a salt intake high enough to compensate for the loss of urine electrolytes 3 to 6 g sodium chloride was added as tablets to the sodium-free diet in six patients. Hypokalaemia occurred in five patients but was easily corrected with either supplements of potassium chloride or a potassium-sparing diuretic.

These findings add further weight to evidence that frusemide is a good alternative for the treatment of patients with inappropriate secretion of antidiuretic hormone who cannot tolerate water restriction.

Introduction
Water restriction is the cornerstone of treatment for the syndrome of inappropriate secretion of antidiuretic hormone.\(^1\) When restriction must be drastic or is difficult for the patient to tolerate demeclocycline\(^2\) or urea\(^3\) may be tried. We successfully treated a patient with symptoms of inappropriate secretion of antidiuretic hormone using a single oral dose of 40 mg frusemide,\(^4\) the principle being to induce a water diuresis while compensating for electrolyte losses by ensuring a sufficiently high salt intake. We have now extended the observations to nine patients.

Patients and methods
We treated nine patients with chronic inappropriate secretion of antidiuretic hormone due to organic brain disease (three cases) and inoperable oat-cell carcinoma of bronchus (six) who had continued to have serum sodium concentrations below 125 mmol(mEq)/l after five days of water restriction. All were given 40 mg frusemide by

References

(Received 11 May 1982)
mouth, usually at noon. They were allowed unlimited fluids, but salt tablets were given if salt intake was considered to be too low as judged by urinary sodium excretion. Estimations of electrolytes, creatinine, urea, and osmolality were made on daily blood samples and 24-hour urine collections. Statistical analysis was by Student's t test and the two-tailed test.

Results

Eight of the nine patients given frusemide responded satisfactorily (table). Two patients with a high salt intake were treated by a single oral dose without added salt; of the others, four were given 3 g salt daily and two 6 g salt daily. Only one patient needed 80 mg frusemide and 6 g salt a day to maintain a normal serum sodium value. Hypokalaemia occurred in five patients and was corrected with potassium supplements or triamterene.

Symptoms of water intoxication, such as anorexia, headache, confusion, and somnolence, disappeared completely during treatment, and the overall condition of the patients improved. Individual serum sodium concentrations fluctuated between 130 and 143 mmol/l over a long period of observation, but despite this all patients remained symptom free.

Comment

The principle of treatment is to restore normal water balance with a loop diuretic which inhibits reabsorption of free water while correcting for electrolyte loss by ensuring a sufficiently high salt intake. Water was not restricted and hyponatraemic dehydration did not occur. The treatment cannot absolutely prevent water intoxication, since retention might still occur with a large fluid intake; nevertheless, 3000 ml/day was tolerated by some patients. Electrolyte losses were easily corrected with a relatively high salt intake (± 150 mmol/day) and, when necessary, by adding potassium or a potassium-sparing diuretic.

One patient deteriorated with frusemide despite a normal sodium balance. This was due to failure of diuresis, probably resulting from a relatively low creatinine clearance (45-55 ml/min) and a high fluid intake. He achieved good control with urea.

If the primary lesion inducing inappropriate secretion of antidiuretic hormone cannot be treated the first choice remains water restriction. Demeclocycline, urea, or frusemide is usually effective whatever the aetiology. If urine osmolality is very high (over 900 mmol/(mosmol)/kg H2O) and creatinine clearance satisfactory frusemide is preferable to urea, as a high dose of urea would be needed to produce a sufficient osmotic diuresis. On the other hand, if creatinine clearance and urine osmolality are low, urea is more likely to induce a satisfactory diuresis. Demeclocycline is best used as a second choice because of the incidence of nephrotoxicity and risk of superinfection, especially in immunosuppressed patients. Also demeclocycline takes a few days to act, whereas frusemide and urea act immediately. The few patients with high urine osmolality who cannot restrict water intake to less than 2500 ml a day are probably best treated with demeclocycline.

We thank Drs C Melot, Y Van Laethem, and J Mockel for referring patients; Mrs F Masquelier, Mrs J Syoen, Mrs M Chartier, and Mrs A Salingret for nursing care; and Drs F Vertongen and P Courtoy for laboratory help.

This work was supported by a grant from the Ministère de la Politique Scientifique (Actions concertées).

References


(Accepted 14 April 1982)

ONE HUNDRED YEARS AGO With the complaints of professional grumblers, all medical officers, whether civilian or military, are unhappily too conversant; the man who out of hospital lives willingly on a shilling a day, in hospital finds the cooking never good enough, the beef-tea never strong enough, the wine not in sufficient abundance, the beds hard, the nurses inefficient. The value of the complaints made by such grumblers, and the unreasonableness of giving public importance to them, may be partly judged by the following incident, which falls within my personal knowledge. One of the returned invalids, on being asked how he got on at Ismailia, and if he received any medical comforts, replied, "No, none whatever; only just our rations." Struck with the peculiarity of the circumstance, and thinking the man must have been mistaken, in the course of the day he was asked the questions, "Did you get no arrowroot or port wine?" "O, yes," he replied, "I had plenty of arrowroot, and port wine, egg flip, and all those sort of things." "But," said his interrogator, "you told me this morning you had no medical comforts?" "O!" he replied, "I do not call those medical comforts." And in answer to the question, "What do you call medical comforts?" he replied, "O! grapes, jellies and such." Even field hospitals and military officers cannot be expected to work miracles, or to provide grapes in the desert and jellies in the wilderness. (British Medical Journal, 1882).