Continuous infusion of frusemide in refractory oedema

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It is well known that patients may be resistant to 'conventional' doses of frusemide, and may require a dose of up to 500 mg or more to achieve a therapeutic response (Allison & Kennedy, 1971). In our study ten patients with severe congestive cardiac failure which had proven resistant to single doses of 120 mg were treated with a continuous infusion of frusemide delivered by a constant rate infusion pump. The patients' urine volume and urine and plasma electrolyte concentrations were monitored in detail during therapy. The patients received frusemide at a mean delivery rate of 8.9 mg/h (range 4–16 mg/h). On this regime all patients experienced a vigorous diuresis: 24 h urine output 5.05 $\pm$ 3.7 l (mean $\pm$ s.d.). The mean 12 h urinary sodium excretion rose from 58.2 $\pm$ 28 mmol before therapy to 327.2 $\pm$ 202.4 mmol during the infusion. There was a similar rise in the mean 12 h potassium excretion from 29 $\pm$ 14.7 to 79.8 $\pm$ 56.6 mmol. Patients did not receive potassium supplementation during treatment, and four became hypokalaemic (plasma $K^+ < 3.5$ mmol/l). No other adverse reactions were experienced. Steady state plasma frusemide concentrations were measured during therapy in eight patients by the method of Forrey, Kimpel, Blair & Cutler (1974). In all cases the levels were low: mean 0.68 μg/ml, range 0.4–0.9 μg/ml. There was a significant correlation between the delivery rate and the obtained plasma frusemide concentration ($r = 0.79$, $P < 0.02$). Thus, these patients exhibited a satisfactory and controllable diuresis with plasma frusemide concentrations well below those thought to be necessary for a therapeutic response following administration of frusemide by a single dose (Branch, Roberts, Homeida & Levine, 1977). This proved to be a safe and effective treatment, and provides an alternative to the use of massive single doses of frusemide without the associated toxicity.

References

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A domiciliary study of urinary circadian rhythms in rheumatoid patients with particular reference to the effects of the time of administration of corticosteroid drugs

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There is a circadian rhythm in renal function which results in low urine flow at night and maximal urine flow in the forenoon. The loss or reversal of the normal pattern of urinary excretion often results in nocturia. This may be especially troublesome in rheumatoid arthritis patients who suffer from impaired mobility.

Many drugs alter the normal circadian rhythm of urine production and it seemed likely from a hospital based study of asthmatics that nocturia was a side-effect of corticosteroid therapy (Thomas, Coles & El-Shabourg, 1970).

Prednisolone is frequently prescribed in rheumatoid arthritis. The circadian rhymicity of urine flow rate and electrolyte excretion has been investigated in rheumatoid arthritis patients taking prednisolone at various times of the day, particularly to determine whether nocturia was more likely with a single evening dose. Patients were studied over a 3 day period on three separate occasions in the sequence, (i) after taking prednisolone as a single morning dose for at least 1 month, (ii) 4 to 6 days after changing to a