Sucking pressures recorded at 6 days in baby with neonatal myasthenia gravis.

Comment

All that was required to monitor the response to treatment of this infant with neonatal myasthenia gravis was a balloon, a pressure transducer, and a pen recorder—items of equipment available in many neonatal units.

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Unusual complication of high-dose frusemide

High-dose frusemide (1000-2000 mg/day) has been advocated in the treatment of haemodialysis patients to increase urinary output and thus permit a larger fluid intake and a more comfortable life.¹ This therapy significantly increased diuresis in about half the patients in our unit. There are few complications provided frusemide is given orally.¹⁻³ We report here an unusual side effect observed in one of our patients.

Case Report

A 49-year-old man developed rapidly progressive glomerulonephritis, proved by renal biopsy, and was started on chronic haemodialysis on 22 February 1974. Frusemide 1000 mg/day increased urine output from 300 ml to 1000 ml, and was therefore continued. White cell counts (W.B.C.) made monthly ranged between 4.47 and $6.6 \times 10^9/l$ with a normal differential count. On 19 June the patient received a cadaver kidney transplant. He retained his own kidneys. A transient episode of leucopenia and thrombocytopenia resulted from the high dose of immunosuppressive agents given. After a few weeks renal function deteriorated, oedema appeared, and 100-300 mg frusemide was given intravenously daily. On 2 August haemodialysis was resumed. Immunosuppressive therapy was interrupted four days later. The graft remained in situ. The patient was discharged on 13 August with a white cell count of $5.04 \times 10^9/l$. Frusemide, 1000 mg/day, was given orally. The only other medication was aluminium hydroxide gel 17 g/day. On 29 August the patient developed fever of 39.5°C . A leucopenia of $0.9 \times 10^9/l$ with a differential count of 72% segmented neutrophils, 6% non segmented neutrophils, 2% basophils, 4% eosinophils, 8% monocytes, and 8% lymphocytes was noted. The platelet count was normal. The findings on clinical examination were within normal limits; the results of biochemical tests were unchanged. Serological tests were normal; bacteriological cultures of blood, sputum and urine were sterile.

The hypothesis of a drug-induced leucopenia was confirmed by a lymphocyte stimulation test which provided the following results: spontaneous incorporation 70 c.p.m., frusemide 145 c.p.m. In the same test performed on 30 July the results were: spontaneous incorporation 309 c.p.m., frusemide 226 c.p.m. Frusemide was stopped on 30 August and white cell counts returned to normal within 10 days. Throughout this period platelets and packed cell volume remained stable. The therapeutic regimen, W.B.C., and platelets counts are shown in the fig.

Therapeutic regimen in relation to white cell and platelet counts.

Discussion

The commonest cause of leucopenia in a dialysis patient is the profound neutropenia induced at the start of haemodialysis by temporary sequestration of the neutrophils in the lungs.⁴ In our patient all W.B.C. counts were made before connexion to the dialyser and differential counts remained normal. That the leucopenia was related to the immunosuppressive agents given four weeks earlier is improbable: there was no leucopenia one week after interrupting azathioprine and lymphocytic antiserum, differential counts, and platelets remained normal throughout this period. In fact, the results of the lymphocyte stimulation tests and the spontaneous recovery within a few days of stopping frusemide seem to implicate this drug as the cause of the leucopenia.

The side effects usually reported with high doses of frusemide in chronic renal failure are deafness, tinnitus, hyperuricaemia, hyperglycaemia, and nausea.¹⁻³ Though the chemical structures of sulphonamides and frusemide are very similar we know of no reports of cases of granulocytopenia from using frusemide in haemodialysis patients. Rastogi *et al.*⁵ state that out of 250 white cell counts in their patients with chronic renal failure receiving frusemide up to 2000 mg/day only six gave results below $3 \times 10^9/l$, and none of these findings was substantiated on repetition without interruption of the drug. Nevertheless, frusemide may have the same leucopenic action as sulphonamides and white cell counts should be made repeatedly in every patient receiving the drug.

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