

Erythromycin must join the long list of drugs implicated in interstitial nephritis. So far as we know this is the first case of erythromycin induced renal failure proved by renal biopsy. The insidious onset may permit the renal lesion to escape early detection with resultant permanent damage, as in our case. We suggest that renal function should be monitored when erythromycin or other drugs which may induce interstitial nephritis are administered in prolonged or repeated courses.

- ¹ Rajapakse RA, Glynn LE. Macrophage migration inhibition test using guinea-pig macrophages and human lymphocytes. *Nature (Lond)* 1970;226:857-8.
- ² Magil AB, Ballon HS, Cameron EC, Rae A. Acute interstitial nephritis associated with thiazide diuretics: clinical and pathologic observations in three cases. *Am J Med* 1980;69:939-40.
- ³ Van Ypersele de Strihou C. Acute oliguric interstitial nephritis. *Kidney Int* 1979;16:751-65.
- ⁴ Linton AL, Clark MF, Driedger AA, Turnbull DI, Lindsay RM. Acute interstitial nephritis due to drugs. Review of the literature, report of nine cases. *Ann Intern Med* 1980;93:735-41.

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Erythrocytapheresis in idiopathic haemochromatosis

Clinically manifest idiopathic haemochromatosis is currently treated by weekly phlebotomy.^{1,2} Recently, favourable results have been obtained in haemochromatosis secondary to β -thalassaemia by administering the iron chelating agent desferrioxamine intravenously, or subcutaneously via an infusion pump, possibly with concomitant oral ascorbic acid.^{3,4} Only limited data are available on the use of desferrioxamine in idiopathic haemochromatosis.⁵ Owing to the cost and inconvenience of prolonged periods of chelate infusions we investigated the effect of erythrocytapheresis in this disease.

Patients, methods, and results

We studied three men with idiopathic haemochromatosis without heart failure, impotence, testicular atrophy, joint disease, or fluid retention; two (cases 1 and 2) were diabetic. Results of routine blood tests and liver function tests including measurement of α -fetoprotein concentration were normal. The table shows the main clinical and laboratory data on the patients. Basal urinary iron excretion was respectively 434, 340, and 260 $\mu\text{g}/24\text{ h}$ in cases 1, 2, and 3; after desferrioxamine (1 g intramuscularly) it increased to 10 906, 8600, and 7650 $\mu\text{g}/24\text{ h}$ respectively (normal <200 $\mu\text{g}/24\text{ h}$). At biopsy micronodular cirrhosis was found with predominantly parenchymal iron overload (4+ with Perls' stain) and an appreciably increased hepatic iron concentration (3000, 2010, and 1027 $\mu\text{g}/100\text{ mg}$ dry liver weight

respectively in cases 1, 2, and 3; normal <100 $\mu\text{g}/100\text{ mg}$). Iron overload was also found in the skin, gastric mucosa, and bone marrow.

After an overnight fast erythrocytapheresis was performed using a sterile double bag (Teruflex, TC450) and citrate phosphate dextrose (63.0 ml) as anticoagulant. Packed red blood cells (225-240 ml) were removed by centrifugation at 2000 rpm for 12 minutes, while plasma, platelets, and buffy coats were saved and reinfused within 30 minutes. Erythrocytapheresis was performed twice a week for 10 months in case 1, eight months in case 2, and six months in case 3, after which it was performed once weekly for eight, 10, and 12 months respectively. Percentage saturation of transferrin and serum ferritin concentration were used as indexes of removal of iron and checked every three months when routine blood tests were done.

Assuming a packed cell volume of 0.4, we calculated that 200 mg iron was removed during each erythrocytapheresis, and therefore the total amount of iron removed in the three patients was roughly 22, 20, and 19 g respectively. Since the rate of accumulation of iron is about 3.6 mg/day (that is, 1.6-3.2 g reaccumulated over 18 months), a net iron depletion of 17-19 g was obtained.

Eighteen months' treatment with erythrocytapheresis resulted in a pronounced fall in the percentage of transferrin saturation and in serum ferritin concentration (table). Serum iron concentration decreased in one patient but increased in two. We have previously observed this effect in patients treated with phlebotomy and regarded it as due to mobilisation of iron from the deposits. Serum iron concentration often decreases only in the late stages of treatment. Skin pigmentation resolved and the size of the liver decreased considerably. Insulin requirements fell by about 20% and 30% respectively in the two diabetics. No side effects were observed.

Comment

Weekly phlebotomy remains the treatment of choice in idiopathic haemochromatosis² but may not be suitable for patients with decompensated cirrhosis of the liver, low plasma concentrations of albumin, fibrinogen, and other coagulation factors, or low platelet count. In some cases the use of chelating agents was suggested to increase urinary iron excretion.⁵ Such treatment is expensive, however (about £1100 a year using desferrioxamine 1 g/day), and prolonged periods of chelate infusions are inconvenient. Our results show that patients may be treated with erythrocytapheresis; this procedure is time saving and cheaper than chelate infusion (about £200 a year).

- ¹ Finch CA, Huebers H. Perspectives in iron metabolism. *N Engl J Med* 1982;306:1520-8.
- ² Bomford A, Williams R. Long term results of venesection therapy in idiopathic haemochromatosis. *Q J Med* 1976;45:611-23.
- ³ Propper RD, Shurin SB, Nathan DG. Reassessment of the use of desferrioxamine B in iron overload. *N Engl J Med* 1976;294:1421-3.
- ⁴ Propper RD, Cooper B, Rufo RR, et al. Continuous subcutaneous administration of deferoxamine in patients with iron overload. *N Engl J Med* 1977;297:418-23.
- ⁵ Young N, Henry W, Nienhuis AW. Treatment of primary hemochromatosis with deferoxamine. *JAMA* 1979;241:1152-4.

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Characteristics of three patients with idiopathic haemochromatosis, and effect on certain variables of erythrocytapheresis given twice weekly and then once weekly for 18 months (normal ranges given in parentheses)

	Case 1		Case 2		Case 3	
	Basal	Final	Basal	Final	Basal	Final
Age (years)	40		47		48	
No of times erythrocytapheresis given	112		104		96	
Haemoglobin (g/dl)	13.6	14.2	13.7	14.9	13.0	15.0
Reticulocytes (%)	0.7	1.4	0.8	1.1	1.0	2.1
Mean cell volume (fl)	95	100	95	104	98	102
Serum albumin (g/l)	39	45	40	47	37	38
Serum iron ($\mu\text{mol/l}$) (10.7-30.4 $\mu\text{mol/l}$)	31.0	40.8	32.4	45.5	32.6	22.7
Transferrin saturation (%) (<30%)	100	46	85	52	80	50
Serum ferritin ($\mu\text{g/l}$) (30-350 $\mu\text{g/l}$)	4400	450	2950	245	2650	300
Total iron removed (g)		22		20		19

Conversion: SI to traditional units—Serum iron: 1 $\mu\text{mol/l}$ \approx 5.6 $\mu\text{g}/100\text{ ml}$.