HIV infection except possibly a blood transfusion in 1986, when the blood supply was regarded as "safe" in Australia. Initial investigations of cell-mediated immunity revealed a negative delayed-type hypersensitivity skin test for candida and a negative candida blastogenesis assay; both results persist. Investigations have now included T cell subsets by cytofluorographic analysis:

<table>
<thead>
<tr>
<th>Date</th>
<th>CD4+ (µl)</th>
<th>CD8+ (µl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan, 1985</td>
<td>100</td>
<td>96</td>
</tr>
<tr>
<td>May, 1988</td>
<td>500</td>
<td>320</td>
</tr>
<tr>
<td>March, 1989</td>
<td>80</td>
<td>120</td>
</tr>
</tbody>
</table>

All measurements of CD4+ cells were reduced in 1988 and 1989. The CD4:CD8 ratio inverted. Repeated HIV antibody testing by two ELISAs, western blotting (Novapath, Biorad Laboratories), and HIV p24 antigen assay ('HIV Antigen EIA', Abbott) have been negative. The patient is currently well on ketoconazole 200 mg per day, but, as in Parkhurst and Peakman’s case, she has low peripheral CD4+ cells in the absence of HIV infection. These findings provide further support to the previous warning about overinterpretation of low CD4+ counts in the presence of candidiasis.

Investigations have now included T cell subsets by cytofluorographic analysis:

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PAUL A. GATENBY

REMOVAL AND REPLACEMENT OF TENCEKHOFF CATHETER AT SINGLE OPERATION

Sir,—Paterson et al.1 reported the successful treatment of refractory peritonitis complicating continuous ambulatory peritoneal dialysis (CAPD) in 12 patients by the removal and immediate replacement of the Tenckhoff catheter at a single operation.2 This approach spares the patient several weeks of haemodialysis in hospital and a second operation for reinsertion of a new catheter. Although Morton et al.3 reported a satisfactory outcome in a further 12 cases, others have been less successful. Marichal et al.4 experienced failure in 3 of 18 cases, and the recurrence of peritonitis in 3 of the 13 cases treated by Grefberg5 led him to abandon the technique.

We have treated 12 consecutive cases of refractory peritonitis by a modification of the technique of Paterson et al. The indications for catheter removal were persistent peritonitis in 4 cases (Staphylococcus aureus 3, Pseudomonas aeruginosa 1), and recurrent peritonitis in 8 cases (Staphylococcus aureus 2, coagulase-negative staphylococci 2, P. vesicularis 1, Ps. stutzeri 1, Acinetobacter anitratus 1, Acromobacter sp 1). The cases of peritonitis caused by Staphylococcus and Ps. aeruginosa were associated with a pre-existing infection of the Tenckhoff catheter exit site with the same strain. Antibiotics that had failed to eradicate the organisms were continued during the operation and for 7 days thereafter (all doses administered intraperitoneally). In the cases of recurrent peritonitis, antibiotic therapy was started 24 hours before the operation to ensure adequate tissue levels at the time of replacement. There has been no recurrence of infection (mean period of observation 12 months, range 4-24).

We attribute our success to two factors. Firstly, our modification of the replacement technique. Paterson et al. fashioned a new subcutaneous tunnel and exit site for the replacement catheter, but used the same peritoneal insertion site. We chose to regard the procedure as two separate operations: the infected catheter was removed and the surgeon then changed gown, gloves, and instruments before inserting the replacement catheter at a different site from the previous catheter throughout its subcutaneous length, including the site of entry into the peritoneum. Secondly, we impress upon our patients the importance of aseptic bag exchange and exit site care (especially important in cases associated with exit site infection).

Our modification of the single operation catheter technique has ensured a successful outcome in all cases of refractory peritonitis so far treated. We consider this to be a major advance in the management of infection in CAPD, yielding considerable savings for both patient and hospital.

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H. A. LUDLAM

A. E. YOUNG

A. J. WING

VP-1 ANTIGEN IN CHRONIC POSTVIRAL FATIGUE SYNDROME

Sir,—Yousef et al7 reported that an enterovirus group specific antigen, VP-1, was demonstrated in sera from patients with chronic fatigue. Our studies have confirmed the serological findings of Yousef et al.8 In a study of the serology of a large group of patients with chronic fatigue,9 we found 9 out of 30 (30%) of the cases were positive for VP-1 antigen (confidence interval 13-6-46-4%) compared with 5 of 43 (12%) of the controls (confidence interval 13-6-46-4%). There were no differences between the proportions receiving psychiatric therapy and for antibody against human immunodeficiency virus. Lancet 1986; ii: 483-86.


ERYTHROPOIETIN IN ACUTE RENAL FAILURE

Sir,—Dr Nielsen and Dr Thaysen (March 18, p 264) report erythropoietin (EPO) levels in acute renal failure (ARF). We have measured EPO concentrations serially in five patients with oliguric ARF. Two examples illustrate the trend (figure), in a 21-year-old man (crush syndrome) and a 67-year-old woman (gram-negative septicaemia). EPO concentrations fell rapidly within 2-3 days of onset and remained very low throughout the course of ARF and for some time after normal renal function had been regained.

EPO is produced in the peritubular cells of the kidney. In acute tubular necrosis a precipitous fall in EPO followed by a rapid rise on recovery of tubular function might be expected. However, appropriate EPO levels are not achieved for at least three weeks after recovery of tubular function might be expected. This suggests that the recovery phase may account for the slow rise. Treatment with recombinant EPO could hasten complete recovery from ARF.

deficiency cannot be a major factor in the development of anaemia unless ARF is unduly prolonged. Haemoglobin concentrations often take weeks to return to normal, and inappropriately low EPO production in the recovery phase may account for the slow rise.

EPO concentrations fall rapidly in the first few days of ARF. Even allowing for shortened red-cell survival, EPO levels.

Erythropoietin (EPO) levels in acute renal failure (ARF). We have measured EPO concentrations serially in five patients with oliguric ARF. Two examples illustrate the trend (figure), in a 21-year-old man (crush syndrome) and a 67-year-old woman (gram-negative septicaemia).

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EPO, haemoglobin, and serum creatinine in two cases of ARF, showing duration of oliguria and of dialysis dependence.

--- = haemoglobin (g/dl); — = creatinine (μmol/l); stars indicate blood transfusion.

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LIPID-LOWERING DRUGS IN TREATMENT OF HYPERLIPIDAEMIA ASSOCIATED WITH NEPHROTIC SYNDROME

Sir,—Rabelink et al compared the efficacy of cholestyramine, a bile-acid binding resin, with simvastatin, a 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitor, in the treatment of hyperlipidaemia in patients with nephrotic syndrome. Simvastatin inhibits the rate-limiting step in the intracellular biosynthesis of cholesterol and reduces low-density lipoprotein (LDL) cholesterol in plasma. We and others have suggested that HMG-CoA reductase inhibitors are the therapy of choice since the underlying mechanism for the hyperlipidaemia in nephrotic syndrome is essentially increased synthesis and not defective catabolism. It may be wise, however, to proceed with caution in this form of therapy, at least with regard to dosage. Before our use of lovastatin, another HMG-CoA reductase inhibitor, in patients with nephrotic syndrome, we evaluated the drug in a rat model.

Nephrotic syndrome was induced in 24 male Sprague-Dawley rats (180-270 g) by daily intraperitoneal injection of three doses of puromycin aminonucleoside 80 mg/kg, which is sufficient to produce overt nephrotic syndrome. The animals were then randomly divided into a treatment group (n = 12), which received a daily oral dose of lovastatin 25 mg/kg (a dose slightly below the minimum toxic dose for rats indicated by the manufacturers); the other group was the controls.

Lovastatin reduced the elevated LDL cholesterol levels associated with nephrotic syndrome, but between days 14 and the end of the experiment (day 20) 6 of the 12 lovastatin-treated rats died. Necropsy revealed extensive hepatic necrosis and vacuolar degeneration. The surviving animals, compared with the controls, showed no hepatic abnormalities that were inconsistent with puromycin-induced nephrotic syndrome; renal histological findings in all the rats were compatible with minimal change disease.

We are investigating whether the deaths resulted from the induced nephrosis (although this is a well established model), from the toxicity of lovastatin in combination with puromycin, or whether the dosage of the lipid-lowering agent needs to be reduced in nephrotic syndrome. This condition predisposes to hepatic and renal dysfunction, and reduced plasma albumin levels may result in increases in uncomplexed (and consequently toxic) circulating drug levels.

## ERYTHROPOIETIN IN ACUTE RENAL FAILURE


## LIPID-LOWERING DRUGS IN TREATMENT OF HYPERLIPIDAEMIA ASSOCIATED WITH NEPHROTIC SYNDROME