PSYCHIATRY AND THE ARTIFICIAL KIDNEY

Regular, long term haemodialysis is a standard treatment of patients in chronic renal failure. Its psychiatric implications have been dealt with in a number of studies, most of which concentrate on purely psychological or social aspects, for example patients' perception of and response to illness (Pritchard, 1974), the relevance to outcome of basic personality (Kaplan De-Nour and Czaczkes, 1976), or the impact on the family of dialysis carried out at home (Farmer *et al*, 1979). There are two distinct psychiatric syndromes of importance which can be clinically recognized.

The so called dialysis dysequilibrium syndrome (Kennedy, 1964) is a confusional syndrome, with or without drowsiness, and may show mood changes, such as anxiety or depression in particular. Variable disturbances of thinking and perception may occur, but headaches, dizziness and nausea may be the presenting symptoms. The EEG of such patients is abnormal, showing diffuse slowing of activity, with characteristic triphasic waves. This syndrome tends to occur in early stages of treatment, and improve spontaneously as dialysis proceeds, accompanied by complete reversal of the EEG changes. It is generally attributed to a degree of cerebral oedema, caused by the osmotic gradient created when urea, or other substances are cleared more rapidly from the blood than from the cerebrospinal fluid. Consequently, management is based on slowing the rate of dialysis, or on dialysing against fluid containing a maintained concentration of fructose.

The other syndrome, dialysis dementia or dialysis encephalopathy (Alfrey *et al*, 1972), is a much more serious condition, occasionally subacute, but more often of chronic, insidious onset. It usually becomes manifest not earlier than 12 to 16 months after the beginning of treatment, tends to be progressive and in an advanced stage fatal. Initially thought to be rare, its prevalence in 1976 and 1977 was estimated as approximately 600 per 100,000 European dialysis patients (*Lancet*, 1980). The likely cause of the syndrome is chronic intoxication by aluminium absorbed mainly from the large amounts of often unprocessed tap water used in dialysis (Parkinson *et al*, 1981). Besides those features frequently emphasised in medical reports of the syndrome, namely speech and mobility disturbance, mental changes are invariably present. These consist initially of anxiety and depression with marked withdrawal or irritability, but psychotic symptoms usually of a paranoid nature progressively appear, including both delusions and hallucinations even in apparently clear consciousness. Subtle cognitive deterioration may be detectable by careful assessment right from the early stages, which without intervention will progress to global dementia. The EEG is characteristically abnormal and different from that of the dysequilibrium syndrome, showing high amplitude spike or spike and wave activity. These EEG abnormalities can be of great diagnostic value, since they may appear early in the course of the illness, sometimes preceding the clinical manifestations by months (Burks *et al*, 1976). In the early stages of the condition, the course can be arrested either by rigorous exclusion of aluminium from the dialysis fluid, which is achieved through reverse osmosis or deionization, or by renal transplantation. Recently there have been encouraging preliminary reports on the effectiveness of the chelating agent desferrioxamine in removing tissue aluminium from patients with moderately severe disease, with some evidence of improved cerebral function (Ackrill *et al*, 1980; Platts and Anastassiades, 1981).

Neuropathologically the brain in dialysis dementia shows neurofibrillary tangles, and in a distribution similar to that noted in Alzheimer's disease (Kogeorgos and Scholtz, 1982). It is interesting that a high concentration of aluminium has been found in the brain in both conditions.

Given the distinctive course of the two syndromes, early recognition and differential diagnosis is important. Although the need to use purified water in home dialysis is now recognized and therefore likely to lead to a decline in incidence, liaison and general psychiatrists may occasionally encounter cases of unsuspected dialysis dementia and therefore need to be alert to the features of both syndromes.

References

Ackrill, P., Ralston, A. J., Day, J. P. & Hodge, K. C. (1980) Successful removal of aluminium from patient with dialysis encephalopathy. *Lancet, ii,* 692–3.

Alfrey, A. C., Mishell, J. M., Burks, J., Contiguglia, S. R., Rudolph, H., Lewin, E. & Holmes, J. H. (1972) Syndrome of dyspraxia and multifocal seizures associated with chronic haemodialysis. *Transactions of the American Society for Artificial Internal Organs,* **18,** 257–60.

Burks, J., Alfrey, A. C., Huddlestone, J., Norenberg, M. D. & Lewin, E. (1976) A fatal encephalopathy in chronic haemodialysis patients. *Lancet, i,* 764–8.

Farmer, C. J., Bewick, M., Parsons, V. & Snowden, S. A. (1979) Survival on home haemodialysis: its relationship with physical symptomatology, psychosocial background and psychiatric morbidity. *Psychological Medicine,* **9,** 515–23.

Kaplan De-Nour, A. & Czaczkes, J. W. (1976) The influence of patients' personality on adjustment to chronic dialysis. *Journal of Nervous and Mental Diseases,* **162,** 323–33.

KENNEDY, A. C. (1964) The pathogenesis and prevention of cerebral dysfunction during dialysis. *Lancet, i,* 790–3.

KOGEORGOS, J. & SCHOLTZ, C. (1982) Alzheimer's neurofibrillary tangles in Dialysis Encephalopathy: A new finding. *Neuropathology and Applied Neurobiology,* Vol. **8,** 246.

Lancet (1980) Dialysis dementia in Europe: Report from the Registration Committee of the European Dialysis and Transplant Association, *ii,* 190–2.

PARKINSON, I. S., WARD, M. K. & KERR, D. N. S. (1981) Dialysis encephalopathy, bone disease and anaemia: the aluminium intoxication syndrome during regular haemodialysis. *Journal of Clinical Pathology,* **34,** 1285–94.

PLATTS, M. M. & ANASTASSIADES, E. (1981) Dialysis encephalopathy: Precipitating factors and improvement in prognosis. *Clinical Nephrology,* **15,** 223–8.

PRITCHARD, M. (1974) Meaning of illness and patients' response to long term haemodialysis. *Journal of Psychosomatic Research,* **18,** 457–64.

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