can be taken as the firmest evidence of the development of TD, then the annual incidence rate of the condition in Nithsdale schizophrenics is three per cent.

ELIZABETH T. BARRON
ROBIN G. MCCREADIE

Crichton Royal Hospital,
Dumfries DG1 4TG

References

ANONYMOUS (1979) Tardive dyskinesia. *Lancet, ii,* 447–8.

CARPENTER, W. T., REY, A. C. & STEPHENS, J. H. (1980) Covert dyskinesia in ambulatory schizophrenia. *Lancet, ii,* 212–3.

MCCREADIE, R. G., BARRON, E. T. & WINSLOW, G. S. (1982) The Nithsdale schizoprenic survey: II. Abnormal movements. *British Journal of Psychiatry,* **140,** 587–90.

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE (1976) Abnormal Involuntary Movements Scale (AIMS). In *ECDEU Assessment Manual* (ed. W. Guy), pp 534–7. Rockville, Maryland: U.S. Department of Health, Education and Welfare.

RENAL FINDINGS AFTER 30 YEARS ON LITHIUM

DEAR Sir,

John Cade reported his original findings on the use of lithium salts in the treatment of 10 patients with mania (Cade, 1949). The fifth patient, B.D., continued to take lithium for 32 years until his death in 1980 at the age of 77 from a cardiac infarction. Two years before his death he was studied with renal function tests and renal biopsy.

History of psychiatric illnesses: He was born in 1903. He was a second year medical student when he had his first manic illness in 1926. Further episodes of illness occurred in 1934 and 1935. In 1938 there was an episode of "deep depression—which was like a deep dark trough of despair from which even God could not rescue me." In 1940 there were 2 episodes of mania each requiring hospital admission. Another depressive illness occurred in 1947.

In 1948 there was another episode of mania. Cade's notes read "recurrent mania, present attack has lasted 2½ months and shows no signs of abating. At present restless, noisy, elated, flight of ideas, constantly striding about, gesticulating and up to all sorts of antics. Eating very well, but thin".

30/7/48 "Commenced lithium citrate gr. 20 t.d.s."

2/8/48 "Marked improvement. Far less flight of ideas and much less restless".

12/8/48 "Slowly settling down. Less motor restlessness. Flight of ideas still marked".

16/8/48 "Greatly improved. Flight of ideas has disappeared".

21/8/48 "Quiet, pleasant and rational".

27/8/48 "Normal. To continue with lithium indefinitely".

In 1948, the patient was aged 45 and he said "Since I took the lithium I had no more severe mania or deep depression like the 1938 episode." Despite lithium, however, he was in hospital on 9 subsequent occasions. There were five depressive episodes in 1953, 1954, 1962 and 1979, and 4 manic episodes in 1956, 1966, 1973 and 1976. B.D. never married. He left medical school in the second year and entered the public service and worked until he retired at 65.

Mild tremor of the hands, and severe polydipsia, polyuria and nocturia were the main side effects of lithium treatment, though it is difficult to define the progression of the last symptoms. Thyroid function tests were normal. His plasma lithium levels were monitored from 1972, and levels between 0.6–1.2 mmol/l were kept till 1975 when levels of 0.6–0.8 were obtained. Daily dosage varied but it is estimated that in 32 years he would have taken 14.5 kg of lithium salts. Lithium toxicity was never recorded. In the last two years of his life he developed mild angina. In June 1980 he developed severe chest pain and died in hospital on the same day, of myocardial infarction.

Renal investigations: These were carried out in August 1978 after 30 years on lithium treatment.

Tests of distal tubular renal function revealed that the polyuria was associated with a marked defect in urinary concentrating ability. This urinary concentration defect was resistant to the action of exogenous vasopressin, confirming its nephrogenic origin. The defect was also more marked than in any other patients we have studied on lithium (Walker *et al,* 1982). A significant impairment of urinary acidification was also present. However, measurements of determinants of glomerular filtration rate were not different from age-related normal values (Table). The urinary sediment and urinary protein excretion were also entirely normal.

A percutaneous renal biopsy demonstrated the specific distal tubular lesion associated with lithium therapy that has previously been described (Burrows *et al,* 1978). The lesion consists of vacuolation of the epithelial lining cells of the distal nephron (distal convoluted tubular and collecting duct), with the appearance of variable degrees of periodic acid Schiff (PAS) positive material in granules and strands particularly at the periphery of the cells. There was a mild to moderate degree of interstitial fibrosis. Tubular atrophy and glomerular sclerosis were also present similar to the changes of chronic focal interstitial nephropathy described in other patients on long term lithium therapy (Hestbech *et al,* 1977). However, the

TABLE
Renal function tests

		Patient	Normal values (age corrected where appropriate
1.	*Distral tubular function**		
	Urine osmolality (FD)	203	>720 mosm/kg
	Urine osmolality (VP)	204	>720 mosm/kg
	Urine pH (NH_4Cl)	5.8	<5.3 pH units
	Urine volume	2700-4830	1000–2500 mls/day
2.	*Glomerular filtration rate*		
	Serum creatinine	0.10	<0.11 mmol/l
	Blood urea	4.9	<10.0 mmol/l
	Creatinine clearance	1.0	1.0–1.5 mls/sec.
	51 CrEDTA clearance	56	60–90 mls/min.
3.	*Urine sediment/urine protein excretion*		
	Urine red cells	<250	<10,000 cells/ml
	Urine white cells	<250	< 2,000 cells/ml
	Urine protein	<100 mg/day	<200 mg/day

*(FD); Maximum urine osmolality following 14–16 hrs. fluid deprivation;
(VP); Maximum urine osmolality following exogenous vasopressin,
Minimum urine pH following acid (NH_4Cl) load.

degree of interstitial fibrosis and glomerular sclerosis was also consistent with changes predicted for the age of the patient (Walker *et al*, 1982). Some of the distal convoluted tubules and collecting ducts were markedly dilated and contained amorphous PAS-positive material in the form of casts.

Conclusion: Renal function tests on a 75-year-old man who had taken approximately 14.5 kg of lithium over 30 years showed severe tubular dysfunction but his glomerular function rate was relatively well preserved. Renal histology revealed specific lithium-related distal tubular changes but minimal chronic renal damage.

EDMOND CHIU

St Vincent's Hospital,
Fitzroy, Victoria 3965,
Australia

BRIAN DAVIES

University of Melbourne,
Royal Melbourne Hospital,
Victoria 3050

ROWAN WALKER

Royal Melbourne Hospital,
Victoria 3050

PRISCILLA KINCAID-SMITH

Royal Melbourne Hospital,
Victoria 3050

References

BURROWS, G. D., DAVIES, B. & KINCAID-SMITH, P. (1978) Unique tubular lesion after lithium. *Lancet, i,* 1310.

CADE, J. F. J. (1949) Lithium salts in the treatment of psychotic excitement. *Medical Journal of Australia,* **2,** 349–52.

HESTBECH, J., HANSEN, H. E., AMIDSEN, A. & OLSEN, S. (1977) Chronic renal lesions following long-term treatment with lithium. *Kidney International,* Supplement 11, S13–S–19.

WALKER, R. G., DAVIES, B. M., HOLWILL, B. J. & DOWLING, J. P. (1982) A clinico-pathological study of lithium nephrotoxicity. *Journal of Chronic Diseases,* **35,** 658–95.

https://doi.org/10.1192/bjp.143.4.424 Published online by Cambridge University Press