Lithium-induced hypercalcemia and parathyroid dysfunction

This lady with a background of schizophrenia and depression, on long term lithium therapy, initially presented in 2002, at the age of 53, with acute renal failure and symptoms of lithium toxicity secondary to sepsis. Lithium level measured at the time was 2.5 mEq/l and her creatinine 314 µmol/l. She was normocalcaemic on admission. The patient was hospitalized on ICU and the treatment included ventilation, haemofiltration and inotropic support.

On 10th day post admission the adjusted calcium was noted to be 3 mmol/l, phosphate 1.70 mmol/l, ALP 249 mmol/l, Na 160 mmol/l and Cr 130 µmol/l. Parathormone level was 66 pg/ml (10–70).
The thyroid function was normal. Additionally, the patient became polyuric with 2500 ml of negative fluid balance daily. Her lithium levels had normalized by then. All sinister causes of hypercalcaemia were ruled out. The diagnosis of lithium induced hypercalcaemia and nephrogenic diabetes insipidus was made. Lithium was stopped permanently. The patient was commenced on chlorpropamide. Throughout the course of the next few weeks her polyuria, hypernatraemia and hypercalcaemia have gradually resolved.
In May 2008, she was admitted with worsening confusion and polidypsia. Her adjusted calcium was found to be 2.92 mmol/l and ALP 100 mmol/l. PTH level was elevated at 122 pg/ml. Twenty-four hours urinary calcium excretion was performed and calcium level was 2.6 (2.5–7.5). The sesta MIBI scan demonstrated an increased uptake in the right upper parathyroid which, however, did not correlate with the ultrasound findings (normal parathyroid glands on ultrasound). The right sided neck exploration was performed revealing a large oedematous upper parathyroid and a suppressed second parathyroid. Postoperatively, the calcium level has fallen to 2.35 mmol/l and PTH to 47 pg/ml. The presence of parathyroid adenoma was confirmed histologically.
Lithium is widely used in the treatment of acute manic states and bipolar affective disorders.
Although thyroid dysfunction is the most widely recognised side effect of lithium therapy, hypercalcaemia and a biochemical picture resembling primary hyperparathyroidism may also develop. Currently there is no consensus on the prevalence, severity or exact mechanism underlying lithium-induced hypercalcaemia but it appears that lithium increases the set point for PTH suppression by calcium.

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