

## Lithium

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**Acute kidney injury and lithium toxicity: 2 case reports**

In a case report, a 51-year-old man and a 61-year-old man were described; they developed acute kidney injury and lithium toxicity during treatment with lithium for bipolar affective disorder [BAPD; *routes and times to reaction onsets not stated*].

Case 1: A 51-year-old man, who had been receiving lithium 1350 mg/day for 4 years alongside valproic acid for BAPD, was hospitalised due to disorientation, unsteadiness of gait, slurred speech and difficulty getting up from bed for 3 days, in addition to fever, malaise and loose stools for 2 days. On investigation, he was restless, disoriented to time, place and person, and febrile. His vital signs were as follows: body temperature 103°F, pulse rate 94 beats/minute, RR 22 /minute, BP 164/114mm Hg and oxygen saturation 87%. Bilateral deep tendon reflexes were 2+ along with truncal and gait ataxia. Subsequently, he tested positive for SARS-CoV-2 on RT-PCR. Further laboratory work-up on day 1 revealed the following: total leucocyte count 16400 / $\mu$ L, neutrophils 66.8%, lymphocytes 25.1%, platelets 368000 / $\mu$ L, haemoglobin 15.4 g/dL, creatinine 2.1 mg/dL, urea 52 mg/dL, sodium 151 mmol/L, potassium 5.56 mmol/L, chloride 118.6 mmol/L, D-dimer 769 ng/FEU/mL, CRP 41 mg/L, LDH 420 U/L, SGOT 76 U/L, SGPT 82 U/L, random blood sugar 116 mg/dL, serum valproate 54  $\mu$ g/mL, plasma ammonia 55  $\mu$ g/dL, serum calcium 8.6 mg/dL and serum phosphorus 4.6 mg/dL. Based on these observations, he was diagnosed with lithium toxicity and AKI associated with lithium. Thereafter, valproic acid and lithium were discontinued. He was then shifted to the COVID-19 ICU and treated with off-label IV ceftriaxone 1g twice daily, ivermectin 12mg twice daily for 5 days, zinc tablet 50mg once daily, ascorbic acid [vitamin C] tablet 500mg twice daily, IV dexamethasone 4mg twice daily and SC heparin [unfractionated heparin] 5000IU. The hypernatraemia was managed with sodium chloride, glucose [dextrose] and insulin. On day 4, he developed ventricular tachycardia associated with elevated potassium, which was treated with calcium polystyrene sulfonate. By day 10, his urine output gradually improved. He also regained consciousness and orientation by day 14 and day 17, respectively. He was discharged with gait and truncal ataxia, intention tremors and past pointing.

Case 2: A 61-year-old man, who had been receiving lithium 900 mg/day for 4 years for BPAD, in addition to quetiapine and flupentixol, was brought to hospital due to fever for 3 days and altered sensorium for 1 day. On investigation, he was afebrile, disoriented to time, place and person, and was arousable on painful stimulus. His vital signs were as follows: pulse rate 124 beats/minute, BP 173/103mm Hg and oxygen saturation 96%. ECG was unremarkable. Further cardiovascular and respiratory investigations were unremarkable. He tested positive for SARS-CoV-2 on RT-PCR. Laboratory work-up revealed the following: serum lithium 2.9 mmol/L, creatinine 2.2 mg/dL, serum urea 60 mg/dL, WBC count 19200 cells/mm<sup>3</sup> with neutrophils 79% and lymphocytes 8.4%. He was diagnosed with lithium toxicity and AKI associated with lithium. Brain CT scan revealed calcified granuloma of the right frontal lobe. His treatment with lithium, quetiapine and flupentixol was discontinued. Thereafter, he started receiving off-label IV ceftriaxone 1g twice daily, ivermectin 12mg twice daily for 5 days, zinc tablet 50mg once daily and ascorbic acid [vitamin C] tablet 500mg twice daily. In addition, on the day he was admitted, he received sodium chloride [normal saline] for the lithium toxicity. By day 2, his oxygen saturation dropped to 80% at room air and 92% on non-rebreathing mask. His clinical symptoms persisted, and on day 3, he died of acute respiratory failure.