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A case of lithium intoxication associated with a heat-related illness in summer

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Objective: Lithium has been used in the treatment of depressive and bipolar disorders. The effective serum concentration range of lithium is 0.6-1.2 mmol/L, and lithium intoxication sometimes occurs due to its relatively narrow therapeutic index. So, it is necessary to monitor lithium serum levels in patients receiving this treatment.

Case Report: A 56 year-old female with history of depression who was prescribed lithium by her family doctor (serum lithium level 1.16 mmol/l for 1 year was found lying on the street in summer; the day was very hot and humid. Her axillary temperature was 37.4 ℃. And she was transported to our ED with active cooling. Her core body temperature was 37.8 ℃, blood pressure 131/79 mmHg, pulse 90 beats/min, respiratory rate 18 /min, SpO2 97 % (O_2 4 L/min). She presented with tremor and involuntary movements. Serum BUN was 24 mg/dL creatinine 1.69 mg/dL and creatine kinase increased to 1547 U/L. Serum lithium level was 3.64 mmol/l, and ECG presented QTc interval 456 msec. Lithium intoxication was diagnosed as a result of dehydration and acute kidney injury caused by heat-related illness. She underwent hemodialysis for 6 hours, and serum lithium level decreased to 0.96 mmol/L immediately after hemodialysis. Serum lithium level rose to 1.54 mmol/l on the next day, but it remained at 1.2 mmol/l or less after day 3 hospitalization. Although the serum lithium level was not high, her tremor persisted for about 2 weeks after hemodialysis. Her condition stabilized and she was discharged on 25th day of hospitalization.

Conclusion: Lithium is a useful therapeutic agent for depressive and bipolar disorders, but dehydration and acute kidney injury caused by the hot environment can be a risk factors causing an increase in its serum level. This can require hemodialysis, and despite a decrease in lithium levels after hemodialysis, lithium toxicity can persist and require a prolonged hospital admission.