

Lithium-induced asymptomatic dose-related elevation of serum creatine kinase: a case report

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Dear Editor,

Lithium has many adverse effects limiting its prescription¹. Creatine kinase (CK) is released when skeletal muscle cells are damaged. Psychiatric patients with remarkable CK elevations commonly indicate to two life-threatening physical conditions, rhabdomyolysis and neuroleptic malignant syndrome (NMS). Lithium use is related to rhabdomyolysis and NMS^{2,4}, but the association of lithium and asymptomatic CK elevation had not been reported.

Mr. Y is a 17-year-old man presenting with hyperactivity and agitation when he was brought to emergency department. He had manic symptoms including elevated mood, decreased need of sleep, grandiosity, hypertalkativeness lasting for one week. Upon emergency room visit his blood test showed increased levels of GOT/GPT (208/63 U/L) and CK (8697 U/L). He was admitted to pediatric ward due to rhabdomyolysis and then transferred to psychiatric ward after the condition became stable (CK was 1215 U/L at the transferring day). He was treated with quetiapine first but manic symptoms were still active despite the dosage reached to 600 mg/day. His serum CK level decreased to 644 U/L after two-week admission. We had tried to add mood stabilizers for combination treatment, but valproic acid was discontinued due to allergic reaction and carbamazepine was contraindicated because of his positive HLA-B1502 genotype. Then, we prescribed lithium for him. We started with 300 mg/day and gradually titrated to 900 mg/day. He had obvious response to lithium (Young Mania Rating Scale total score from 43 to 12 after the dose reaching 900 mg/day). When monitoring his laboratory parameters and serum lithium concentration, we found the serum CK level increased again after lithium treatment. Further, his serum CK levels were positively correlated to serum lithium levels. Lithium was then discontinued and his serum CK level returned to baseline (the time trends are shown in Figure 1). During the period of abnormal CK level, he did not have hyperactivity and other physical complaints, and his associated laboratory data were unremarkable (normal liver, renal function and urine globulin).

Lithium interferences with the collecting tubules and suppress antidiuretic hormone stimulation, which makes its polyuria and polydipsia side effects¹. Another case report assumed lithium might induce hyperosmolar state³. These conditions might induce elevated CK levels and even rhabdomyolysis. However, our patient did not have the above states. Besides, the positive correlation between lithium and CK concentration was not mentioned before. The concentration-dependent relationship between lithium and CK needs further investigations.

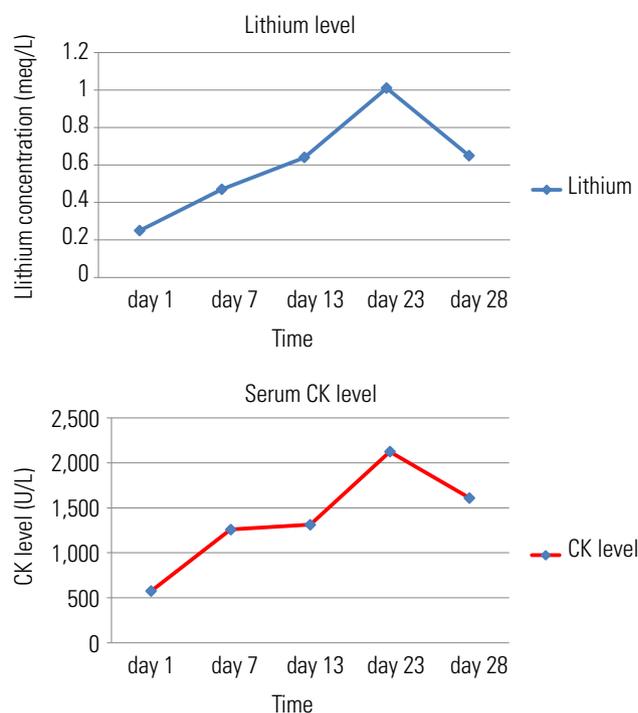


Figure 1. The time trends of lithium and creatine kinase (CK) levels.

Massive Asymptomatic Creatine Kinase Elevation (MACKE) has been discussed in youths using antipsychotics⁴. The article concluded that MACKE is harmless and intensive CK monitor is unnecessary. Whether lithium induced CK elevation is harmless like MACKE or not need more studies to confirm. Furthermore, Gosling *et al.* found the elevation of serum CK may indicate mania is under controlled⁵. Our patient also showed obvious response during CK elevation. But using serum CK level to detect lithium treatment efficacy is lack of well-established evidence. Whether lithium induced asymptomatic serum CK elevation is harmful, harmless, or treatment response predictive needs more explorations.

In addition, studies revealed that higher CK level was found in the manic patients compared with the depressed ones and the lack of correlations between CK level and motor activity⁶. Further studies need to explore the state-dependent differences in CK levels.

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