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Successful treatment of tetanus with magnesium in a dialysis patient

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Dear Editor:

Tetanus is a life-threatening disease caused by *Clostridium tetani* infection. The clinical manifestation includes spasms and autonomic nervous system disturbance. Neurotoxin from the microbe blocks neurotransmitter release from the inhibitory pathways of the motor and autonomic nervous system (1), resulting in the overactivation of sympathetic nerve and extreme hypertension. Hypotension and bradycardia, often seen in severe cases, are attributed to a sudden withdrawal of sympathetic activity, and controlling rapid fluctuation of the hemodynamics is difficult in such patients.

An 87-year-old man with end-stage renal disease (ESRD) on maintenance hemodialysis (HD) was admitted to the hospital with dysarthria. He had hurt 7 days before the administration. His course got worse complicating trismus, spasms, and respiratory failure. He was transferred to our intensive care unit. On examination, his blood pressure was 216/138 mmHg, heart rate was 110/min. He showed muscle rigidity in his arms and legs. With the diagnosis of tetanus, penicillin G was started. Rocuronium, propofol, and fentanyl were used for controlling spasms. His respiratory failure required mechanical ventilation. His blood pressure was labile showing extreme hypotension, and that resulted in the cessation of intermittent hemodialysis. Continuous hemodiafiltration was initiated, however the blood pressure remained labile. Intravenous injection of magnesium-sulfate targeting the serum magnesium concentration of 2-3 mmol/L succeeded in stabilizing his hemodynamics (Fig. 1). Magnesium was continued for 2 weeks and renal replacement therapy could be switched to intermittent HD.

Magnesium has been shown to be effective in reducing spasms and autonomic

instability (2). Intravenous infusion of magnesium targeting the concentrations of 2-4 mmol/L is recommended from a randomized controlled trial in patients without renal impairment (1). Hypermagnesemia causes nausea and headache at the concentration of 2-3 mmol/L, and hypotension, muscle paralysis and coma above the concentration of 3 mmol/L (3). Serum magnesium concentration in patients with ESRD tends to be high and depends on dialysis clearance. It has recently been suggested that magnesium supplementation targeting high normal range may be beneficial in reducing all-cause and cardiovascular mortalities (4).

In patients with ESRD, serum magnesium concentration tends to be high and depends on dialysis clearance (4). Our patient was successfully treated by monitoring serum magnesium level. Magnesium can be a therapeutic option for tetanus even in patients with ESRD.

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Stabilized haemodynamics after injection of magnesium