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Chocolate milk in CRRT circuit: Propofol induced hypertriglyceridemia



Dear Editor:

A 74-year-old male with past medical history of hypertension, stroke, end stage renal disease on hemodialysis, type 2 diabetes mellitus and anemia presented to emergency with fever and cough for 3 days. Physician examination was positive for crackles in bilateral lung fields. Chest radiograph showed bilateral interstitial infiltrates. He was diagnosed with coronavirus disease-2019 (COVID-19) after positive severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) polymerase chain reaction. Patient was admitted to the intensive care unit due to severe hypoxemia. He was intubated and started on propofol and fentanyl drip for sedation and analgesia. Multiple vasopressors (norepinephrine, vasopressin, and epinephrine) were started due to septic shock. The patient developed multiorgan failure and continuous renal replacement therapy (CRRT) was initiated. On day 3, CRRT started to alarm negative pressure for the return line. Upon inspection of the machine, it was noted that the filter had a chocolate milk color on the top and the tubing had chocolate milk colored plasma in it (Fig. 1). Serum triglyceride (TG) level was significantly elevated (930 mg/dL; normal range, 149 mg/dL). Propofol infusion was discontinued. Follow-up TG level dropped promptly to 321 mg/dL the following day and to 288 mg/dL two days later. No further clotting was reported in the dialysis circuit afterwards.

Several factors influence the patency of CRRT circuit such as catheter size, location, anticoagulant use, blood flow rate, replacement fluid flow rate, hematocrit, and platelet count (viscosity of blood) and ultrafiltration rates (filtration fraction).¹ Elevated serum TG as a cause of CRRT circuit malfunction is sparsely reported.² It can occur due to propofol infusion in critically ill intubated patients. Propofol has many beneficial effects, including rapid emergence and onset, antiemetic properties, and neurophysiologic benefits such as decreased cerebral metabolic demand, anticonvulsive properties, and possible neuroprotective effects. Periodic triglyceride level monitoring can identify the potential adverse effects associated with this drug. A retrospective study performed by Devlin et al. on 159 patients which showed that 29 patients (18%) developed hypertriglyceridemia (>400 mg/dL) out of which 6% developed severe hypertriglyceridemia (>1000 mg/dL).³ Propofol infusion syndrome is a rare but potentially fatal complication typically associated with high-dose infusion (>67 μ g/kg per minute) for over 48 h.⁴ Typical features include unexplained anion gap metabolic acidosis, hyperkalemia, hypertriglyceridemia, and cardiac dysrhythmias. Toxicity may occur with lower doses if given over an extended period or

presence of additional risk factors such as critical illness, vasopressor use, and severe liver injury. Physicians should also be aware of hypertriglyceridemia as a cause of filter clotting during CRRT in patients on propofol.



FIG. 1. Continuous renal replacement therapy (CRRT) circuit showing chocolate milk colored plasma.

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REFERENCES

1. **Kakajiwala A, Chiotos K, Brothers J, Lederman A, Amaral S.** What is this chocolate milk in my circuit? A cause of acute clotting of a continuous renal replacement circuit: answers. *Pediatr Nephrol.* 2016;31(12):2253–2255. <https://doi.org/10.1007/s00467-016-3318-4>.
2. **McLaughlin DC, Fang DC, Nolot BA, Guru PK.** Hypertriglyceridemia causing continuous renal replacement therapy dysfunction in a patient with end-stage liver disease. *Indian J Nephrol.* 2018;28(4):303–306. https://doi.org/10.4103/ijn.IJN_201_17.
3. **Devlin JW, Lau AK, Tanios MA.** Propofol-associated hypertriglyceridemia and pancreatitis in the intensive care unit: an analysis of frequency and risk factors. *Pharmacotherapy.* 2005;25(10):1348–1352. <https://doi.org/10.1592/phco.2005.25.10.1348>.
4. **Hemphill S, McMenamin L, Bellamy MC, Hopkins PM.** Propofol infusion syndrome: a structured literature review and analysis of published case reports. *Br J Anaesth.* 2019;122(4):448–459. <https://doi.org/10.1016/j.bja.2018.12.025>.