



Suspected Propofol Infusion Syndrome (PRIS) during coronary artery bypass graft (CABG) surgery while using total intravenous anesthesia (TIVA) due to risk of malignant hyperthermia (MH)



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Case Description & Learning Objective

Learning Objective:

Recognize the early signs and symptoms of Propofol Infusion Syndrome (PRIS) in patients undergoing cardiac surgery, especially in the context of malignant hyperthermia risk.

Case Presentation:

We present a case of a 67- year old male with a significant family history of malignant hyperthermia (MH) who presented for elective coronary artery bypass graft (CABG) surgery. Due to his elevated risk for MH, a total intravenous anesthesia (TIVA) approach was selected using propofol and dexmedetomidine.

During the intraoperative period, arterial blood gas (ABG) analysis revealed an unexplained and progressive metabolic acidosis with findings of pH 7.3, HCO₃ 16 mmol/L, Base Excess -2mmol/L. Dark urine was also noted in the foley. There were other hemodynamic changes at this time. The total intraoperative propofol dose administered by this point was less than 3mg/kg/hr.

Due to the progressive, unexplained metabolic acidosis, the propofol infusion was discontinued and the anesthesia was maintained with dexmedetomidine only. A subsequent ABG was sent which showed a normalized metabolic acidosis and the following ABG findings: pH 7.37, HCO₃ 23.4 mmol/L, Base Excess -2mmol/L.

The patient recovered from his surgery with no further complications and was extubated on postoperative day (POD) 1 and discharged to home on POD 6.

Clinical Discussion

Propofol Infusion Syndrome (PRIS) is a rare clinical condition that is associated with prolonged, high-dose propofol administration. When used as a sole anesthetic agent, such as in the case of TIVA, high doses increase the risk of developing PRIS. It is characterized by a constellation of symptoms including metabolic acidosis, rhabdomyolysis, acute kidney injury, hyperkalemia, arrhythmia, and cardiac failure. Mortality rate is high.

Key Aspects of PRIS

Pathophysiology: While not fully understood, PRIS is thought to be related to propofol's interference with mitochondrial fatty acid metabolism, leading to impaired oxidative phosphorylation and lactic acidosis.

Risk Factors: High-dose propofol (>4 mg/kg/hr), prolonged infusion (>48 hours), critical illness (sepsis, head injury), low carbohydrate intake, and concomitant catecholamine use are significant risk factors. In this case, the moderate dose but prolonged infusion time were likely contributors.

Challenge in Cardiac Surgery: Recognizing PRIS in patients undergoing CABG surgery can be particularly challenging as there are many factors that may lead to confounding presentations such as inadequate tissue perfusion due to the nature of the surgery which may also lead to a metabolic acidosis. Early symptoms are non-specific although prompt diagnosis and management are always crucial.

Early Recognition: A worsening metabolic acidosis with a rising lactate on an ABG in a patient receiving a propofol infusion should prompt consideration of PRIS.

Management: Immediate cessation of propofol infusion should reverse the metabolic acidosis and allow for full recovery. Supportive care, including fluid management and correction of electrolyte imbalances is essential.

Key Points

- Family history of MH necessitated TIVA, highlighting the importance of alternative anesthetic approaches, although each with respective risk factors
- PRIS is a life-threatening complication of propofol infusion that requires a high index of suspicion.
- Unexplained metabolic acidosis is often the earliest detectable sign of PRIS
- Early suspicion of the diagnosis and prompt discontinuation of propofol are critical for patient recovery.

Conclusion

This case highlights the importance of considering PRIS in the differential diagnosis of unexplained metabolic acidosis, even in cases with only moderate propofol doses. Early intervention prevents negative patient outcomes.

References

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