PROPOFOL LIPEMIA MIMICKING CHYLE LEAK DURING NECK DISSECTION

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Abstract: Background. Propofol is an intravenous agent used in anesthesia. Lipemia is an uncommon adverse effect of propofol infusion.

Methods. A patient undergoing neck dissection for recurrent chordoma had intraoperative lipemia develop after prolonged propofol infusion.

Results. Lipemia gave blood in the surgical field a milky appearance resembling chyle, but no chyle leak was present. Lipemia was confirmed by drawing a sample of blood and leaving it to stand. Layering of the blood with a milky white upper layer was observed. Analysis of a second sample of blood revealed a high lipemic index.

Conclusions. Lipemia is an uncommon adverse effect of propofol infusion, which may give blood a milky appearance and be confused for a chyle leak in a dissected neck. Identification of lipemia is also important because there is a risk of acute pancreatitis, and it may represent the early stage of propofol infusion syndrome.

Keywords: propofol; lipemia; chyle leak; neck dissection

Chyle leak is an uncommon and potentially serious complication of neck dissection.1 Propofol is an intravenous hypnotic agent used in the induction and maintenance of anesthesia with an excellent safety profile.2 One of the uncommon adverse effects of propofol use is lipemia, seen primarily in the intensive care unit (ICU) setting with extremely prolonged infusions.3 We report a 49-year-old man undergoing an extended radical neck dissection for a recurrent chordoma who developed intraoperative lipemia from propofol infusion, which gave the blood in the surgical field a milky appearance that was initially thought to be a possible chyle leak. The purpose of this report is to alert clinicians about this entity and to discuss methods to recognize and rapidly confirm the presence of intraoperative lipemia, which may also be an early sign of propofol infusion syndrome, a life threatening complication of prolonged propofol use.
ing right neck mass, dysphagia, and right shoulder weakness. Imaging revealed multiple masses in the right neck, which were confirmed by fine-needle biopsy to be chordoma. Further surgical excision with postoperative chemotherapy was advised.

An extended radical neck dissection was performed. Intraoperatively 3 cervical masses were found: 1 adjacent to the carotid sheath, a second adjacent to the vertebral bodies at the cervicothoracic junction, and a third related to the second and third cervical nerve roots with invasion of the vertebral bodies of C2–4. Six hours after the commencement of general anesthesia, during dissection of the brachial plexus, milky, blood-stained fluid was observed in the base of the right side of the neck at the cervicothoracic junction. The right lymphatic duct had been identified earlier and ligated, and there was no evidence of a lymphatic leak from this region. No leak was identified when the patient was placed in the Trendelenburg position and a Valsalva maneuver performed. On further observation, the abnormal fluid appeared to be blood with a milky appearance. The patient had not eaten for at least 6 hours prior to surgery, which raised further doubts that this fluid was chyle. As monitoring of spinal cord function with somatosensory evoked potentials was performed throughout the procedure, an intravenous propofol infusion had been used for the induction and maintenance of general anesthesia at a standard infusion rate equivalent to 350 μg/kg/min. Based on a similar observation in a previous patient undergoing prolonged intravenous propofol infusion, we theorized that blood containing propofol was responsible for our observations. While raising a pectoralis major flap for transfer to the neck, a similar appearance was noted with slow bleeding from the anterior chest wall musculature.

To confirm our suspicion, a sample of the patient’s blood was drawn from a site away from the infusion and left to stand. After 20 minutes, layering of the blood with a milky white upper layer was observed, which further separated over the next hour (see Figure 1). Biochemical analysis of a second sample of blood revealed a very high lipemic index (triglycerides >100 mg/mL). The propofol infusion was discontinued 60 minutes prior to the conclusion of the surgery, and blood in the neck wound reverted to its normal appearance. At the conclusion general anesthesia, we also noted that the patient’s urine was green, which may also be seen with the use of propofol. Urinalysis did not reveal the presence of myoglobinuria.

Postoperatively the patient developed no metabolic complications. The urine color normalized over 2 days. There were no wound complications, and no chylous fistula developed.

**DISCUSSION**

Propofol (2,6-diisopropylphenol) is a rapidly acting nonnarcotic nonbarbiturate hypnotic agent used for the induction and maintenance of general anesthesia and for sedation in the ICU. It causes a global depression of the central nervous system by binding to γ-aminobutyric acid receptors. Because of its poor water solubility, propofol is formulated in an emulsion of 1% propofol, 10% soybean oil, 2.25% glycerol, and 1.2% egg phosphatide. This contains 0.1 g of fat per milliliter.

Although propofol has an excellent safety profile, there are several side effects that need to be recognized, including a rare but potentially fatal complication that can result from its use. The most common adverse effect is dose-dependent hy-
potension. Lipemia (hypertriglyceridemia) and allergic reactions are uncommon. The incidence of lipemia varies from 3% to 10%. Lipemia may cause acute pancreatitis and its attendant sequela. A rare but potentially fatal complication, usually seen in high-dose and/or prolonged propofol use, is propofol infusion syndrome, characterized by bradycardia (which may progress to asystole), hepatic steatosis, lipemia, severe metabolic acidosis, and muscle damage (rhabdomyolysis with myoglobinuria).3,4

Chyle leaks have been reported as a complication in 1% to 2.5% of neck dissections,1 with 75% occurring in the left neck (secondary to injury to the thoracic duct) and 25% occurring in the right (injury to the right lymphatic duct).5 Prolonged and/or high-output postoperative chyle leaks may be associated with significant wound, metabolic, nutritional, and immunologic complications; therefore, prevention or intraoperative recognition and treatment of a chyle leak is vital. However, it is important not to mistake propofol-induced lipemia for blood-stained chyle, as attempts to identify the source of the suspected leak will prove futile. We have found a simple method to assess for lipemia is to draw a sample of blood from a vein away from the anesthetic infusion site and let it settle. Development of a thick layer of white fluid that settles at the top of the tube, similar to cream separating from fresh milk, will rapidly identify the presence of lipemia. Determination of a blood triglyceride level will confirm this diagnosis.

Green discoloration of the urine is another uncommon (<1% incidence) side effect of propofol use; however, it is entirely benign and of no clinical significance.6 This phenomenon may occur as propofol is metabolized: a phenolic green chromophore is conjugated in the liver, and its metabolite is excreted in the urine.7 Green discoloration of the hair and liver have also been reported. Propofol may also cause pink, white, brown, or red-brown discoloration of the urine. The discoloration usually resolves within 2 to 3 hours after cessation of the propofol infusion, but persisted nearly 48 hours postoperatively in our patient.6 No renal impairment developed.

**CONCLUSION**
Propofol is a common and safe hypnotic agent used in anesthesia. Lipemia is an uncommon adverse effect of propofol infusion, which may give blood a milky appearance and be confused for a chyle leak, particularly in patients in whom feeding has been restarted following neck dissection. Furthermore, identification of lipemia is important as it puts patients at risk of developing acute pancreatitis, and it may also represent the early stage of propofol infusion syndrome. For these reasons, suspected lipemia should always be brought to the attention of the anesthesiologist.

**REFERENCES**