Anesthetic Management of a Patient With a History of Rhabdomyolysis for Dental Treatment

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When general anesthesia is administered for patients considered at high risk for rhabdomyolysis, appropriate precautions are warranted. The use of suitable anesthetics, with attention to intravenous fluid management, electrolyte balance, respiration, and metabolism, should be addressed. We performed general anesthesia for dental treatment and biopsy for fibrous hyperplasia of the buccal mucosa in a patient with a history of rhabdomyolysis. We utilized thiamylal sodium, midazolam, rocuronium bromide, nitrous oxide, fentanyl, and remifentanyl without using volatile anesthetics and propofol for this case. No complications of rhabdomyolysis were noted.

Key Words: Rhabdomyolysis; General anesthesia; Inhalation anesthetics; Intravenous anesthetics.

Rhabdomyolysis refers to the breakdown of skeletal muscle causing the release of intracellular muscle constituents, such as creatinine kinase, myoglobin, and potassium, into the bloodstream.¹ In patients at high risk of rhabdomyolysis, the use of suitable anesthetics, with attention to intravenous fluid management, electrolyte balance, respiration, and metabolism, should be addressed. Here, we report the general anesthetic management of an outpatient with a history of rhabdomyolysis.

A 23-year-old man weighing 72 kg with a body mass index of 32.4 kg/m² was scheduled to undergo general anesthesia for dental treatment and biopsy for fibrous hyperplasia of the buccal mucosa. He had presented with symptoms of rhabdomyolysis at the age of 22 and had recovered after receiving fluid infusion and the administration of antibiotics for 3 days. He had trisomy 21, tetralogy of Fallot with atrioventricular septal defect repaired at 2 years of age, epilepsy, and intellectual impairment (difficulty communicating) as additional complications.

General anesthesia was induced using thiamylal sodium (425 mg), fentanyl (200 µg), and rocuronium bromide (30 mg) intravenously, followed by the

continuous administration of midazolam (0.1 mg/kg/h) and remifentanyl (0.2 µg/kg/min). Anesthesia was maintained with nitrous oxide (2–2.5 L/min) in oxygen (1 L/min), midazolam (0.06–0.1 mg/kg/h), and remifentanyl (0.1–0.25 µg/kg/min). The total infusion volume of Ringer's acetate solution with 1% glucose was 700 mL. The durations of surgery and anesthesia were 75 and 156 minutes, respectively. No problems were encountered, and no symptoms of rhabdomyolysis occurred during the perioperative period.

Drugs with suitable safety profile are needed in the management of anesthesia in patients at risk of rhabdomyolysis. Volatile anesthetics, propofol, and succinylcholine were not used for this case. Volatile anesthetics are well-known triggers of malignant hyperthermia. It has been suggested that propofol causes rhabdomyolysis as one symptom of propofol infusion syndrome. There is a strong association between propofol infusion syndrome and propofol infusions at doses greater than 4 mg/kg/h of longer than 48 hours' duration.² However, the possibility of metabolic acidosis increases with infusion of propofol at doses over 4.5 mg/kg/h (75 mcg/kg/min) for 2–3 hours or more.³ Furthermore, it has been reported that administration of propofol during status epilepticus is involved in the genesis of rhabdomyolysis.⁴ For these reasons, we thought it appropriate to avoid using propofol for this case. Succinylcholine was not used to avoid excessive and unwanted fasciculation.

In this case, Ringer's acetate solution was used as the infusion fluid. The preferred intravenous fluid in order

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to prevent the development of rhabdomyolysis is not clear. When malignant hyperthermia develops, the infusion of cooled physiological saline is effective in lowering body temperature without increasing potassium concentration. The infusion of Ringer's lactate solution is not recommended under conditions of metabolic acidosis. However, there is no clear evidence for selecting intravenous fluids in a malignant hyperthermia crisis.⁵

We performed anesthetic management of a patient with a history of rhabdomyolysis using thiamylal sodium, midazolam, rocuronium bromide, nitrous oxide, fentanyl, and remifentanyl, without evidence of rhabdomyolysis.

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REFERENCES

1. Hanai J. Rhabdomyolysis [in Japanese]. *Diagn Treat*. 1993;81:495–503.
2. Kam PC, Cardone D. Propofol infusion syndrome. *Anaesthesia*. 2007;62:690–701.
3. Burow BK, Johnson ME, Packer DL. Metabolic acidosis associated with propofol in the absence of other causative factors. *Anesthesiology*. 2004;1018:239–241.
4. Dougo N, Takashima S, Sasahara E, Taguchi Y, Inoue H. Two cases of rhabdomyolysis following status epilepticus [in Japanese with English abstract]. *J Jpn Congr Neurol Emerg*. 2005;18:69–72.
5. Safety Committee of Japanese Society of Anesthesiologists. JSA guideline for the management of malignant hyperthermia crisis 2016. *J Anesth*. 2017;31:307–317.