

Case Report

Inhaled sevoflurane for lower gastrointestinal endoscopy with possible propofol anaphylaxis

Ling Ye, Yun-Fei Liu, Tao Zhu

Department of Anesthesiology, West China Hospital, Sichuan University, Chengdu 610041, Sichuan Province, China

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Abstract: Sedation with propofol is widely used for the outpatient examination. Although anaphylaxis to propofol is rare, there were some reports of anaphylaxis following propofol administration. We present a case of female patient under sedation for lower gastrointestinal endoscopy with possible propofol anaphylaxis. Then sevoflurane was successfully used for the examination and the following surgery. We discussed the possible feasibility of sevoflurane for the examination of lower gastrointestinal endoscopy. Propofol is widely used for the sedation of outpatient with lower gastrointestinal endoscopy. But it may cause some allergic reaction. Inhaled sevoflurane may provide a satisfactory and safe alternative for adult outpatients' endoscopy.

Keywords: Inhaled anesthetics, propofol, gastrointestinal endoscopy, anaphylaxis

Case report

A 72-year-old female patient (62 kg, 158 cm, ASA II) was scheduled for lower gastrointestinal endoscopy under sedation as an outpatient. She had no history of a prior allergies or general anesthesia. After obtaining approval from the patient, standard monitoring including electrocardiograph (ECG), pulse oximeter (SPO₂), and noninvasive blood pressure (BP) were applied. Prior to anesthesia, the patient was delivered with 8 liters min⁻¹ of oxygen via an Ambu Bag Valve Mask for 3 minutes. 1 mg Midazolam and 4 µg sulfentanil were IV administered first. Then 1 mg kg⁻¹ propofol (1% Diprivan™; AstraZeneca Japan, Osaka, Japan) was administered IV slowly. Five minutes later, the patient's face, neck, chest was flushed, followed by papule and wheal all over the body especially on the extremities. Normal breath was kept with the SPO₂ 95%, BP 138/82 mmHg and heart rate 90/min. 10 mg Dexamethasone and 1 g Calcium Gluconate were IV administered immediately. The vital signs were stable throughout the intervention. About 5 minutes later the patient recovered from the sedation and she only felt a little pruritus. So the endoscopy test was cancelled. After

2 hours, the patient went home escorted by her family member.

Three days later, papule and wheal recurred without any cause. And a little edema could be found on her face, dorsum of the hand and foot while the temperature of skin increased. Then the patient was diagnosed as drug eruption and admitted into the department of dermatology for the treatment of anaphylaxis. Prednisone, loratadine and ketotifen were administered. Ten days later, the papule and wheal were almost disappeared and the patient was discharged.

Two days after her discharge, the patient was scheduled for the lower gastrointestinal endoscopy examination again. Because the patient insisted on sedation for lower gastrointestinal endoscopy. We decided to complete the sedation with sevoflurane. After obtaining approval from the patient, standard monitoring and pre-oxygenation were given as the routine. 1 mg Midazolam and 4 µg sulfentanil were IV administered first. Anesthesia circuit was primed with 8% sevoflurane and 6 litres min⁻¹ of oxygen for one minute. Then the patient received vital capacity breathe technique of induction with

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the above concentration of sevoflurane. When the patient lost consciousness, sevoflurane and oxygen were decrease to 4% and 3 litres min^{-1} respectively. Before the examination began, the patient spontaneously breathed at that concentration of sevoflurane for another 3 minutes. As soon as the endoscope arrived at ileocecal junction, sevoflurane was discontinued. During the 12-minutes examination, the patient kept the spontaneous breath throughout the procedure and the vital signs were normal all the time. Four minutes after the examination the patient recovered and she was satisfied with this sedation experience. Finally, the pathological examination showed it was a tubular villous adenoma of colon.

Two months later, the patient was scheduled for tumor resection under general anesthesia. Volatile induction and maintenance anesthesia (VIMA) was administered for the patient. The vital signs were normal during anesthesia. The operation was finished without complications and her postoperative course was uneventful. The patient was discharged 12 days later. No allergic effect occurred peri-anesthesia.

Discussion

Papule and wheal occurred during sedation by propofol in this patient without any allergic history. Propofol is oil at room temperature and insoluble in aqueous solution. Present formulation consists of 1% or 2% (w/v) propofol, 10% soybean oil, 2.25% glycerol, and 1.2% egg phosphatide. Disodium edetate (EDTA) or metabisulfite is added to retard bacterial and fungal growth. Propofol has a rapid onset of action with a dose-related hypnotic effect and recovery is rapid even after prolonged use. So propofol is widely used for the outpatient examination. Although anaphylaxis to new formulation of propofol is rare [1], there were some reports about anaphylaxis following propofol administration, including bronchospasm [2-4]. In previous case reports, most of the patients had allergic history prior to the anesthesia. The patient in our report did not have any allergic and general anesthesia history, it is difficult to identify the element in the propofol caused the allergic reaction. We speculate emulsifier is most likely the allergen. Hiyama et al [5] report a case of urticaria associated with parenteral nutrition with an intravenous 10% lipid emulsion containing a soybean oil base. Allergic

reactions to propofol on first exposure are sometimes because of the isopropyl groups [6]. After the first propofol exposure, the patient may be sensitive to environmental allergen, such as latex at her home. So an allergy reaction spontaneously appeared days after the propofol exposure. When papule and wheal occurred in this patient without any allergic history, early awareness and appropriate management are necessary to prevent a fatal outcome in patients with propofol anaphylaxis.

Etomidate, another widely used medicine for the outpatient examination, containing the same ingredients may also cause allergic reaction to the patient. Therefore we used sevoflurane for the following sedation.

Sevoflurane is an inhaled anesthetic agent with properties well suited for pediatric outpatient procedures, such as pleasant odor allowing mask induction, rapid onset and rapid emergence from anesthesia, and minimal airway irritation, respiratory depression and hemodynamic effects [7]. To our knowledge, there is no report that sevoflurane could cause allergic reaction. Even for the patient with multiple drug allergies, sevoflurane could be used for fulfilling the sedation without complications [8, 9]. And Mitsuhashi et al [10] reported that sevoflurane is effective in attenuating bronchoconstriction associated with anaphylaxis in dogs. Wang CY [11] et al reported that sevoflurane could be used for upper gastrointestinal endoscopy. Montes [12] et al found deep sedation with inhaled sevoflurane for pediatric outpatient gastric endoscopy was as safe as conventional sedation techniques. There was no report about sedation with sevoflurane for lower gastrointestinal endoscopy because this type of examination needs longer time than upper gastrointestinal endoscopy and rapid recovery from sedation. During the examination without endotracheal intubation, spontaneous breath of the patient should be maintained. And inhaled sevoflurane is easy for modulate the depth of sedation.

Our case report indicated that inhalation anesthesia with sevoflurane is a satisfactory method for sedation in lower gastrointestinal endoscopy. During the examination, the patient's vital signs was normal and little fluctuation (< 10%) of blood pressure was monitored. Furthermore, no respiratory depression or other airway com-

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plications occurred. The recovery times and patient satisfaction were compared with intravenous anesthesia induction with propofol. In addition, no allergic reaction was observed. Philip [13, 14] and Wang [11] also observed the similar findings.

In conclusion, for adult outpatients, inhalation of sevoflurane may provide a satisfactory and safe alternative. But further controlled clinical trials should be held to investigate the feasibility and safety for sevoflurane sedation in lower gastrointestinal endoscopy.

Disclosure of conflict of interest

None.

Address correspondence to: Dr. Tao Zhu, Department of Anesthesiology, West China Hospital, Sichuan University, Chengdu 610041, Sichuan Province, China. Tel: 86-18980601552; Fax: 86-28-85423593; E-mail: xwtao.zhu@gmail.com

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