Hypersensitivity reactions to Succinylcholine and Fentanyl during anesthesia – Unpredicatbale reaction case report

Somboon Thienthong M.D

ABSTRACT

A 59-year-old woman was scheduled for cholecystectomy. She had no history of allergies and her previous spinal anesthesia was unremarkable. She developed cardiac arrest after receiving midazolam, fentanyl, ketamine and succinylcholine. Ventricular fibrillation developed but successfully converted. She made an uneventful recovery. Skin pricks testing 10 months later demonstrated positive reactions to both succinylcholine and fentanyl. We concluded these two drugs caused the reactions.

Key Words: Hypersensitivity reactions, Succinylcholine, Fentanyl

Departments of Anesthesiology, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

Corresponding author mail: somthi@kku.ac.th

Conflict of interest: None

INTRODUCTION

Succinylcholine (SCh) causes anaphylactic reactions more frequently than other anaesthetic agents.[1,2] Despite its many side effects and should be abandoned[3], in some cases, SCh is used to facilitate tracheal intubation because of its rapid onset. In contrast, hypersensitivity reactions to fentanyl is rarely reported.[4,5] This case report presents a patient who survived from hypersensitivity reactions to both SCh and fentanyl.

CASE REPORT

A 59-year-old woman, 53 kg, with multiple gallstones without jaundice was scheduled for open cholecystectomy. Six and seven years prior, she received spinal anesthesia for an appendectomy and some sedative agents for tubal sterilization, respectively. No history of allergies was recorded or known to the patient.

On physical examination prior to surgery, the patient was fit and well *viz.* aside from the stones. Her chest x-ray, ECG, CBC and other blood chemistries were within normal limits.

In the operating room, the patient's initial blood pressure was 112/70 mmHg and her pulse rate of 56 beats/min. After pre-oxygenation, anesthesia was induced with 75 mg of ketamine, 2.5 mg of midazolam, 50 μg

of fentanyl and 75 mg of SCh for tracheal intubation.

Immediately following tracheal intubation, the blood pressure was undetectable followed by severe bradycardia without response to 12 mg ephedrine. There were no bronchospasms or urticaria.

A diagnosis of hypersensitivity reaction was made and 0.1 mg (1:10000) of epinephrine given intravenously. Despite an increased heart rate (*i.e.* 130 beats/min) and a repeated dose of epinephrine, blood pressure was still low. The ECG at this point changed from sinus tachycardia to ST-depression followed by ventricular tachycardia. It took about 20 minutes of CPR to convert the ventricular tachycardia to a sinus rhythm by using defibrillation together with lodocaine, epinephrine, magnesium sulphate, $NaHCO_3$, calcium gluconate and dexamethasone.

The patient regained consciousness before being transferred to ICU. At the ICU, the patient received treatment with dopamine and epinephrine infusion, dexamethasone 4 mg iv q 6 hr and ranitidine 50 mg iv q 8 hr. A complete-lead ECG showed the sinus tachycardia and cardiac enzymes (CK, CK-MB) were normal. The serum IgE was 104.3 IU/mL (normal value <103 IU/mL) and she made an uneventful recovery.

Skin tests was scheduled, which she did not attend until 10 months. Once done, the skin prick testing revealed positive reactions to SCh (3^+) and fentanyl (2^+) but a negative response to ketamine.

DISCUSSION

Hemodynamic instability is a common symptom associated with anaphylactic reactions.[4,5] This may occur without bronchospasms or urticaria.[6] In our patient, the normal cardiac enzymes and echocardiogram recorded after anaesthesia excluded severe hypotension from myocardial infarction, therefore, a hypersensitivity reaction to anaesthetic agents was suspected.

According to previous studies,[1,2] neuromuscular blocking (NMB) agents cause hypersensitivity reactions more frequently than other anaesthetic agents. Among the NMB agents, SCh is the most common cause of the reactions.[5]

Fentanyl has low incidence of hypersensitivity[4,5] and that even positive skin prick test reactions to it

can prove false.[4] But a severe reaction in our patient possibly confirms her positive skin test.

Laxenaire studied cross-reactivity to the muscle relaxants in 317 cases and found that the rate of cross-reactivity was 72.6% for succinylcholine.[7] Cummings reported a case with anaphylaxis to both succinylcholine and fentanyl that was confirmed by skin testing.[8] However, reported cases with anaphylaxis to both succinylcholine and fentanyl is quite rare.

The skin prick tests showed a positive reaction to both SCh and fentanyl, though serum IgE was not elevated, making differentiation of the mechanism of anaphylaxis and anaphylactoid unclear. In our case, a hypersensitivity or anaphylactoid reaction[4] was implied. Skin prick tests for other opioids and local anaesthetic agents also need to be done to determine which analgesic agents are appropriate for future surgeries on this patient.

CONCLUSION

Hypersensitivity reactions to anesthetic drugs is unpredictable, especially a cross-sensitivity between succinylcholine and fentanyl as was the case with this patient.

REFERENCES

1. Pedersen AF, Green S, Rose MA. Failure to investigate anaesthetic anaphylaxis resulting in a preventable second anaphylactic reaction. Anaesth Intensive Care 2012; 40: 1053-5.
2. Watkins J. Adverse reaction to neuromuscular blockers: frequency, investigation, and epidemiology. Acta Anaesthesiol Scand 1994; 38: suppl 102, 6-10.
3. Cook DR. Can succinylcholine be abandoned? Anesth Analg 2000; 90: S24-S28.
4. Assem ESK. Anaphylactic anaesthetic reactions, the value of paper radioallergosorbent tests for IgE antibodies to muscle relaxants and thiopentone. Anaesthesia 1990; 45: 1032-8.
5. Fisher MM. Anaphylactoid reactions during anaesthesia. In: Prys-Roberts C, Brown Jr. BR, eds. International practice of anaesthesia, Volume 1.

Butterworth Heinemann, Oxford 1996; 85/1-13.

6. Konarzewski W, De'Ath S. Unrecognised fatal anaphylactic reaction to propofol or fentanyl. Anaesthesia 2001; 56: 497-8.
7. Laxenaire MC, Mertes PM. Anaphylaxis during anaesthesia: results of a two-year survey in France. Br J Anaesth 2001; 87: 549-58.
8. Cummings KC, Arnaut K. Case report: fentanyl-associated intraoperative anaphylaxis with pulmonary edema. Can J Anaesth 2007; 54: 301-6.