

Bronchospasms and wheezing after induction of anesthesia with propofol in patients with a history of asthma

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To the editor: The goal during general anesthesia in patients with bronchial asthma is to avoid bronchoconstriction. Recently, clinical observations suggested that propofol is a reasonable agent for induction of anesthesia in asthmatic patients who require timely intubation, because of a potent bronchodilating effect with propofol [1,2]. However, we treated two patients who developed bronchoconstriction and wheezing during anesthetic induction with propofol, although their bronchial asthma had been well managed preoperatively.

Case 1

An 11-year-old girl (34 kg, 138 cm) was scheduled for resection of a left humeral tumor. Although she had a history of bronchial asthma 6 years previously, she had been in good condition without medication. Diazepam 4 mg and ranitidine 75 mg were given orally 90 min before anesthetic induction. Anesthesia was induced with propofol 60 mg and vecuronium 3.5 mg intravenously. Immediately after propofol injection, mask ventilation of the lungs was difficult, with audible wheezing. Although mask ventilation was continued with 100% oxygen, SpO₂ fell to 95% within a short time. The anesthesia was maintained with 3%–5% sevoflurane. The bronchospasm was then treated with theophylline 150 mg followed infusion of 37.5 mg·h⁻¹ hydrocortisone 50 mg and lidocaine 30 mg intravenously. Salbutamol (β₂-agonist) administered into the anesthetic circuit by nebulizer was especially effective, and the wheezing and bronchospasm gradually resolved within 30 min. The surgery was canceled. Tracheal intubation was not performed throughout.

Case 2

A 17-year-old boy (67 kg, 168 cm) was scheduled for shoulder-joint repair. Although he had a history of bronchial asthma and use of theophylline, he had been in good condition and symptom free for the past 2 years. Atropine 0.5 mg and hydroxyzine 25 mg i.m. and theophylline 250 mg i.v. were given before anesthetic induction. Anesthesia was induced with lidocaine 70 mg and propofol 140 mg intravenously. After administration of propofol, mask ventilation of the lungs was difficult, with audible wheezing. The anesthesia was maintained with 100% oxygen and 5% sevoflurane. The bronchospasm was then treated with aminophylline 250 mg and hydrocortisone 300 mg intravenously. The wheezing stopped, and the bronchospasm gradually resolved.

In Japan, propofol has been used clinically since 1995. In the last 8 years, more than 30 cases associated with attacks of bronchial asthma, bronchospasm, or wheezing were reported to the AstraZeneca. Moreover, at least 12 cases associated with bronchospasm were reported in medical journals in Japan [3–11] (Table 1). In 2 of the 12 reports, irritations of the upper airway under light anesthesia with propofol were responsible for bronchospasm. In the other reports, the authors speculated that propofol itself and/or its solvent might have induced bronchospasm. Generally, thiobarbiturates contract airway smooth muscles, whereas propofol, ketamine, and volatile anesthetics have a marked relaxant effect [2,12,13]. However, the direct bronchodilating effects of propofol occur at higher concentrations than clinical doses [12,13], and allergic reactions to propofol could induce severe bronchoconstriction in patients with allergic disease [3].

Although propofol is considered a first-line agent for anesthetic induction, our cases suggest that propofol may induce bronchospasm during induction of anesthesia. We should not overestimate the direct bronchodilating effect of propofol in asthmatic patients.

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Table 1. Summary of case reports of bronchospasms associated with propofol

Age (years)	Sex	Cause	Complication	Time of attack	Past history of asthma	Induction drug	Other drug	Maintenance of anesthesia	Treatment	Outcome	Authors	Year reported	Reference
42	F	Propofol induced	Bronchospasm	After ILMA	None	Propofol	None	Sevoflurane	Epinephrine, M	Alive	Nishiyama	2001	3
35	F	Propofol induced	Bronchospasm	After ILMA	None	Propofol	None	Sevoflurane	A, S	Alive	Nishiyama	2001	3
34	M	Propofol induced	Bronchospasm	Before TI	Asthma	Propofol	None	Isoflurane	Epinephrine, S, A, M	Alive	Kikutani	2001	4
17	F	Propofol induced	Bronchospasm	After TI	Asthma	Propofol	Fentanyl	Isoflurane	A, HC	Alive	Kojima	2000	5
61	M	Propofol induced	Asthma attack	After TI	Asthma	Propofol	Ketamine	Sevoflurane	S	Alive	Yamada	1999	6
60	F	Propofol induced	Bronchospasm	After TI	None	Propofol	Fentanyl	Sevoflurane	S	Alive	Takeuchi	1999	7
61	F	Propofol induced	Bronchospasm	After TI	None	Propofol	Fentanyl	Sevoflurane	S	Alive	Takeuchi	1999	7
29	F	Propofol induced	Bronchospasm	After ILMA	None	Propofol	Fentanyl	Propofol	S	Alive	Takeuchi	1999	7
61	F	Light anesthesia	Bronchospasm	After TI	Asthma	Propofol	Fentanyl	Propofol	A, M	Alive	Hanzawa	1998	8
48	M	Propofol induced	Asthma attack	Before TI	Unknown	Propofol	None	Isoflurane	A	Alive	Watanabe	1998	9
32	M	Light anesthesia	Wheezing	After TI	None	Propofol	Fentanyl	Isoflurane	A, halothane, M	Alive	Shiraishi	1997	10
76	M	Propofol induced	Bronchospasm	Before TI	Asthma	Propofol	None	Isoflurane	A, HC	Alive	Sasaki	1996	11

TI, Tracheal intubation; ILMA, insertion of laryngeal mask airway; S, sevoflurane; A, aminophylline; M, methylprednisolone; HC, hydrocortisone

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