Clindamycin-induced Anaphylactic Shock During General Anesthesia

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Clindamycin-related anaphylactic reaction is rarely reported. We report a male patient with buccal cancer who was undergoing radical neck dissection when life-threatening anaphylactic shock developed soon after intravenous infusion of clindamycin. Immediate cardiopulmonary resuscitation was performed, and the patient recovered uneventfully. Perioperative anaphylactic shock is a serious problem due to the difficulty of judgment and potentially disastrous outcome. Immediate diagnosis and halting of drug infusion should be the first actions taken. [*J Chin Med Assoc* 2006;69(11):549–551]

Key Words: anaphylactic shock, clindamycin, general anesthesia

Introduction

Anaphylactic shock or anaphylactoid reaction induced by antibiotics, including penicillin and cephalosporin, is not rare during operation. Clindamycin, a broad-spectrum non-β-lactam antibiotic, is an alternative choice to prevent catastrophic anaphylactic reaction in patients with history of allergy to antibiotics because it is rarely reported to be associated with anaphylactic reaction. Here, we report a male patient admitted for buccal cancer surgery who experienced life-threatening anaphylactic shock under general anesthesia soon after clindamycin was given.

Case Report

A 47-year-old male patient, 168 cm tall and weighing 65 kg, was admitted under the impression of buccal cancer; radical neck dissection was planned. His past history was unremarkable except for allergy to some oral antibiotics (names unknown), with symptoms of skin itchiness and redness. Clindamycin, well known for being rarely associated with anaphylaxis, was chosen as a prophylactic agent for the operation.

On the patient's arrival in the operating room, standard monitoring including electrocardiography (ECG), pulse oximetry, and noninvasive blood pressure were applied. His vital signs were heart rate of 76 beats/min, blood pressure of 122/70 mmHg, and SpO_2 saturation of 100% while breathing room air. Eighteen- and 20-gauge peripheral intravenous lines were established. Induction of anesthesia was carried out with fentanyl 150 μg and thiamylal 300 mg. Tracheal intubation was facilitated with rocuronium 50 mg. Radial arterial catheter and central venous catheter were all applied smoothly after induction. The patient was prepared by beta-iodine and draped, lying on the operating table and awaiting operators for about half an hour.

Vital signs were stable until clindamycin (600 mg in 30 mL lactated Ringer's solution) was infused for about 10 minutes through the peripheral intravenous route. Within 3 minutes after the antibiotic was almost totally infused, sudden onset of bronchospasm, hypotension (systolic blood pressure dropped from 90 mmHg to < 40 mmHg), and tachycardia (from 95 beats/min to 160 beats/min) were noted, followed by a downhill trend in end-tidal carbon dioxide and oxygen saturation. Ephedrine 24 mg was injected without any obvious effects. The waveform of arterial blood pressure soon

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flattened. Pulseless electrical activity was impressed. Inhalation agent and presumptive drugs were all discontinued. With 100% oxygen supplementation, cardiopulmonary resuscitation was started with chest massage. Epinephrine administered through the central venous catheter totaled up to 5 mg, combined with infusion of 1,500 mL of crystalloid fluid. About 3 minutes later, the ECG, the waveform of radial arterial catheter, and saturation were all regained, at 145 beats/min, 79/64 mmHg, and 100%, respectively. However, unsettled blood pressure was noted. Continuous infusion of low dose epinephrine was used to stabilize the vital signs.

After resuscitation, hydrocortisone 200 mg and decadron 10 mg were administered. Skin wheals and redness were found over almost all of the patient's body. Hemodynamic stability was restored over the next half an hour. The patient was transported from the operating room to the postanesthesia care unit for further care. He had made an uneventful recovery with full awakening 2 hours later, and he was extubated several hours later. The operation was postponed, and he was discharged 2 days later without any sequelae.

Discussion

Clindamycin, the 7(S)-chloro-7-deoxy derivative of lincomycin, is a non-β-lactam antibiotic. Its spectrum of antimicrobial activity includes many Gram-positive and Gram-negative anaerobic bacteria as well as protozoa.[1] According to its broad spectrum and low incidence of side effects, it appears to be the most satisfactory alternative in patients who are allergic to penicillin G and the cephalosporins. Hypersensitivity and anaphylactic reactions associated with the administration of clindamycin appear to be uncommon,[2–4] with anaphylactic shock connected to clindamycin rarely reported.[5] Thus, we have reported this life-threatening anaphylactic shock related to clindamycin.

Anaphylaxis is a type I immunoglobulin (Ig) E-mediated hypersensitivity reaction involving mast cells and basophils. Anaphylactoid reactions occur through a direct non-immune-mediated release of mediators, and they present with clinical symptoms similar to those of anaphylaxis.[6] Antibiotics that are administered perioperatively can cause immunologic or non-immunologic generalized reactions. It might be difficult to differentiate between immune and non-immune mast cell-mediated reactions and pharmacologic effects from the variety of medications administered during general anesthesia. In addition, the incidence of anaphylactic reactions in the perioperative setting has been suggested to be increasing; most of the information in support of this assumption is from case reports and retrospective studies.[7]

Diagnosis of IgE-mediated reactions to non-β-lactam antibiotics is limited by a lack of knowledge of the relevant allergenic determinants and/or metabolites.[8] No specific IgE antibody for clindamycin has been found, and skin tests for it are not standardized, so the negative predictive value is unknown. At present, there is no suggested concentration of clindamycin for skin testing.[9]

The diagnosis of anaphylaxis deals with past history, risk of testing, limitation of tests, patient refusal of tests, and other management options available. Sometimes, the clinical history of anaphylactic reaction to some agents is so specific and strong that testing is unnecessary or dangerous,[8] just like in our case. The timing of the onset of anaphylaxis may help to determine the inciting drug. In fact, rare cases are diagnosed based on the close temporal relationship between drug administration and symptom onset, with no need for immunologic verification or exclusion of other agents by using skin tests or by measurements of the specific IgE.[9]

However, the clinical diagnosis of intraoperative anaphylaxis is problematic because most anesthetics cause vasodilatation, hypotension and, potentially, cardiopulmonary dysfunction because of their direct and indirect effects on sympathoadrenergic responses of the heart and vasculature, especially in patients with preexisting cardiovascular diseases.[10] Furthermore, other significant causes, including vasovagal reflex, pulmonary embolism, myocardial dysfunction, cardiac tamponade, and tension pneumothorax, can cause abrupt and dramatic patient collapse.[8] This 47-year-old male patient had never experienced any cardiac symptoms, and no predisposing factors of the cardiac events were noted perioperatively. Cardiac events like acute myocardial dysfunction, cardiac tamponade, and pulmonary embolism could be excluded by clinical findings. During the attack episode, the patient was under the maintenance of the inhalation agent isoflurane, so that the central nervous system and the autonomic nervous system were both blunted. Since the trigger of vasovagal response may be central in origin, from psychiatric stress or pain, or initiated peripherally by a reduction in venous return to the heart, the possibility of the event is extremely low.[11] The Bezold-Jarisch reflex may overlap the vasovagal response and it seems unlikely to occur in such an anesthetized patient.[12] Bilateral breathing sounds were heard during the event. By following his chest roentgenography after the incident, no evidence was available to suggest that pneumothorax existed.

It is noteworthy that after the start of clindamycin infusion, unexpected and profound cardiovascular

collapse was noted. According to the clinical history of the episode, life-threatening anaphylactic shock connected to clindamycin was diagnosed. In most cases, the faster the onset of symptoms, the more severe the reaction. All anesthesiologists should note that even with an unlikely agent such as clindamycin, a dangerous anaphylactic event may be induced, and appropriate actions need to be carried out as soon as possible to save the patient's life. Immediate diagnosis and halting of drug infusions should be the first actions to be taken.

References

1. Dhawan VK, Thadepalli H. Clindamycin: a review of fifteen years of experience. *Rev Infect Dis* 1982;4:1133–53.
2. LeFrock JL, Molavi A, Prince RA. Clindamycin. *Med Clin North Am* 1982;66:103–20.
3. Falagas ME, Gorbach SL. Clindamycin and metronidazole. *Med Clin North Am* 1995;79:845–67.
4. Hau T, Nishikawa R, Danziger LH. Antibiotics in surgery. *Surg Annu* 1983;15:177–205.
5. Lochmann O, Kohout P, Vymola F. Anaphylactic shock following the administration of clindamycin. *J Hyg Epidemiol Microbiol Immunol* 1977;21:441–7.
6. Hepner DL, Castells MC. Anaphylaxis during the perioperative period. *Anesth Analg* 2003;97:1381–95.
7. Mertes PM, Laxenaire MC, Alla F. Anaphylactic and anaphylactoid reactions occurring during anesthesia in France in 1999–2000. *Anesthesiology* 2003;99:536–45.
8. Lieberman P, Kemp SF, Oppenheimer J, Lang DM, Bernstein IL, Nicklas RA. The diagnosis and management of anaphylaxis: an updated practice parameter. *J Allergy Clin Immunol* 2005; 115:483–523.
9. Thong BY, Chan Y. Anaphylaxis during surgical and interventional procedures. *Ann Allergy Asthma Immunol* 2004;92: 619–28.
10. Levy JH. Anaphylactic reactions to neuromuscular blocking drugs: are we making the correct diagnosis? *Anesth Analg* 2004;98:881–2.
11. Van Lieshout JJ, Wieling W, Karemaker JM, Eckberg DL. The vasovagal response. *Clin Sci* 1991;81:575–86.
12. Kinsella SM, Tuckey JP. Perioperative bradycardia and asystole: relationship to vasovagal syncope and the Bezold-Jarisch reflex. *Br J Anaesth* 2001;86:859–68.