A Case of Rocuronium-Induced Anaphylactic Shock in an Asthmatic Child

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We experienced a case of anaphylactic shock in a young asthmatic child immediately after administering rocuronium during the induction of anesthesia. Because urticaria did not develop immediately after ventilation difficulty, we diagnosed and responded to asthma, rather than to anaphylactic shock. Correct and rapid response to anaphylactic is extremely important.

Key Words: Anaphylactic shock; Asthma; Rocuronium.

The patient was a 7-year-old boy with asthma and allergies to egg and dairy. A slow inhalation induction was initiated in preparation for removal of an odontoma under general anesthesia. During the initial administration of anesthesia, we were able to maintain ventilation. However, ventilation difficulty, decreased blood pressure, and tachycardia occurred immediately after the administration of rocuronium. During direct laryngoscopy via standard laryngoscope, hypopharyngeal or glottic edema was not noted. We suspected an asthma attack, and administered an inhaled β_2 stimulant (salbutamol sulfate), but the symptoms did not improve. However, oxygen saturation and heart rate were beginning to improve as a result of using noradrenaline to increase blood pressure while calling for support. It was not until we confirmed that urticaria was present on the limbs when stripping off the patient's surgical drapes to secure an arterial line that we noticed the signs of anaphylactic shock (Figure 1a and b).

Although we discussed the administration of adrenaline, it was not carried out because respiratory status and hemodynamics had improved. All vital signs were restored soon thereafter. Urticaria also appeared on

the face after all vital signs had stabilized. The operation was canceled, with planned intradermal anesthetics testing including local anesthetics. We waited for the patient to regain consciousness naturally in order to confirm the stability of his circulation dynamics. After confirming that there was no glottic edema (Figure 2), extubation was performed. Serum β tryptase testing revealed elevated levels on initial testing until the next day. In addition, rocuronium showed a positive reaction in a later intradermal test.

Anaphylactic shock occurring during general anesthesia is one of the most serious complications.¹ Many cases have been reported to occur on induction when multiple agents are rapidly administered. Simons et al² have reported that skin or mucous membrane changes are the most important signs. Muscle relaxants, latex, or antibiotics have often been shown to be the causative drug, and the muscle relaxant rocuronium bromide has been reported to be the most likely cause.^{2,3} It has been reported that the possibility of anaphylactic shock in response to rocuronium should be strongly considered if cutaneous symptoms, unexplained hypotension, or respiratory symptoms appear after its administration. Although this case expressed all symptoms, rapid circulatory collapse and shock appeared before any skin symptoms were observed and it was not until the patient's surgical drapes were removed that we confirmed the urticaria. Hives also appeared on his face after his condition stabilized. There was a delay in generalized skin symptoms on his

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Figure 1. Some dark violet, bulging urticaria appeared on the trunk (a) and extremities (b).

entire body. Therefore, we think the optimum timing for administering epinephrine, the first-line drug for anaphylactic shock, was missed. Interestingly, norepinephrine appeared to improve bronchospasm in our case despite minimal β_2 effects when the drug is exogenously administered.

There is a possibility that anaphylactic shock will be fatal if it occurs and we are not able to respond quickly. Early diagnosis and rapid response to anaphylactic shock are the best ways to increase the survival rate.

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Figure 2. No edema of the glottis was observed.

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