ANAPHYLACTIC SHOCK TO PANCURONIUM BROMIDE UNDER GENERAL ANESTHESIA: A CASE REPORT

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Abstract - Anaphylactic reactions can occur following the adminstration of muscle relaxants. However, it happens very rarely with pancuronium bromide. A case report of anaphylactic shock to pancuronnium bromide, which is supported by a highly poitive skin prick test, is reported.
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Key words: Anaphylactic reaction, pancuronium bromide, skin prick test

INTRODUCTION

Although anaphylactic shock happens very rarely under general anesthesia, the anesthesiologist must be familiar with the correct diagnosis and measures that must be undertaken immediately to resuscitate the patient. In the literature there are some reports of anaphylactic reaction to muscle relaxants. However, there are very few reports of hypersensitivity to pancuronium bromide (1-3). This communication reports a severe anaphylactic reaction in a patient to pancuronium bromide which was established by the presence of positive skin prick test to the drug and detection of pancuronium bromide IgE - specific antibody in the patient's blood.

Case

A 42 - yr - old female was scheduled for abdominal lipectomy under general anesthesia. She had no history of atopy and previous general anesthesia. Preoperative studies included blood chemistry, electrocardiography and chest x - Ray, which were all within normal limits. On physical examination, the patient was a well developed healthy looking woman, with no evidence of distress.

On arrival in the operating room an ECG, pulse oximeter and automated blood pressure cuff were applied to the patient. Her initial blood pressure was 100/80 mmHg, pulse rate 100/min and Spo2 was 95%. Two milliliters of thalamonal was administered intravenously as premedication. Anesthesia was induced with sodium thiopental 300 mg, followed by succinylcholine 80 mg intravenously. The patient's lungs were ventilated with 100% oxygen and the trachea was intubated with a 7.5 portex orotracheal tube. Ventilation was controlled while nitrous oxide in oxygen with 1% halothane was started. Five minutes later the patient was given 4 mg of pancuronium bromide intravenously. Almost immediately after administration of pancuronium bromide, severe cardiovascular collapse with bronchospasm and general urticaria developed. The patient's radial pulse was not palpable and arterial blood pressure was not measurable by automated blood pressure cuff, however, carotid pulse was palpable. There was no evidence of ECG changes on electrocardiogram. The patient was ventilated with 100% oxygen manually. The patient's condition did not improve by administration of calcium gluconate, dopamine, aminophylline and corticosteroids. However, radial pulse became palpable, immediately after administration of 100 μg of epinephrine intravenously. The patient's vital signs were stabilized after administration of 1200 microgram epinephrine in incremental doses. Arterial blood gases at 30 minutes after cardiovascular collapse and bronchospasm showed a pH of 7.15 , $PaCO_2$ of 52 mmHg, paO_2 of 86 mm Hg and HCO_3^- of 19 mEq/lit. Fifteen minutes later, after correction of acidosis, ABG

showed a pH of 7.31, $PaCO_2$ of 33 mmHg, PaO_2 of 208 mmHg, and HCO_3^- of 21 mEq/lit. One hour after the beginning of the patient's resuscitation, the patient was responding to verbal commands. She was admitted in the ICU overnight, and was discharged in a good general condition the next day. One month later skin prick test was done with the drugs which were used during anesthesia. She developed severe positive skin prick test to pancuronium bromide. A wheal and erythema, more than 11 mm in diameter developed within 3 minutes, accompanied by itching. The patient's IgE specific test to pancuronium bromide was also positive.

DISCUSSION

Anaphylaxis to muscle relaxants occurs by recognition of the complex of ammonium ions group present in many of muscle relaxants by IgE antibodies(4).

Although there are some reports of anaphylactic shock following administration of muscle relaxants, cases of anaphylactic shock definitely due to pancuronium bromide are very rarely reported (1-3). In pancuronium bromide, ammonium ions are more than six angstrom apart, which is an optimal length for cross-linking cell surface IgE and making it capable of inducing histamine release, however the rigid backbone between the two ammonium ions makes it less flexible in initiating mediator release and anaphylaxis (5).

The diagnosis of anaphylactic shock is very difficult if it happens under general anesthesia, when multiple drugs with different pharmacological properties are given to the patient, and the patient is covered with drapes. Therefore anaphylactic syndrome should be suspected whenever the patient develops urticaria, bronchospasm and cardiovascular collapse under general anesthesia. In the case presented here, hypersensitivity to pancuronium bromide, steroid muscle relaxant with no histamine release effect, (7) was suspected when symptoms and signs of anaphylactic shock appeared immediately following administration of the drug intravenously, and was alleviated only after administration of epinephrine in incremental doses intravenously. Further, the diagnosis of hypersensitivity of the patient to pancuronium bromide was supported by the presence of skin prick test which was highly positive to pancuronium bromide (> 11 mm in diameter accompanied by itching) one month later, and IgE - specific antibody against pancuronium bromide which was also present in her serum.

The occurrence of anaphylactic shock under general anesthesia is a serious disaster. It might happen as a reaction to a drug which is administered for the first time (as the patient presented here). The anesthesiologist should always be wary of its occurrence. The value of the skin test, especially the skin prick test, has been extensively studied in Austria and France (6 - 12). Skin prick test, is readily available and can both identify the responsible agent to anaphylaxis and guide the anesthsiologist in selection of the safe anesthetic drugs in case the patient needs general anesthesia in the future. This test should be done at least one month after the occurrence of anaphylactic shock.

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