Thiopental Anaphylaxis: A Case and a Method for Diagnosis

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Severe allergic reactions to sodium thiopental are extremely rare, especially in light of the vast number of injections given throughout the world. Seven cases of anaphylactic shock due to thiopental have been reported to date. This seems to indicate either that very few such episodes occur, or that this event may go undiagnosed or unsuspected. The following is a case report of thiopental anaphylaxis confirmed by the basophil degranulation test.*

REPORT OF A CASE

The patient, a healthy 40-year-old caucasian woman, was admitted to the hospital early in 1971 for repair of bilateral hallux valgus. Thiopental had been given for uterine dilatation and curettage in 1957, 1958, and 1967. There was a history of a rash following treatment of a sore throat with penicillin, and the patient had been instructed to avoid penicillin. She had also experienced coryza from perfumed cosmetics, but did not have seasonal allergies or eczema. Physical examination revealed no abnormalities other than the orthopedic problem. Preoperative hemoglobin, urinalysis, serum electrolytes, chest x-ray, and electrocardiogram were normal.

The patient had an uneventful one-hour anesthetization for correction of the hallux valgus. Anesthesia was induced with 450 mg sodium thiopental and maintained with nitrous oxide, oxygen, and halothane.

Fourteen days later the patient returned unpremedicated to the operating room for application of below-knee casts. Induction of anesthesia with 275 mg of thiopental, 2.5 per cent, was followed by atropine sulfate, 0.2 mg iv. Immediately following induction, N₂O:O₂ (6:3 liters) was administered by mask via a Magill circuit. After a few breaths, salivation and cyanosis were noted, together with some difficulty in manual ventila-

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tion. The patient's airway was suctioned and cleared, but cyanosis persisted. Succinylcholine, 60 mg, was given intravenously, a Magill endotracheal tube inserted, and the patient ventilated with 100 per cent oxygen. These measures did not appreciably decrease the cyanosis. Blood pressure and brachial and radial pulses were unobtainable at this time, but a carotid pulse was present. The pupils were constricted. Five milligrams of methamphetamine were given intravenously, after which the blood pressure was obtained at 80 mm Hg by palpation. The chest was clear on examination, and there was no evidence of bronchospasm. Application of the casts was completed within 20 minutes using 50 per cent nitrous oxide and oxygen.

The trachea was then extubated and the patient was taken to the recovery room; awake and responsive, she received oxygen by mask. Blood pressure once more became unobtainable, and the electrocardiogram showed sinus tachycardia of 150 beats/min. Central venous pressure was 2 cm H₂O. Analysis of arterial blood gases revealed a mild metabolic acidosis, with PaCO₂ 89 torr. Therapy then consisted of lanatoside C, 0.8 mg, IV, and phenylephrine infusion, IV, in an attempt to slow the rapid pulse and raise the systemic blood pressure.

At this time, about 45 minutes after induction of anesthesia, the patient was found to have bright red discoloration of the skin, "goose flesh," and circumoral edema. Therapy was then instituted with epinephrine (1:1,000), 0.2 ml im, and hydrocortisone, 200 mg, IV. Physiologic saline solution, 1,000 ml, was quickly infused. The blood pressure slowly increased to 110/70 mm Hg and the pulse rate decreased to 90/min over the next 20 minutes. Four hours later the patient was discharged to the ward for further observation.

Clinical recovery was uneventful, with no detected hematologic, renal or biochemical abnormalities. Blood samples were drawn on the second day, and the serum was tested for hypersensitivity to several drugs, including thiopental, by the indirect basophil degranulation technique. The test showed marked degranulation to thiopental, slight degranulation to penicillin G and succinylsulfathiazole, and no response to other drugs tested. Four days after this episode, the patient was discharged from the hospital in good condition, and her further convalescence was uneventful.

**DISCUSSION**

The dramatic onset of shock in an apparently healthy woman, who two weeks previously had tolerated thiopental anesthesia, made the diagnosis difficult initially. The diagnosis was confirmed and definitive therapy was administered after the cutaneous manifestations were observed. This "glowing red" skin eruption had been seen in three previous cases. The patient's rapid and satisfactory clinical response to epinephrine and hydrocortisone, IV, supported the clinical suspicion.

In most of the previous reports, the importance of numerous exposures to thiopental (viz., 10) prior to development of anaphylaxis was emphasized. Our patient had received thiopental four times before, including once two weeks before the anaphylactic episode. A two-week incubation period is optimal for expression of primary sensitization to drugs. Therefore, not only multiplicity of exposures but also the timing of previous thiopental anaphylactic episodes can be an important factor in anaphylactic reactions.

After resuscitation, it is important to identify thiopental sensitivity positively in order to advise the patient on the dangers of future exposure. This confirmation of thiopental hypersensitivity has been difficult in the past. Direct intravenous or intradermal testing with the drug is hazardous and unreliable. The Prausnitz-Küstner test is more accurate, but necessitates exposure of a volunteer to the possibility of serum hepatitis. The lymphocyte transformation test was reported to give unsatisfactory results, because thiopental has a toxic effect on lymphocytes.

The indirect basophil degranulation test partially duplicates anaphylaxis as a test tube. It detects a drug-specific factor in the sera of patients with anaphylactic hypersensitivity. This factor prepares rabbit basophils for degranulation on exposure to the drug. Fresh rabbit basophils are incubated in the human serum under test. They are exposed briefly to a solution of the suspected drug, and then stained and examined for degranulation. For control purposes, other basophils are exposed to the drug alone. The hypersensitivity is proportional to the percentage of basophils degranulated. The test appears useful for identifying thiopental hypersensitivity in vitro. This case serves as a further reminder that the anesthesiologist should be aware of the possibility of thiopental anaphylaxis. A safe method of diagnosis is suggested.
REFERENCES


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