

# Management of Anaphylactic Shock During Intravenous Fluorescein Angiography at an Outpatient Clinic

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We report the proper management of a severe adverse reaction of anaphylactic shock during intravenous fluorescein angiography at an outpatient clinic. A 72-year-old male developed the severe, life-threatening complication after intravenous injection of sodium fluorescein dye for retinal angiography. Three minutes after receiving an intravenous injection of fluorescein, the patient developed syncope, apnea and circulatory shock. Fortunately, he recovered without any neurologic sequelae after immediate intensive resuscitation with fluid and inotropic support. We highlight the occurrence of anaphylactic shock as a potentially fatal complication during intravenous fluorescein angiography. Thus, one should be alert to the possibility of this adverse event and be prepared to deal with it when fluorescein angiography is performed. When it happens, immediate intensive medical resuscitation is essential to minimize morbidity and to avoid mortality. [*J Chin Med Assoc* 2007;70(8):348–349]

**Key Words:** anaphylactic shock, fluorescein angiography, fluorescein contrast medium

## Introduction

Intravenous fluorescein angiography is a useful and commonly performed ophthalmic diagnostic procedure. Adverse reaction to intravenous fluorescein angiography is unusual; however, nausea, vomiting, urticaria and skin necrosis with dye extravasation have been reported.<sup>1,2</sup> Moreover, life-threatening anaphylactic reaction is very rare, and death is estimated to occur in approximately 1 in 222,000 examinations.<sup>1</sup> We recently encountered a case of severe anaphylactic adverse reaction to fluorescein dye at an outpatient clinic. The patient developed this severe life-threatening complication after intravenous injection of sodium fluorescein dye for retinal angiography. Fortunately, he recovered without any sequelae after immediate intensive resuscitation with fluid and inotropic support.

## Case Report

A 72-year-old male was diagnosed with proliferative diabetic retinopathy in the right eye. His left eye was

phthisis bulbi after an ocular trauma 10 years before. A 5-mL intravenous injection of sodium fluorescein (10% fluorescite; Alcon Laboratories Inc., Fort Worth, TX, USA) for retinal angiography was administered. Three minutes after the fluorescein injection, the patient suffered from sudden attack of syncope, apnea, urinary incontinence and circulatory shock. His condition was recognized, and he was given intensive medical treatment immediately at the office examination room. We called for help and the emergency cardiopulmonary resuscitation team came immediately. Initial physical examination revealed unconsciousness, apnea, weak and rapid pulsation, and hypotension (50/34 mmHg), and anaphylactic shock was highly suspected. The patient's airway was kept patent, and ventilation was maintained by Ambu mask bagging with 100% oxygen. His spontaneous respiration gradually resumed within 5 minutes. Electrocardiographic monitor showed a sinus tachycardia and ST elevation with a heart rate of 105 per minute. Rapid fluid therapy with 5% dextrose/0.45% saline 500 mL was given; additionally, ephedrine 16 mg and hydrocortisone 200 mg were intravenously injected. The patient's

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blood pressure gradually returned to 110/70 mmHg by 30 minutes later.

He was evaluated and observed at our emergency room for 24 hours. He had leukocytosis (white blood cell count, 12,900/mL with 6.5% eosinophils) and was anemic (hemoglobin, 10.6 g/dL). Cardiac enzyme (troponin-I and CK-MB) survey, chest X-ray, and chest auscultation were unremarkable, so the possibility of acute myocardial infarction, asthma, or laryngeal edema was excluded. He was also not atopic in his past medical history. According to the above information, we came to a conclusion of anaphylactic shock induced by intravenous fluorescein. This was the first fluorescein angiography examination for this patient. No skin test or measurement of IgE level had been done because he had no previous allergic history. Fortunately, the consciousness of the patient recovered completely 4 hours later, and no neurologic deficit was noted. The patient was discharged the next day without sequelae.

## Discussion

The frequency of untoward reactions after intravenous fluorescein angiography was 4.8% in one prospective study, and the percentage of adverse reactions strongly depended on the patient's angiographic history. Patients with previous allergic reaction comprised a high-risk group with a much higher incidence (48.6%) of adverse response to the next tests.<sup>2</sup> In contrast, the percentage of reaction was 1.8% for patients who had had previous angiography without ever having had an adverse reaction. Most of the adverse reactions were mild-degree reactions, such as nausea (2.9%), vomiting (1.2%), urticaria (0.5%) and dye extravasation.<sup>2</sup> Pre-medication with antihistamine and corticosteroids before subsequent angiography may lessen the severity of symptoms, mainly nausea.<sup>2,3</sup> However, a rare severe adverse reaction may occur without warning in a patient with no history of atopy. These severe adverse reactions (0.05%) include life-threatening cardiovascular (circulatory shock, myocardial infarction), respiratory (laryngeal edema, bronchospasm) and neurologic (tonic-clonic seizure) complications or even death.<sup>1,4</sup>

An elevated serum  $\beta$ -tryptase concentration was found in a severely anaphylactic patient,<sup>5</sup> therefore, profound mast cell activation with IgE-mediated mechanism was suggested in the fluorescein-induced allergic reaction. Allergy evaluation should be considered in patients with history of atopy or adverse reactions to fluorescein (such as itching, urticaria, skin rash, asthma) so that preventive measures may be prepared for when the subsequent fluorescein examination is

scheduled. In our patient, immediate recognition of the anaphylactic reaction and resuscitation successfully restored his vital function. However, it is indeed difficult to predict and prevent this serious event during the first injection. Therefore, patients should be informed of the possibility of adverse reactions before examination. Physicians should be aware of this severe adverse reaction to fluorescein, and be prepared for handling it. The emergency equipment recommended for fluorescein angiography at the examination unit include Ambu bag with facial mask, laryngoscope, endotracheal tube, oxygen tank and nasal cannula tubing. Emergency medicines, such as epinephrine, hydrocortisone, antihistamine, aminophylline, sodium bicarbonate, and intravenous glucose and fluid supply, should be within reach at all times. When it happens, the first-line medical team should immediately take action to preserve the vital signs of the patient, including airway patency, breathing and circulation. Then, the patient should be transferred to the emergency room or the standby emergency cardiopulmonary resuscitation team should be called for subsequent medical management. Immediate intensive medical resuscitation is essential to minimize morbidity and to prevent mortality.

In conclusion, anaphylactic shock is still a potentially fatal complication during the routine examination of intravenous fluorescein angiography. Thus, it is recommended that fluorescein angiography be performed on the alert for adverse events, with adequate preparation.

## Acknowledgments

This study was supported by grants from the National Science Council, Department of Health and Veterans General Hospital (V95C1-144), Taiwan.

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