CASE REPORT

Anaphylaxis with convulsions following intravenous fluorescein angiography at an outpatient clinic

Anafilaxia com convulsões após angiografia com fluoresceína em paciente ambulatorial

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ABSTRACT

Fluorescein is associated with minor adverse effects during retinal angiography, and most of these effects are not severe and not related to immunological mechanism. However, on rare occasions, anaphylatoid reaction can occur, and fatalities involving fluorescein have been described. Life threatening complications after intravenous injection of sodium fluorescein require immediate intervention. Trainings for professionals are needed to standardize treatment for this event.

Keywords: Anaphylaxis; Seizures/chemically induced; Fluorescein angiography/adverse effects; Fluoresceins/administration & dosage; Retinal diseases; Injections, intravenous; Case reports

RESUMO

A fluoresceína endovenosa é associada a pequenos efeitos adversos durante a angiografia da retina, a maioria deles sem gravidade e não relacionada a mecanismos imunológicos. Entretanto, em raras ocasiões, pode ocorrer reação anafilactoide; fatalidades envolvendo o uso de fluoresceína têm sido descritas. Complicações graves após injeção endovenosa de fluoresceína requerem ação imediata da equipe envolvida, assim como treinamento regular para padronizar o tratamento.

Descritores: Anafilaxia; Convulsões/quimicamente induzido; Angiofluoresceinografia/efeitos adversos; Fluoresceínas/administração & dosagem; Doenças retinianas; Injeções intravenosas; Relatos de casos

INTRODUCTION

Adolf von Bayer synthesized fluorescein dye in 1871, and Novotny and Alvis developed a graphic system for sequential records of fluorescein flow through the ocular fundus in 1960[1]. Fluorescein angiography is a diagnostic method used to assess chorioretinal disorders. The largest survey describing its side effects was done in 1986 and involved more than 220,000 patients[2]. Adverse reactions in intravenous fluorescein angiography are uncommon, however, nausea, vomiting, and urticaria are described. In addition, life-threatening anaphylactoid reaction is described, and approximately 1 patient die in 222,000 examinations done[2].

We recently dealt with a case of intense adverse reaction to fluorescein dye at our clinic. The individual developed severe life-threatening complication after intravenous injection of sodium fluorescein dye for retinal angiography. Diagnosis and treatment were performed in time, and patient recovered without sequelae. This was the first case of such magnitude we have had experienced in our facility in over 15,000 angiographies done.

CASE REPORT

A 48-year-old man was diagnosed with retinal venous occlusion in the left eye. He had the same diagnose in his right eye by fluorescein angiography 3 years before. The patient worked as a laborer in building construction. He had no history of allergy and usually work normally without health complaints.

A new angiography was indicated to elucidate the diagnosis in his left eye. Because the patient reported nausea in the previous exam, we decided to give 5mg of dexamethasone intravenously 5 minutes before the angiography. A 2-mL intravenous injection of sodium fluorescein (20% sodium fluorescein,

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Received on: May 5, 2011 – Accepted on: May 24, 2011

Fludiag®, Oftalmopharma, São Paulo, Brazil) is usually used for this procedure, although, in this case, the ophthalmologist decided to use half of the dose, and also recommended intravenous injection of 1-mL of dye. The dose was reduced because of the patient's previous history of adverse reaction.

Three minutes after fluorescein injection, the patient mentioned pruritic nodules on the head and neck that spread rapidly to the thorax and arms. Ten minutes after injection, he felt dizziness and then lost consciousness, starting to have tonic-clonic seizures, lasting for 2 minutes. The nurse and then the ophthalmologist provided permeable airflow using jaw thrust maneuver, so the patient breathed well during and after seizures. He remained lethargic for 10 more minutes; his blood pressure was 100/60mmHg and pulse 80bpm at recovery time, when saline solution and promethazine 25mg were administered intramuscularly. He recovered consciousness, did not remember what happened and complained of chest pain. The patient was transferred to a major hospital three blocks away from our facility to be evaluated, where blood samples were collect and an electrocardiogram (ECG) was perform. The myocardial infarction hypothesis was excluded, and he was discharged without complications after 3 hours.

The anesthesia team from the hospital invited him a week later for detailed analysis of his story of adverse reactions to medication. Surprisingly they found that he had extreme pruritus when in contact with azarcon, a specific ink that contains lead tetroxide (Pb3O4) used to coat steel bars to prevent them from oxidation in construction sites.

DISCUSSION

Nausea and vomiting are the most common adverse reactions to fluorescein angiography, although the frequency of such reactions has varied considerably in previous reports.

Nausea rates of 0.7%[3], 2.9%[4] and 6.83% were found[1]. In another study the subgroup of diabetic patients experienced the highest nausea rate in more than 15% of the angiograms[5], but hypertensive and elderly patients did not show increase in such reactions[6].

Previous adverse reactions seems to be a powerful risk factor for future exams[1,2,4]. Some authors claim rates of complications as high as 48.6% when patient had experienced symptoms in a prior angiography[4]. Curiously, a report with 4 severe cases of anaphylactoid reactions following fluorescein angiography injection, out of 1,400 exams, indicated that, for those patients, that was the first exposure to the drug[7]. Our patient underwent an angiogram 3 years before, and at that time had nodules in the head and neck.

The effects to fluorescein may be due to multiple reactions, which are not always related to an allergic response. Yannuzzi et al. suggested some possible mechanisms responsible for effects, for example, the vaso-vagal reaction, the drug-related immediate response, and the histamine release of a non-allergic nature[2].

Even though health professionals use the term "anaphylactic reaction", this is not strictly correct[3]. In immunological terms, anaphylaxis refers to a systemic immediate hypersensitivity reaction caused by the rapid immunoglobulin E (IgE)-mediated immune release of potent mediators from the tissue mast cells and peripheral blood basophils.

In contrast, anaphylactoid reactions are intense organic reactions resembling anaphylaxis with identical symptoms and signs but they are not caused by IgE-mediate immune responses[8]. In fact, it has been shown that allergy skin tests cannot predict fluorescein reactions[9], which are now considered mostly as anaphylactoid ones[10]. Perhaps, this explains the complication that our patient had despite the small amount of fluorescein, received, particularly because such reactions occur in an "all-or-nothing" manner.

A study in 1989 of a generalized tonic-clonic seizure (grand mal) after fluorescein stated that in that case the patient already had a history of seizure disorders and was using proper medication[11]. The kinetics of the reaction we indicated, within minutes for our patient, suggests the typical anaphylactoid response, with intravenous route of allergen[12]. The second case of convulsions after fluorescein was reported two decades ago and described seizures starting 2 hours after the procedure when the patient was discharged. The patient also had neurological complaints before the angiogram and showed some abnormalities in the electroencephalography[13].

Our patient was a healthy worker, and we believe that the complication was a combination of fasting, hypotension, stress and the overwhelming effect of sodium fluorescein.

His allergy to azarcon presented in steel bars was found a week later during a more detailed anamnesis. Azarcon is an orange ink that contains lead tetroxide and is used to coat steel bars at building construction sites for its anticorrosive properties.

There are no reports regarding allergy to this compound or atopic dermatitis despite the paint contains vegetable oil, phenol, aliphatic hydrocarbon, inorganic

pigments, inert minerals and organic metals. Perhaps, one of these compounds may be involved in an atopic response.

In conclusion, it is important to emphasize that adverse events are not always related to previous history of allergy as discussed above. Emergency routines should be available to manage potential complications. Training professionals to deal with rare events is of paramount importance.

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