



Contents lists available at ScienceDirect

Journal of Clinical Neuroscience

journal homepage: www.elsevier.com/locate/jocn

Case Report

Anaphylactic reaction after fluorescein sodium administration during intracranial surgery

Ozdamar Dilek^{a,*}, Anik Ihsan^b, Hosten Tulay^a^a Department of Anesthesia and Reanimation, Faculty of Medicine, Kocaeli University, AD 41100 Umuttepe, Kocaeli, Turkey^b Department of Neurosurgery, Faculty of Medicine, Kocaeli University, Kocaeli, Turkey

ARTICLE INFO

Article history:

Received 17 March 2010

Accepted 14 June 2010

Available online xxxx

Keywords:

Anaphylactic reaction

Fluorescein sodium

Glioma surgery

ABSTRACT

We present a male patient who underwent a fluorescein sodium-guided brain tumor excision and experienced an anaphylactic reaction with severe hypotension and bradycardia. A 54-year-old, 70 kg man of American Society of Anesthesiologists status II was seen with a history of glioma. In the 80th minute of the operation, 20 mg/kg intravenous (i.v.) fluorescein sodium was injected after dural opening. A few minutes later, the anaphylactic reaction was diagnosed. Surgery was ended and the patient was delivered to the intensive care unit with intubation. Laboratory values were: immunoglobulin E, 332 U (upper limit 100 U); and elevated tryptase, 3.12 mg/dL. In view of the expanding use of fluorescein sodium in clinical procedures, physicians should be alerted to this rare but life-threatening adverse event.

© 2010 Elsevier Ltd. All rights reserved.

1. Introduction

Fluorescein sodium and 5-aminolevulinic acid (5-ALA) are the most common fluorescent dyes used in brain tumor surgery.¹ There are many reports of the effectiveness of fluorescence-guided glioma surgery with fluorescein sodium, which is now becoming an established operative technique.² Fluorescein sodium can be used for intraoperative visualization of tumour tissue.^{3,4} Fluorescent dyes penetrate the tumor and blood–brain barrier (BBB)-damaged areas, leading to more effective surgery. Shinoda et al.³ reported that observation of fluorescence using a normal microscope, under white light, was also possible without the need for a special filter by intravenously injecting a double dose (20 mg/kg) of fluorescein sodium. The dye is inexpensive, safe, and comparatively easy to use, and does not require any additional equipment. However intravenous (i.v.) fluorescein administration is not free of complications.⁵ We present a patient who underwent a fluorescein sodium-guided brain tumor excision and experienced an anaphylactic reaction with severe hypotension and bradycardia.

2. Case report

A 54-year-old man with American Society of Anesthesiologists status II presented to our institution. He had a history of an intracranial mass; a glioma located in the temporal lobe. In addition, he

had a history of arterial hypertension and was on telmisartan medication. He had no drug, personal or family history of allergic disease.

The patient was to undergo surgery for intracranial mass excision. Routine monitoring and radial artery catheterization were performed in the operating room. Anesthesia was induced by i.v. sodium thiopental (7 mg/kg), remifentanyl (0.5 µg/kg [50 µg/mL]) and rocuronium bromide (0.6 mg/kg). Maintenance treatment included i.v. remifentanyl infusion (0.2 µg/kg) and 35% oxygen plus 65% air, as well as sevoflurane inhalation. In the 80th minute of the operation, 20 mg/kg fluorescein sodium was injected i.v. after dural opening. A few minutes later, severe hypotension with mild bradycardia was observed.

The patient's blood pressure decreased to 30/20 mmHg and his pulse was 40 beats per minute. Widespread flushing was seen over the arm. Thus, an anaphylactic reaction was diagnosed and i.v. adrenaline (1 mg) and prednisolone (100 mg) were administered. Atropine for bradycardia (1 mg) and colloid replacement were then administered. Dopamine infusion (15 µg/kg per minute) was started due to the continuation of hypotension. His blood pressure increased initially to 70/40 mmHg and to 90/50 mmHg thereafter. Although the procedure was not complete, surgery was discontinued and the patient was delivered to the intensive care unit. Laboratory values before intensive care were: immunoglobulin E (IgE), 332 U (upper limit 100 U); and elevated tryptase, 3.12 mg/dL. His chest radiograph and electrocardiogram were unremarkable.

The patient recovered fully without any symptoms of late-phase reaction. He was returned to the neurosurgical service with a Glasgow coma scale of 15.

* Corresponding author. Tel.: +90 5324514521; fax: +90 2623038001.

E-mail address: dilekozdamar@gmail.com (O. Dilek).

3. Discussion

Anaphylaxis is a systemic reaction caused by antigen-specific cross-linking of immunoglobulin E molecules on the surface of tissue mast cells and peripheral blood basophils, which results in the immediate release of potent mediators.

In our experience of fluorescein sodium administration to 121 patients, no adverse reactions occurred between 2003 and 2010. There has been only one previous report of an allergic reaction in a similar procedure,⁵ in which similar signs and laboratory findings of increased IgE levels and tryptase were reported.

Most reports of allergic reactions due to fluorescein describe a response during angiography of vitreoretinal pathologies. These patients are generally reported to have mild allergic reactions^{6,7} rather than severe, life-threatening ones. However, the dose in vitreoretinal surgery is much lower than that used in glioma surgery. Because we do not use a special surgical microscope, a high dose of i.v. fluorescein sodium (20 mg/kg) is required after dural opening at the craniotomy site.^{2,3}

Our patient's negative history of allergy, and his subsequent anaphylactic reaction, point to the need for testing among a wider

group of patients. It seems likely that many physicians are not fully aware of the potential hazard of anaphylaxis resulting from the use of fluorescein sodium, which led to life-threatening reactions in both Tanahashi et al.'s previously reported patient⁵ and our patient in the current report.

References

1. Okuda T, Kataoka T, Taneda M. Metastatic brain tumor surgery using fluorescein sodium: technical note. *Minim Invasive Neurosurg* 2007;**50**:382–4.
2. Koc K, Anik I, Cabuk B, et al. Fluorescein sodium-guided surgery in glioblastoma multiforme: a prospective evaluation. *Br J Neurosurg* 2008;**22**:99–103.
3. Shinoda J, Yano H, Yoshimura S, et al. Fluorescence-guided resection of glioblastoma multiforme by using high-dose fluorescein sodium. *J Neurosurg* 2003;**99**:597–603.
4. Kuroiwa T, Kajimoto Y, Ohta T. Development of a fluorescein operative microscope for use during malignant glioma surgery. A technical note and preliminary report. *Surg Neurol* 1998;**50**:41–9.
5. Tanahashi S, Lida H, Dohi S. An anaphylactoid reaction after administration of fluorescein sodium during neurosurgery. *Anesth Analg* 2006;**103**:503.
6. Moosbrugger KA, Sheidow TG. Evaluation of the side effects and image quality during fluorescein angiography comparing 2 mL and 5 mL sodium fluorescein. *Can J Ophthalmol* 2008;**43**:571–5.
7. Brzoza Z, Kasperska-Zajac A, Rogala E, et al. Anaphylactoid reaction after the use of sodium tetradeceyl sulfate: a case report. *Angiology* 2007;**58**:644–6.