ORIGINAL ARTICLE

Incidence of Complications during Fluorescein Fundus Angiography (FFA) in Our Population

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ABSTRACT

Objective: To see incidence of complications during FFA in our population.
Method and material: A prospective descriptive study was conducted to document the incidence of adverse reactions with this procedure. Data collection was carried out between July 2007 and December 2008 at AFIO Rawalpindi. A total of 430 patients had undergone intravenous injection for retinal fluorescein angiography at Eye Department Rawalpindi. The sample ages were 40 to 65 years old. Patients with prior fluorescein angiography history, serious cardiovascular disease, bronchial asthma, pregnant patients or patients in use of corticosteroids, immunosuppressive, antihistamine drugs or receiving anticoagulants were excluded from the study.
Results: The incidence of adverse reactions was 17.4%. Most adverse reactions were mild including urticaria/itching 50 patients (11.6%) and nausea/vomiting 20 patients (4.65%). Extravasation of dye was noted in 3 patients (0.69). Vasovagal attack with complete recovery without any intervention was noted in 2 patients (0.46%). No acute anaphylaxis reaction was noted.
Conclusions: Fluorescein fundus angiography is a relatively safe diagnostic test. Adverse reactions do occur during or after FFA but majority of adverse reactions are mild in nature.
Keywords: Fluorescein angiography; anaphylaxis; drug hypersensitivity; adverse reactions, incidence

INTRODUCTION

The dye was first synthesized in 1871 by Adolf von Baeyer, who later received the Nobel Prize in Chemistry (1905) for his work in organic dyes.[1] Later on two medical students from Indiana University, Novotny and Alvis, described and demonstrated the technique of retinal fluorescein angiography in 1961.[2] Fluorescein fundus angiography is a diagnostic test to assess retinal or choroidal vascular diseases such as diabetic retinopathy, age-related macular degeneration, hypertensive retinopathy and vascular occlusions. Through this test blood flow is visualized in retinal, choroidal and iris tissues[3]. This test is in vogue for the last over four decades and is an extraordinarily valuable diagnostic procedure in the assessment, understanding, and the treatment of various ocular diseases[3-4].

Flluorescein fundus angiography is considered a relatively safe procedure, although numerous adverse reactions have been documented in the various studies. These are divided into mild (nausea, vomiting, pruritus, sneezing, vaso-vagal disorders, inadvertent arterial injection), moderate (urticaria, other skin eruptions, syncope, thrombophlebitis, pyrexia, local tissue necrosis, muscular paralysis) and severe (bronchospasm, laryngeal edema, circulatory shock, myocardial infarction, tonic-clonic seizure)[5-7].

Previous studies indicate that the most frequent adverse reactions are mild, such as nauseas and vomiting (2% to 14%) and that moderate and severe reactions are infrequent (<1%)[5-6,8]. The reported frequency of these adverse reactions has varied among authors, however most of the studies are retrospective and they do not distinguish patients who had previously undergone this test from those who had undergone it for the first time.[7,9-10] Donald Gass began publishing his experience with fluorescein angiography in 1967 and his efforts led to the wider acceptance of the technique in the evaluation of retinal disease[11].

The purpose of this prospective study is to determine the incidence of adverse reactions in patients who had undergone fluorescein angiography for assessment of fundus pathologies.

MATERIALS AND METHODS

The descriptive study was conducted at Armed forces institute of ophthalmology Rawalpindi between July 2007 and December 2008. A total of 430 outdoor/indoor cases that underwent retinal fluorescein angiography for assessments of ocular pathological states were included in the study.284 (66.04%) were males and 146(33.95%) were females. Patient's age ranged between 40 to 65 years. Patients with prior fluorescein angiography

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history, serious cardiovascular disease, bronchial asthma, pregnant patients or patients in use of corticosteroids, immunosuppressive, antihistamine drugs or receiving anticoagulants were excluded. Written informed consent was taken from all patients.

Single dose of 3 ml 25% Fluorescien Inj was injected into anti cubital vein. Pupil was dilated with mydriacyl/cyclopen eye drops. Photographic documentation of images was carried out by Topcon digital FFA camera. Adverse reactions that occurred during and after the angiography were registered in a standardized chart.

RESULTS

The incidence of adverse reactions was 17.4%. Most adverse reactions were mild including urticaria/itching 50 patients (11.6%) and nausea/vomiting 20 patients (4.65%). Extravasation of dye was noted in 3 patients (0.69). Vasovagal attack with complete recovery without any intervention was noted in 2 patients (0.46%). No acute anaphylaxis reaction was noted.

Table 1: Incidence of adverse reactions after FFA

Adverse reactions	No.	%
Itching / pruritis	50	11.6
Nausea /vomiting	20	4.65
Extravasation of dye	03	0.69
Vasovagal attack	02	0.46
Acute Anaphylaxis reaction	nil	nil

DISCUSSION

Fluorescein angiography is an indispensable procedure that can help you investigate the integrity of the retinal vasculature. Fluorescein angiography is an application of the physical phenomenon of fluorescence[12]. Fluorescein sodium is well tolerated by most patients, but angiography is an invasive procedure with an associated risk of complication or adverse reaction. Use of fluorescein sodium may be contraindicated in patients with history of allergic hypersensitivity to fluorescein. Historically, adverse reactions occur in 5-10% of patients and range from mild to severe[6-8,13-16].

In case of oral administration of fluorescein, the frequency of reactions is between 1% and 2%[17-19] and in case of intravenous dye it is between 3% and 20%[4-8,20-21]. In our study, the incidence of adverse reactions to dye injection was 17.4% in patients who were submitted to fluorescein angiography for the first time.

Mild reactions as nausea and/or vomiting occurred in 4.65% of the patients. In other studies, they ranged from 3% to 14%[6,9,15,22]. The pathophysiology of these effects involves the activation of chemical receptors in the vomiting nervous center located in the area postrema that induce vomiting through integration with vagal nerve or vestibular system[23].

Moderate and/or severe reactions as urticaria, bronchospasm and laryngeal edema were infrequent, with incidences of 1.06%, 0.38% and 0.1%, respectively. Other authors report frequencies of urticaria between 0.5% and 1.2%[6-7,10] and of respiratory distress between 0.02% and 0.1%[7-8,15].

Allergic reactions such as pruritus or urticaria can be treated with antihistamines, but any patient who experiences these symptoms should be observed carefully for the possible development of anaphylaxis. In our study itching and pruritis occurs in 11.6% of patients and adequately managed by softin tablets.

Vasovagal attacks occur in some patients[24] most likely due to anxiety about the procedure or their ocular condition. Usually the angiogram needs to be aborted or postponed, but some patients are able to tolerate the angiogram during the initial stages of a syncopal episode. However, the drop in blood pressure and heart rate can dramatically alter the angiographic results[25]. In our study vasovagal attack with complete recovery without any intervention was noted in 2 patients (0.46%).

More severe reactions are rare, but include laryngeal edema, bronchospasm, anaphylaxis, tonic-clonic seizure, myocardial infarction and cardiac arrest[26-30]. The overall risk of death from fluorescein angiography has been reported as 1 in 222,000[18]. Although life-threatening reactions during angiography are rare, angiographic facilities and personnel should be properly equipped and prepared to manage serious reactions to the procedure. A resuscitative crash cart and appropriate agents to treat severe reactions should be readily available including epinephrine for intravenous or intramuscular use, soluble corticosteroids, aminophylline for intravenous use, oxygen, and airway instrumentation. It is generally recommended that a physician be present or available during angiographic procedures.

Extravasation of fluorescein dye during the injection is another serious complication of angiography and its infiltration can be quite painful. Serious complications are more likely to occur when large amounts of dye extravasate. Sloughing of the skin, tissue necrosis, subcutaneous granuloma, and toxic neuritis have been reported following extravasation of fluorescein[31-33]. To avoid these problems, continual observation of the injection site during the course of the injection and monitoring the patient for pain is recommended. In our study Extravasation of dye was noted in 3 patients (0.69). Patients were managed by cold compresses and anti-inflammatory drugs.

Keeping in view past studies and our present research one can safely adopt this procedural test with confidence to achieve relatively more accurate results. However one should always be conscious and prepared to meet any eventuality causing severe reactions in patients afterward in order to protect patients from further complications.

CONCLUSIONS

FFA is a relatively safe diagnostic test. Majority of adverse reactions are mild in nature. However, because of previously published cases of life-threatening reactions in literature one should be prepared to handle acute anaphylaxis within the clinic before administering the test with Emergency Tray/Trolley at hand. Thorough medical history, detailed physical examination before the test and observing the patients closely during and after the test and strengthening the salvage measures are important to improve the safety of FFA in patients.

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