

Prospective study of incidence of cystoid macular edema in uneventful cataract surgery: a study of 100 cases

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Received May 10, 2015. Accepted June 20, 2015

Abstract

Background: Cystoid macular edema (CME) is the important postoperative complication of cataract surgery, which can compromise the result of a cataract surgery. It can occur even after uneventful cataract surgery, but the incidence rapidly increase after complicated cataract surgery. Fundus fluorescein angiography (FFA) has been used for long time for diagnosis of cystoid macular edema. Angiographic CME, which is the presence of fluorescein leakage within the macular area without visual impairment, must be differentiated from clinical CME. The incidence of the two forms is different, with the angiographic form being much more common. Angiographic CME was reported to occur in 3–70% of the patients 4–6 weeks after cataract surgery.

Objective: To study the incidence of cystoid macular edema in uneventful cases of small incision cataract surgery (SICS).

Materials and Methods: This prospective study comprised 100 eyes of 100 patients who have undergone SICS with IOL implantation. Incidence of CME was found with the help of FFA.

Results: In the study, 40 male patients and 60 female patient who underwent uneventful SICS of whom 20% male were CME positive and 20% female were CME positive. Angiographic CME (20%) incidence was more than clinical CME (2%). The incidence of CME was more on 30th post-operative day as compared to 7th post-operative study. intracameral adrenaline increases the incidence of CME.

Conclusion: Incidence of clinical cystoid macular edema is 2% in uncomplicated cataract surgery, incidence of angiographic cystoid macular edema is 20%.

KEY WORDS: Cystoid macular edema, uneventful cataract surgery, angiographic cystoid macular edema, FFA

Introduction

By the current Indian definition of blindness, there are 12 million blind persons in India, of whom 90% live in the

rural areas. According to a population-based study (based on a WHO definition of visual acuity of less than 3/60), the incidence of blindness is 3.8 million new cases per year. Cataract is the major cause of blindness in India, amounting for 81% of total number of cases. Cystoid macular edema (CME) is one of the important postoperative complications of cataract surgery, which can compromise the result of a cataract surgery. CME is one of the important causes in abnormal vision following cataract surgery. Incidence of CME depends on complication during or after surgery, diagnostic method, time of diagnosis. It can even occur after uneventful cataract extraction, but the incidence rapidly increases after complicated surgery.^[1–3] In intracapsular cataract extractions, clinical

Access this article online

Website: <http://www.ijmsph.com>

DOI: 10.5455/ijmsph.2015.10052015321

Quick Response Code:



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CME was reported in about 2–7.6% of the cases.^[4–6] The use of iris-plane lens resulted in a strikingly higher incidence of 6–23% of clinical CME.^[7,8] Reported angiographic CME rates after phacoemulsification with intact posterior capsule varying from 5.7 to 19%.^[9–12] CME is commonly found in older patients. In most of the cases, CME resolves of its own, but even in these cases patients might have problems in their daily life due to decrease in contrast sensitivity.^[13] Chronic CME does not resolves of its own; it may lead to permanent dimness of vision and various complications such as macular hole and retinal detachment that may lead to loss of vision.^[14] Fundus fluorescein angiography (FFA) has been used for a long time for the diagnosis of CME.^[15] Angiographic CME, which is the presence of fluorescein leakage within the macular area without visual impairment, must be differentiated from clinical CME. The incidences of the two forms are different, with the angiographic form being much more common. Angiographic CME was reported to occur in 3–70% of the patients 4–6 weeks after cataract surgery.^[16–19] Different surgical techniques and procedures used represent one of the causes of the large heterogeneity in the studies. Most investigators have found a reduced incidence of CME after extra capsular surgery as opposed to intracapsular procedures.^[20,21] Recently, it has also been shown that phacoemulsification with continuous curvilinear capsulorhexis (CCC) induced a less severe blood-aqueous barrier breakdown than extra capsular cataract extraction (ECCE) with a linear capsulotomy. In this prospective study, primary objective is to determine incidence of clinical and angiographic CME following uncomplicated cataract surgery (small incision cataract surgery) followed by in-the-bag intraocular lens implantation. Secondary objective is to evaluate the effect of such damage on the visual acuity by measuring best-corrected visual acuity (BCVA).

Material and Methods

A total number of 100 cases were studied.

This prospective study comprised 100 eyes of 100 patients who had undergone small incision cataract surgery with intraocular lens implantation. Prior ethical clearance was obtained from institutional ethical review board. Written informed consent was obtained from patients participating in this study.

Inclusion criteria for the study were the presence of senile cataract in patients, no history of intraocular surgery, ocular disease, or laser treatment. Exclusion criteria were diabetes mellitus and hypertension requiring control, serious cardiac problems, glaucoma, previous uveitis, serious posterior segment pathology, and topical or systemic steroid use and patient allergic to fluorescein dye.

The patient's age and sex were recorded. The preoperative and postoperative examinations included BCVA measurement, bio microscopy of the anterior and posterior segments, and intraocular pressure measurement by Schiottz tonometry.

Surgical Procedure

Peribulbar anesthesia followed by ocular compression for 2 min was used for local anesthesia. All surgeries were performed using a similar technique: small incision cataract surgery, CCC of 5.5–6.0 mm hydro dissection, nuclear delivery, cortex aspiration. In-the-bag implantation of a lens was done in all cases. The irrigation solution was used at room temperature and comprised balanced salt solution (BSS). The time for surgery was recorded.

Postoperatively, all patients were given prednisolone and ofloxacin eye drops one hourly for one week followed by four times for 6 weeks. The patients were examined 7th, 30th, 45th postoperative days. At each visit, a complete ocular examination, including visual acuity and refraction determination, intraocular pressure measurement, and evaluation with regard to clinical CME using direct, indirect ophthalmoscope, and 90 diopter lenses, was performed in the operated eyes.

On 7th day and 30th day, the patients underwent a standardized fluorescein angiogram (after taking written consent) with 3 ml of sodium fluorescein 20%, administered through an antecubital vein, and a standard run of photographs of the macula area, taken with late view of the macula at 5 min. The criterion for the presence of CME was macular fluorescence during the late phase that was greater than the surrounding background fluorescence. Briefly, angiographic CME was graded as 0 = no visible macular edema; +1 = edema without clear-cut cystoid spaces, +2 = edema with clearly evident cystoid spaces, and +3 = petaloid edema with cystoid edema.

Results

One hundred cases of post-operative cataract surgery (SICS) were studied with fundus fluorescein angiography for CME. Out of 40 male patients, 8 patients developed CME while 12 female patients out of 60 developed CME. Overall, incidence of CME was 20%.

Six patients belonging to 51–65 years age group developed CME, while 14 patients from 66–80 years age group developed CME.

CME was detected in two patients in the first week of surgery, while 20 patients were diagnosed with CME after 1 month of surgery.

Clinical CME was detected in two patients, while angiographic CME was detected in 20 patients.

Table 1. Best-corrected visual acuity post operatively

Vision	First post op week	Fourth post op week	Sixth post op week
6/6	98	82	94
6/9	0	12	4
6/12	2	4	0
6/18	0	2	0
<6/18	0	0	2

Since all surgeries were uneventful, the total time of surgery remained same, i.e., 25–35 min.

Discussion

The study included 100 patients, all of whom successfully completed the protocol. The mean age of 40 male and 60 female was 66.5 years. Clinically, CME was noted in (2%) of the case. Angiographically CME was detected in 20% of cases. Incidence of CME was found variable in different studies. It ranges from 1.7% to 31% in various studies.^[22–26] Variation in wide range of incidence of CME might be due to various techniques used to diagnose CME. Fundus fluorescein angiography is considered gold standard for detection of CME, but there are limitations of fundus fluorescein angiography, i.e., it uses invasive procedure and it is unethical to expose normal patient to this procedure. While optical coherence tomography is safer alternative to FFA as it is noninvasive technique for diagnosing CME. Thirty-one percent incidence of CME is also due to study design of that particular study. As investigators have enrolled patients who developed intraoperative complications, so incidence of CME is higher in those patients compared to patients who did not develop intraoperative complications.^[26] Lower incidence of CME (3.05%) was credited toward better surgical techniques. In the same study, incidence of CME diagnosed by two methods is same, i.e., FFA and OCT.^[27] Incidence of CME was found to be as high as 50% in diabetic patients who have undergone cataract surgery. So, apart from diagnostic methods, preexisting disease such as diabetes mellitus in which there is higher chance of retinopathy incidence of CME may be high postoperatively.^[28]

The BCVA was better in the angiographically CME negative group than in the CME positive group. Among the CME positive group clearly evident cystoids spaces seen in four patients. In remaining CME positive eyes, the fluorescein angiogram revealed edema without clear-cut cystoids spaces (grade 1). And the visual consequences were not proportional to the grade of angiographic CME. BCVA was better in patients who did not develop CME compared to the patients who develop CME, which is consistent with the findings of other study.^[26] BCVA of 6/12 was achieved in majority of diabetic patients who developed CME after cataract surgery.^[28]

Only two cases develop CME at the end of 1 week, whereas 20 cases develop CME at the end of the fourth week. At about 6 weeks, the vision of CME positive group improved. Only two case of clinical CME has vision less than 6/18.

Limitations of this studies are: 1) surgeries are performed by different surgeons, so there might be some variation in surgical expertise. 2) We have enrolled only those patients without any preexisting diseases and only uncomplicated cataract surgery. Incidence might be variable in patient with preexisting disease such as diabetes mellitus or in complicated surgery.

Conclusion

CME is a postoperative complication of cataract surgery. Incidence of clinical cystoids macular edema is 2% in uncomplicated cataract surgery in our study. Incidence of

angiographic CME is 20%. Fundus fluorescein angiography only yields qualitative information, and the degree of leakage does not necessarily correlate with the visual acuity. Fundus fluorescein angiography is safe procedure. CME is more common on the fourth week postoperatively, but can start even from the first week postoperatively.

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How to cite this article: Sharma DN. Prospective study of incidence of cystoid macular edema in uneventful cataract surgery: a study of 100 cases. *Int J Med Sci Public Health* 2015;4:1561-1564

Source of Support: Nil, **Conflict of Interest:** None declared.