Astigmatism in Post-Operative Cataract Patients

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The aim of the study was to find out the various degrees of post-operative refractive astigmatism in our cataract patients, causes of the astigmatism and ways of minimising this problem.

The total number of post-operative refractive astigmatism was determined in patients following cataract surgery. 22% of the patients had an astigmatism of greater than 2 diopters although only 1.9% had the more intolerable astigmatism of greater than 4 diopters. Associated causes for the astigmatism included intraoperative vitreous loss, wound dehiscence, pterygium and corneal scars.

With the advent of microsurgery and better magnification, suggestions are made as to how to minimise this condition which, if high proves very intolerable for the patient.

Keywords: *cataract; post cataract; astigmatism.*

A frequent complication of cataract extraction is surgically induced astigmatism[1-3]. This has demanded the attention of surgeons for decades[4,5]. The main causes of surgical astigmatism include tightly placed limbal/corneal sutures, malapposition of the surgical wound and any intra or post operative complication that would compromise the surgical wound. When surgical astigmatism is found to be due to tightly placed sutures, these have been removed or adjusted in the past to correct the astigmatism[3]. Some surgeons have avoided corneal sections because of unacceptable and unpredictable post-operative astigmatism[6]. In our unit, a 180° limbal section is made superiorly for intra-capsular and a slightly smaller wound for the extracapsular cataract extraction. This study, which is retrospective in nature was instituted primarily to find out the level of astigmatism in our post operative cataract patients over a 3-year period, 1991–1993, and the causes of the astigmatism with a view to suggesting ways of eliminating them.

Patients and Method

This study was carried out in the Ophthalmology department of this tertiary institution, University College Hospital. The study included all consecutive patients who had cataract in the 3-year period between 1991–1993. All patients were given appointments for refraction post-operatively. Two types of operations were carried out. Some had ICCE while others had ECCE. For the intracapsular extraction, a 180° limbal section following a fornix-based conjunctival flap was utilized while a slightly smaller wound was made for the extracapsular extraction. The wound was closed with 8/0 silk and covered by the conjunctival flap in all cases. Post-operative refraction was done between 3 and 6 months and aphakic glasses were prescribed as necessary.

Since this was a retrospective study, the case notes of the refracted patients were collected and analysed, to find out the associated causes of post-operative astigmatism and other contributory factors.

Criteria for analysis included:

(a) the surgeon – Consultant or resident?
(b) what type of cataract surgery – intracapsular or extracapsular?
(c) intra operative and post operative complications
(d) associated corneal problems like pterygium extending into the cornea and corneal scars.
(e) was magnification used i.e. operating loupes or microscope?

Results

423 patients were diagnosed as having cataracts and were operated. Of these, those who reported back were 206 patients for post-operative

refractions. 153 (74.3%) had their cataracts removed by the intracapsular method and 53(25.7%) had theirs removed by the extracapsular method. Local anaesthesia was utilized in 165 cases (80%) while general anaesthesia was utilized in 41 cases (20%). 97 patients (47%) were performed by consultant surgeons while 109 patients (53%) were performed by resident doctors. 45 patients (22%) had greater than 2 diopters of astigmatism although the more intolerable situation of greater than 3 diopters occurred in 17 patients (8.25%) (Table I). Out of the 45 patients, 38 had intracapsular extractions, while 7 had extracapsular extractions. Most of the more severe astigmatism occurred in 1991 (8 cases) while in the 2-year period of 1991–1993, a total of 9 cases were found. 5 patients had astigmatism greater than 4 diopters, 3 of the surgeries performed by consultants and 2 were performed by residents. The maximum astigmatism in the study was 6 diopters. Post-operative complications in the 206 refracted aphakic patients are listed in Table II. Some patients had more than one complication or associated corneal problems (Table III). The patient with the 6 diopter astigmatism had an unplanned extracapsular extraction and intraoperative vitreous loss. The other 5 patients had complications ranging from striate keratopathy, intraoperative vitreous loss, hyphaema and corneal oedema, with one patient having a pterygium, a few millimeters into cornea. All the five patients had intracapsular cataract extractions.

Table I: Post-operative refractive astigmatism in 206 aphakic patients

	Less than 2 diopters	2–3 diopters	3–4 diopters	4–5.5 diopters	6 diopters
Number of Patients	161	28	12	4	1

Table II: Intraoperative and post operative complications in 206 aphakic patients

Complications	No. of Patients	Percentage Total
Vitreous loss	25	12.2
Unplanned extracapsular cataract extraction	14	6.8
Hyphaema	11	5.4
Post operative corneal oedema or striae	53	25.8
Increase IOP	7	3.4
Severe Uveitis	1	0.5
Wound dehiscence	2	1
Endophthalmitis	1	0.5
Stitch abscess	2	1
Conjunctivitis	1	0.5
Choroidal detachment	3	1.5
Total	120	100

Table III: Associated corneal problems in 206 aphakic patients

	No. of Patients	Percentage Total
Pterygium	11	5.4
Corneal Scars	8	3.9

Discussion

Astigmatism following cataract surgery may result from several causes. The principal cause of post-operative astigmatism is surgically induced corneal distortion[2,3,7]. This study was instituted to find out the degree of astigmatism in our post-operative cataract patients, the contributory factors to this abnormality and to suggest ways of reducing it in future patients. From the results presented here, it is apparent that post-operative corneal astigmatism occurs in a sizeable group of our patients (22%) although the more intolerable astigmatism of greater than 3 diopters occur as many as in 8.25% of the patients (17 patients). 5 patients (1.9%) had greater than 4 diopters of astigmatism, the highest being 6 diopters. The patient with 6 diopters astigmatism had an unplanned ECCE with vitreous loss.

Out of the 17 patients with greater than 3 diopters of astigmatism, 9 occurred in the 2-year period 1992–1993, and 8 occurred in the 1-year period of 1991. The cause of the decreased incidence in the last 2 years is attributable to the increased use of the operating microscope and binocular loupe instead of the naked eye. With the magnification of the operating field, wound apposition was better and high tension of limbal sutures was more easily recognisable. Consultants performed 47% of the cases while residents performed 53%. In the cases with severe astigmatism of greater than 4 diopters, 2 were performed by residents and 3 by consultant surgeons, showing no predilection for a particular group. All 5 patients had their cataract extractions by the intracapsular (ICCE) method. As the limbal wound for ICCE is slightly wider than for ECCE, wound distortion is more apparent with the ICCE. Complications in this group of severe astigmatism included unplanned ECCE, vitreous loss and pterygium which were associated with post operative astigmatism.

In this part of the world, intraocular cataract extraction (ICCE) is still more commonly done, 74.3% of our cases, as opposed to the extracapsular cataract extraction (ECCE), 25.7% of our cases. Also, most cases were performed under local anaesthesia (80%) while only 20% were under general anaesthesia (GA). Most cases under G.A. were extracapsular although some patients billed for intracapsular extraction under L.A. ended up with an unplanned extracapsular extraction due to rupture of the anterior lens capsule by the cryotherapy probe on attempted extraction. ICCE and L.A. are more favoured in our environment because the surgery is faster, keeping in mind the large number of patients we have to operate on. ECCE is still done in patients under the age of 50 years but this is a small number compared to the senile cataracts.

Vitreous loss is also a recognisable cause of post operative astigmatism due to the presence of vitreous gel entangled in the section and adherent to the posterior surface of the cornea. This leads to distortion of the pupil, which becomes dragged up to the limbus, defective apposition of incision edges which could lead to high astigmatism. In this study 25 patients (12.2%) had vitreous loss but it is of note that the patient with 6 diopters astigmatism had an unplanned ECCE and vitreous loss.

Corneal problems which could also cause astigmatism include in this study, pterygium, which occurred in 11 patients (5.4%) and corneal scars in 8 patients (3.9%). These by their pathological presence, caused distortion of the cornea. Pterygium on its own is a well recognised cause of corneal astigmatism[9].

Increased intraocular pressure is also a known cause of post-operative astigmatism[10]. This is thought to be due to pressure induced wound malapposition following surgery and the surgical wound healing taking place in the malpposed position. In this study, 7 patients (3.4%) had increased intraocular pressure.

Other intra and post-operative complications which could cause astigmatism included wound dehiscence (1%), stitch abscess (1%) and unplanned extracapsular cataract extraction (6.8%). Post-operative corneal oedema or striae is a transient phenomenon which clears within the first few days after surgery. It is not known to cause post-operative astigmatism as it would have cleared by the time refraction is performed. In this study it occurred in 53 patients (25.8%), the largest group of post-operative complication. Hyphaema, uveitis, endophthalmitis and choroidal detachment which occurred in 5.4%, 0.5%, 1.5% respectively did not leave any permanent damage on the limbal wound or the cornea and so are not likely to be the cause of post-operative astigmatism. It is of note that out of 423 patients who had cataract surgery, only 206 came back for refraction post-operatively. The main reasons for the larger number, 217 (51.3%) not reporting for post-operative refraction was presumed to be that the patients appreciated an improvement in their visual acuity which they felt was adequate for their day to day living, like farming, housekeeping or trading. Also a lot of patients cannot afford aphakic glasses and so do not turn up for their refraction appointments especially if there is some improvement in their vision post-operatively.

In conclusion, we would like to suggest ways of reducing post operative astigmatism in our cataract patients as it could be quite troublesome and intolerable.

In recent times, microsurgery, using the binocular operating microscope has improved the view of the surgeon during cataract surgery. It would therefore be adviceable to use the microscope for all cataract extractions to allow a uniform, well bevelled limbal incision and good apposition whilst suturing with equal tension on all stitches.

Patients with pre-operative pterygium should have these excised prior to cataract surgery as the astigmatism has been found to reduce considerably after pterygium excision[9]. Possible excision on same day prior to cataract surgery is possible.

It would also be more adviceable if more ECCE could be performed, rather than ICCE to prevent the intraoperative complication of vitreous loss. With practice, the surgeons will find that performing an ECCE takes just at long as an ICCE, therefore not compromising the number of patients that could be operated on a particular list.

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