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Clinical Study of Scleral Fixated Intraocular Lens Implantation in Blunt Ocular Trauma

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Authors' contributions

This work was carried out in collaboration among all authors. Authors GG, NM designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors NM and VHK managed the analyses of the study. Author VHK managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aim: to assess visual outcome and complications associated with SFIOL implantation in traumatic lens subluxation/ dislocation cases.
Methods: This is a retrospective study of 45 patients who were managed for traumatic dislocation/subluxation of clear or cataractous lenses from June 2019 to July 2020 in a Krishna hospital, Karad, Satara. All cases underwent anterior vitrectomy/3 port pars plana vitrectomy + removal of lens and ab externo 2 point scleral fixation with rigid or foldable sfiol. In posteriorly dislocated/subluxated lens, vitrectomy was done and the lens was removed using pick forceps and retrieved by hand shake technique. In anteriorly dislocated cataractous lens, the lens was removed through the tunnel incision.
Results: Majority of the patients were between 55-65 years of age with male pre-ponderance (73.3%).Out of 45 cases, 21 cases (46.6%) were traumatic dislocated lens and 24 cases (53.3%) were traumatic subluxated lens. The mean preoperative BCVA was 0.13 ± 0.24 logMAR, which improved 0.39 ± 0.366 logMAR postoperatively (P <0.0001).Preoperatively BCVA in logMAR in 39 cases (86.6%) was 0.3 or better, 6 cases (13.3%) was 0.3 to 1.0 . Postoperatively BCVA in logMAR in 21 cases (46.67%) was 0.3 or better, 24 cases (53.3%) was 0.3 to 1. P-value is 0.00057 which is

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significant. Early postoperative complications noted were raised intraocular pressure in 12 cases (26.6%), corneal edema in 9 cases (20%), vitreous hemorrhage in 8 cases (17.7%) and hypotony in 3 cases (6.67%).Late postoperative complications were persistent elevation of intraocular pressure in 10 cases (22.2%), cystoid macular edema in 3 cases (6.67%), epiretinal membrane in 3 cases (6.67%).

Conclusion: In every horrendous case, long haul follow-up is needed to distinguish confusions and start treatment at the most punctual.

Keywords: Intraocular lens; blunt ocular trauma; cataractous lenses; epiretinal membrane.

1. INTRODUCTION

One of the significant reasons for serious visual debilitation is visual injury, either blunt or penetrating. An expected 18 million individuals overall experience the ill effects of visual injury every year [1]. Traumatic cataracts and focal point disengagement or misfortune are the most widely recognized and critical results of eye injury [2]. Cases with post-traumatic cataracts or focal point disengagement are treated with focal point expulsion medical procedure. Much of the time, it is related with injury to other visual designs. Hence the administration of visual injury patients with deficient back Various different choices to supplant the intraocular focal point (IOL) implantation in eyes with a focal point like subluxation or relocation of optional visual injury with insufficient capsular or zonular backing, for example, scleral fixed back chamber intraocular focal point (SFIOL), front chamber intraocular focal point (ACIOL)), iris stable IOL. This should be possible as an essential or optional interaction [3].

ACIOL or iris-fixed IOL implantation can provoke a collection of disarrays, including corneal endothelial cell decompensation, cystoid macular edema, and glaucoma speed increase, and iris abrading [4]. Consequently, SFIOL implantation enjoys some relative benefits. It diminishes the risk of corneal degeneration, periphery front synechiae, and helper glaucoma by keeping the point of convergence further away from the chief segment structures [5,6]. Be that as it may, when utilizing SFIOL implantation, stitch disintegration and crack, hazard of stitch tie, conjunctival and sclerotomy, scleral cut and so on are completely related [7,8].

To decrease fasten related disarrays, a couple of examinations introduce haptics of three-piece IOLs into the scleral tunnel, anyway there is still some threat of postoperative hypotony, IOL slippage and point of convergence deviation, scleral tunnel burst, insufficient haptic fixation power, and are in addition. Haptics deformation after operation [9,10].

In this article, we have contemplated the post-usable visual result and intricacies related with both inflexible and foldable SFIOL implantation in visual injury patients without sufficient container support.

2. MATERIALS AND METHODS

A total number of 45 patients with traumatic subluxation or dislocation were taken up for the study. The study was conducted for one year from June 2019 to July 2020 in a Krishna hospital, Karad,Satara.

- **Inclusion Criteria**

1. Traumatic subluxation of more than 180 degree of crystalline/cataractous lens.
2. Traumatic dislocation of crystalline/cataractous lens.

- **Exclusion Criteria**

1. Corneal obscurity, ongoing uveitis, optic nerve pathology and macular pathology meddling with last visual result.
2. Subluxation of lens of less than 180 degree.

2.1 Methodology

A detailed history of the type of trauma (blunt /penetrating), eye involved, object causing trauma, duration between trauma and presentation were taken. An intensive visual assessment including visual keenness, cut light assessments, immediate and aberrant ophthalmoscopy, slit lamp biomicroscopy with +90 dioptre lens, Tonometry, Gonioscopy, B-Scan ultrasonography and routine x-ray orbit was done. OCT, FFA, CT-scan and MRI were done whenever required. A scan biometry and keratometry were done for intraocular lens power

calculation. Using the SRK 2 formula IOL power was calculated.

2.1.1 Preoperative work up

Pre-operative investigations including Complete blood count, Random blood sugar, X ray chest, Electrocardiogram were done. Informed and written consent was taken from the patients as well as guardians in case of children. All the surgeries were performed by single surgeon. Peribulbar Anesthesia and was obtained using 4ml mixture of 2% xylocaine with adrenaline, 2ml of 0.75% bupivacaine with addition of hyaluronidase. Eye was painted using 5% povidone iodine and same drops instilled topically.

2.2 Surgery

All cases underwent anterior vitrectomy/3 port pars plana vitrectomy + removal of lens and ab externo 2 point scleral fixation. In posteriorly dislocated/subluxated lens, vitrectomy was done and the lens was removed using pick forceps and retrieved by hand shake technique from scleral tunnel. In anteriorly dislocated cataractous lens, the lens was removed through the tunnel incision. AB- Externo four point fixation with polypropylene suture with rigid PMMA lens (Aurolab, India).

The main steps after lens removal, vitrectomy and PVD induction are as follows-

Scleral folds with an incomplete thickness of around 3x3 mm were made at the 3 and 9 o'clock positions. A bowed tip and a 26 G empty needle from one side of the scleral burrow at 9 o'clock were set opposite to the scleral divider and corresponding to the iris. A 10-0 polypropylene stitch on a straight needle was presented from the contrary 3 clockwise edge, which meets the 26 G needle in the pupillary plane. The 10-0 proline stitch needle was occupied with lumen of 26 g needle and needle was painstakingly removed. The edge of the 10-0 proline stitch was extended simply behind the iris plane at 3 to 9 h. A comparable cycle was rehashed from the opposite side of the passage for 9 to 3 hours. At 12 o'clock a 7 mm scleral burrow was made, 2 strands of proline stitch eliminated. Outer proline stitches were cut in the center and the closures were fixed to the eyelets at the haptics of the sfiol. The IOL was embedded into the foremost chamber and situated behind the iris, executing controlled foothold on the uncovered closures of the stitch. The bunches were tied. Utilizing foldable sfiol (Acryfold hydrophilic single piece iol) same strategy is utilized. Acryfold sort of iol utilized so that stitch can be gone through eyelet of haptics of iol. Postoperatively all patients were given effective anti-infection steroid mix eye drop (Gatifloxacin 0.3% + dexamethasone 0.1%). Patients were evaluated on day 1, multi week, 3 weeks and 3 months which included visual keenness recording, cut light assessment, IOP estimation and enlarged fundus assessment.

3. RESULTS

Majority of the patients were between 55-65 years of age with male pre-ponderance (73.3%) (Table 1 and 2). Out of 45 cases, 21 cases (46.6%) were traumatic dislocated lens and 24 cases (53.3%) were traumatic subluxated lens. (Table 3) Associated conditions included secondary glaucoma in 10 cases (22.2%), angle closure glaucoma in 3 cases (6.67 %), traumatic mydriasis in 9 cases (20%), vitreous in anterior chamber in 4 cases (8.89%), angle recession in 7 cases (15.5%), vitreous hemorrhage in 9 cases (20%). (Table 4)

The mean preoperative BCVA was 0.13 ± 0.24 logMAR, which improved 0.39 ± 0.366 logMAR postoperatively ($P < 0.0001$). Preoperatively BCVA in logMAR in 39 cases (86.6%) was 0.3 or less, 6 cases (13.3%) was 0.3 to 1.0. Postoperatively BCVA in logMAR in 21 cases (46.67%) was 0.3 or less, 24 cases (53.3%) was 0.3 to 1. P-value is 0.00057 which is significant. (Table 5) 31 cases (68.8%) underwent SFIOL implantation with foldable IOL and 14 cases(31.1%) with rigid sfiol. (Table 6)

Early postoperative complications (at 1week postoperatively) noted were raised intraocular pressure in 12 cases (26.6%), corneal edema in 9 cases (20%), minor vitreous hemorrhage in 8 cases (17.7%) and hypotony in 3cases (6.67%). (Table 7) Minor vitreous hemorrhage occurred because 26 G needle was used to penetrate sclera and was resolved without treatment. Transient elevated intraocular pressure had not affected the final visual outcome.

Late postoperative complications (at 3 months postoperatively) were persistent elevation of intraocular pressure in 10 cases (22.2%), cystoid macular edema in 3 cases (6.67%), epiretinal membrane in 3 cases (6.67%). (Table 8) Persistent IOP elevated cases were treated with

antiglaucoma medications. No other complications like IOL tilt, suture erosion or breakage, retinal detachment, endophthalmitis were observed during follow-up period.

4. DISCUSSION

Traumatic cataracts and point of convergence removing are the fundamental wellsprings of outrageous visual mishap after an eye injury. If there should be an occurrence of lacking capsular assistance or capsular disfigurement, SFIOL implantation is advantageous over other IOL implantation methodology. Besides, implantation of ACIOL isn't by and large possible because of deserts in the iris and the shortfall of glassy assistance after guidelines plana vitrectomy in horrifying eyes.

Medical Surgery and visual restoration in these eyes are regularly difficult because of the presence of related foremost or back section inconveniences. In this examination, we portray the complexities and visual results of SFIOL implantation in awful radiation or separation of the focal point. The mean preoperative BCVA was 0.13 ± 0.24 logMAR, which improved 0.39 ± 0.366 logMAR postoperatively and the difference is statically significant ($P < 0.0001$). However, the visual outcome in trauma cases can be confounded by various factors related to the mode of injury, extent of injury, anterior and posterior segment comorbidities related to trauma [11].

In our study associated anterior and posterior segment morbidities were- secondary glaucoma in secondary glaucoma in 10 cases (22.2%), angle closure glaucoma in 3 cases (6.67%), traumatic mydriasis in 9 cases (20%), vitreous in anterior chamber in 4 cases (8.89%), angle recession in 7 cases (15.5%), vitreous hemorrhage in 9 cases (20%). 31 cases (68.8%) underwent SFIOL implantation with foldable IOL and 14 cases (31.1%) with rigid sfiol. Both had no significant difference in final visual outcome.

Revealed postoperative complexities with different SFIOL methods incorporate hypotony, choroidal separation, corneal edema, RD, suprachoroidal discharge and glaucoma [11,12,13,14,15,16] In our study early postoperative complications (at 1 week postoperatively) noted were raised intraocular pressure in 12 cases (26.6%), corneal edema in 9 cases (20%), minor vitreous hemorrhage in 8 cases (17.7%) and hypotony in 3cases (6.67%). Past investigations have demonstrated a frequency of corneal edema to be around 10% after SFIOL implantation [11,17,15,18]. Related corneal endothelial injury auxiliary to visual injury may represent the marginally higher occurrence of early postoperative transient corneal edema in our examination.

Hypotony was seen in 3 cases which were associated with horseshoe retinal tears, base avulsion and retinal dialysis. All were treated prophylactically intraoperatively. Zhao and colleagues [11] on SFIOL implantation in horrible aphakias has shown a rate of glaucoma as 7.2%. The underlying expansion in IOP after injury might be because of uveitis and hyphema that normally react to skin steroids and antiglaucoma prescriptions. Transient raised intraocular pressure didn't influence the last visual result in our investigation.

Minor vitreous hemorrhage occurred because 26 G needle was used to penetrate sclera and was resolved without treatment.Late postoperative complications (at 3 months postoperatively) were persistent elevation of intraocular pressure in 10 cases (22.2%).Late onset glaucoma occurs secondary to trabecular meshwork damage and angle recession [19]. 7 cases (15.56%) had associated angle recession found on gonioscopy and 3 cases (6.67%) had angle closure glaucoma due secondary to anterior dislocation of lens. Incidence of CME has been found to be around 1–2% following SFIOL implantation [11,17,16,18]. In our study cystoid macular edema was seen in 3 cases (6.67%) and epiretinal membrane in 3 cases (6.67%). No other complications like IOL tilt, suture erosion or breakage, retinal detachment, endophthalmitis, suprachoroidal hemorrhage were observed during follow-up period.

5. CONCLUSION

The last visual result of SFIOL implantation in post-awful subluxation/separation of the reasonable or cataractous focal point might be influenced by attendant foremost and back segmental disfigurements. The quick and late postoperative difficulties noted in our investigation were contrasted and those of other comparative examinations. Nonetheless, in every horrendous case, long haul follow-up is needed to distinguish confusions and start treatment at the most punctual.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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