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Larger side port for capsulorhexis in Small Incision Cataract Surgery (SICS) with Posterior Chamber Intra Ocular Lens (PC IOL) implantation is safe, maintains constant anterior chamber depth and does not affect the refractive status of the eye

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Abstract:

Background: Capsulorhexis is an important step for a good Small Incision Cataract Surgery (SICS). Continous Curvilinear Capsulorhexis (CCC) technique was the anterior capsulotomy approach of choice. Depending on the liquidity of lens material, liquid cortex was aspirated using a 26 gauge needle before Capsulorhexis or through a small CCC through the main incision can be done but as the viscoelastic material comes out easily through the wound with the resultant shallow A/C & convex crystalline lens surface, the Capsulorhexis may cause radial tear of the anterior capsule. Moreover the work of capsulorhexis & rotation of cystotome through the wound at 12 o'clock is difficult. Side port Capsulorhexis overcomes this problem as it maintains constant deep A/C. ***Objectives:*** It may help in aspiration of cortical matter at 12 o'clock. As the side port in SICS is slightly larger it can compensate the astigmatism created by the incision at 12 o'clock. Here, the side port is sealed by hydration of the wound. ***Methodology:*** 20 eyes (10 pairs of eyes of some cataract-affected patients) were done SICS with side port Capsulorhexis. The study was conducted from 1st July 2021 to 31st December 2021. All patients were aged between 55 to 65 years and had age-related cataract with grade 2 to 4, all operations were done under LA by a 12 o'clock position. Two side pores were made at the nasal and temporal side. These side ports were slightly larger than the usual ones. Capsulorhexis was done through the right side port, SICS was done as usual and the eye was closed. ***Result:*** All patients have minimal AC reaction (+), no corneal striation, visual acuity unaided 6/18 to 6/9 with pinhole 6/9 to 6/6 after 1st week. After 8th weeks, all have corrected vision 6/6, and N5. ***Conclusion:*** Extra side pore can be made for Capsulorhexis in SICS, which helps in doing successful Capsulorhexis by maintaining constant AC depth without causing any bad effect to the cornea or vision and the incidence of astigmatism (Minus lens at 900).

Keywords: Capsulorrhexis, SICS surgery, PC IOL

Introduction:

Capsulorhexis which is Continuous Curvilinear Capsulorhexis (CCC) technique is better than capsulotomy as by this method incidence of tear of posterior capsule is less because of the smooth , regular and stable capsular margin without any tag of capsule in SICS surgery which may be captured by the aspiration canula during irrigation and wash of the

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cortical matter of lens and may cause accidental posterior capsule rupture[1]. Capsulorrhexis through the main wound can be done but sometimes the capsule may tear rapidly as the gel comes out rapidly andrepeatedly through the wound & depth of A/C becomes shallow soon and A/C depth cannot be maintained during capsulorhexis which is more important for good surgical outcome. Introduction of cystotome through the wound at 12 o'clock is also difficult. Rotation of the cystotome is also difficult through this wound. Side portcapsulorhexis overcomes these problems as it maintains constant deep A/C plus the introduction and rotation of the cystotome becomes easy. It may help in aspiration of cortical matter at 12 o'clock. As there are two side port in this Small Incision Cataract Surgery (SICS), it neutralizes the induced refractive error (due to the side port).

Materials & Methods:

This prospective observational study was carried out in the Department of Ophthalmology, Delta Medical College & Hospital, from 1st July 2021 to 31st December 2021 on 20 cataract patients aged between 55 to 65 years. Patients of cataract attending the Ophthalmology outdoor, Delta Medical College& Hospital, Dhaka. Subjects with associated with cataract treatment in the past 6 months, current vision therapy or orthoptics, ocular cause of reduced visual acuity (e.g. corneal opacity, pathological myopia), prior intraocular or refractive surgery were excluded from this study. After selection of the subject, the purpose and procedure of study were explained to each subject with a cordial attitude giving emphasis of the benefit they would obtain from the study. Detailed history were taken from all the selected patients and they underwent detail ophthalmic examination by slit lamp bio microscope and indirect ophthalmoscope. Visual acuity were assessed by Log MAR chart at a 6 meter testing distance and cover test were conducted with patients fixing both near and distance targets. Posterior segment examined after dilatation of the pupil with a midriatic topical agent by indirect ophthalmoscope, Volk lens.

Some 20 (cataract-affected eyes of patients) was selected for SICS with side pore capsulorhexis, Polymethyl Meth Acryl (PMMA) Intraocular Lens (IOL) in (a) capsular bag. The study was conducted in all patients having cataract with grade 1 to 3 nucleus. Informed consent was taken from all the patients. IOL power was calculated by biometry & IOL was selected with desired refraction -0.4 to -0.5D. All operations were done under L/A by the same surgeon.

All the patients were draped as usual after giving a peribulbar block. The scleral tunnel was made to enter into A/C. After introduction of viscoelastic two side pores were made, one on the right side and another on the left side and were made slightly larger than the conventional size. The anterior capsule of the lens was stained with trypan blue dye 0.035 (50 % dilution of 0.06% dye) (Auroblue, Aurolabs, India) under the OVD using the painting technique.[2,3] After capsular staining, Visco are injected again to replace the dye stained viscoelastic for enhanced visibility as well as to flattened the anterior capsule of lens. The anterior capsule is punctured in the center to aspirate the liquefied cortex and decompress the anterior chamber. Then capsulorrhexis was done through the side pore on the right side. SICS was done as usual. Irrigation & Aspiration (I/A) was done to wash out the cortical matter. But in eyes where the cortical matter was at 12 o'clock (positions) had to be removed by enlarging the side pore on the right side. Alcon PMMA IOL was implanted in all eyes. Washing of the viscoelastic substance was done by an I/A cannula. Injection of vancomycin 0.1 ml was given into anterior chamber. Eye was made closed with eye pad. Eye pad was removed on the 1st POD. Dexamethasone eye drop was installed two hourly for two weeks & then 6 hourly for one month. Patients were followed up after 2 weeks & 8 weeks. Follow-up was done up-to attainment of 0.3 Log MAR unit or stable vision for four consecutive visit.

Results:

All patients had a very minimum A/C reaction (+ or ++), no corneal striation; negligible conjunctival congestion, visual acuity unaided 6/18 to 6/9 & with pinhole 6/9 to 6/6 & N5. Postoperatively 3 eyes (5.77%) had corneal edema (striate keratopathy) and 1 eye (1.9%) had fibrin in anterior chamber. Five eyes (9.61%) had more than 2+ cells and flare at 2nd weeks. All responded well to intensive topical and subconjunctival steroids.

Distribution of best corrected visual acuity during follow-up periods

Table-1: Distribution of best corrected visual acuity in Log MAR unit of the study subjects.

Follow-up periods	BCVA (Log MAR unit)	T value / p value
Baseline	0.70±0.15 (SD)	……..
1st day	0.55±0.13 (SD)	12.476/000[s]
5th day	0.49±0.09 (SD)	13.405/000[s]
7th day	0.37±0.11(SD)	14.845/000[s]

s=significant

Table-1 and figure-1 shows the distribution of best corrected visual acuity in Log MAR unit of the study subjects in the baseline and follow-up periods. Mean best-corrected visual acuity in Log MAR unit was 0.70±0.15 (SD). It was 0.55±0.13 (SD),0.49±0.09 (SD) and 0.37±0.11(SD) in 1stday, 5thday and 7th day respectively.

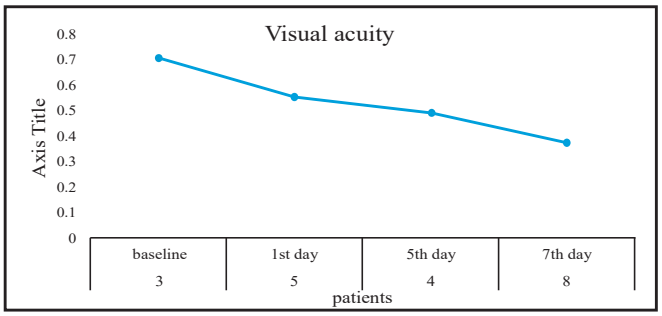

Figure-: I-Line chart showing distribution of best corrected visual acuity in Log MAR unit of study subjects

Distribution of mean best corrected visual acuity during follow-up periods according to the number of patients

Follow-up periods (Patients)	Baseline	After 1 month	t value/ p value	After 3 months	t value/ p value	After 6 months	t value/ p value
05	0.70+_0.16	0.55+_0.13	8.854/0.000[s]	0.48+_0.11	6.1/0.000[s]	0.33+_0.10	11.0/ < 0.001[s]
07	0.67+_0.13	0.55+_0.13	8.316/0.000[s]	0.49+_0.09	10.6/0.000[s]	0.36+_0.10	24.383/ <0.001[s]
08	0.78+_0.17	0.57+_0.16	9.101/0.000[s]	0.50+_0.10	9.027/0.000[s]	0.41+_0.17	12.899/ <0.001[s]

p value obtained by paired t test

Table-2: Best corrected visual acuity in different follow-up periods according to the) number of patients.

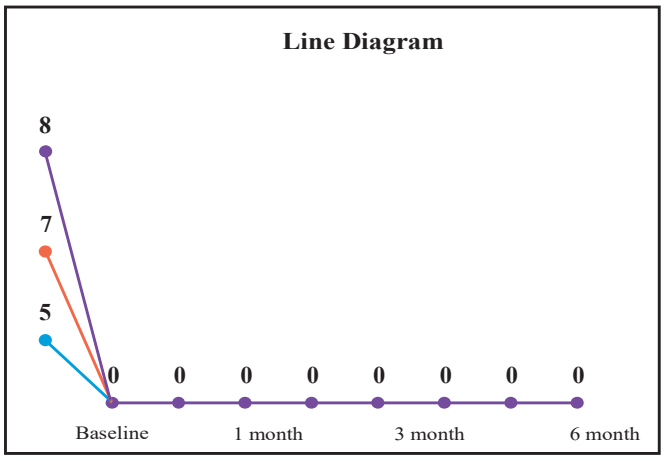

Figure II: shows the distribution of best corrected visual acuity according to the number of patients.

Table-2 and figure-II shows the distribution of best corrected visual acuity according to number of patients. Mean corrected visual acuity of 5 patients, baseline, 1 month, 3 months, 6 months period were 0.70±0.16,0.55±0.13, 0.48±0.11,0.33±0.10 respectively. In 7 patients it was 0.67±0.13, 0.55±0.13, 0.49±0.09,0.36±0.10 respectively and in 8 patients it was 0.78±0.17, 0.57±0.16, 0.50±0.10, 0.41±0.1 respectively.

Discussion

Performing a CCC in eyes with intumescent cataract presents a significant challenge to cataract surgeons because of poor visualization of the anterior capsule as a result of the absence of red reflex. This is further complicated by lens milk extrusion upon puncture of the anterior capsule and high intraocular pressure. There was no endopthalmitis. In two cases, the final visual acuity was worse than 20/200 because of preexisting posterior segment pathology.

Moreover, intumescent cataracts are usually associated with increased and higher than usual posterior vitreous pressure, making capsulorhexis more challenging.[4] The astigmatism in 10 eyes with posterior chamber IOL was less as the wound size was 3.2 to 3.5 mm and astigmatism was -1.12 D on the first day & -.77 D after 6 weeks. The extra side port in SICS does not affect much on astigmatism there was no opacity on the cornea due to the side port.[5,6]

Conclusion

An extra side port can be done for capsulorhexis in SICS which helps in doing successful capsulorhexis by maintaining desirable A/C depth without causing adverse effects on refraction and any harmful effect to the cornea.

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