

Original article

Comparative evaluation of continuous curvilinear capsulorhexis and can opener capsulotomy in manual small incision cataract surgery in Rural Medical College , Loni

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Abstract

Background and Objectives - capsulotomy is one of the important step in cataract surgery which can affect surgical outcome.the aim of this study was to compare outcomes of can opener and continuous curvilinear capsulorhexis technique in small incision cataract surgery.

Materials and methods – A total of 40 eyes of 40 patients undergoing MSICS were studied. The study group was randomly divided into two groups of 20(group A- can opener and group B – CCC).

Results - Mean VA in group B was 0.35 ± 0.11 (logMAR) i.e 6/12 (snellen's equivalent) and 0.20 ± 0.09 (logMAR) i.e 6/9 (snellen's equivalent) on post op 1st week and 6th week, respectively. This was found to be significantly better than mean VA in group A, which was 0.44 ± 0.19 (logMAR) i.e 6/18 (snellen's equivalent) and 0.30 ± 0.10 (logMAR) i.e 6/12(snellen's equivalent) on post op 1st week and 6th week, respectively. More post-op complications were seen in group A than in group B. Mean ACD post-operatively was more in CCC than in can opener technique indicating better placement of IOL i.e. in the bag placement.

Conclusion – CCC technique is considered superior to can opener technique for long term visual rehabilitation.

Introduction -

Cataract is most common cause of visual disability and is surgically treatable. There is almost complete restoration of vision with the help of intra ocular lens implantation. The cataract surgery has under gone lot of revolution and innovation in last century. In the past cataract surgery was looked upon as only operation for restoration of vision but in the modern times it has become part of refractive surgery. To be refractive surgery various instruments and modification of surgical techniques were developed. Amongst them the minimal size of surgical incision and placement of Intra ocular lens (IOL) in the most natural position are crucial.

Capsulotomy plays a vital role in visual outcome in cataract surgery. A properly sized capsulotomy with better technique enhances surgical safety, hydrodissection , cortical clean up, IOL centration and inhibits posterior capsule opacification. There are several methods to perform the anterior capsulotomy: 1) can-opener capsulotomy - in which multiple, small tears are connected to create a large, central opening; 2) envelope capsulotomy - in which a horizontal slit allows removal of lens substance and PC-IOL implantation. This type provides protection to the corneal endothelium during the procedure; and 3) circular continuous capsulorhexis (CCC) - in which a smooth-edged circular opening without serration is made by a tearing motion with a bent cystotome or forceps. The main

rationale for this technique is to preserve the integrity of the capsulotomy margin and to reduce the propensity for radial tear formation and subsequent decentration of the IOL.1,2,3,4

Aims and objectives of my study were -To determine the effect of type of anterior capsulotomy on the Visual outcome,To study the incidence of complications in relation to type of capsulotomy,To determine the depth of anterior chamber and position of the IOL in relation to type of capsulotomy.

Methods -

It was a Observational longitudinal study with Sample size of 40 eyes of 40 patients undergoing Manual small incision cataract surgery (MSICS) with posterior chamber intraocular lens (PCIOL) implantation carried out for a period of one year (September 2016 to September 2017).

INCLUSION CRITERIA of my study were, 1)The patients of age of 50 years and above of either sex with senile cataract. **2)**Patients who underwent MSICS only were included.**3)**Those patients who had PMMA rigid IOL **4)**Patients with normal fundus in other eye.

EXCLUSION CRITERIA of my study were 1)Patients below 50 years.**2)**Patient of complicated cataract**3)**Patients with traumatic cataract.**4)**Patients with diabetic retinopathy and ARMD in other eye.**5)**Patient with pre existing Glaucoma, Uveitis , Corneal Opacity .

The study group was randomly divided into - group A- Can-opener (20 cases) and group B- Continuous Curvilinear Capsulorhexis (CCC) (20 cases). Pre operative Visual acuity, Anterior chamber depth (ACD) and Keratometric reading were noted. Visual acuity and post-operative complications were recorded on 1st & 6th week , While ACD was recorded post-operatively during 6 weeks follow up.

Result –

A total of 40 eyes of 40 patients undergoing MSICS were studied .Patients were equally divided into 2 groups i.e.20 patients each in can opener capsulotomy (group A) and continuous curvilinear capsulorhexis (CCC) group (group B).Mean age of the subject in years \pm SD in group A was 61.05 ± 8.12 and that in group B was 62.45 ± 8.9 .No statistically significant difference was found in distribution of age or gender.

Comparison of visual acuity in both groups

	Can opener	CCC
1 st week	0.44 ± 0.19 (6/18)	0.35 ± 0.11 (6/12)
P value	p=0.047, significant	
6 th week	0.30 ± 0.10 (6/12)	0.20 ± 0.09 (6/9)
P value	p=0.0657, significant	

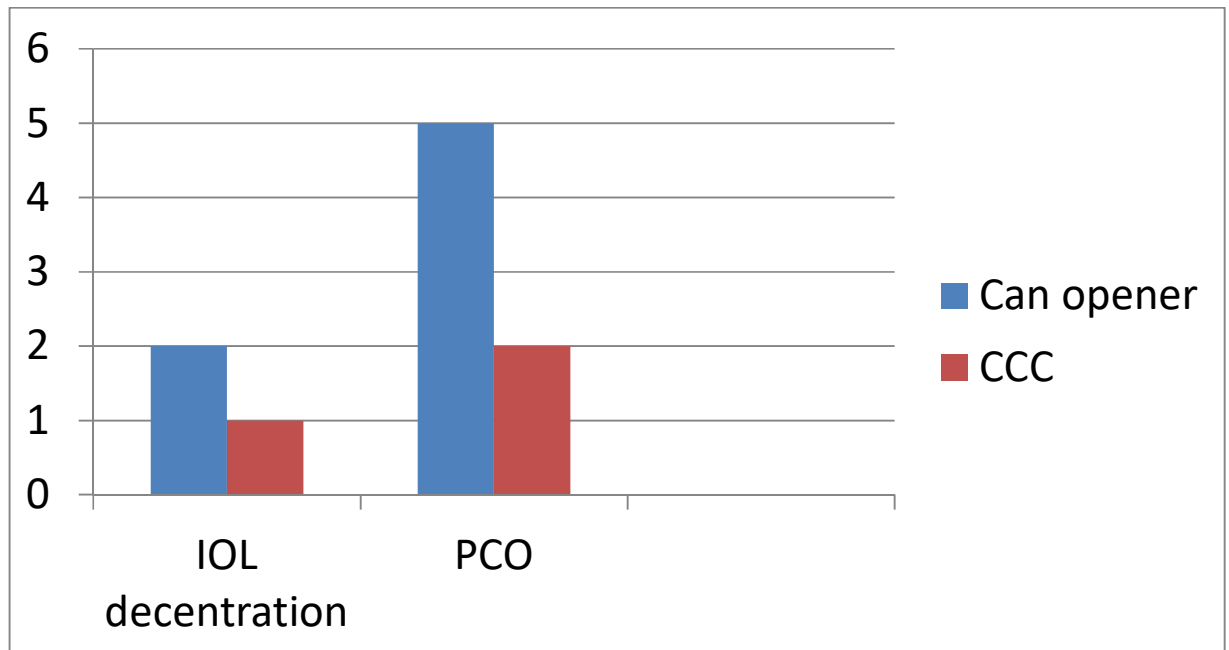
By applying Student's Unpaired 't' test there was significant difference between mean values of visual acuity at 1st and 6th week respectively, on comparing can opener to CCC.

Complications first week –

parameter	Can -opener	CCCC
Ac reaction more than 3	6 (30%)	5 (25%)
Corneal edema	5 (25%)	4 (20%)
Cortical matter more in pupillary area	3 (15%)	1 (5%)

Complications 6th week –

Parameter	Can-opener	CCC
PCO	5(25%)	2(10%)
IOL decentration	2 (10%)	1(5%)



Anterior chamber depth-

Mean Anterior chamber depth is more in CCC than in can opener technique indicating better placement of IOL i.e in the bag.

Discussion

With the advent of the microscope, delicate instruments and microsurgical techniques the management of cataract have slowly transformed from conventional extra capsular cataract extraction (ECCE) to small incision cataract surgery (SICS) and phacoemulsification. The re-birth of ECCE in its refined microsurgical version has brought with it the need for an adequate technique for anterior capsulotomy with placement of IOL in the natural anatomical position, which can be achieved with CCC technique, leading to decrease in complications of ciliary sulcus fixated IOL. 5,6

Mean age of the subject in years \pm SD in group A was 61.05 ± 8.12 and that in group B was 62.45 ± 8.9 . No statistically significant difference was found in distribution of age or gender.

All types of cataract were included in this study. CCC can limit the movement of the nucleus in cases of cataracta brunescence, thereby causing difficulty in nucleus expression hence majority of patients having advanced, mature or hypermature cataract underwent can opener capsulotomy i.e (group A) while in group B most of patients had early immature cataract.

In can-opener technique all IOL were placed in sulcus while in CCC all IOL were placed in-the-bag. anterior chamber depth –

Cataract extraction with intraocular lens (IOL) implantation results in widening of the anterior chamber angle and depth. . It is desired that the IOL must be placed in the natural position as the human lens for achieving best

corrected visual acuity. This is achieved by placing the lens in the capsular bag. Thus assessment of depth of anterior chamber can be used to estimate effective lens position and to study position of the IOL. 7

The mean anterior chamber depth (ACD) was calculated preoperatively and post-operatively in both the surgery groups. On intragroup analysis, there was increase in the mean chamber depth in both the groups. On intergroup analysis, the mean ACD was significantly higher in group B (3.47 ± 0.35) than in group A (3.27 ± 0.29). The study Yun-e Zhao, Xian-hui Gong, Xue-ning Zhu, He-ming Li, Meng-jun Tu, Terry G. Coursey also showed that the mean ACD in ciliary sulcus fixation group was significantly shallower than capsular bag fixation. 8

Mean visual acuity in group B was more in group A at 1st (group A - 0.44 ± 0.19 and group B - 0.30 ± 0.10) and 6th week (group A - 0.35 ± 0.11 and group B - 0.20 ± 0.09) respectively. There was significant difference between mean values of visual acuity at 1st and 6th week respectively, on comparing can opener to CCC. Our study was comparable with Jayshree M.P. et al where visual acuity seen more with IOL placed in-the-bag than sulcus fixed IOL. 9

This was attributed to low level of post-operative astigmatism, less complications and exclusion of high risk cases and placement of IOL in the bag (i.e natural position of lens) in group B. There is a significant difference between mean values of visual acuity at 1st and 6th week respectively, on comparing can opener to CCC.

Post operative complications were considered.

Post operative corneal edema was present in 25% of group A and 20% in group B. All cases resolved by treatment with hyperosmotics and carbonic anhydrase inhibitor. Increased in corneal edema in group two was more due to prolonged intraoperative manipulation during cortex aspiration, anterior uveitis, endothelial touch with IOL while implantation and old age. Our study was comparable with other study done by Jayshree M.P., Laxman V Dasar that corneal edema was seen more in ciliary sulcus fixated IOL (group A) (14%) than group B (4%).

Cortical matter in pupillary area was seen more in group A (15%) than in group B (5%).

The most common complication in both the groups at 6th week was (posterior capsular opacification) PCO. In our study, PCO was seen more in group A (25%) than in group B (10%) as compared to 12% and 1% in Jayshree M.P. et al, 30% and 11% of Rajan Mohan study, 34% and 12% in Robert G Martin, M.D. study. (Robert G Martin, M.D. effect of posterior chamber intraocular lens design and surgical placement on post operative outcome). In group B (patient undergoing CCC) less incidence of PCO was seen. CCC appears to be the best type of anterior capsulotomy to decrease the overall incidence of PCO – 1) smooth anterior capsule edge 2) cortical clean-up is enhanced when combined with hydrodissection, and 3) the adhesion between edges of the anterior capsular flap and posterior capsule may prevent in-growth of retained epithelial cells into the visual axis.

In our study IOL Decentration was seen more in group A (10%) than in group B (5%) compared to (10%) ciliary sulcus and (2%) in-the-bag in Jayshree M.P. et al study and 13% and 3.7% of Rajan Mohan study. (10,11) This may be due to irregular shape and size of capsulotomy not corresponding to size and shape of optic.

Limitations of my study were – 1) small sample size 2) The effect on quality of vision like glare and retinal image problems like halos and shadowing were not considered.

Conclusion –

From this study we concluded that post operative visual outcome (6th week)was better in group with CCC technique,More post-op complications were seen in group A than in group B,Mean ACD post-operatively was more in CCC than in can opener technique indicating better placement of IOL i.e. in the bag placement and thus CCC technique can be considered superior to can opener technique for long term visual rehabilitation in cataract surgery.

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