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**Research Article**

# A study of the efficacy of cryoextraction in various types of cataract

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## ABSTRACT

**Background:** The outcome of cataract surgery is determined by the patient, the technique, and the surgeon: the patient where there is coexisting morbidity; modern techniques (most notably the implantation of an intraocular lens and probably small incision methods) have transformed the quality of visual rehabilitation and dare we say the 'better' the surgeon the 'better' the results. Objective of the study is to study the efficacy of cryoextraction in various types of cataract and also the complications in immediate post-operative period and up to 6 weeks.
**Methods:** A hospital based cross sectional study was carried out among 1000 cataract patients. Institutional Ethics Committee permission was obtained. Informed consent was taken from each patient. The study was carried out for a period of two years. Patients who were willing, not chronically ill, not bed ridden and having diagnosed as cataract were included in the study. The data was collected in the pre designed study questionnaire. The data was analyzed using proportions.
**Results:** Majority of cases have undergone the Sector type of iridectomy (81.8%). Majority (85.4%) had no complications. Cryo adherence to the iris was the commonest complication (6.3%) followed by capsular rupture in 4.7% of cases. Majority (85.9%) had no complications. Hyphema (4.7%) was the most common complication followed by shallow anterior chamber in 3.8% of cases. 400 cases has come for follow up after 6 weeks post-operative period out of them 91.05% of patients had no complications. Iritis was most common late post-operative complication at the end of 6 weeks in 5% of cases.
**Conclusion:** Cryoextraction of cataract with complete iridectomy has given good results in the present study. The young surgeon can achieve the results equal to that of master using cryoextraction as it is easy to apply and complications are less.

**Keywords:** Cryoextraction, Cataract, Iridectomy, Complications

## INTRODUCTION

The controlled destruction of tissue by freezing is today widely practised in medicine. Terms for it include cryotherapy, cryocautery, cryocongelation and cryogenic surgery, but cryosurgery (literally, cold handiwork) seems most appropriate. Cryosurgery is a cheap, easy, and safe treatment suitable for both hospital and office based practice. Its major advantage is excellent cosmetic results with minimal scarring.[1]

Cryotherapy is used in ophthalmology to treat a variety of eye conditions. These include surface eye cancers, cyclodestruction for uncontrolled intraocular pressure, retinopathy of prematurity, retinopexy in retinal detachments, periocular tumors, and trichiasis, to name a few. Cryotherapy may be preferable to other therapies in treating some eye diseases, as there are few postoperative adverse events and patients respond well to treatment without the long-term complications associated with radiation and cytotoxic therapies sometimes used in lieu

of cryotherapy. The experienced ophthalmologist can usually avoid serious complications by limiting the time that the cryogen is in contact with the surface of the eye.[2]

The outcome of cataract surgery is determined by the patient, the technique, and the surgeon: the patient where there is coexisting morbidity; modern techniques (most notably the implantation of an intraocular lens and probably small incision methods) have transformed the quality of visual rehabilitation and dare we say the 'better' the surgeon the 'better' the results.[3]

The present study was undertaken to study the efficacy of cryoextraction in various types of cataract and also the complications in immediate post-operative period and up to 6 weeks. 400 cases have come for follow up after 6 weeks post-operative period.

## METHODS

A hospital based cross sectional study was carried out among 1000 cataract patients. Institutional Ethics Committee permission was obtained. Informed consent was taken from each patient. The study was carried out for a period of two years. Patients who were willing, not chronically ill, not bed ridden and having diagnosed as cataract were included in the study. The data was collected in the pre designed study questionnaire. The data was analyzed using proportions.

The operative technique was as follows;

***Section***

- Limbal based conjunctival flap with abextune suction using bard Parker knife.
- Knife section with a small lumbal based conjunctival flap.

***Cornealscleral suture:*** Single post placed suture with 8/0 polyamide.

***Iridectomy***

- Peripheral iridectomy
- Broad iridectomy

***Lens extraction:*** cryoextraction in all cases.

The present study was undertaken to study the efficacy of cryoextraction in various types of cataract and also the complications in immediate post-operative period and up to 6 weeks. 400 cases have come for follow up after 6 weeks post-operative period.

## RESULTS

Majority of cases have undergone the sector type of iridectomy (81.8%).

Majority (85.4%) had no complications. cryo adherence to the iris was the commonest complication (6.3%) followed by capsular rupture in 4.7% of cases.

**Table 1: Distribution of study subjects as per the type of iridectomy.**

| Type Of Iridectomy | Number | Percentage |
|---|---|---|
| Peripheral type of iridectomy | 182 | 18.2 |
| Sector type of iridectomy | 818 | 81.8 |
| Total | 1000 | 100 |

**Table 2: Distribution of study subjects as per the operative complications.**

| Operative complications | Number | Percentage |
|---|---|---|
| Capsular rupture | 47 | 4.7 |
| Vitreous loss | 22 | 2.2 |
| Cryo adherence to cornea | 12 | 1.2 |
| Cryo adherence to iris | 63 | 6.3 |
| Expulsive hemorrhage | 02 | 0.2 |
| No complications | 854 | 85.4 |
| Total | 1000 | 100 |

**Table 3: Distribution of study subjects as per the post-operative complications.**

| Post-operative complications | Number | Percentage |
|---|---|---|
| Shallow anterior chamber | 38 | 3.8 |
| Hyphema | 47 | 4.7 |
| Wound gape | 06 | 0.6 |
| Iritis | 35 | 3.5 |
| Endophthalmitis | 03 | 0.3 |
| Expulsive hemorrhage | 04 | 0.4 |
| Retinal detachment | 01 | 0.1 |
| Choroidal detachment | 04 | 0.4 |
| Iris prolapsed | 03 | 0.3 |
| No complications | 859 | 85.9 |
| Total | 1000 | 100 |

Majority (85.9%) had no complications. Hyphema (4.7%) was the most common complication followed by shallow anterior chamber in 3.8% of cases.

400 cases have come for follow up after 6 weeks post-operative period out of them 91.05% of patients had no complications. Iritis was most common late post-operative complication at the end of 6 weeks in 5% of cases.

**Table 4: Distribution of study subjects as per the late post-operative complications at the end of 6 weeks.**

| Late post-operative complications | Number | Percentage |
|---|---|---|
| Iritis | 20 | 05 |
| Up-drawn pupil | 05 | 1.2 |
| Glaucoma | 10 | 2.5 |
| Retinal detachment | 01 | 0.25 |
| No complications | 364 | 91.05 |
| Total | 400 | 100 |

## DISCUSSION

The present study was undertaken to study the efficacy of cryoextraction in various types of cataract and also the complications in immediate post-operative period and up to 6 weeks. 400 cases have come for follow up after 6 weeks post-operative period.

Majority of cases have undergone the Sector type of iridectomy (81.8%). Majority (85.4%) had no complications. Cryo adherence to the iris was the commonest complication (6.3%) followed by capsular rupture in 4.7% of cases. Majority (85.9%) had no complications. Hyphema (4.7%) was the most common complication followed by shallow anterior chamber in 3.8% of cases. 400 cases has come for follow up after 6 weeks post-operative period out of them 91.05% of patients had no complications. Iritis was most common late post-operative complication at the end of 6 weeks in 5% of cases.

Kapoor H et al[4] found that of 6383 operated eyes 94.8% had a visual acuity of less than 3/60 preoperatively, and 41% of the procedures were performed on patients who were bilaterally blind (less than 3/60 better eye). At discharge with standard aphakic spherical spectacles, 11.3% of eyes had an acuity of less than 6/60 (poor outcome), and 25.9% had an acuity of 6/18 or better. At 6 weeks' follow up 3908 eyes were examined (61.2%), of which, with best correction, 4.3% had poor outcome (acuity of less than 6/60) and 79.9% obtained 6/18 or better. Pre-existing eye pathology was responsible for poor outcome in 3.0% of eyes and surgical complications in 1.3% of eyes, of which corneal decompensation was the major cause (0.5%). In 237 eyes which received an intraocular lens implantation (IOL) in the camp, the visual acuity at discharge was 6/18 or better in 44.5% of eyes improving to 87.9% in the 157 eyes which were seen at 6 weeks follow up. Poor outcome (less than 6/60) was seen in 5.7% of the eyes with an IOL at discharge improving to 1.9% at follow up.

Bourne RR et al[5] reported that 199 (88%) eyes had undergone intracapsular cataract extraction (ICCE), and 22 (10%) extra capsular surgery with intraocular lens (ECCE+IOL); surgical technique(s) in four cases were not identified. Presenting VA for the 226 operated eyes were: 68 eyes (30.1%) were 6/12 or better, 31 (13.7%) <6/12 >or=6/18, 63 (27.9%) 6/18 to 6/60, 8 (3.5%) <6/60 >or=3/60, and 56 (24.8%) <3/60. With 'best' refractive correction these values were 114 (50.4%), 31 (13.7%), 51 (22.6%), 5 (2.2%) and 25 (11.1%) respectively. Of the 158 eyes with VA of 6/12 or worse on presentation, 44 (28%) were the result of coincident disease (principally age related macular degeneration), 95 (60%) refractive error (44 of these had uncorrected aphakia), and 19 (12%) operative complications. ICCE was more likely to result in a VA of <6/18 (OR: 4.26, p = 0.01) than ECCE+IOL. Likewise, eye camp surgery was more likely to result in a VA of <6/60 (OR: 1.98, p = 0.04). No significant association was found between time since surgery and VA outcome, nor was there a sex difference for postoperative vision. Literate subjects were significantly less likely to have an outcome of <6/18 (OR: 2.38, p <0.01) or <6/60 (OR: 2.87, p <0.01). Following ICCE (199 eyes), 56 (37%) of the 151 eyes with an aphakic spectacle correction achieved 6/12 or better. Females, eye camp surgeries, illiterate subjects, and rural dwellers were less likely to wear their aphakic correction. The ratio of ICCE: ECCE+IOL has reduced in the past 3 years (3.8:1) compared to >or=4 years before the survey (25:1). Hospital based ECCE+IOL surgeries were associated with a better outcome, yet 36% of these eyes were <6/12 postoperatively, after excluding coincident disease.

Nirmalan PK et al[6] observed that treatable blindness, particularly that associated with cataract and refractive error, remains a significant problem among older adults in south Indian populations, especially in females, the illiterate, and those living in rural areas. Further study is needed to better understand why a significant proportion of the cataract blind are not taking advantage of free of charge eye care services offered by the Aravind Eye Hospital and others in the district. While continuing to increase cataract surgical volume to reduce blindness, emphasis must also be placed on improving postoperative visual acuity outcomes.

Jadoon Z et al[7] found that 16,507 Adults were examined (95.5% response rate). The crude prevalence of blindness (presenting <3/60 in the better eye) caused by bilateral cataract was 1.75% (95% CI 1.55%, 1.96%). 1317 Participants (633 men; 684 women) had undergone cataract surgery in one or both eyes, giving a crude prevalence of 8.0% (95% CI 7.6%, 8.4%). The CSC (persons) at <3/60, <6/60 and <6/18 were 77.1%, 69.3% and 43.7%, respectively. The CSC (eyes) at <3/60, <6/60 and <6/18 were 61.4%, 52.2% and 40.7%, respectively. Cost of surgery (76.1%) was the main barrier to surgery.

Odugbo OP et al[8] reported that the prevalence of bilateral blindness due to cataract was 2.1%, (95% confidence intervals (CI): 1.7-2.5%) in the entire cohort, 2.4% in females (95% CI: 1.8-3.8%); and 1.8% in males (95% CI: 1.2-2.4%) ($\chi(2) = 0.85$, P >0.05). The prevalence of monocular blindness due to cataract was 5.9% (95% CI: 5.2-6.6%). The cataract surgical coverage for subjects

with visual acuity (VA) less 3/60 was 53.8% in the entire cohort; 60.5% for males and 48% for females ($\chi^2 = 2.49$, $P > 0.05$). The couching coverage for subjects who were blind was 12%. A total of 180 eyes underwent surgical intervention (surgery or couching) for cataract, of which, 48 (26.7%) eyes underwent couching. The prevalence of bilateral (pseudo) aphakia was 1.5%, (95% CI: 1.2-1.9%) and 2.7% (95% CI: 2.2-3.2%) for unilateral (pseudo) aphakia. Visual outcomes of the 180 eyes that underwent surgical intervention were good (VA ≥ 6/18) in 46 (25.6%) eyes and poor (VA < 6/60) in 105 (58.3%) eyes. Uncorrected aphakia was the most common cause of poor outcome (65.1%). Most subjects who underwent cataract surgery were not using spectacles 74 (71.2%). Cost and lack of awareness were the main barriers to uptake of cataract surgery services.

Kolawole OU et al[9] observed that the Cataract Surgical Coverage (CSC) (persons) was 12.1% and Couching Coverage (persons) was 11.8%. The age- and sex-adjusted prevalence of bilateral operable cataract (VA < 6/60) in people of 50 years and older was 2.7% (95% CI: 2.3-3.1%). In this last group, the cataract intervention (surgery+couching) coverage was 22.2%. The proportion of patients who could not attain 6/60 vision after surgery were 12.5, 87.5, and 92.9%, respectively, for patients who underwent intraocular lens (IOL) implantation, cataract surgery without IOL implantation and those who underwent couching. 'Lack of awareness' (30.4%), 'no need for surgery' (17.6%), cost (14.6%), fear (10.2%), 'waiting for cataract to mature' (8.8%), AND 'surgical services not available' (5.8%) were reasons why individuals with operable cataract did not undergo cataract surgery.

Abibalar T et al[10] found that A total of 13,591 participants were examined (response rate 89.9%). Prevalence of cataract surgery was 1.6% (95% confidence interval 1.4-1.8), significantly higher among those aged ≥70 years. Cataract surgical coverage (persons) in Nigeria was 38.3%. Coverage was 1.7 times higher among males than females. Coverage was only 9.1% among women in the South-South geopolitical zone. Over one third of those who were cataract blind said they could not afford surgery (36%).

Thulasiraj RD et al[11] noted that within the cataract-operated sample of 682 persons, 13.8% had presenting visual acuity worse than 6/60 in both eyes, 25.2% better than or equal to 6/18 in both eyes, and 37.8% were bilaterally operated on. For aphakic eyes, 50.5% presented with visual acuity better than or equal to 6/18; 82.6% with best-correction. For pseudophakic eyes, the corresponding percentages were 78.0% and 94.5%. Over one-third of all eyes were pseudophakic, and nearly three-fourths had been operated on in non-governmental facilities. Uncorrected aphakia and other refractive error were the main causes of vision impairment. In multiple logistic regression modeling, poor presenting visual acuity in aphakic eyes was associated with illiteracy, rural residence, and surgery in government facilities; gender and time period of surgery were not predictors of vision outcomes. None of these variables were associated with best-corrected outcomes in aphakic eyes, nor with presenting and best-corrected outcomes in pseudophakic eyes.

Bergwerk KL et al[12] concluded that mean patient age was 72 years and mean follow-up, 6 months. Thirteen patients (14%) were monocular from complications of surgery. Eighty patients (86%) were monocular because of medical eye conditions. Ocular co-morbidities were present in 75% of eyes having surgery. Preoperative median BCVA was 20/60. Median BCVA was 20/30 by the final scheduled follow-up examination and 20/25 by the final follow-up examination. Thirty-seven percent of eyes were correctable to 20/20 or better and 67% were correctable to 20/40 or better. Two eyes lost BCVA by the final scheduled postoperative examination, and 3 eyes lost BCVA by the final follow-up examination. Final BCVA of worse than 20/40 was always related to preexisting macular or optic-nerve pathology. There were 16 intraoperative or early postoperative complications. The most common (3 eyes) was posterior capsule plaque that could not be removed by capsule polishing. Twenty eyes (22%) had subsequent surgical procedures, the most common being laser posterior capsulotomy. No patient who was monocular from surgical complications had similar problems with second-eye cataract surgery.

## CONCLUSION

Cryoextraction of cataract with complete iridectomy has given good results in the present study. The young surgeon can achieve the results equal to that of master using cryoextraction as it is easy to apply and complications are less.

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