



## Coritocapsular adhesions during cataract surgery: Associations and Implications -An Observational Study

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Date of Submission: 01-07-2023

Date of Acceptance: 15-07-2023

**ABSTRACT:** Corticocapsular adhesions (CCA) are adhesions formed between the lens capsule and the adjacent cortical layer. They can have significant implications during cataract surgery, affecting procedures such as capsulorrhexis, hydrodissection, and nuclear rotation. This study aimed to investigate the prevalence of CCA and its associations with gender, cataract type, and systemic illnesses. A total of 120 eyes with uncomplicated cataracts were examined, and CCA presence and severity were documented. The results showed a higher incidence of CCA in female subjects, particularly in cortical and mixed cataracts. Diabetes mellitus was also found to be associated with CCA. Understanding these associations can aid in preoperative assessment and guide surgical strategies to minimize complications during cataract surgery.

**KEYWORDS:** corticocapsular adhesion, cataract surgery, associations, gender, cataract type, systemic illnesses.

### I. INTRODUCTION

Corticocapsular adhesions (CCA) are adhesions that form between the lens capsule and the adjacent cortical layer. They can occur in different locations, including the anterior, equatorial, and posterior regions of the lens. During cataract surgery, these adhesions can pose challenges, leading to difficulties in procedures such as capsulorrhexis, hydrodissection, and nuclear rotation.

Understanding the importance of CCA is crucial to optimize surgical outcomes and prevent complications. These adhesions can resemble cortical opacities and impede the uniform buildup of hydraulic pressure between the posterior capsule and the cataract. Consequently, the firm adhesions resist single hydrodissection, keeping the nucleus anchored to the capsule and inhibiting rotation. Stressful rotation during surgery can also lead to zonulolysis or weakening of the capsular zonular complex.

### II. MATERIALS AND METHODS:

This was a single observational study undertaken at K J SOMAIYA MEDICAL COLLEGE AND HOSPITAL during the period April 2021 to December 2022.

The study included 120 healthy eyes with uncomplicated cataracts aged 50years and above who were scheduled for cataract surgery (phacoemulsification), while those with coexisting ocular pathology, traumatic cataracts, previous ocular surgeries, small pupil size, and inability to evaluate the lens using a slit-lamp were excluded. Presence of CCA was noted preoperatively or intraoperatively.

Each patient signed an informed consent form before enrolling in the study. Slit-lamp examinations were conducted after dilatation of pupil with tropicacyl plus, and the same single trained observer recorded the presence and severity of specific lens opacity. A single surgeon did phacoemulsification under topical anesthesia using a standardized surgical technique.

The type of cataract was categorized as T1- nuclear, T3- anterior cortical, T3- posterior cortical, or T4- posterior subcapsular cataract (PSC). Grading of nuclei based on hardness followed the Emery and Little classification. Corticocapsular adhesions were identified with the slit-lamp at 12x magnification, with maximum illumination and the slit beam focused on the capsule at a 30° to 45° angle. Corticocapsular adhesions appeared as an opacity in the outermost layer of the cortex with no visible area of translucence between the capsule and the underlying opaque cortical layer. However, during slit-lamp examination, cortical cataract should be differentiated from CCA. In cortical cataract, a distinct area of translucence is always visible in the inner substance of the lens.

The Data collected over 20 months was then analysed for Male v/s Female ratio, Unilateral v/s bilateral presence of CCA, Age bias, Associations with other ocular features, Association with systemic illness.



### Intraoperative Observations

- Confirmation of CCA under the microscope.
- Capsulorrhexis border was seen extending to the periphery over these adhesions (cystitome was used) in some cases- especially in focal CCAs.
- Difficulty in finding the cleavage plane after a single focal hydrodissection.
- As nucleus was anchored, there was difficulty in rotation of the same noted in some cases (PCR/zonulardialysis)

### III. STATISTICAL ANALYSIS

We saw that various factors coexisted and there was interdependence between them, to assess the presence of CCA with changes in independent variables, multivariate logistic regression analysis was adopted. The dependent variable occurrence of CCA was dichotomous, with Code 0 for nonoccurrence and Code 1 for occurrence of CCA. The associations evaluated were age, gender, type of cataract, grade of nuclear sclerosis, and presence of systemic illnesses like diabetes mellitus. SYSTAT statistical package (Version 8.0) for Windows (SPSS, Chicago, IL, USA) was used for statistical analysis.

### IV. RESULTS:

The mean age of the subjects was  $60.31 \pm 7.10$  years (range 40 to 81 years). Of 120 patients, 48 (40%) were males and 72(60%)females.Statistical observations revealed a higher incidence of CCA in female subjects compared to males.As age increased the occurrence of CCA also showed an increasing trend.There were 68% of patients with cortical cataracts and 20% mixed cataracts 12% had Nuclear Sclerosis only. The occurrence of CCA was also found to be greater in cortical particularly anterior cortical cataracts more than posterior cortical cataracts, with negligible association in isolated nuclear cataracts. Diabetes mellitus showed an increased incidence of cortical cataracts and was associated with CCA.

### V. DISCUSSION:

The increased detection of CCA could be attributed to increased awareness and diligent efforts to identify these adhesions. It has been hypothesized that mitotically active equatorial lens epithelial cells (LEC) proliferate and migrate, leading to the accumulation of secretory extracellular material and the formation of CCA.

The current study observed a higher prevalence of CCA in female subjects. Similarly, a case-control study that examined various risk

factors for cataract formation reported an elevated risk specifically for cortical cataracts among women . Furthermore, a population-based survey conducted in Beaver Dam, Wisconsin, found that women in similar age groups exhibited a greater presence of cortical opacities compared to men . These findings suggest that the increased propensity of cortical cataract development in women may predispose them to CCA. It is hypothesized that hormonal factors could play a role in the elevated incidence of CCA among females. Nevertheless, additional research is needed to explore and elucidate the relationship between CCA occurrence and female gender.

In our study, we observed a higher incidence of CCA in cases of cortical cataracts and mixed cataracts, whereas the association was minimal in isolated cataracts. This significant correlation between CCA and cortical cataracts suggests a potential shared underlying cause for both conditions. However, further investigations conducted in a more controlled manner are required to confirm and explore the impact of cortical cataracts on CCA.

No significant association between the grade of cataract and CCA was identified in our study. However, we believe that this lack of association can be attributed to the insufficient sample size

The associations observed in this study, such as the higher incidence of CCA in females and its association with cortical cataracts and diabetes, provide valuable information for preoperative assessment. Surgeons can anticipate the presence of CCA and adopt strategies to avoid stressing the capsular bag and zonules during rotation. Techniques such as focal cortical cleaving hydrodissection, viscodissection, and mechanical separation of adhesions may be necessary.

In summary, our findings indicate that the association between CCA and cortical cataracts is heightened, particularly in individuals of older age and female gender , Diabetes Mellitus.

### VI. CONCLUSION:

Corticocapsular adhesions represent avoidable complications during routine cataract surgery. Understanding their associations with gender, cataract type, and systemic illnesses can help identify patients at risk and guide surgical strategies to achieve favourable outcomes. Further research is needed to investigate the nature of CCA and potential remedies to overcome these adhesions.



### REFERENCES

- [1]. Vasavada AR, Goyal D, Shastri L, Singh R. Corticocapsular adhesions and their effect during cataract surgery. *J Cataract Refract Surg* 2003;29:309-14
- [2]. Emery JM, Little JH. Phacoemulsification and aspiration of cataracts, surgical technique, complications and results. CV Mosby: St Louis, Mo; 1979. p. 45-9.
- [3]. The probable associations for corticocapsular adhesions in patients undergoing cataract surgery: A clinic-based observational study Vasavada Abhay R, Raj Shetal M, Praveen M R, Vasavada Viraj A, Vasavada Vaishali A Year : 2008 | Volume: 56 | Issue Number: 2 | Page: 103-108
- [4]. The Italian-American Cataract Study Group. Risk factors for age-related cortical, nuclear and posterior subcapsular cataracts. *Am J Epidemiol* 1991;133:541-53
- [5]. Cruickshanks KJ, Klein BE, Klein R. Ultraviolet light exposure and lens opacities: The Beaver Dam Eye Study. *Am J Public Health* 1992;82:1658-62.
- [6]. Wong TY, Klein BE, Klein R, Tomany SC, Lee KE. Refractive errors and incident cataracts: The Beaver Dam Eye Study. *Invest Ophthalmol Vis Sci* 2001;42:1449-54
- [7]. Lim R, Mitchell P, Cumming RG. Refractive association with cataract: The Blue Mountains Eye Study. *Invest Ophthalmol Vis Sci* 1999;40:3021-6.