Original Article

# The Prevalence of Dry Eye After Cataract Surgery Among Acute Angle Closure Crisis Patients at Thammasat Hospital

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## Abstract

**Introduction:** Dry eye is a common condition. Patients with dry eye may have a reduced quality of life due to their discomfort, and significant visual disturbances. Dry eye can occur as a result of various factors such as increasing age, female, medication use, and surgical procedures. The definitive treatment of acute angle closure crisis is surgical intervention to prevent its recurrence.

**Objectives:** The objective of the study was to identify the prevalence of dry eye after cataract surgery among acute angle closure crisis (AACC) patients by using Ocular Surface Disease Index (OSDI), which is a standardized instrument to diagnosis dry eye disease (DED).

**Methods:** Prospective descriptive study. Twelve cases of AACC were diagnosed and underwent phacoemulsification at Thammasat Hospital. All participants were enrolled in this study. The dry eye related data was collected preoperatively and at 1 week, 1 month, and 3 months postoperatively. OSDI evaluation form was completed by all participants to record the type of dry eye.

**Results:** Fifteen eyes of 12 patients, including 4 (33.33%) men and 8 (66.67%) women with the mean age of 67.4 (±6.1) years were studied. DED were found 73.33% eyes ($P < .001$) of patients at 1 week follow-up. 46.67% and 6.67% of the eyes were dry eye at 1 month and 3 months after surgery, respectively.

**Conclusions:** Prevalence of DED is significant after cataract surgery among AACC patients. The clinicians should be concerned about DED after cataract surgery.

**Keywords:** Dry eyes, Cataract surgery, Acute angle closure crisis, OSDI, Glaucoma

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## Introduction

Dry eye is a common condition and often chronic problem.[1] Dry eye syndrome occurs when there is a change in tear film that normally keeps the eye moist and lubricated.[1] It can occur as a result of various conditions such as increasing age, female, medication use, environmental conditions, digital device use, cosmetic use, and surgical procedures.[2] Patients with dry eye may have a reduced quality of life due to their discomfort, difficulty in performing daily activities, and significant visual disturbances.[3] Management of dry eye may require more than one therapeutic modality, including artificial tear drop instillation, treatment to reduce ocular inflammation and patient's education to encourage adherence of dry eye treatments.[4]

The definitive treatment of acute angle closure glaucoma is surgery. The goal for surgical intervention is to prevent its recurrence[6=5]. If the patient has both a narrow occludable angle and visually significant cataract (visual disturbance due to cataract), cataract surgery is the treatment of choice. It opens the angle and improves vision[7=6]. Even without significant cataract, the effectiveness of early lens extraction for treatment angle closure glaucoma showed that clear lens extraction may be more efficacious and cost effective than laser surgery[8=7].

Cataract surgery has been found to exacerbate preexisting dry eye in patients with ocular surface disease, especially in glaucoma patients which usually prescribed multiple topical drugs, and also induce dry eye in patients with healthy cornea[5=8].

The Ocular surface disease index (OSDI) is a standardized instrument to evaluate symptoms, and can easily be performed and used to support the diagnosis of dry eye syndrome.[9] The objective of the study was to identify the prevalence of dry eye after cataract surgery among acute angle closure crisis (AACC) patients.

## Methods

This prospective descriptive study followed the tenets of Helsinki declaration and was approved by the Human Research Ethics Committee of Faculty of Medicine, Thammasat University, Thailand. All the participants enrolled in the study were the patients that were diagnosed with AACC at Thammasat Hospital between July 2021 and June 2022. All patients were informed verbally about the procedures. An informed written consent was obtained from each of them.

Inclusion criteria for participants is the patients that were diagnosed with AACC at Thammasat Hospital between July 2021 and June 2022. All participants were treated by topical and oral anti-glaucoma medication, if the intraocular pressure cannot be lowered sufficiently, a laser iridotomy or penetrating glaucoma surgery can be performed prior to lens extraction by phacoemulsification. Exclusion criteria are participants with other conditions that increase intraocular pressure example for uveitis, intraocular tumor, and who have history of prior intraocular surgery other than glaucoma surgery or participants who have complications from cataract extraction.

Age and gender of patients, preoperative and postoperative intraocular pressure, method of treatment, complication of the treatment and adverse effect was collected. Qualitative data were calculated into percentage. Quantitative data were calculated as mean and standard deviation.

There were 12 diagnosed acute angle closure crisis patients underwent phacoemulsification at Thammasat Hospital enrolled in this study. The dry eye related data was collected preoperatively and at 1 week, 1 month, and 3 months postoperatively. OSDI evaluation form was completed by all participants to record the type of dry eye. The OSDI was done on all participants at preoperatively, one week, one month, and three months after the phacoemulsification.

OSDI is a structured symptom-based survey, which was designed to identify patients with symptoms suggestive of dry eyes and their impact on vision-related functioning. According to the score of OSDI, which is based upon the response to a questionnaire of twelve questions **(Figure 1)**.

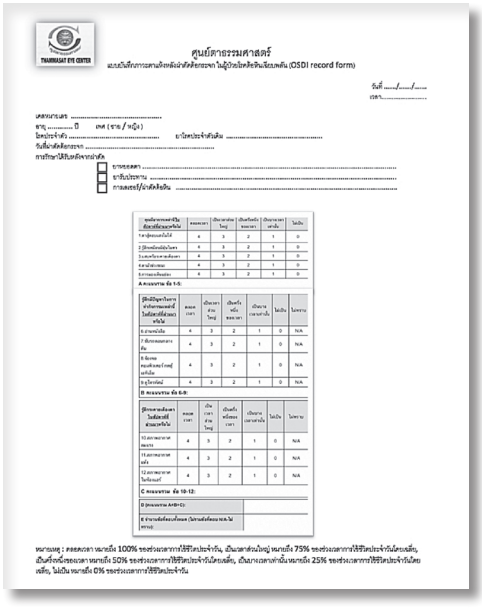

**Figure 1** Thammasat hospital's OSDI record form (Thai version).

## Results

All of the participants completed OSDI questionnaires at ophthalmology unit, Thammasat Hospital. Fifteen eyes of 12 patients, including 4 (33.33%) men and 8 (66.67%) women with the mean age of 67.4 (±6.1) years were studied (Table 1). At 1 week follow-up, DED was found 73.33%, ($P < .001$) of patients. Most presented in mild severity (46.67%). DED was found in women (71.43%) more than men (28.57%). 46.67% and 6.67% of the eyes were dry eye at 1 month and 3 months after surgery, respectively. All post-operative dry eye patients were treated with lubrication. There were 73.33% of eyes showed clinical improvement within 3 months **(Table 2)**.

**Table 1** Patient Demographic Characteristics

| Data | Number (%) |
|---|---|
| | 12 (100) |
| Sex | |
| Male | 4 (33.33) |
| Female | 8 (66.67) |
| Age (years) | |
| 40 - 49 | 0 (0) |
| 50 - 59 | 1 (8.33) |
| 60 - 69 | 9 (75) |
| 70 - 80 | 2 (16.67) |

**Table 2** The Ocular Surface Disease Index (OSDI) level

| Data | Preoperative | Postoperative 1 week | Postoperative 1 month | Postoperative 3 months |
|---|---|---|---|---|
| OSDI (total score 48) | | | | |
| No symptom (0-12 scores/0.25) | 10 (66.67) | 4 (26.67) | 8 (53.33) | 11 (73.33) |
| Mild (13-22 scores/25.1-45.8%) | 4 (26.67) | 7 (46.67) | 5 (33.33) | 1 (6.67) |
| Moderate (23-32 scores/45.9-66.7%) | 1 (6.67) | 3 (20.0) | 2 (13.33) | 0 (0) |
| Severe (≥33 scores/66.8%) | 0 (0) | 1 (6.67) | 0 (0) | 0 (0) |

## Discussion

Qualitative methodology from data analysis was considered. The OSDI is a standardized instrument to evaluate patients with symptoms suggestive of dry eyes and their impact on vision-related functioning. The OSDI can easily be performed and is user-friendly. Moreover, OSDI is considered for qualitative assessment to support the diagnosis of dry eye syndrome. Thus, OSDI is an appropriate diagnostic tool to evaluated DED. Dry eye can occur inconsequence of various conditions especially AACC patients who were prescribed multiple anti-glaucoma medications and may be had history of previous laser or glaucoma surgery, which can aggravate DED. This study shows a significant result of dry eye after cataract surgery among AACC patients.

According to the OSDI, the results in this study were found to be at a mild stage of the disease mostly (46.67%) one month postoperative cataract surgery, 20 percent were reported as moderate severity, and 6.67 percent of patients suffered from serious conditions. Thereby among the studied population, the OSDI score well demonstrated the relationship between postoperative cataract surgery and dry eye disease.

A limitation of this study was its relatively small sample size. However, due to the pandemic COVID-19 infection worldwide in the early few years, this prospective descriptive study was not able to collect as many participants as we would have liked. Nonetheless, the information may be beneficial for patients. Evaluation and treatment of dry eye disease prior to and after cataract surgery is recommended.

Due to high prevalence of DED after cataract surgery among AACC patients. Clinicians should be concerned about DED after cataract surgery.

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