

## REVIEW ARTICLE

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# DRY EYE MANAGEMENT IN PATIENTS AFTER CATARACT SURGERY: A LITERATURE REVIEW

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### Abstract

Cataract surgery is the most common surgical procedure performed to restore visual function due to opacification of the lens. One of the side effects of cataract surgery is the appearance of dry eye symptoms that can occur one to three weeks after surgery. Dry eye symptoms were reduced visual acuity can affect daily work, so that it can interfere with work productivity and quality of life. This paper is a literature review to identify dry eye management in patients after cataract surgery. The search was carried out on Web of Science, EBSCO, PubMed, and Google Scholar. The results showed that the management of dry eyes can be done with drugs, healthy living behaviors especially maintaining eye health and hygiene and also avoiding various risk factors for dry eyes. Assessment of early signs and symptoms of dry eye needs to be done before surgery so that it can reduce the risk of dry eye events. Management of dry eye in post cataract surgery patients needs to be done comprehensively so that it can improve the patient's visual ability and a better quality of life.

**Keywords:** cataracts, dry eyes, dry eye management

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### Introduction

Cataracts are a common eye disorder, which is defined as turbidity in the eyepiece. The occurrence of cataracts is caused by several factors, including factors of increasing age, sun exposure in the long term, old myopia, eye trauma, birth defects, diabetes mellitus or the use of certain drugs. The effect of cataracts causes problems in gradual decrease in vision, inability to see colors, glare, and double vision (1).

Cataract surgery is an action that is often carried out to restore visual function due to cataracts. Already many methods of cataract surgery are used today. Many patients who have had cataract surgery experience complaints of dry eyes and symptoms of irritation after cataract surgery. Dry eye complications often occur in patients with cataract surgery caused by a large incision made during a surgical procedure that can damage the cornea (2). Complications of dry eyes can occur with mild to severe symptoms. In fact, complications that can occur are loss of eye organs due to severe eye infections. This paper aims to identify dry eye management in patients after cataract surgery.

## **Method**

This paper is a literature review to identify dry eye management in post cataract surgery patients. Search is done on Web of Science, EBSCO, PubMed, and Google Scholar with keywords "cataract", "dry eyes", "dry eye management", and "cataract management".

## **Result**

Some literature explains that nurses must be able to understand risk factors, signs and symptoms of dry eye in patients after cataract surgery in order to be able to carry out appropriate management in handling it.

### **Understanding the risk factors of dry eye in patients after cataract surgery**

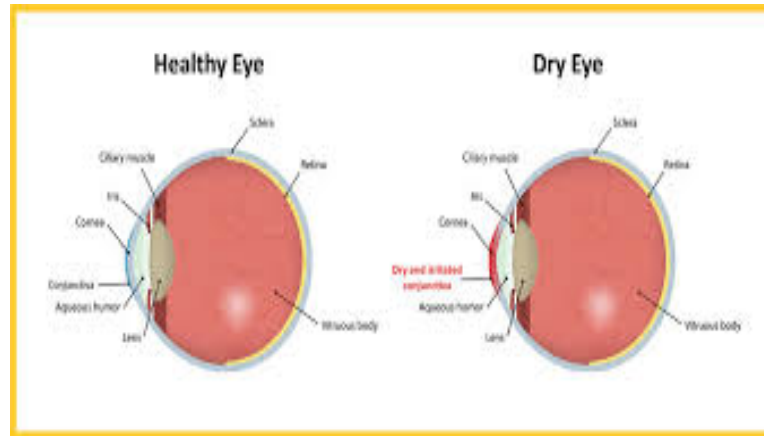
In general, dry eye disorders are caused by a lack of tears and excessive evaporation. The cause of lack of tears is the presence of Sjogren and Non Sjogren's Syndrome. Sjogren's syndrome is divided into primary and secondary. Primary Sjogren is caused by an autoimmune disorder that causes damage to all the lacrimal glands, salivary glands and several other body glands (3). Lack of tears due to evaporation results in loss of tears on the surface of the eye, while the lacrimation glands function normally. This situation can be affected by intrinsic (eyelid structure) and extrinsic factors (eye surface disease or the influence of topical drugs) (4).

Risk factors for dry eye disorders are women, old age, use of estrogen replacement hormone therapy, contact lens use, light effects on computers, essential omega 3 levels, refractive surgery, vitamin A deficiency, radiation therapy, bone marrow transplantation, hepatitis C and treatment other eyes (5,6,7). Other risk factors are systemic diseases such as Diabetes mellitus, HIV, viral infections, joint disease, cancer, chemotherapy, steroid drugs, antidepressants, beta-blockers, and anti-diuretic drugs. Based on several studies it also shows an association between the incidence of dry eyes in cigarettes and alcohol (8). The problem of anatomical abnormalities of the eye is also the cause of dry eyes. Ectropion (reversing the inner eyelid to the outside) and entropion (the outer part of the eyelid inward) can irritate dry eyes because the tear layer evaporates rapidly after continuous contact with the air.

### **Understanding the signs and symptoms for dry eye in patients after cataract surgery**

The symptoms that are generally felt by the patient are the presence of a sensation that disrupts the surface of the eye such as there is sand, there are objects that block the view, blurred vision and will disappear when winking (9). Symptoms of dry eyes that interfere with visual acuity can affect daily work activities / activities, which can interfere with work productivity and individual quality of life. In addition, patients also complain that the eyes feel hot, red like sand, runny eyes, very sensitive to light, eyes feel tired, and lots of dirt (10).

**Figure 1. Differences in the condition of healthy eyes and dry eyes**



### **Management of eye dry after cataract surgery**

The main goal of treatment for visual impairments in general is to reduce symptoms, improve vision, improve the condition of the eye surface, tear glands, improve the condition of the effects of treatment, improve healthy living habits and ultimately improve the quality of life of patients (11). Dry eye sufferers will experience excessive tear production because the eyes do not get enough lubrication so that the eye sends an emergency signal through the nervous system to ask for more lubricant (12). Furthermore, the eye's nervous system responds to this request by flooding the eyes with tears to compensate for eye dryness.

Repair of eye damage can be done by giving medication and surgery. Medication is a drug that functions to replace natural tears and anti-inflammatory drugs (13). Care or management provided must be taken into account with the harmony between cost and time efficiency, and patient safety and compliance. So, before starting eye care, patients are asked to commit to working together during treatment. In addition to drug administration, there are a number of things that can change healthy living habits in an effort to prevent dry eye symptoms (14).

Some efforts or activities that can support eye health are: (1) Avoid long-term exposure to high-radiation light (TV, computer) with the aim of reducing evaporation of eye fluids and increasing the habit of winking; (2) Using artificial tears during activity in front of high radiation rays; (3) Keep the humidity of the work place and avoid exposure to smoke, especially cigarette smoke; (4) Maintain eye health, especially around the eyelids by compressing the eyes with warm water and giving antibiotics if there are signs of infection; (5) Avoid giving tear supplements or artificial tears that contain ingredients that can irritate the eyes. Artificial tears cannot replace the role of natural tears; (6) It must be understood that the symptoms of dry eye are the effects / signs of the inflammatory process, therefore giving antibiotics must be in accordance with the benefits of giving and evaluating the side effects of the drug; and (19) Drink plenty of water and adequate nutrient intake which can help keep the eye lining moist. In addition, multiply the consumption of foods that are rich in omega-3 fats, flaxseeds, walnuts, and fatty fish such as salmon (15).

Giving medicine is intended to determine the right type of medication to reduce symptoms of dry eyes. Many studies have been carried out by comparing several drugs containing Desquafosol tetrasodium 3% with other drugs or with artificial tears. From the

literature it was found that the use of topical ophthalmic drugs is recommended to be free from hypoonic or isotonic fluids and containing electrolytes, preservatives, neutral pH, osmolarity 181 - 354 mOs / L (16). In addition, a study by Baek J, 2016 states that cataract surgery causes an inflammatory condition, which is followed by a decrease in mucin and water secretion from conjunctival epithelial cells and trophy cells. 3% tetrasodium disquafosol can reduce the signs and symptoms of dry eyes by stimulating the secretion of water and mucin.

A literature shows that autologous serum eye drops consist of essential tear components such as vitamin A, lysozyme, fibronectin, vitamin C, immunoglobulin A, and epithelial growth factors that play an important role in maintaining healthy eye surfaces (17). Such treatment is recommended as a therapy for ocular surface disorders such as Sjogren's dry eye syndrome, dry eyes not Sjogren's syndrome associated with graft host disease, neurotropic keratitis, persistent epithelial defects, superior limbic keratoconjunctivitis, and post-LASIK dry eyes.

### **Nursing management of dry eyes after catarac surgery**

Although management of mild or moderate dry eye disorders has no special intervention, this condition can cause vision problems (18). Moreover, if dry eye disorders occur with severe symptoms, they must be intervened immediately because it will cause permanent vision loss. Assessment of dry eye before surgery must be done correctly and thoroughly, which can be done by the nurse. Preoperative examination can be done by asking a number of questions related to signs and symptoms of dry eyes, carrying out checks or tests and examining the eyeball using a slit lamp. If dry eye symptoms are detected, the patient will be at high risk of developing dry eyes after surgery.

### **Discussion**

Some of the risk factors for surgery in cataract patients that can cause dry eye are the process of planting an IOL (Intra Ocular Lens), included; opening of the eyelids, age, light and heat from the microscope lamp in the operating room (19), drops, non-steroidal drugs, local anesthetics and antiseptic drugs (20). At present the theoretical concept of the causes after dry eye surgery is increasingly clear. These risk factors can cause a tear of the cornea and conjunctival epithelium that causes discomfort or visual impairment. Eye membrane as a layer that protects the epithelium from tears. Layer damage causes dry eye syndrome.

The incidence of dry eye syndrome can also be found in the operation of Laser Assisted Photorefractive Keratectomy, such as Keratomileusis (LASIK), even dry eye events can appear one week after LASIK good action with an incidence of 47.06% (22). In a previous study it was stated that dry eye events were more common in post cataract surgery than pre-cataract surgery (23).

The phacoemulsification technique of cataract surgery is surgery that is said to be successful in improving vision. However, it often causes complaints of dry eye after cataract surgery with this technique. Cataract surgery using phacoemulsification techniques can affect or interfere with the neurogenic response of the eye surface and reduce tear secretion. Based on the results of Schimer's test in post cataract phacoemulsification surgery without anesthesia, it can disrupt the stability of the eye membrane and cause inflammation of the eye surface, decrease in TBUT score, cellulose metaplasia and spots on the corneal surface with fluorescent examination. In the Barabino et al. Study, it was said that

phacoemulsification cataract surgery showed dry eye events on the first (24) and seventh days (19). Inflammation and decreased corneal sensitivity after phacoemulsification occur due to the effect of the length of the incision when destroying katarata tissue which can reduce tear output, difficulty winking the eyes, so as to reduce the osmolarity of tears that cause dry eye symptoms.

As a result of nerve incisions in the cornea and damage to epithelial cells, exposure to the microscope beam and administration of irrigation fluids to the tear layer, are factors that can cause eye surface irritation. Likewise, the use of intra-operative local anesthetics and administration of postoperative eye drops can be the cause of dry eye symptoms after phacoemulsification surgery. Giving irrigation with strong pressure and manipulating the intraoperative eyeball surface can reduce the duration of the trophy cell type and produce postoperative TBUT shortening (21).

If the condition of the eye surface is not protected from the danger of infection, in the case of symptoms of severe dry eye that is not treated can cause damage to the conjunctiva and cornea, which will eventually cause infection in the eyeball. Many cases of dry eye in conjunctivitis do not require special treatment, but if the inflammation becomes severe and chronic as soon as possible management therapy can be done to prevent ongoing corneal ulceration. Symptoms that appear also become more severe such as very sensitive to light, pain, red eyes and loss of vision.

## Conclusion

Dry eye events can appear immediately after cataract surgery using the phacoemulsification technique and will increase if treatment is not done properly. Assessment of early signs and symptoms of dry eye is needed before surgery so that dry eye events can be avoided or reduced. Some literature explains that in order to be able to carry out appropriate management in dealing with dry eye in patients after cataract surgery, nurses must be able to understand the risk factors, as well as signs and symptoms of the occurrence of dry eyes in patients. Dry eye management consists of two parts, including preoperative management and postoperative management. However, what is more emphasized is when post cataract surgery, because dry eye disorders can occur 1-7 days after surgery. Management consists of administering drugs to deal with dry eyes, maintaining lifestyle and regulating food consumed.

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