

Research paper on cataract and the corrective surgery procedure

[Technology](#), [Development](#)



Visual loss due to cataract is due to clouding of the lens of the eye leading to the inability of light to pass through it and focusing on the retina in the back of the eye (Jacobs, 2013); the vision loss can be partial or complete in the affected eye. The Latin word “catarractes” means waterfall; to someone looking into a person's eye that suffers from cataracts the clouding looks like the splashing water of a waterfall. It is the leading cause of blindness worldwide.

Disease Process/ Pathophysiology

Transparency of the lens is due to a high concentration of cytoplasmic protein, crystallins, as well as the intricate structure of the lens itself. Unlike the epithelial cells found in other parts of the body, the lens does not remove the cells that have died; therefore the lens is at an increased risk for the degenerative effects of aging (Kuszak, Deutsch, & Brown). Specifics' concerning the patho-mechanism for the development of cataracts has not been found in the literature, some evidence suggests that environmental toxins or sensitivities may play a role in the photo - oxidative insult required for cataract formation.

Practically there are three types of cataracts that can develop, subcapsular, nuclear, and cortical. Subcapsular cataract is found at the back of the lens. This type is more frequently found in patients using corticosteroids, or those that suffer from diabetes. Nuclear cataract develops deep in the nucleus of the lens, and is the quintessential cataract found in age related cataract development. Finally, cortical cataract is characterized by white opacities that start in the periphery and move centrally. This type forms in the lens cortex that encircles the nucleus of the lens.

Risk factors for the development of acquired cataracts (age – related cataracts) include, age, smoking, sunlight, metabolic syndrome, diabetes, and the use of topical corticosteroids. These risk factors seem to lead to the formation of toxic substances that have effects on the lens, or they may decrease or inhibit the formation and use of antioxidants. Smoking has a dose response relationship with cataracts formation; (West, 1992) exposure to excessive amounts of sunlight, specifically UV B radiation, also shows a dose response relationship (West, Duncan, Muñoz, Rubin, Fried, Bandeen-Roche, & Schein, 1998).

Besides the aforementioned risk factors, other accepted causes for the development of acquired cataracts include, ocular trauma, infections such as uveitis and scleritis, and radiation therapy. Cataracts may also develop as a symptom to many genetic diseases, such as myotonic dystrophy, neurofibromatosis type 2, and galactosemia (Harrison's, 2008).

Treatment

Modern advances in surgical techniques allows for normal vision to be restored with the use of an intraocular lens implantation. Delaying surgical treatment has not been shown to lead to an increase in adverse outcomes following the operation. A patient is considered a surgical candidate when the cataract results in significant vision loss to interfere with daily activity; it is not based on the actual amount of vision loss present. The surgery is safe with few complications (Harrison's, 2008). The operation is conducted under local anesthesia and is done as an outpatient procedure. Local anesthesia can be administered via several methods, examples include: retro – or peri-

bulbar injection, sub Tenson's infusion, or topical anesthetic (Jacobs, 2013). Topical anesthesia avoids the risk of trauma to the eye but is not effective in causing paralysis to the extra ocular muscles (Jacobs, 2013).

Two types of surgical techniques are accepted for cataract surgery. Standard extra capsular cataract extraction (ECCE) involves the removal of the lens nucleus as one piece. The cortex of the lens is aspirated and the lens capsule is left behind to support the placement of an intraocular lens, which is placed on or in the capsule, either of which is behind the iris. The other method, is known as phacoemulsification, and involves a smaller incision than the one used for ECCE. The cortex is aspirated and the capsule is left intact as in ECCE, but instead of a rigid lens that requires a larger incision, this method uses a foldable silicone lens that can be passed through the smaller incision. In most cases the incision is so small it only requires one suture if any which is good at preventing suture related astigmatism as may be a consequence with the ECCE technique (Jacobs, 2013).

There are two types of lenses that can be implanted into the eye, either monofocal or multifocal. In a review conducted in 2012 both lenses seemed to show similar improvements in distal visual acuity. However multifocal lenses showed to be better for near vision, and patients were less likely to need to use glasses after the operation (Calladine, Evans, Shah, & Leyland, 2012).

Nursing Intervention

Considering the stress related to the vision loss associated with the development of cataract, nurses could be a great resource to the patient by

lowering the emotional stress and depression associated with vision loss, but can also be an educator for the treatment options available. During the initial visits nurses can assess the duration and the amount of vision loss. They can also aid the patient in getting comfortable with their new environment; this can be a big help in reducing stress and increasing the feeling of security and independence. Nurses can also aid in educating the patient on post-operative care of the eye such as the use of goggles to protect the eye from injury, or not to apply pressure as it can cause serious problems. Finally the nurse can also aid in explaining the use of prescription medication, such as the use of eye drops. Improper use of the dropper can lead to trauma and irritation of the eye leading to further damage. Education on post-operative care also includes explaining to the patient to wash hands frequently to maintain aseptic conditions, as this can prevent infections seeding in the eye. Being familiar with complications such as infection or bleeding can reduce the risk of the development of serious consequences such as complete vision loss in the specific eye.

Treatment

Before undergoing the operation patients may benefit from the use of a mydriatic eye drop, which dilates the pupil and allows more light to enter the eye, compensating even slightly for the vision loss ("Cataracts-Medication", n. d.). While curative treatment requires surgery, studies exist that show preventative measures can be taken to prevent the development of cataracts. As mentioned previously there has been shown to be a dose response relationship with the exposure to sunlight and the development of

cataracts. Avoiding sun exposure by wearing a wide brimmed hat and avoiding the outdoors during the sunniest hours of the day; between 10am-3pm, and the use of sunglasses, are simple lifestyle changes that may have an effect on the development of cataracts.

Future Outcomes

Recent evidence supports the beneficial effects of nutrition on helping prevent cataracts. The two carotenoids lutein and zeaxanthin have been studied the most in their relationship to the prevention of the development of eye diseases (Mares-Perlman, Millen, Ficek, & Hankinson, 2002). In a study by Hien, Robman, Hodge, McCarty, and Taylor (2006) they found that there is an inverse relationship between the intake of lutein and zeaxanthin and the development of nuclear cataracts. The idea behind this is that lutein and zeaxanthin are carotenoids that are found in the lenses of the eye; therefore supplementing them into our diet should have some sort of protective effect. However the evidence is limited, therefore in the future, studies should focus more on the nutritional supplements that one could supply in their diet to prevent development of this debilitating eye condition. This could especially be beneficial in patients who develop cataracts from diseases like diabetes, as this could be another nutritional lifestyle change that may affect other medical problems that come with diabetes. Antioxidants inhibit the oxidation of other molecules, and low levels of antioxidants lead to oxidative stress in the cells, which is one theory for the damaging effects that leads to cataract formation. While studies have tried to prove that supplementing vitamins could aid in the prevention of cataract formation, little evidence has actually

been found. However the antioxidants found in such vitamins as C and E have been shown to have an effect on overall good health. Other theories on foods that could aid in the prevention of cataract formation are dark colored, such as red, purple, and green, vegetables and fruits. These fruits and vegetables have higher levels of phytochemicals, which are essentially antioxidants (Simon, 2012).

Cataract was once thought to be a debilitating eye condition. However with recent technological advances in microsurgical techniques treatment for this condition is definitive. Because cataract is the leading cause of blindness worldwide and since we have effectively perfected the techniques for the treatment of this condition, future research needs to focus on the environmental and lifestyle changes we can make and integrate into our daily lives to prevent this condition, because while surgical treatments are available, the most modern techniques are very expensive for the countries of the developing world. If we can help prevent this condition we will also be saving the population a significant amount of money.

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