

CATARACT IN DOGS

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Cataracts are a leading cause of visual impairment in dogs and frequently progress to total blindness. Cataract is an opacity of the lens or lens capsule. The term cataract literally means "to break down" which refers to the disruption of the normal arrangement of the lens fibres or capsule, resulting in loss of transparency of the crystalline lens. Besides vision loss cataract may lead to secondary conditions like uveitis and glaucoma. The basic function of the lens is to help focus light on the retina to produce a sharp, clear image for acute vision. For proper function a healthy lens must be transparent, avascular and pliable. The lens lacks blood vessels and pigments, which would decrease its transparency. The aqueous humor is primarily responsible for providing the lens with its metabolic requirements. Energy is generated through anaerobic glycolysis using glucose which diffuses from the aqueous humor.

Causes of cataract

Cataract can occur from a variety of causes. They can be due to inherited causes, spontaneous developmental abnormalities, chronic uveitis, trauma, nutritional deficiencies, toxicity and metabolic diseases. Diabetes mellitus is the leading metabolic abnormality that leads to cataract. In patients with diabetes mellitus the lenticular glycolytic pathway gets saturated due to increased glucose concentration in the aqueous humor. Then glucose gets shunted down an alternate sorbitol pathway. Sorbitol accumulation within the lens results in osmotic forces that lead to imbibition of water from the aqueous humor causing swelling and opacification of lens fibres.

Classification of cataract

Classification of cataracts can be done based on

▲ Cause- inherited (genetic), developmental, trauma, metabolic diseases, dietary deficiency, toxicity etc.

▲ Age of onset- Congenital (those that are present at birth), Juvenile (in animals less than six years of age), Senile (in animals above six years of age)

▲ Location within the lens- capsular, subcapsular, cortical, nuclear, equatorial and polar.

▲ Stage of maturation- refers to the appearance of the lens

* Incipient cataract-earliest stage of cataract, examination of the fundus is easily performed and the dog's vision is not clinically affected.

* Immature cataract-involvement of the lens varies from 10% to 99%, but fundic reflection will be present through some portion of the lens.

* Mature cataract-a cataract involving the entire lens is considered as mature or complete cataract. Visualization of the fundus is not possible and the dog is blind in the affected eye.

* Hypermature cataract- develops as the mature cataract undergoes lens fibre liquefaction.

* Morgagnian cataract- occurs when the liquefied cortex has a soft consistency and the lens nucleus gravitates to the ventral aspect of the capsular bag. Functional vision may be restored in such cases.

Treatment for cataract

The only known method in treating cataract in dogs is by surgery. There is no known method in making the lens clear once it has developed cataracts. Every dog with cataract is not a good candidate for surgery, but each dog should be monitored for secondary problems with treatment given at appropriate times.

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Selection of patients for cataract surgery

Cataract surgery is almost an elective surgical procedure, so other health problems should be addressed before cataract surgery is considered. A complete ophthalmic examination must be carried out to determine the normal functioning of the retina and to rule out pre surgical complicating factors like keratitis, uveitis, glaucoma, lens subluxation and retinal diseases. Animal's temperament is another factor to be considered; vicious, hyper excitable and fearful biters are poor candidates for cataract surgery. Post operative care is important for a successful outcome. The owner must be dedicated and willing and able to administer numerous treatments over weeks to a few months. Once progression of the cataract is confirmed surgery may be recommended before uveitis and further complications develop.

Surgical techniques

The various techniques that have been used for cataract removal include

1. Discission and aspiration

Discission and aspiration for lens removal can be done in animals less than one year of age; with soft lens material. The technique is similar to phacoemulsification.

2. Extracapsular cataract extraction (ECCE)

ECCE is the traditional method which is still performed if phacoemulsification is not possible. For an ECCE, the incision must be placed on the cornea near the limbus or beneath a conjunctival flap at the limbus or through an incision on the sclera 2mm away from the limbus. The anterior capsule is grasped and cut. The lens cortex and the nucleus are removed using irrigation and a lens loop. After removal of the cataract, the incisions are sutured.

A large incision is required for the removal of the lens. Other complications include posterior capsular tears, vitreous prolapse, lens subluxation and hyphaema. The large incision may also increase the risk of wound dehiscence and large corneal scars.

3. Phacoemulsification and aspiration

Phacoemulsification and aspiration is the most common technique used to remove cataracts in domestic animals. This instrument uses a needle with an ultrasonic tip to fragment the lens cortex

and nucleus, which allows the emulsified cortex and nucleus to be aspirated from the eye. A small corneal or limbal incision is made and an irrigating knife is used to tear and remove a piece of the anterior capsule. During surgery the anterior chamber is kept inflated using balanced salt solution or lactated Ringer's solution. The lens is fragmented and aspirated. The small incisions are closed with 7-0 or 8-0 polyglactin 910 in a simple continuous or interrupted pattern.

The advantages of the technique are that the anterior chamber rarely collapses or deflates and virtually all the lens material can be removed. This results in less post surgical iridocyclitis. Other advantages include smaller corneal incisions resulting in small corneal scars, increased corneal clarity and less risk of wound dehiscence.

The disadvantages of phacoemulsification are that the equipment is expensive and the technique requires training and practice. Intra operative complications may include posterior capsular tears, vitreous prolapse and displacement of lens materials into the vitreous. A rare complication of this technique is the opacification of the retained anterior capsule caused by the proliferation of lens epithelial cells and fibres.

Postoperative care include the application of antibiotics (systemically and topically), mydriatics and anti inflammatory drugs. Use of an Elizabethan collar will help to prevent self mutilation. Dogs usually benefit from cataract surgery with or without artificial lens implantation. An intraocular lens helps to restore the vision to as close to normal as possible. The potential postoperative complications include uveitis, corneal oedema, capsular opacities, glaucoma and retinal detachment.

Conclusion

Canine cataract surgery is a highly rewarding and successful procedure for restoring vision. The ideal candidate for phacoemulsification technique is a dog with a soft immature cataract and minimal uveitis. Thorough and regular ophthalmic examinations after surgery will increase the long term success of cataract surgery. Placement of an intraocular lens will help the dog to attain greater visual accuracy. □