Cataract: Clinical Diagnosis and Treatment

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What is cataract?
Cataract is any opacity of the lens or its capsule (1). The disturbance occurs at the molecular levels due to disturbances of lens nutrition, energy or protein metabolism, and osmotic balance (1, 2). This opacity may or may not result in visual impairment or blindness.

Diagnosis of Cataract
Full pupil dilation is required to enable adequate investigation of the lens. The most sensitive method for diagnosis of cataract is retroillumination. Shining the light through the pupil to investigate any opacity at the lens from fundic reflection allows earliest detection of cataract (3).

Causes
Numerous conditions can cause cataract (1, 4).
Inherited: Inherited cataract is common in dogs. Several breeds are predisposed for inherited cataract such as Miniature Poodle, Toy Poodle, Bichon Frise, and American Cocker Spaniel.

Metabolic: Hyperglycemia due to Diabetes Mellitus must be concerned in dogs with bilateral acute cataract. Seventy five percents of dogs develop cataract within one year after diagnosis. Hypocalcemia could affect lens to produce cataract but this type of cataract usually does not affect vision.

Intraocular diseases: Intraocular inflammation, retinal detachment and chronic glaucoma were possible etiologies for cataract. Intraocular inflammation is the most common cause of cataract in cats. Cataract usually develops in advance stage of progressive retinal atrophy. Stagnation of aqueous humor or deterioration of the anterior epithelium from elevated intraocular pressure might be the reason for cataract following chronic glaucoma.

Senile cataract: Senile cataract usually proceeds with the opacity at the nucleus then progresses through the cortex as streaks to the equator. The progression of this type of cataract is usually very slow.

Trauma: Blunt or perforating trauma could result in cataract.

Toxic: Several compounds are potential cataractogenic such as oral long term ketoconazole or dimethyl sulfoxide in dogs.

Radiation: Radiotherapy is one potential cause of cataract.

Stages of cataract
Five stages of cataract are classified (2, 4)
Incipient cataract: This is the early stage of cataract. Lens opacity in this stage involves less than 10 percents of total. Fundic reflection could be investigated and the shape of the anterior lens capsule is normal.

Immature cataract: When cataract progresses to more than 10 percents but less than 100%, it is classified as immature cataract. Fundic reflection should be somewhat observed in this stage and the anterior lens capsule also has normal shape. Visual impairment depends on the amount of lens opacity.

Mature cataract: At this stage, lens opacity involved the entire lens resulting in completely obscure of fundic reflection. The animal is blind at this stage.

Hypermature cataract: At the advanced stage, lens proteins start to liquefy and possibly leak into the anterior chamber leading to lens induced uveitis. The lens capsule becomes wrinkle and some glistening particles present at the lens.

Morgagnian cataract: This is the hypermature cataract that the lens cortex is massively liquefied and the lens nucleus usually remain freely in the lens capsule.

Consequences of cataract
Visual impairment or blindness could be observed in animals with cataract (1). Non surgical patients with advance stage of cataract possibly suffer from lens induced uveitis (2). Inappropriate management of lens induced uveitis allows complete posterior synechia resulting in secondary glaucoma which can lead to permanent blindness (5). In addition, lens subluxation or luxation possibly occurs following advance stage of hypermature cataract (1).

Phacoemulsification surgery
Phacoemulsification is a technique that breaks down the lens materials by ultrasonic waves generated from a handpiece which inserted through a 3 mm incision at the limbus (6). Intraocular artificial lens is now regularly implanted after phacoemulsification (2, 6). Animals under phacoemulification without lens implantation regain their vision. Eventhough they become hyperopia (farsighted) in aphakic condition (1). Intraocular lens implantation helps aphakic
animals improve their vision performance (2, 6). However, intraocular lens implantation is still an option due to financial reason or lens capsule conditions (2).

**Candidate for surgery**

Visual impairment from cataract is one significant reason for surgical consideration. Lens with a small focal cataract or small non progressive cataract might not require surgical correction (4, 6). On the other hand, delay surgery until approaching the advance stage might not be a wise decision due to possible development of lens induced uveitis (2, 4). Animals with cataract must be under general health check to evaluate their health status for general anesthesia. Patients with diabetic mellitus must be checked to ensure that sugar levels are under controlled (2). Standard ocular examination must be performed to ensure that no other possible cause for blindness. Ocular ultrasonography and electroretinography should be applied in animals that cataract obscures fundic appearance (4). The owner is one of significant factors for surgical consideration because post operative medications and management provided by the owner is one of a key success (1).

**Postoperative management**

Topical and systemic antibiotics and anti-inflammatory medication are needed after surgery. Systemic medication should be continued at least one or two weeks after surgery and topical medication might be at least a month or longer. The animals must wear E-collar for 2 weeks. Owner commitment on this management is a part of surgical success (6).

**Complication of surgery**

Uveitis is the most common complication after cataract surgery, especially for hypermature cataract surgery or aging dogs (7, 8). Intraocular pressure spikes could possibly occur postoperatively (7, 8). Intraocular pressure check on the next day postoperatively is required to reduce a chance of losing vision due to ocular hypertension (6). Other serious complications such as hyphema, retinal detachment, ocular hemorrhage, and suture failure have been reported, but much less often (7, 8).

**Management in non surgical patients**

Some patients with cataract might not be a good candidate for surgery due to their deteriorious health status or other ocular problems such as retinal detachment. Since a chance of lens induced uveitis increases in the advance stage of cataract, occasional ocular examination should be performed. Uncontrolled lens induced uveitis might result in secondary glaucoma which causes discomfort to the patients (4).

**References**