International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

Intra and Post Operative Complications in Diabetic and Nondiabetic Cataract Dogs after Multifocal Hydrophilic and Hydrophobic IOL Implantation Following Endophacoemulsification

Rambabu Kalaka[1], C. Ramani[2], L. Nagarajan[3], S. Usha Kumary[4], S. Ramesh[5], T. N. Ganesh[6]

[1]Ph.D Scholar, Department of Veterinary Surgery & Radiology, MVC, Chennai

[2, 3]Professor, Department of Veterinary Surgery & Radiology, MVC, Chennai

[4]Professor, Department of Veterinary Anatomy, MVC, Chennai.

[5]Professor, Central Animal Laboratory Medicine Unit, MVC, Chennai.

[6]Professor and Head, Department of Veterinary Surgery & Radiology, MVC, Chennai

Abstract: ***The cases presented over a period of 24 months from March 2013 to February 2015 to the Small Animal Ophthalmology unit of the Madras Veterinary College Teaching Hospital, Chennai, were screened for the incidence and stage of cataract. Twenty four co-operative dogs with good owner compliance were selected from the cases of cataract based on the suitability for anaesthesia.They were divided randomly into two groups consisting of twelve dogs each and each group was again sub divided into subgroup A (nondiabetic) and subgroup B (diabetic) consisting of six dogs each. One group was subjected to endophacoemulsification with the implantation of multifocal hydrophilic intraocular lenses while the other group was subjected to endophacoemulsification with the implantation of multifocal hydrophobic lenses.The complications recorded were intra operative miosis, hyphema and post operative aqueous flare, fibrin deposits, IOL decentration, posterior synechia, intraocular hemorrhage, endophthalmitis and PCO.***

Keywords: Incidence, cataract, diabetic, nondiabetic dogs.

1. Introduction

Cataract is the most common causes of blindness in canines. The indications for cataract surgery include restoration of functional vision to the animal, prevention of complications that may occur secondary to cataract such as lens induced uveitis, glaucoma and improvement of the aesthetic appearance of the patient (Bras *et al.,* 2006). The post operative functional visual outcome is a measure of the success of a cataract surgery (Ozgencil, 2005). Post operative uveitis is the most notable complication of cataract surgery in dogs. In post surgical chronic persistent uveitis severe capsular opacification, formation of posterior synechiae, retinal detachment, pthisis bulbi and glaucoma may ensue (Woerdt, 2000).

In diabetes mellitus, cataract formation is one of the most frequent complications noticed and is associated with changes in glucose metabolism within the lens. Eighty percent of diabetic dogs develop cataract by 470 days following diagnosis of diabetes mellitus and almost all may develop cataract during the course of the disease. They are typically middle-aged to older groups with coexisting morbidity, which may act as risk factors for the development of perioperative complications such as hypotension, hypothermia, severe hyperglycemia, bradycardia and mortality (Oliver *et al.*, 2010).

Previous studies indicate that the occurrence of post operative complications, such as ocular hypertension, posterior capsular opacification, glaucoma, uveitis, intraocular hemorrhage and retinal detachment, depended upon presence of diabetes mellitus and lens induced uveitis prior to surgery. These complications though transient and medically treatable, result in posterior capsular opacification (Klein *et al.,* 2011).

Posterior capsular opacification (PCO) is the most prevalent complication following canine phacoemulsification and artificial intraocular lens (IOL) implantation with an incidence of 69 to 100 per cent. PCO is caused by a regenerative response of residual lens epithelial cells (LECs) that undergo epithelial mesenchymal transformation (EMT). These epithelial cells transform from normal cuboidal epithelial cells into myofibroblastic-like cells and can migrate along the posterior face of the lens capsule (Gift *et al*., 2009). This study evaluated complications of intra and post operative complications in diabetic and nondiabetic cataract dogs after multifocal hydrophilic and hydrophobic IOL implantation following endophacoemulsification.

2. Materials and Methods

Dogs were presented to the small animal ophthalmology unit of Madras Veterinary College, Chennai over a period of 24 months from March 2013 to February 2015 were found to suffer from cataracts and cataract associated signs. Twenty four co-operative dogs with good owner compliance were selected from the cases of cataract based on the suitability for anaesthesia. They were divided randomly into two

groups consisting of twelve dogs each and each group was again sub divided into subgroup A (nondiabetic) and subgroup B (diabetic) consisting of six dogs each. One group was subjected to endophacoemulsification with the implantation of multifocal hydrophilic intraocular lenses while the other group was subjected to endophacoemulsification with the implantation of multifocal hydrophobic lenses. The complications observed were intra operative and post operative period were observed in both groups, and their causes were discussed.

3. Results and Discussion

The complications observed were intra operative and post operative period were recorded in both groups, and their causes were discussed in **Table 1** and **Table 2**.

3.1 Complications

3.1.1 Intra operative complications

a) Intra operative miosis

Intra operative miosis occurred in 25 per cent of cases in hydrophilic group and 16.67 per cent in hydrophobic group cases of the study **(Plate 1)**. Intracameral 1:1000 adrenaline was used to achieve mydriasis intra operatively. Preoperative treatment with systemic corticosteroids 2 hrs prior to surgery is important in dogs to prevent the release of endogenous prostaglandins that might cause an immediate miosis. The inciting cause could be due to holding of preoperative treatment with systemic corticosteroids 2 hrs prior to surgery in diabetic dogs. Miosis occurred most commonly after the lens had been partly sculpted as reported by Tuntivanich and Tuntivanich (2007).

b) Intra operative hyphema

In hydrophilic group, 3 (25%) cases and in hydrophobic group, 2 (16.67%) cases had intra operative hyphema **(Plate 2)**. This could be due to accidental instrument contact with the iris may cause limited hyphema. The primary cause attributed to occurrence of hyphema in patients during phacoemulsification may be due to IOL haptic causing trauma to iris, uveitis, retinal detachment, extreme hypotony or due to patient activity causing trauma to the eye as observed by Klein *et al*. (2011). The hyphema regressed within 3 days after topical corticosteroids therapy.

3.1.2 Postoperative complications

a) Aqueous flare

Low grade aqueous flare was noticed in cases 2, 4, 6, 8, 11, and 12 in the hydrophilic group and in hydrophobic group in cases 2, 3, 9, 10, and 12 study groups **(Plate 3)**. The clinical signs of aqueous flare were found to regress 3 to 7 days after surgery with the treatment of topical corticosteroids and antibiotics (Klein *et al*., 2011).

b) Fibrin

Post operatively fibrin deposits were noticed in 25 per cent of the animals under study **(Plate 4)**. Fibrin deposits were seen as sequale to aqueous flare and regress 3 to 7 days after surgery. Nitin (2013) reported an incidence of 50 per cent fibrin deposits.

c) Corneal opacity

Low grade marginal corneal opacities were noticed in cases 4, 5 and 8, 9 in hydrophilic group and in cases 4, 8 and 10 in hydrophobic group **(Plate 5)**. Corneal edema at the incision site was found to be of grade I or grade II in severity and regressed within 3 to 5 days of suture removal. Application of non absorbable sutures in the cornea produced the low grade of opacities in accordance with Klein *et al*. (2011).

d) IOL decentration

Post operative decentration of the IOL was noticed in 1 case in hydrophilic group; a Cocker spaniel (case no.2) and 1 case in hydrophobic group a Lhasa apso (case no.1) **(Plate 6)**. This could be due to more axial length in the above breeds. Similar findings were also observed by Yi *et al.* (2006) reported complications associated with the implantation of the IOL were optic decentration (n=2) and ventral haptic displacement from the capsular bag (n=1).

e) Posterior synechia

Posterior synechia was noticed in hydrophilic group, (2 cases) and hydrophobic group; (1case) which obstructed the visual axis causing the eyes to be not visual **(Plate 7)**. Eyes had intra operative miosis and hyphema complications associated with posterior synechia. Severe fibrin deposition is a causative factor for posterior synechia, in addition to uveitis and secondary glaucoma (Tuntivanich and Tuntivanich, 2007).

e) Endophthalmitis.

Endophthalmitis was noticed post-operatively as a complication in case number 4, 9 and 11 of hydrophilic group **(Plate 8)**. The inciting factors were thought to be hypermature cataract, surgical bacteriology, severe inflammation leading to endophthalmitis and owner's poor attention post operatively. Presence of phacolytic uveitis reduced the success rate of cataract surgery to 52 per cent as compared to 95 per cent in dogs free of phacolytic uveitis. Chronic persistent uveitis after surgery may lead to severe capsular opacification, formation of posterior synechia, retinal detachment, pthisis bulbi and glaucoma (Woerdt, 2000). Severe degree of uveitis is not only sight-threatening but also a causative factor for posterior synechia (Gelatt and Gelatt, 2001).

f) Postoperative intraocular haemorrhage

In hydrophobic group, one case (Spitz, case no.11) had developed intraocular haemorrhage on the 15th day of the postoperative period, due to traumatic injury to the eye and dog was blind till the end of the study **(Plate 9)**. Increased activity in Boston terriers and Poodles compared with mixed breed dogs and in younger dogs compared with older dogs may be a factor in the development of intraocular haemorrhage. Postoperative intraocular haemorrhage was found to be a significant risk factor for blindness with no vision present in 36.4 per cent of eyes that developed intraocular haemorrhage (Klein *et al*., 2011).

g) Posterior capsular opacification (PCO)

PCO was found in 4 dogs in hydrophilic group (case no.8 and 12) and hydrophobic group (case no.7 and 12) and were presented for reexamination after 50 days of surgery. Five dogs from hydrophilic group (case no. 1, 6 and 7) and

hydrophobic group (case no.1 and 4) developed dense capsular opacities after 80 days of surgery **(Plate 10)**.Out of 24 cases, 9 (37.5%) cases developed PCO after 80 days post operatively. Out of these 2 cases (8.33%) in nondiabetic hydrophilic group, 3 cases (12.5%) in diabetic hydrophilic group, 2 cases (8.33%) in nondiabetic hydrophobic group and 2 cases (8.33%) in diabetic hydrophobic group.

The second most common post operative complication after phacoemulsification and intraocular lens (IOL) in dogs was posterior capsular opacification (PCO) (after-cataract or secondary cataract) (Bras *et al.*, 2006, Yi *et al.*, 2006 and Tuntivanich and Tuntivanich, 2007). Gift *et al*. 2009 reported 69 to 100 per cent PCO, whereas in the present study only 37.5 per cent incidence of PCO has been recorded.

4. Conclusion

The present study, recorded intra operative complications of miosis and intra operative hyphema and post operative complications of aqueous flare, fibrin deposits, IOL decentration, posterior synechia, intraocular hemorrhage, endophthalmitis and PCO.

5. Acknowledgement

The Authors thanks to the Director of Clinics, Tamilnadu Veterinary and Animal Sciences University and the Dean, Madras Veterinary College for the facilities provided for the study.

References

[1] Bras, D., C. M. H. Colitz, W. J. A. Saville, A. J. Gemensky-Metzler and D.A. Wilkie, 2006. Posterior capsular opacification in diabetic and nondiabetic canine patients following cataract surgery. *Vet. Ophthalmol.*, **9**(5): 317–327.
[2] Gelatt, K. N. and J. P. Gelatt, 2001. Small animal ophthalmic surgery, Oxford Philadelphia, pp: 126 - 145.
[3] Gift, B. W., R. V. English, B. Nadelstein, A. K. Weigt and B. C. Gilger, 2009. Comparison of capsular opacification and refractive status after placement of three different intraocular lens implants following phacoemulsification and aspiration of cataracts in dogs. *Vet. Ophthalmol.*, **12** (1): 13-21.
[4] Klein, H.E., S.G. Krohne, G.E. Moore and J. Stiles, 2011. Postoperative complications and visual outcomes of phacoemulsification in 103 dogs (179 eyes): 2006 - 2008 *Vet. Ophthalmol.*, **14** (2):114–120.
[5] Nitin, J.D. 2013. Visual outcome after monofocal/multifocal intraocular lens implantation following phacoemulsification in cataractous dogs. Thesis submitted to TANUVAS.
[6] Oliver, J.A.C., L. Clark, F. Corletto and D.J. Gould, 2010. Comparison of anesthetic complications between diabetic and nondiabetic dogs undergoing phacoemulsification cataract surgery: a retrospective study. *Vet. Ophthalmol.*, **13**(4): 244-250.
[7] Ozgencil, F.E. 2005. The results of phacofragmentation and aspiration surgery for cataract extraction in dogs. *Turk. J. Vet. Anim. Sci.*, **29**: 165-173.
[8] Tuntivanich, P and N. Tuntivanich, 2007. Phacofragmentation and aspiration in canine mature cataract: Surgical technique, success rate and complications. *Thai. J. Vet. Med.*, **37**(2) 33 - 45.
[9] Woerdt, A. 2000. Lens-induced uveitis. *Vet. Ophthalmol.*, **3**: 227-234.
[10] Yi, N., S. Park, M. Jeong, W. Kim, S. Kim, J. Chae and K. Seo, 2006. Phacoemulsification and acryl foldable intraocular lens implantation in dogs: 32 cases. *J. Vet. Sci.*, **7**(3): 281-285.

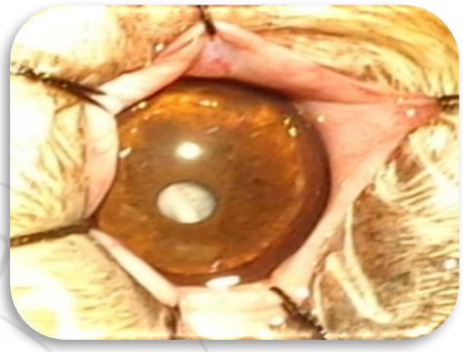

Plate 1: Intra operative miosis

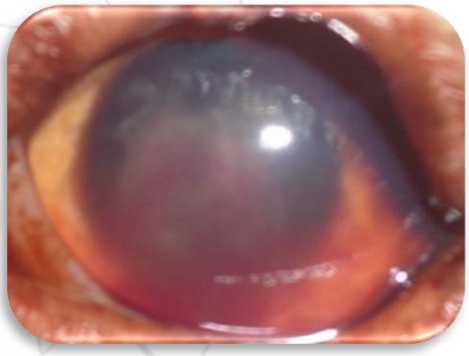

Plate 2: Intra operative hyphema

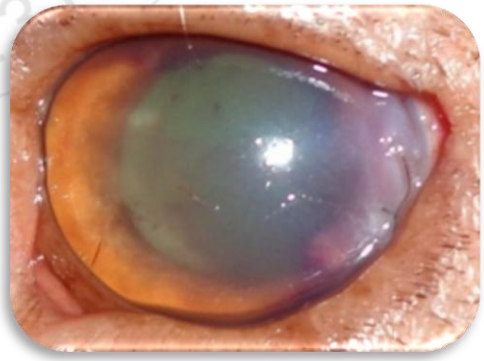

Plate 3: Aqueous flare

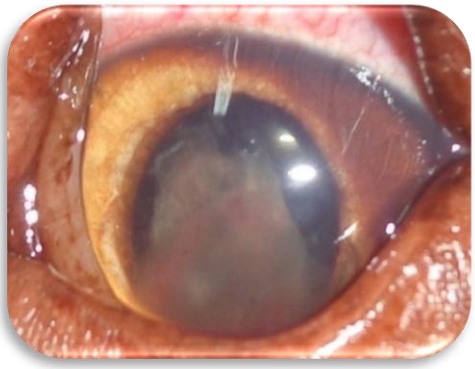

Plate 4: Fibrin deposition in Anterior chamber

Plate 6: IOL decentration

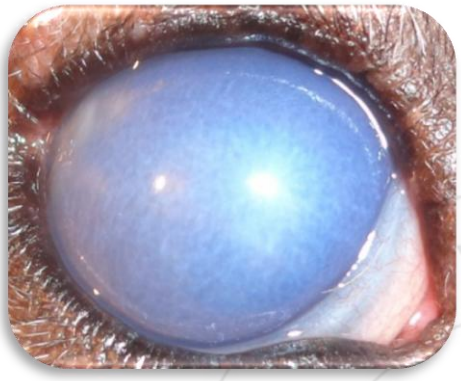

Plate 5: Corneal opacity

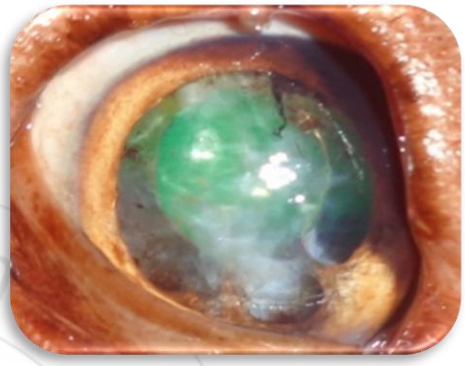

Plate 7: Posterior synechia

Table 1 – Complications Group I Multifocal Hydrophilic IOL

Complication	1	2	3	4	5	6	7	8	9	10	11	12
Intraoperative Miosis	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes
POH	No	No	No	No	No	No	No	No	No	No	No	No
Glaucoma	No	No	No	No	No	No	No	No	No	No	No	No
Aqueous Flare	No	2+ 7d	No	2+ 7d	No	1+ 0d	No	2+ 0d	No	No	2+ 7d	2+ 0d
Fibrin	No	No	No	No	No	No	1+	No	No	No	No	No
Corneal Opacity	No	No	No	G1 – 0d	G1-7d	No	No	G1-0d	G4 –15d	No	No	No
IOL Decentration	Na	Decentred	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na
Posterior Synechia	Yes	No	No	Yes	No	No	No	No	Yes	No	Yes	No
Endophthalmitis	No	No	No	Yes	No	No	No	No	Yes	No	Yes	No
Intraoperative Hyphema	No	No	No	Yes 7-d	No	No	No	No	Yes	No	No	Yes
Postoperative intraocular Hemorrhage	No	No	No	No	No	No	No	No	No	No	No	No
PCO	Yes 80 d	No	Na	No	No	Yes 80 d	Yes 80d	Yes 50d	No	No	No	Yes 50 d

Table 2: Complications Group II Multifocal Hydrophobic IOL

Complication	1	2	3	4	5	6	7	8	9	10	11	12
Intraoperative Miosis	No	No	No	No	No	No	No	No	No	No	Yes	Yes
POH	No	No	No	No	No	No	No	No	No	No	No	No
Glaucoma	No	No	No	No	No	No	No	No	No	No	No	No
Aqueous Flare	No	1+ 0d	1+ 0d	No	No	No	No	No	1+ 0d	2+ 7d	No	2+ 15d
Fibrin	No	No	No	No	No	No	No	No	No	No	Yes	No
Corneal Opacity	No	No	No	G2 – 7d	No	No	No	G1-0d	G1 –15d	No	No	No
IOL Decentration	Decentred	No	Na	Na	Na	Na	Na	Na	Na	Na	Na	Na
Posterior Synechia	Yes	No	No	Yes	No	No	No	No	Yes	No	Yes	No
Endophthalmitis	No	No	No	No	No	No	No	No	No	No	No	No
Intraoperative	No	No	No	Yes 7-d	No	No	No	No	No	No	Yes	No

Hyphema												
Postoperative intraocular Hemorrhage	No	No	No	No	No	No	No	No	No	No	Yes	No
PCO	Yes 80 d	No	Na	Yes 80 d	No	No	Yes 50d	No	No	No	No	Yes 50 d