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USE OF DIODE LASER IN OPHTHALMOLOGY SURGERIES IN DOGS AND CATS: 161 CASES (2019-2022)

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Abstract

Recently used in veterinary medicine, the diode laser represents the surgical option for the entire eye pathology in dogs and cats. It is indicated in: eyelid tumours, trichiasis, distichiasis, conjunctival tumours, iris melanosis, uveal cysts, iris tumours, intraocular tumours, retrobulbar tumours and glaucoma. The diode laser for veterinary use has programs set for each surgical option, which provides intraoperative comfort for surgeon. The study was conducted over a period of 3 years (November 2019-November 2022) in 161 patients. The favourable postoperative evolution with the absence of complications was highlighted in the case of tumours, uveal cysts, and iris melanosis. In glaucoma cases, transscleral cyclophotocoagulation is not effective, 85% of the cases remained blind. The use of the diode laser in the case of symblepharon highlighted the rapid recurrence accompanied by neovascularization. Experimental using of diode laser in pigmentary keratitis revealed a short period of time with clear cornea after removing the pigmentation and the neovascularization was abundant.

Key words*: diode laser surgery, glaucoma, ocular tumours, symblepharon.*

INTRODUCTION

The diode laser in veterinary ophthalmology (transcleral cyclophotocoagulation) has been used for glaucoma surgical treatment in: dogs (Cook et al., 1997; Hardman et al., 2001; Spiess, 2012; Sapienza et al., 2018; Story et al., 2021) and horses (Annear et al., 2010; Cavens et al., 2012, Gellat et al., 2007, Wilkie, 2010).

For deflation and coagulation of uveal cysts in dogs, cats and horses, Gemensky et al., reported in 2004 that semiconductor diode laser coagulation of anterior uveal cysts is safe, effective and noninvasive. Stas et al., in 2022 used diode laser in iris cysts in horses with good results. In 2002, Cook et al., treated iris melanoma using diode laser photocoagulation in 23 dogs. The conclusion of the study was the method is safe and effective for isolated and pigmented iris masses in dogs.

In 1996, Sullivan et al., used photocoagulation of limbal melanoma in dogs and cats and in 2016, Andreani et al., evaluated effectiveness and safety of debulking and diode laser photocoagulation (DPC) for the treatment of limbal melanoma (LM). Transpupillary diode laser retinopexy had good results (Pizzirani et al., 2003).

Since 1996, ARC-Laser produced and developed the medical laser systems in human surgery. In 2011 an important step in the development of diode laser ocular surgery in veterinary medicine was the adaptation of the ARC laser device from human medicine.

User-friendly and with the work parameters preset in the software and at the same time adjustable during the operation, ARC remains the easiest laser system to use.

To the authors' knowledge, this is the first report of use of diode laser in retrobulbar tumours in dog and cats, corneal tumour in dog, symblepharon in cats and pigmentary keratitis in dog evaluating the long-term postoperative outcome.

MATERIALS AND METHODS

Medical records of 161 cases (98 dogs and 63 cats) underwent laser diode surgery from November 2019 to November 2022, were reviewed. All cases underwent complete ophthalmic and physical examination. Prior to surgery the additional diagnostic tests, such as complete blood count and serum biochemistry were performed.

Ocular ultrasound was performed to all patient. MRI or CT were performed to the patients diagnosed with conjunctival, corneal, limbal, third eyelid, intraocular and retrobulbar tumors. The ERG was performed in cats diagnosed with symblepharon and the surgery was performed if the retina had normal function.

Patients were placed under general anesthesia. The patients were pre-medicated with dexmedetomidine (Dexdomitor 0.1 mg/ml, Orion Pharma) 15 mcg/kg, ketamine (Ketamidor 100 mg/ml, Richter Pharma, Austria) 5 mg/kg and butorphanol (Butomidor 10 mg/ml, Richter Pharma, Austria) 0.2 mg/kg IM. Anesthesia was induced with propofol (Propofol Lipuro 10 mg/ml, Braun Germany) IV 2-4 mg/kg. The patients were intubated, maintained on oxygen and isoflurane 1.5-2% (Anesteran, Rompharm S.A., Romania).

The diode laser protocol was selected for each eye pathology. After the diode laser surgery, the Elizabethan collar is not mandatory.

Postoperative medications local antibiotic and anti-inflammatory eyedrops (DexaTobrom®, SC Rompharm Company SRL, Ilfov, Romania) for 21 days, (kanamycin ointment BID on the sutures Kanamicina®, SC Antibiotice SA, Iasi, Romania), hyaluronic acid (Diferion®, Micromed, Austria and an-Hypro® (an-Vision GmbH, Hennigsdorf, Germany) for 21 days.

After the surgery the cases were re-evaluated at 14 days, 1 month and 6 months.

RESULTS AND DISCUSSIONS

In the study were included 161 cases, 98 dogs and 63 cats (Table 1), and the selection criteria were the following:

- ERG within normal parameters for symblepharon in cats;
- complete mydriasis in iris melanosis;
- absence of osteolysis in retrobulbar tumour and third eyelid tumour;
- no response to local treatment in glaucoma patients.

All the surgeries were performed by the same clinician (Iuliana Ionașcu) at the Ophthalmology Department of the Faculty of Veterinary Medicine, Bucharest. The median age was 4 years, with a range between 6 months and 14 years.

Eyelid tumors

Of all cases (n=161), included in the study, 18 dogs and 7 cats presented eyelid tumours. In dogs the meibomian adenoma (Figure 1) was confirmed after histopathological exam.

The work parameters varied between 300 mW-2 Watts (Figure 2) and it developed an average energy of 450 J.

The bleeding was minor (Figure 3), the conjunctival oedema was present, no collar was needed and the depigmentation of the free edge of the eyelid was recorded.

Figure 1. OD Eyelid tumour in a 9 year-old Labrador

Figure 2. The parameters of the diode laser for eyelid surgery

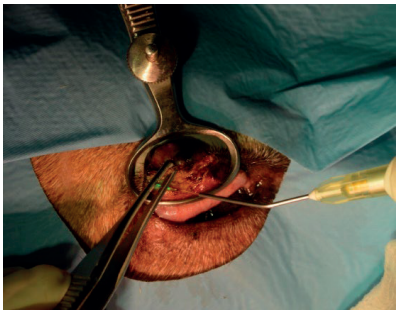

Figure 3. Case from Figure 1, clinical appearance into the surgery. (9 year-old Labrador)

Table 1. Patients' eye pathology included in the study

	Ocular pathology	Dogs	Cats	Total	Observation
1	Eyelid tumour	18	7	25 (15.52%)	No relapse/no collar/HP
2	Trichiasis/Distichiasis	11	0	11 (6.83%)	Relapse/ Stade Technique's
3	Conjunctival tumour	6	8	14 (8.69%)	No relapse
4	Symblepharon	0	11	11 (6.83%)	Relapse
5	Third eyelid tumour	7	5	12 (7.45%)	CT/MRI/ablation of the third eyelid/enucleation of the eyeglobe/HP
6	Iris melanosis	0	4	4 (2.48%)	Dyscoria
7	Anterior Synechia and PPM	0	6	6 (3.72%)	Effective in the presence of pigment
8	Uveal cysts	5	0	5 (3.10%)	No relapse
9	Iris tumour	2	0	2 (1.24%)	Relapse/enucleation of the eyeglobe/HP
10	Intraocular tumour	7	7	14 (8.69%)	Enucleation of the eyeglobe/HP
11	Retrobulbar tumour	14	8	22 (13.66%)	Minor bleeding/Enucleation of the eyeglobe/HP
12	Pigmentary keratitis	4	0	4 (2.48%)	Relapse/vascularization/no collar
13	Glaucoma	18	2	20 (12.42%)	2 visual/18 blind
14	Ablation of remaining tissues from the orbit after eye trauma	3	4	7 (4.34%)	Minor bleeding/no collar
15	Corneal tumour	3	0	3 (1.86%)	Scar/ no relapse/no collar
16	Limbal tumor	0	1	1 (0.62%)	No relapse/no collar
		98	63	161	

One Persian cat was diagnosed with multiple hydrocystoma on the eyelids and periocular skin (Figure 4 and Figure 5). After ablation of the big cyst the suture was performed, while for small one no suture needed (Figure 6).

Figure 4. Hydrocystomas in a 7 year-old Persian Cat

Figure 5. Case from Figure 4, clinical appearance into the surgery. (7 year-old Persian Cat)

Figure 6. Case from Figure 4, clinical appearance after the surgery. (7 year-old Persian Cat)

Trichiasis/Distichiasis

11/98 dogs represented 6.83% diagnosed with trichiasis/distichiasis (Figure 7) underwent diode laser surgery. 3/98 dogs presented secondary corneal ulcer (Figure 8).

The laser parameters (Figure 9) varied between 500 mW - 1 Watts and it developed an average energy of 175 J.

The conjunctival oedema was present, no collar was needed and the depigmentation of the free edge of the eyelid was recorded.

After the surgery the dogs present mild pruritus and in 4 dogs the relapse occur and the Stade's technique was performed.

Figure 7. OD Trichiasis, districhiasis in a 2 year-old Shih Tzu

Figure 8. OS Secondary corneal ulcer due to trichiasis, districhiasis in a 9 month-old English Bulldog

Figure 9. The parameters of the diode laser for trichiasis/distichiasis surgery

Conjunctival tumours

Of all cases (n=161), included in the study, 6 dogs (Figure 10) and 8 cats presented conjunctival tumours (Figure 12) and underwent diode laser surgery. The bleeding and conjunctival oedema (Figure 11) were not to be considered. The laser parameters varied between 1 Watt – 3 Watts and it developed an average energy of 760 J.

Relapses occur in one dog and two cats (Figure 13) and underwent eye globe enucleation.

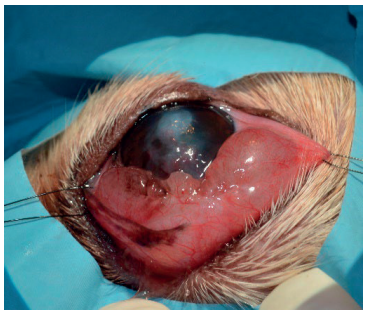

Figure 10. OD Conjunctival tumour in a 14 year-old Crossbred

Figure 11. Case from Figure 10, clinical appearance after surgery revealing conjunctival oedema (14 year-old Crossbred)

Figure 12. OD Conjunctival tumour (adenocarcinoma) in a 10 year-old DSH

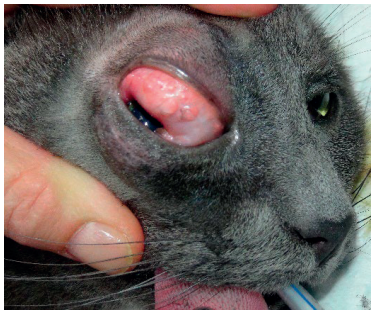

Figure 13. Case from Figure 12, relapse 6 months after the first surgery. (10 year-old DSH)

Symblepharon

11/63 cats with symblepharon (Figure 14) were included in the study had ocular ultrasound without retinal detachment and normal ERG (Figure 15).

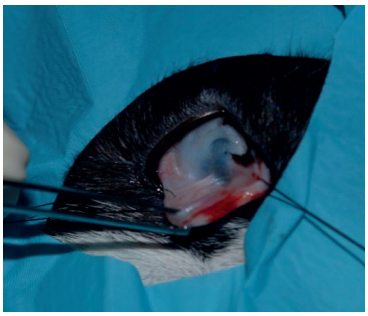

Figure 14. OD Symblepharon in a 7 month-old DSH. The cat is blind secondary to attached conjunctiva on to cornea

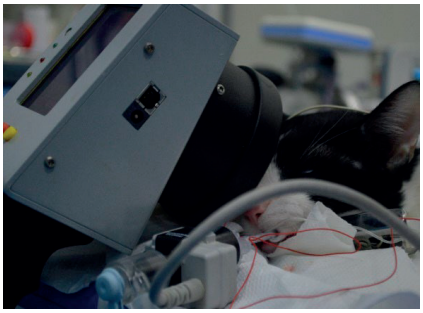

Figure 15. Performing the ERG before symblepharon surgery using laser diode

For section of the conjunctival synechia from the surface of the cornea, between the conjunctival fornix and the third eyelid (Figure 16) we used 2-3 Watts laser parameters with an average energy of 1.5 kJ.

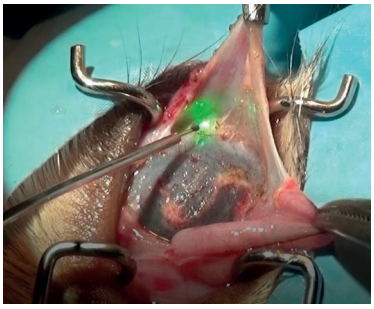

Figure 16. Case from Figure 14, clinical appearance into the surgery (7 month-old DSH)

In all patients the ablation of free edge of the third eyelid with preserving the gland was performed, so that the third eyelid does not cover the cornea (Figure 17).

After the surgery the cornea had opacization but the cats regained vision (Figures 18 and 19).

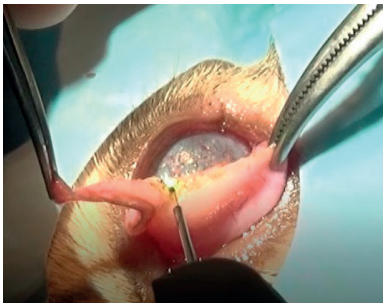

Figure 17. Ablation of the free edge of the third eyelid, appearance during surgery

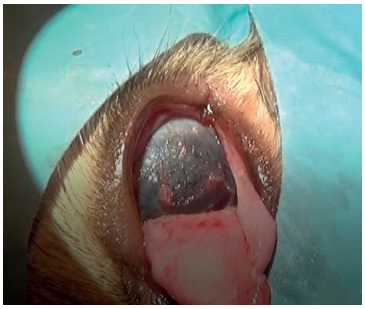

Figure 18. Case from Figure 16, clinical apearance after the surgery

Figure 19. Case from Figure 14, clinical apearance after the surgery

After the surgery, relapses occurred in 2-4 weeks and the cornea had neovascularization and 6/11 cats lost the vision.

Third eyelid tumours

Of all cases (n=161), included in the study, 7 dogs (Figure 20) and 5 cats presented third eyelid tumours (Figure 21) and underwent eye globe enucleation and tumour ablation using diode laser surgery (Figure 22). The laser parameters varied between 5 Watts - 7 Watts and it developed an average energy of 3.3 kJ. The histopathological exam of the tumour was performed for all patients.

Figure 20. OD Third eyelid tumour in a 3 year- old Crossbred

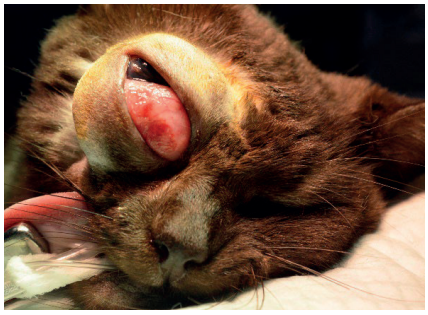

Figure 21. OD Third eyelid tumour in a 13 year- old DSH

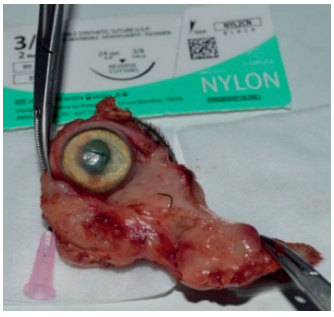

Figure 22. Case from Figure 21, appearence of the tumour after the surgery. (13 year-old DSH)

Iris melanosis

4/63 cats with iris melanosis (Figures 23, 25 and 27) were selected if the drug induced mydriasis was uniform (Figure 24) thus excluding the iris tumour in which dyscoria is present.

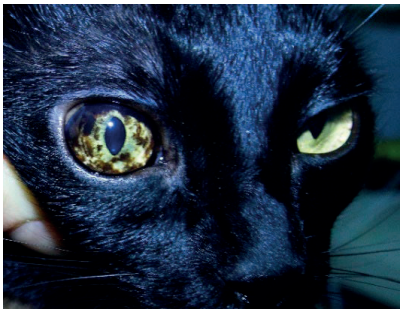

Figure 23. OD Iris melanosis in a 6 year-old DSH

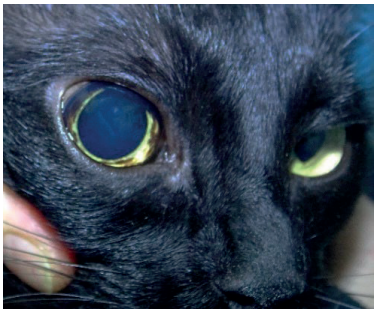

Figure 24. Case from Figure 23, clinical appearence after drug induced mydriasis (6 year-old DSH)

The laser parameters varied between 800 mW - 1.2 Watts and it developed an average energy of 175 J (Figure 26).

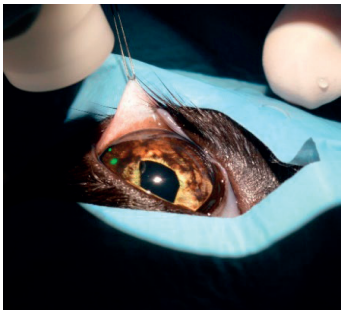

Figure 25. Case from Figure 23, intraoperative appearence. The focused green is on the melanosis area and the lighter spot is the reflection of the cornea

Figure 26. The parameters of the diode laser for iris melanosis surgery

During the surgery, after the carbonization of the area of iris melanosis, fine brown particles (Figure 28) can be observed in the aqueous humour, which disappear within 5 days under local anti-inflammatory treatment.

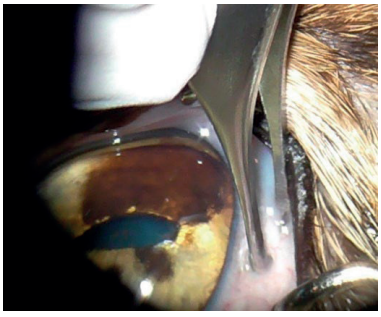

Figure 27. OD Iris melanosis, clinical appearence before diode laser surgery, in a 8 year-old DSH

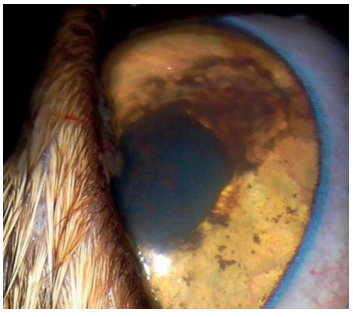

Figure 28. Case from Figure 2, Iris melanosis, clinical appearence after diode laser surgery, in a 8 year-old DSH

In the surgery obvious shrinking of the tissue is present and therefore the deformation of the pupil. After the surgery the inflammation was mild but the dyscoria occur secondary to the iris scar (Figure 29, Figure 30).

Figure 29. Case from Figure 28, dyscoria 2 months after diode laser surgery (8 year-old DSH)

Figure 30. Case from Figure 23, dyscoria 1 month after diode laser surgery. (6 year-old DSH)

Anterior synechia and PPM

In 6 cats with anterior synechia and pigmentary PPM after diode laser the field of sight increased due to the sectioning of the tissue clamps and the pupil is mobile. The corneal opacification does not disappear but it only reduces as a surface in time. The diode laser is not effective when the synechiae are unpigmented.

Uveal cysts

5/98 dogs diagnosed with uveal cysts (Figure 31) underwent deflation using diode laser. The surgery is not painful and miotic pupil is mandatory intraoperative (Figure 32). The laser parameters varied between 300 mW - 800 mW and it developed an average energy of 150 J (Figure 33). After the deflation of the uveal cysts fine brown particles can be observed in the aqueous humour, which disappear within 3-5 days under local anti-inflammatory treatment. Systemic anti-inflammatory is not mandatory.

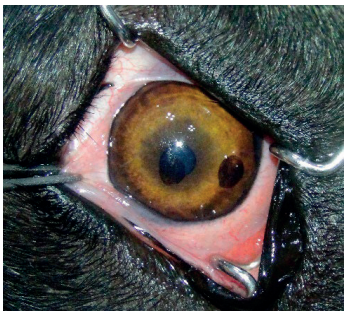

Figure 31. OD Uveal cysts
in a 2 year-old Cane Corso

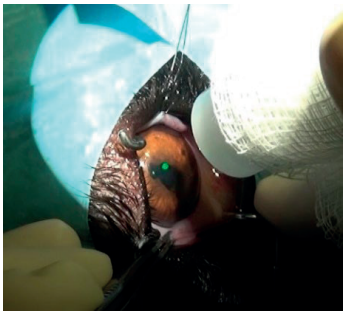

Figure 32. Case from Figure 31, intraoperative appearance of the uveal cysts
in a 2 year-old Cane Corso

Figure 33. The parameters of the diode laser for uveal cysts surgery

Iris tumours

Of all cases (n=161), included in the study, 2 dogs (Figure 34) presented iris tumours and underwent tumour reduction using diode laser surgery (Figure 35). The laser parameters varied between 2 Watts - 5 Watts and it developed an average energy of 1.3 kJ. The diode laser is effective on pigmented iris tumours, but a constant reduction of its size was observed 2 months after the surgery.

Figure 34. OS Iris tumour
in a 10 year- old Crossbred

Figure 35. Case from Figure 34, intraoperative appearance after the diode laser surgery
in a 10 year-old Crossbred

Intraocular tumours

Of all cases (n=161), included in the study, 7 dogs (Figure 36) and 7 cats presented intraocular tumours and underwent eye globe enucleation using diode laser surgery (Figure 37). The laser parameters varied between 4 Watts - 7 Watts and it developed an average energy of 2.9 kJ. The bleeding was minor and mild oedema of the skin after the surgery was noticed.
The histopathological exam of the tumour was performed for all patients.

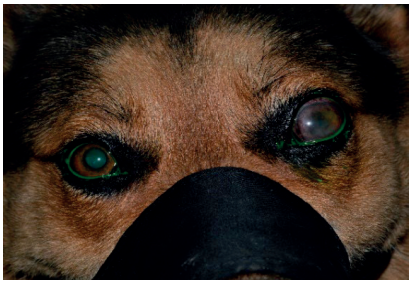

Figure 36. OS Intraocular tumour, secondary glaucoma in a 11 year-old German Shepherd

Figure 37. Case from Figure 36, intraoperative appearance in a 11 year-old German Shepherd

Retrobulbar tumours

For all the patients with retrobulbar tumours, CT and/or MRI were performed and in the study were included the cases without osteolysis of the orbit or invasion of the frontal and maxillary sinuses.

Of all cases (n=161), included in the study, 14 dogs and 8 cats diagnosed with retrobulbar tumours presented exophthalmos (Figure 38) and strabismus. All the patients underwent eye globe enucleation and retrobulbar tumour ablation using diode laser surgery.

Figure 38. OD Retrobulbar tumour, in a 12 year-old DSH

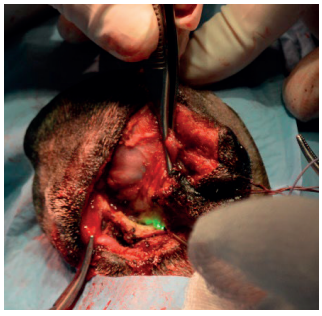

Figure 39. Intraoperative appearance in retrobulbar tumour ablation using diode laser

The enucleation of the eyeball and the ablation of the retrobulbar tumour was performed transpalpebral (Figure 39) and the diode laser parameters varied between 5 Watts - 7 Watts and it developed an average energy of 3.6 kJ. The bleeding was minor and mild oedema of the skin after the surgery was noticed. The histopathological exam of the tumour was performed for all patients.

Pigmentary keratitis

Four blind patients due to pigmentary keratitis (Figure 40) in which all local treatments failed were included in the study.

The diode laser very easily removes pigmentation from the cornea (Figure 41), without pain, without discomfort. We used the iris melanosis laser parameters, between 800 mW - 1.2 Watts and the energy developed had an average of 90 J.

The patients saw immediately after the operation. Three weeks after de surgery, the vascularization starts from the limbus and cornea regained the pigmentation in 4 months after the surgery.

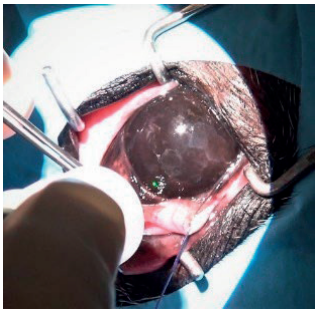

Figure 40. OS Pigmentary keratitis, in a 6 year-old French bulldog

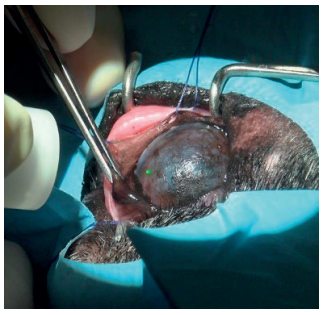

Figure 41. Case from Figure 40, intraoperative appearance after removing the corneal pigmentation in a 6 year-old French bulldog

Glaucoma

Of all cases (n=161), included in the study, 18 dogs (Figure 42) and 2 cats with refractory glaucoma underwent diode laser surgery (Figure 43). The goal is to partially destroy the ciliary epithelium to reduce aqueous humour secretion and decreased the IOP. The laser parameters varied between 800 mW - 1500 mW (Figure 44) and it developed an average energy of 120 J with 20% of the spots with popping sound. The conjunctival oedema was present (Figure 45) and the mild uveitis occur.

Figure 42. OS Glaucoma refractory to treatment in a 7 year-old Crossbred

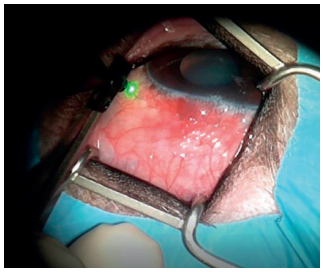

Figure 43. Intraoperative appearance in transcleral diode laser surgery for glaucoma

Figure 44. The parameters of the diode laser in transscleral surgery for glaucoma

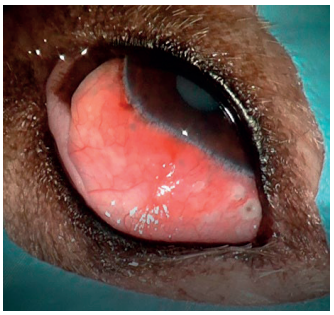

Figure 45. Case from Figure 43, intraoperative appearance after transcleral cyclophotocoagulation using diode laser for glaucoma

After the surgery, 0.5 ml of aqueous humour was removed from the anterior chamber of the eye (Figure 46). Three dogs preserved the vision after the surgery and 85% of the cases, 2 cats and 15 dogs lost the vision due to retinal detachment, high IOP or phtisis bulbi. Patients underwent intrascleral prosthesis due to painful eye.

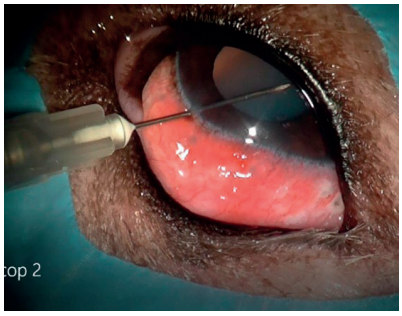

Figure 46. Case from Figure 45, intraoperative appearance, removing the aqueous humour

Ablation of remaining tissues from the orbit after eye trauma

Of all cases (n=161), included in the study, 3 dogs and 4 cats with phtisis bulbi and remaining tissues into the orbit after eye trauma underwent diode laser surgery.

The ablation of the remaining tissues from the orbit was performed transpalpebral (Figure 47) and the diode laser parameters varied between 4 Watts - 5 Watts and it developed an average energy of 2.9 kJ. The bleeding was minor and mild oedema of the skin after the surgery was noticed. The blepharorrhaphy wound heals with suppuration under the crust, with minimal oedema (Figure 48).

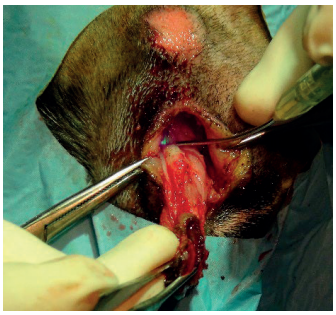

Figure 47. Intraoperative appearance in diode laser surgery for abation of the remaining tissues into the orbit after eye trauma

Figure 48. Case from Figure 47, clinical appearance, after diode laser surgery

Corneal tumours

In the study were included 3 cases with corneal tumours (Figures 49 and 50).

The diode laser very easily removes the tumour from the cornea (Figure 51). The laser parameters were between 3 Watts - 5.5 Watts and the energy developed had an average of 1.9 kJ (Figure 52). The histopathological exam of the tumour was performed for all patients. No relapses were noticed in the period of study.

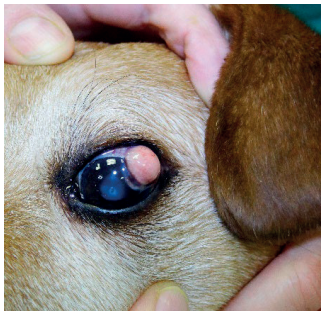

Figure 49. OS Corneal tumour in a 11 year-old Beagle

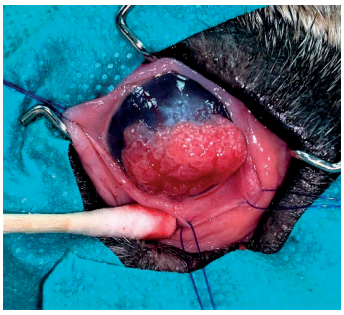

Figure 50. OS Corneal tumour (adenocarcinoma) in a 8 year-old English Bulldog

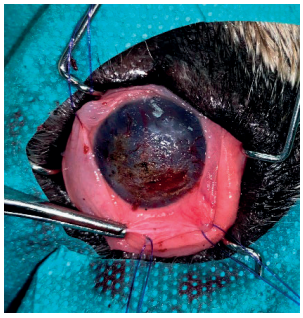

Figure 51. Case from Figure 50, intraoperative appearance of the cornea, after ablation of the tumour

Figure 52. The parameters of the diode laser for ablation of the corneal tumour

Limbal tumour

In the study one cat with limbal melanoma was included. Surgical debulking of limbal melanomas (Figure 53) followed by diode laser photocoagulation (Figure 54), The diode laser parameter was 3 Watts and the energy developed was 1.2 kJ. The cat's eye was visual after the surgery and no relapse occurred (Figure 55).

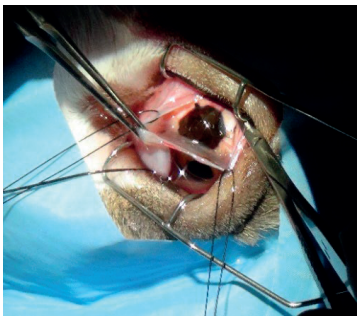

Figure 53. OS Limbal melanoma in a 4 year-old DSH

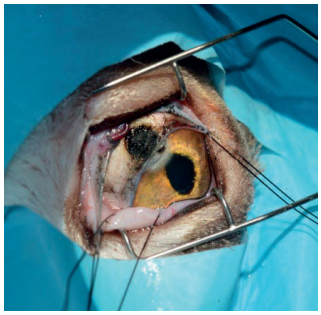

Figure 54. Case from Figure 53, clinical appearance, after photocoagulation using diode laser surgery

Figure 55. Case from Figure 54, clinical appearance, 14 days after the surgery

ARC-Laser used in veterinary ophthalmology surgery had power calibration at fiber distal tip, with the patented fiber connector, fiber change is quick and easy without compromising the performance. It has ergonomically designed hand pieces and delivery systems enables surgeons multiple treatments options.

The diode laser for veterinary use has programs set for each surgical option, which provides intraoperative comfort for surgeon. The green aiming beam is highly visible at all treatment tissues and the touch-screen permit the selection and changing of treatment parameters very easily. The preset settings depending on the pathology are very helpful and as a general rule, the surgical intervention should be initiated with the minimum parameters.

The most complex studies using the diode laser (TSCP) were done in normal equine eye (Morreale et al., 2007; Harrington et al., 2012) to revealed the histologic effect (retinal detachment and hemorrhage) and to demonstrated the histological lesions of the ciliary body that result in a significant and sustained decrease in IOP therefore may be an effective management for equine glaucoma (Cavens et al., 2012; Bădicu et al., 2015).

Comparative studies endoscopic and transscleral cyclophotocoagulation for the treatment of refractory glaucoma were performed by Lin S., 2008; Lin et al., in 2006 and Lutz et al., 2008 and 2009. Sapienza et al., in 2005 and 2009 had good results in primary glaucoma in dogs using combined TSPC and Ahmed gonioimplantation and used TSPC in 2009 for pseudophakic and aphakic dogs with secondary glaucoma.

A retrospective study in 18 dogs with primary glaucoma (Hardman et al., 2001) revealed after diode laser transscleral cyclophotocoagulation (TSCP) that low energy, higher power laser was effective, with 50% of potentially visual eyes regaining vision, but may cause an increased incidence of secondary cataracts and postoperative complications of hyphema and phthisis bulbi were not seen in this series.

Micropulse transscleral cyclophotocoagulation (MP-TSCP) for refractory glaucoma was successful in controlling IOP in 30 dogs as well as to reduce postoperative medications with minimal resultant intraocular inflammation and complications and the micropulse procedure also can be repeated (Sapienza et al., 2018; Story et al., 2021). In our study using TSPC had a small rate of success, in 85% of the case phtisis bulbi occur.

The use of diode laser for deflation and coagulation of anterior uveal cysts in dogs, cats and horses was reported in 2004 (Gemensky et al., 2004) Semiconductor diode laser coagulation of anterior uveal cysts is safe, effective and noninvasive.

Stass et al, in 2022 used noninvasive diode laser for iris cysts in horses. Iris cysts in horses are often asymptomatic and noticed

incidentally. However, cysts can cause local corneal oedema and erratic behavior like shying, decreased performance and head-shaking.

Both short- and long-term results indicate diode laser treatment is a useful and safe option for iris cyst size reduction, with a low risk of recurrence. Presurgical ultrasonography is recommended to assess the feasibility of treatment and to allow for better surgical planning (Stas et al., 2022).

Our study highlighted a rapid recovery after uveal cyst surgery using TSPC. Dogs did not show corneal edema or eye pain.

Sullivan et al., in 1996, performed photocoagulation of limbal melanoma in dogs and cats (15 cases) and Andreani et al., in 2016 combined surgical debulking and diode laser photocoagulation for limbal melanoma treatment in 21 dogs. Debulking, in addition to TSPC was technically straightforward to perform, minimally invasive, well tolerated, and highly successful in this case series.

In 2002 Cook et al., used TSPC for the treatment of presumed iris melanoma in 23 dogs.

Minor complications related to laser treatment were seen, including: dyscoria, iris hyperpigmentation, and corneal edema due to collateral hyperthermia. Glaucoma and cataract formation were not observed. Non-invasive diode laser photocoagulation appears to be a safe and effective method of treatment for isolated, pigmented iris masses in dogs.

In our study the diode laser used in iris melanosis in cats had good outcome and only mild dyscoria was present.

CONCLUSIONS

The diode laser surgery is used successfully in: eyelid tumours, trichiasis, distichiasis, conjunctival tumours, iris melanosis, uveal cysts, iris tumours, intraocular tumours, retrobulbar tumours and glaucoma. The favourable postoperative evolution with the absence of complications was highlighted in the case of eyelid tumours, uveal cysts, and iris melanosis. Due to the chronic evolution in refractory glaucoma, the rate of blindness was 85%. The use of diode laser for eye globe enucleation ensures the comfort of the surgeon following minimal hemorrhage. The use of the diode laser in the case of symblepharon highlighted the rapid recurrence accompanied by neovascularization. Experimental using of diode laser in pigmentary keratitis revealed a short period of time with clear cornea after removing the pigmentation and the neovascularization was abundant.

To the authors' knowledge, this is the first report of use of diode laser in third eyelid tumours and retrobulbar tumours in dog and cats; corneal tumour in dog; symblepharon in cats and pigmentary keratitis in dog evaluating the long-term postoperative outcome.

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