Treatment of Dogs With Oral Melanoma Recurrence by Diode Laser Excision

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Abstract

Treatment of oral melanomas utilizes the surgical excision-resection (Culp *et al.*, 2013) and/or radiation therapy (Proulx *et al.*, 2003), chemotherapy with carboplatin (Brockley *et al.*, 2013), immunotherapy (Ottner *et al.*, 2013). Treatment based on surgical excision is usually palliative (Freeman *et al.*, 2003). In the literature even though there are data concerning the prognosis of oral melanomas in dogs after surgery, are missing data after laser excision. Taking into account these findings we wished to present our experience regarding three cases of oral melanoma recurrence and immediate and long term laser surgery results.

The casuistry consisted of three dogs with recurrent oral malignant melanomas, subjected to surgical reintervention. The initial diagnosis was melanotic melanoma in stage I or II. The animals were brought back at different time intervals from originally excision with electric scalpel. Before reintervention, dogs were subjected to clinical, paraclinical exam and biopsy. Excision of the tumor mass was made with an optical fiber having a diameter of 400µm, at a power of 10W and a wavelength of 940 nm with a diode laser. At 1, 2, 3, 6 and 12 months after laser reintervention the dogs were reexamined. Average time in which appeared canine oral melanoma relapse was 58.6 days. After reexamination all cases were reinstatement in stage I. Operators times were held in conditions of comfort with wide access, minimum bleeding, and effective hemostasis. After surgery at 24 hours on the intervention place a slight local redness, without swelling and bleeding was observed. Palpation revealed initially also a slight local sensitivity which completely disappeared in 48 hours. There were no grasping and chewing disturbances. Macroscopic healing occurred in 7-9 days. At last recheck performed at 12 months there were no evidences of tumor recurrence or metastasis. Diode laser excision of oral malignant melanoma in dogs can be an alternative palliative procedure to invasive surgical resection procedures. The average of free recurrence and metastasis time after laser surgery has exceeded 360 days in these three cases.

Keywords: canine oral melanoma, diode laser

INTRODUCTION

Melanoma with oral location is a common malignant neoplasm in dogs, affecting mostly older animals (Bostock, 1979; Gilard *et al.*, 2014; Nishiya *et al.*, 2016; Ogilvie and Moore, 1988; Ramos *et al.*, 2000; Thomas and Fox, 1998). Canine oral melanoma represents between 14.4 and 45.5% of oral tumors (Nishiya *et al.*, 2016; Todoroff and Brodey, 1979). The breeds most commonly

affected are: Poodle, Dachshund, terriers and Golden Retriever, Chow Chow, Boxer, Rottweiler (Gilard *et al.*, 2014; Modiano *et al.*, 1999; Ogilvie and Moore, 1988).

Canine melanomas are classified into two types: melanotic and amelanotic, based on terms of clinical behavior, cells' multiplication and connexin expression (Teixeira *et al.*, 2014). The

amelanotic variant is very aggressive (Teixeira *et al.*, 2014).

Treatment of oral melanomas utilizes the surgical excision-resection (Bradley *et al.*, 1984; Culp *et al.*, 2013; Felizzola *et al.*, 2002; Kosovsky *et al.*, 1991; Wallace *et al.*, 1992) and/or radiation therapy (Proulx *et al.*, 2003; Freeman *et al.*, 2003), chemotherapy with carboplatin (Brockley *et al.*, 2013; Freeman *et al.*, 2003), immunotherapy - vaccines with dendritic cells (Grosenbaugh *et al.*, 2011; Ottnod *et al.*, 2013).

The indicated treatment is based on extensive surgical resection - hemi mandibulectomy or maxillectomy (Bradley *et al.*, 1984; Felizzola *et al.*, 2002; Kosovsky *et al.*, 1991; Wallace *et al.*, 1992). Treatment based on surgical excision is usually palliative (Culp *et al.*, 2013; Freeman *et al.*, 2003) with few studies reporting a curative action, canine oral melanoma having a high rate of relapse - 3-28% (Culp *et al.*, 2013; Esplin, 2008; Tuohy *et al.*, 2014) and development of metastasis. The rate of metastasis of oral melanoma in dogs is between 14 and 92% (Nishiya *et al.*, 2016; Ramos *et al.*, 2000; Williams and Packer, 2003), with an average of about 80% (Thomas and Fox, 1998). The median survival time post-surgery (classical surgery) in dogs with oral melanoma is 147-241 days (Brockley *et al.*, 2013; Culp *et al.*, 2013).

In the literature even though there are data concerning the prognosis of oral melanomas in dogs after surgery (Bostok-1979; Esplin, 2008; Hahn *et al.*, 1994; Harvey *et al.*, 1981; MacEwen *et al.*, 1986; Smedley *et al.* 2011; Tuohy *et al.*, 2014), data on the prognosis after laser excision are missing.

In this case report are presented data recorded by laser excision of oral malignant melanoma in dogs.

MATERIALS AND METHODS

The casuistry included in this study - table 1, consisted of three dogs with recurrent oral malignant melanomas, subjected to surgical reintervention by laser excision of the tumor masses.

The initial diagnosis was established by clinical, radiographic and histological exam, in all three cases being melanotic melanoma in stage I or II, according to TNM classification (tumor, lymph node, metastasis) of the World Health Organization for oropharyngeal tumors (Bergman 2007; Freeman *et al.*, 2013), T - tumor cm in diameter, a-b - mitotic index no/field 1-2 - location (1- rostral mandible/caudal maxilla; 2 - another), N - lymph nodes involvement, M - distant metastases). The animals were presented again in the Surgery Clinic of FMV Timisoara at different time intervals (table 1) from classical surgical intervention performed originally (excision with electric scalpel).

The time interval without relapse was calculated between the time of the first surgery and time of the owner presentation to signal the relapse observed macroscopically. Decision for surgical reintervention was taken after owners' refusal to accept an invasive surgical procedure (mandibulectomy or maxillectomy).

Before surgical reintervention, the dogs were subjected to clinical and paraclinical exam (complete physical examination, thorough oral

Tab.1. Casuistry of relapsed canine malignant melanoma

No	Breed	Age years	Weight kgs	Sex	The initial diagnosis	Time interval after which the relapse has occurred days
1	Poodle	12	9	M	Palatal melanoma with rostral location stage I - T ₁ a ² , N ₀ , M ₀	36
2	Rottweiler	9	36	M	Gingival right jaw melanoma with caudal location stage II - T ₂ a ¹ , N ₀ , M ₀	95
3	German Shepherd	12	32	F	Gingival maxilla melanoma with rostral location stage II - T ₂ a ¹ , N ₀ , M ₀	45

examination, palpation of peripheral lymph nodes, chest radiography, complete blood count and blood biochemical analysis). Clinical examination revealed no respiratory changes and no changes in volume of regional lymph nodes. The paraclinical exam and imaging investigations were unremarkable. From biopsy samples taken before surgery, fresh cytological specimens were made by tissue samples mark on glass microscope slides and were stained with Diff-Quick, confirming the relapse.

The protocol for general anaesthesia included premedication with diazepam (0.4 mg/kg b.w., i.v.) and ketamine (5 mg/kg b.w., i.v.), followed by induction with propofol (3 mg/kg b.w., i.v.). After endotracheal intubation, general anaesthesia was maintained with izoflurane vaporized in oxygen using intermittent positive pressure ventilation. Postoperative analgesia was provided with

one dose of butorphanol (0.4 mg/kg b.w., s.c.) administered within 15 minutes before recovery. Ampicillin (20 mg/kg b.w., i.v.) was administered at induction and at the end of surgery, which lasted two hours.

The dogs were placed in recumbency (dorsal or sterno-abdominal) with the neck in extension and mouth held open with a speculum.

Excision of the tumor mass was made with an optical fiber having a diameter of 400µm, at a power of 10W and a wavelength of 940 nm with a diode laser (Dornier Medilas D LiteBeam + Germany), in contact, working mode continuous wave - figure 1. The device is equipped with Lightguide Protection System, thereby preventing the overheat of local tissue and damage of the optical fiber. Oral mucosa and submucosal incision was performed in presumed healthy tissue at a distance of 1-2 cm from the tumor mass. After excision, the oral

Fig. 1. Diode laser excision

Fig. 2. Oral mucosa apposed in a simple interrupted sutures

Fig. 3. Initial preoperative appearance

Fig. 4. Appearance of the relapse

Fig. 5. Intraoperative appearance - laser surgery

Fig. 6. Intraoperative appearance of intervention place

Fig. 7. At seven days

mucosa was sutured in simple interrupted sutures using PDS II (2 metric) - figure 2.

Postoperatively, in the first 10 days, the animals were clinically examined daily observing: local pain on palpation, local swelling, presence of hemorrhage, the appearance of operative wound and speed of healing.

At 1, 2, 3, 6 and 12 months after laser reintervention, the dogs were clinically examined (complete physical examination, thorough oral examination, palpation of peripheral lymph nodes) and imagistically (thoracic - abdominal radiographs for evidence of metastasis).

RESULTS AND DISCUSSION

For the three cases included in this study (table 1) mean age was 11 years (range, 9-12 years) with an average body weight of 25.6 kg (range, 9-36 kg).

Average time in which canine oral melanoma has relapsed was 58.6 days (range, 36-95 days), ascertaining the halving of it, when compared to data from the literature (Freeman *et al.*, 2013) which mentions a median time without recurrence of 139 days.

Compared to the initial stadialization (table 1), one case of malignant oral melanoma stage I (T_1a^2 , N_0 , M_0) and two cases of stage II (T_2a^1 , N_0 , M_0), clinical and radiographic examinations made before surgical reintervention, allowed the reinstatement of these three cases in stage I (T_1 , N_0 , M_0) but without determining the mitotic index - fig. 3 and 4. There are studies (Ramos *et al.*, 2000)

showing that there were no statistically significant differences regarding tumor location, mitotic index, relapse-free interval and survival range.

During laser reintervention the surgical steps were conducted in conditions of comfort with wide access, minimum intraoperative bleeding, effective hemostasis - fig. 5 and 6, confirming the advantages of using diode-laser in oral surgery in dogs (De Lorenzi *et al.*, 2015).

After laser reintervention at 24 hours, in all three dogs on the intervention site a slight local redness was observed, without swelling nor bleeding. Palpation of the intervention site also revealed initially (24 hours) a slight local sensitivity which completely disappeared in 48 hours, all dogs resuming to normal eating behavior. There were no grasping and chewing disturbances. Macroscopic operative wound healing occurred in 7-9 days, allowing removal of suture materials- fig 7.

At recheck, performed at 1, 2, 3, 6 and respectively 12 months from the laser reintervention, there were no evidences of tumour recurrence nor metastasis. Comparison of the obtained data with those reported in other studies (Bergman, 2007; Freeman *et al.*, 2013; Nishiya *et al.*, 2016) require as a future need the Smedley *et al.*, 2011 opinion to guide the research for “*more rigorous prospective studies, especially to evaluate specific treatment protocols, that would enable a more targeted therapy*”.

CONCLUSION

Diode laser excision of oral malignant melanoma in dogs can be an alternative palliative procedure to invasive surgical resection procedures.

The average of free recurrence and metastasis time after laser surgery has exceeded 360 days in those three cases.

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