

Upper eyelid and medial canthus reconstructive surgery after histiocytoma resection in a dog: a case report

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ABSTRACT: A six year old crossbred male dog presented with non-pigmented, pale pink, unhaired, ulcerative tumor of the medial canthus and upper eyelid region. As treatment, surgery was proposed. During the surgery complete excision of the tumor was performed. The extent of skin loss, especially in the upper eyelid required plastic reconstruction by pedicle flap transposition. The soft skin of the cheek was chosen as a graft donor site. The postoperative period proceeded without any complications and ended with successful engraftment. The soft cheek skin did not impede movement of the upper eyelid. Histopathological examination indicated histiocytoma and tumor-free excisional margins were confirmed. There has been no recurrence during the subsequent 12 month period.

Keywords: reconstructive surgery; blepharoplasty; transposition flap; histiocytoma; dog

Two types of fasciocutaneous grafts – axial and random flaps – can be used in the reconstruction of the facial region. In an axial flap, where an identifiable blood vessel constitutes the pedicle of the flap, a graft can be totally isolated from the donor site and transposed easily to the recipient site. An axial flap is excellently vascularised and there is high probability of total engraftment. Unfortunately, the number of sites where an axial flap may be performed is limited by the topographic structure of superficial blood vessels (Stiles et al., 2003, Jacobi et al., 2008).

In the presented case, a random flap, where a graft is vascularised by a network of tiny, unnamed blood vessels of the subdermal plexus (Moore, 1993; Borodic and Townsend, 1994), was used for defect reconstruction (Borodic and Townsend, 1994; Esson, 2001; Gelatt and Gelatt, 2001; Schmidt et al., 2005). Therefore, it is important that the flap should be separated from its base within the subcutaneous adipose tissue. After the skin incision is performed, the source of flap vascularisation runs through its base. The base of a random flap is its pedicle. As a rule, to ensure the survival of a random flap it is necessary that the width-to-length

ratio should not be smaller than 1 : 3. These features of a random flap limit its size and the skin area which can be reconstructed. In local skin plasty there are many techniques of skin flap grafting. These include advancement flaps (e.g. H-plasty, Z-plasty, Hughes procedure), rotation flaps (e.g. Mustarde procedure), interpolation flaps (e.g. Cutler-Beard or bucket-handle, two-stage procedure) and a transposition flap, which was applied in this case (Mustarde, 1982; Dziezyc and Millichamp 1989; Peiffer et al., 1989; Borodic and Townsend, 1994; Pellicane et al., 1994; Esson, 2001; Gelatt and Gelatt, 2001; Lewin, 2003; Hagard, 2005; Hunt, 2006; Stades and Gelatt, 2007; Jacobi et al., 2008; Martin, 2010).

Prognosis in systemic histiocytosis requires caution and treatment may necessitate systemic immunotherapy. Despite their rapid proliferation and histological features of malignancy, histiocytomas are benign tumours which may sometimes display spontaneous regression, as was observed in the studied case (Angus and Lorimier, 2004; Gross et al., 2005; Vail and Withrow, 2007; Martin, 2010). They grow fast, are painless, solitary, hairless and glossy (Goldschmidt and Hendrick, 2002; Martin, 2010).

This paper presents a case of primary lesions of histiocytoma in the medial canthus and upper eyelid of a dog, treated by reconstructive surgery employing the transposition flap method.

Case description

A six year old crossbred male dog was referred to the Surgery Clinic with a non-pigmented, pale pink, hairless, ulcerative tumour of the medial canthus and upper eyelid region. An anamnesis revealed that the dog had been suffering from disease for over six weeks, without any treatment. The dog presented with mucopurulent discharge and epiphora from the right eye. The solid mass of the tumor significantly impeded the blink reflex (Figure 1).

Routine, general clinical and laboratory examinations of the patient did not reveal any deviations from the reference values. The serum chemistry profile as well as the hemogram was normal, except for slight lymphocytosis. Differential diagnosis included histiocytoma, mast cell tumour, squamous cell carcinoma and fibrosarcoma. Surgical treatment was proposed.

The patient was anaesthetized according to the following anaesthetic protocol: pre-medication with

atropine sulphate (Atropinum sulfuricum, Polfa, Poland) at a dose of 0.05 mg/kg of body weight and Acepromazine maleate (Calmivet, Vetoquinol, France) at a dose of 0.5 mg/kg of body weight, administered *i.m.* Anaesthesia was induced by a combination of xylazine (Rometar, Spofa, Czech Republic) at a dose of 1 mg/kg of body weight, administered *i.m.* and, after inserting a vascular cannula with ketamine (Bioketan, Biovet, Poland), at a dose of 5 mg/kg of body weight, administered *i.v.* to the cephalic vein. The dog was then intubated. The anaesthesia was maintained with isoflurane (Isoflurane, Abbott, Great Britain) at a concentration of 1–1.5%.

Analgesic treatment was conducted with tramadol hydrochloride (Tramal 100, Polpharma S.A., Poland) at a dose of 5 mg/kg of body weight *i.m.* The treatments were continued until day 2 after the surgery.

During surgery, complete excision of the tumour was carried out (Figure 2). The incision line on the medial canthus side ran on the margin between the skin and mucosa, covering one-quarter of the lower eyelid, the medial canthus and half of the upper eyelid. The tumour did not penetrate deeper tissues; therefore, the line of preparation was on the border of subcutaneous adipose tissue, above



Figure 1. Mucopurulent discharge and epiphora from the right eye. The solid mass of the tumor significantly impeded the blink reflex

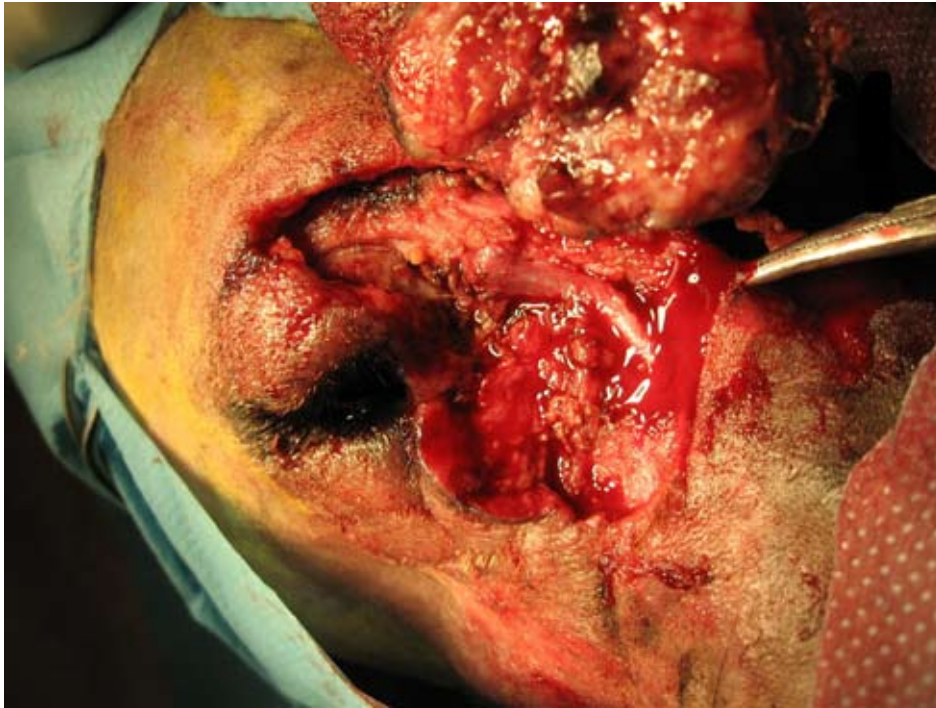


Figure 2. Complete excision of the tumor

the orbicularis muscle. Opposite, the line of incision shifted towards the medial line, covering all the medial tumour edge. Bleeding was stopped by thin-needle monopolar diathermy. The extent of skin loss, especially in the upper eyelid, required plastic reconstruction by pedicle flap transposition.

The soft skin of the cheek was chosen as a graft donor site. A flap outline was made before the skin incision (Figure 3).

The graft size was planned according to the principle of a width-to-length ratio of 1 : 2. The graft length was planned to be slightly greater than that

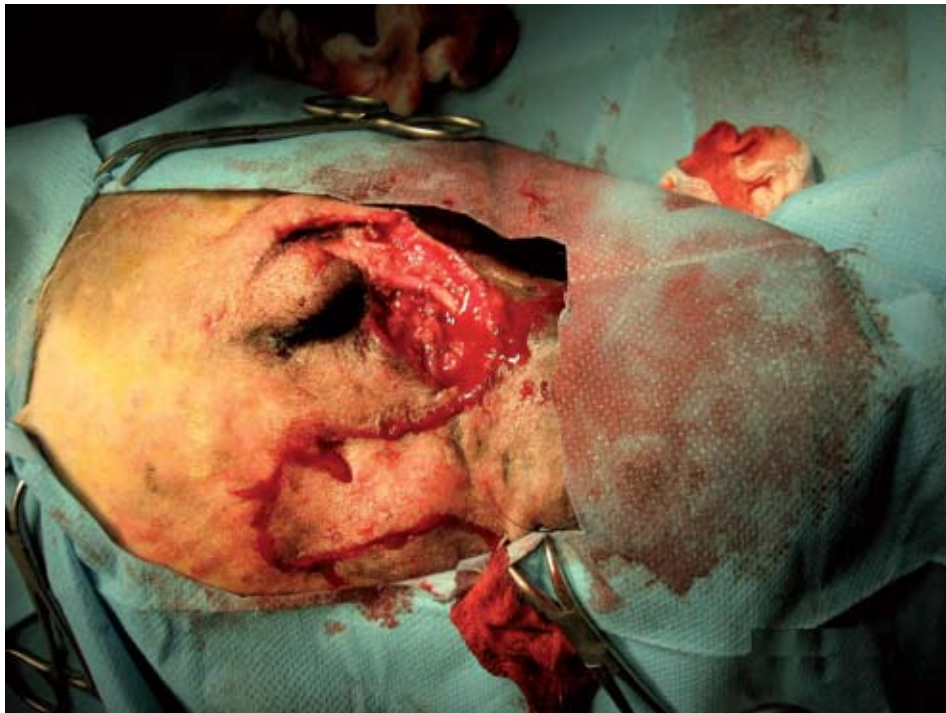


Figure 3. The flap outline was made before the skin incision



Figure 4. The graft was fixed with a 4-0 simple interrupted nonabsorbable suture

of the graft recipient site. Graft separation was done at the level of subcutaneous adipose tissue. After the graft was transposed to the graft recipient site, it was fixed with a 4-0 simple interrupted nonabsorbable suture (Figure 4).

Postoperative management included daily anointment of the graft with Lini oleum virginale (Linomag, Ziółolek, Poland). Antibiotic cover with Amoxicillin (Betamox L.A., ScanVet, Poland) at a dose of 15 mg/kg per body weight *i.m.* was maintained until day 5 after surgery.

RESULTS AND DISCUSSION

The post-operative period proceeded without any complications and ended with successful engraftment. Soft cheek skin did not impede movement of the upper eyelid. No mucopurulent discharge or epiphora from the right eye was observed. The blink reflex was regular. In week 2 after the operation, hair cover was observed to return to the graft. Six weeks after the operation, the appearance of the operation area was normal (Figure 5).

Histopathological examination yielded the result of canine cutaneous histiocytoma (CCH) and tumour-free excisional margins were confirmed. The histopathological picture of the tumour revealed

histiocytic cells with irregular mitotic figures, collagenic fibres, a small count of connective tissue, and foci of necrosis (Figure 6). There has been no recurrence during the subsequent 12 month period.

In local skin plasty it is very important that the skin graft has similar features as the skin of the operated area, hence the defect was replaced with thin cheek skin. Because the blink reflex is carried out by the upper eyelid it is very important that it should be reconstructed with tissue which enables free movement. Successful engraftment depends on proper vascularisation, solid adhesion to the margins and base of graft recipient site and securing against shifting and exudates (Borodic and Townsend, 1994).

Reconstructive surgery by pivotal rotation of transposition flap shortens the length of the skin graft, which has to be considered before the procedure. The degree of the skin paleness in the line of highest tension between the pivot point and the opposite end of the graft is an indication of proper perfusion in the skin transplant (Borodic and Townsend, 1994). The graft shifting angle was about 35 degrees; hence, there was no need to make Burow's triangle or a "back cut" (Borodic and Townsend, 1994; Gelatt and Gelatt, 2001).

It was important that the width-to-length ratio for the pedicle should not be lower than 1 : 3 (Dziezyc and Millichamp, 1989; Borodic and Townsend,



Figure 5. The operation area 6 weeks after the procedure. Note its normal appearance

1994; Gelatt and Gelatt, 2001; Stades and Gelatt, 2007). Within the skin of the head there is high perfusion pressure in the subcutaneous vascular nodes, therefore the width-to-length ratio may be

increased to 1 : 4 (Borodic and Townsend, 1994). In the case in question, maintaining the width-to-length ratio at 1 : 2 contributed to improvement of the engraftment conditions.

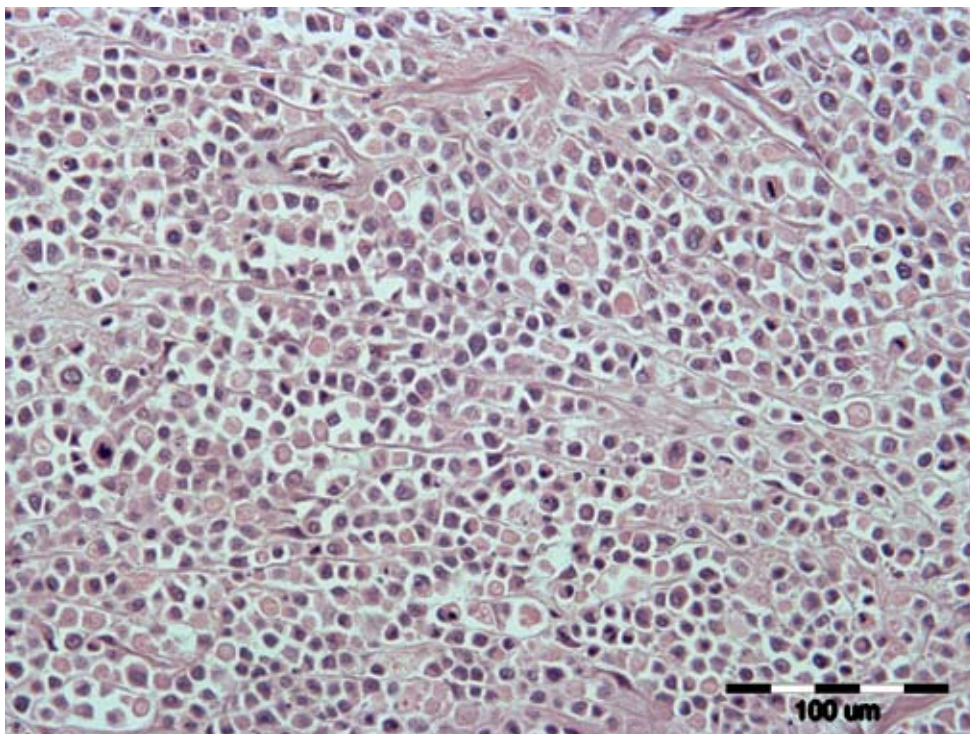


Figure 6. Histiocytic cells with irregular mitotic figures, collagenic fibres, a small count of connective tissue and foci of necrosis; HE staining

In surgical treatment of eyelid tumours, the part of an eyelid removed with the tumour may be as large as one-quarter to one-third of its length. Larger defects should be reconstructed by plastic surgery (Gelatt and Gelatt, 2001; Lewin, 2003; Jacobi et al., 2008; Martin, 2010).

CCH is classed as a globocellular tumour (Vail and Withrow, 2007). It is diagnosed in individuals of every age, but usually in dogs less than four years old (Angus and de Lorimier, 2004; Maxie, 2007; Patel et al., 2008; Martin, 2010). As in the described case, typical places of tumour occurrence include eyelid skin, as well as earlobes and face (Angus and de Lorimier, 2004; Patel et al., 2008; Jasik and Reichert, 2009; Martin, 2010). The breeds particularly susceptible to histiocytoma are thought to include boxers, dachshunds, short-haired retrievers, cocker spaniels, Great Danes, Shetland sheepdogs and bullterriers (Scott et al., 2001; Goldschmidt and Hendrick, 2002; Vail and Withrow, 2007).

Parenchyma of a histiocytoma consists of uniform cells resembling histiocytes, which infiltrate dermis and subcutaneous tissue, squeezing between collagen fibres and skin appendages (Gross et al., 2005). The cells are oval or multiangular, with a lot of pale basophilic cytoplasm; they have oval or kidney-shaped nuclei and indistinct nucleoli, and manifest high mitotic activity (Goldschmidt and Hendrick, 2002; Maxie, 2007). Despite its fast growth and histological features which are typical of a malignant tumour; i.e., numerous mitotic figures and no connections between cells, it is a benign tumour (Gross et al., 2005). In early staging, the tumour parenchyma consists solely of the cells described, after some time cellular inflammatory infiltration and superficial tumour ulceration appear (Goldschmidt and Hendrick, 2002; Gross et al., 2005), which were observable in the case described here.

CCH may undergo spontaneous regression 2 to 3 months after it first appears (Gross et al., 2005; Vail and Withrow, 2007; Martin, 2010). Advanced regression is hardly distinguishable from inflammation (Maxie, 2007). Multifocal necrosis is observed along with weakened proliferation of histiocytic cells (Vail and Withrow, 2007).

In the case in question, secondary wounds caused by scratching with a paw, contributed to exacerbation of the inflammatory condition, proliferation of the connective tissue, superficial ulcerations and secondary necrosis foci.

In summary, this report describes reconstructive surgery employing the transposition flap method in

the treatment of massive histiocytoma. The result was complete recovery with the maintenance of a positive plastic effect.

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