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Corticoids as a treatment to control complications arising after reconstructive surgery of the skin: a case report

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ABSTRACT: Corticosteroids are not indicated in wound healing, but the intralesional and topical administration of these agents has been described to control tissue overgrowth in humans. The aim of the present study was to assess the use of topical corticosteroids to control pre- and post-surgical tissue overgrowth in a 5-year-old male Belgian shepherd weighing 33.5 kg. We report successful use of topical administration of corticosteroids to treat granulation tissue overgrowth before and after skin grafting. Corticosteroids are a safe and easy way to treat this complication and can be used to prepare a healthy granulation tissue bed before performing surgical procedures to cover large defects in dogs.

Keywords: corticosteroids; dog; granulation tissue; overgrowth; skin grafting

Wound management is frequently a challenge for the veterinary surgeon. Several options are available, including second intention healing and skin plasties, flaps or grafts. A deep knowledge of the anatomy of the area, skin vascularisation and corrective plastic surgery techniques are necessary to resolve these kinds of lesions. A combination of several techniques is often required. Pre- and post-surgical control is as important as the surgery, as is the correct choice and administration of topical agents. Depending on the response of the patient, different medicines such as antibiotics, debridants, epithelisants, healing agents and regenerative therapies have to be administrated (Kim et al. 2009; Karayannopoulou et al. 2014).

Granulation tissue overgrowth is a complication that can prevent successful resolution. It must be controlled before performing another corrective surgery. Although anti-inflammatory drugs are contraindicated in wound healing, several authors refer to their topical use to control tissue overgrowth in humans (Jalali and Bayat 2007; Roques and Teot 2008; Monstrey et al. 2014).

Case description

Topical corticoid treatment was applied twice (before and after skin graft surgery) in a 5-year-old, male Belgian Shepherd dog weighing 33.5 kg that presented with a large cutaneous defect in the left hind limb caused by a dog bite incurred during a fight.

Three months previously, the patient had been bitten by another dog in the lumbar region. Although this lesion had been treated by another veterinary surgeon, the consequent infection had caused extensive tissue loss on the left hind limb (Figures 1A and 1B).

Pre-surgical routine shaving revealed severe scar retraction and stenosis at both proximal and distal positions (Figure 1C), preventing proper venous return and resulting in distal oedema. For this reason, a two-step surgical procedure was planned: in a first procedure, the scars were retracted both proximally and distally, and debrided; the defect was then further enlarged. Besides this, the first procedure made use of an epigastric axial pattern

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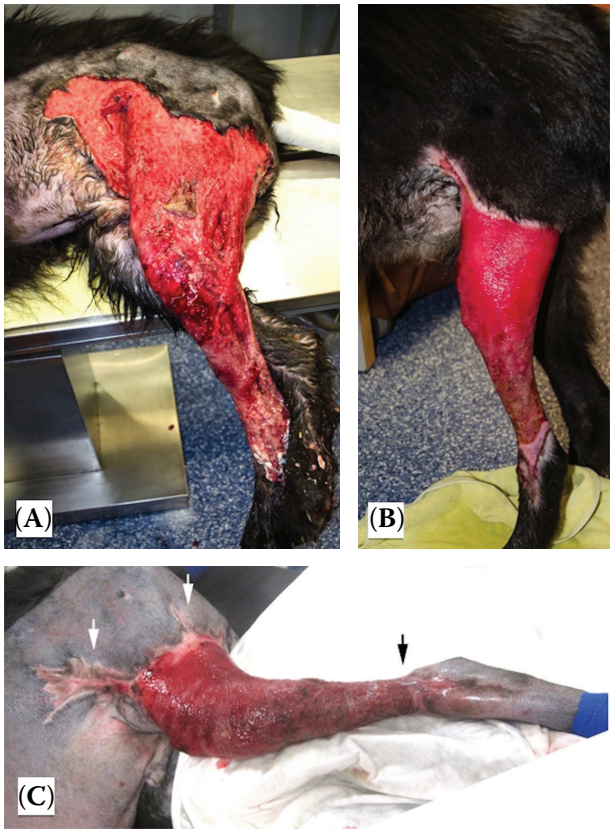

Figure 1. Injury in the left hind limb 48 hours after the bite (**A**). Evaluation of the injury after three months of treatment by the referring veterinarian (**B**). Preparation of the surgical field. Stenosis and scar retraction (arrows) (**C**)

flap to protect the proximal part. The second surgical intervention consisted of a skin graft to cover the distal segment.

Before skin grafting, the area to be covered was pre-treated in order to promote healthy granulation tissue post-surgery. For this purpose, a hydrocolloid was applied to improve healing and autolytic debridement. After 20 days, different areas of necrosis and exuberant granulation tissue appeared in this pre-treated area (Figure 2A). These were treated by means of a combination of hydrocortisone and oxytetracycline (Terracortril; Farmasierra, Madrid, Spain) for 15 days. Finally, neomycin sulphate and *Centella asiatica* extract ointment (Blastoestimulina; Almirall, Barcelona, Spain) were added over the healthy granulation bed. In summary, 45 days after the flap surgical procedure, the distal area of the original defect was in good condition for skin grafting (Figure 2B). Two rectangular skin grafts removed from the dorsal area of the neck were implanted to cover the total defect. The skin graft was covered by an impregnated antibiotic dressing (Tulgrasum antibiotic; Desma Laboratorio Farmaceutico, Madrid, Spain) and a compression b+andage. The subsequent course of the patient was positive, even though exuberant tissue growth was detected 17 days after the procedure (Figure 2C). This was treated with topical hydrocortisone and oxytetracycline ointment (Terracortril; Farmasierra, Madrid, Spain) for one week. Subsequently, we also administered hydrocolloid (Ugotul; Urgo Medical, Barcelona, Spain), debridant (Dertrase; Salvat, Barcelona, Spain) and/or antibiotic ointments (Blastoestimulina; Almirall, Barcelona, Spain) to control the tissue as needed. Two and a half months later, the area was almost completely epithelised (Figure 2D).

Figure 2. Overgrowth of the granulation tissue after 20 days of topical treatment subsequent to the first surgical procedure (arrows) (**A**). Reduction of the tissue overgrowth (arrows) and receiving area prepared for the insertion of the skin graft. Correct development of the axial rotation flap in the proximal half of the limb (**B**). Tissue overgrowth after 17 days through graft networking (**C**). Epithelialisation 2.5 months after skin grafting (**D**)

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Topical corticosteroid administration controlled the hypertrophic scar before and after skin grafting. Before skin grafting, exuberant tissue formation was observed and controlled with corticosteroid topic ointment for 15 days to promote healthy granulation tissue. New overgrowth was observed 17 days after skin grafting through fenestrations and was successfully controlled with topical corticoid administration for seven days.

DISCUSSION AND CONCLUSIONS

The treatment of large skin defects is occasionally challenging because a combination of different surgical and conservative techniques is needed to completely cover the affected area depending on the condition of the injured tissues. First of all, it is necessary to obtain a healthy granulation bed and sometimes complications such as granulation tissue overgrowth can occur.

In this case, a split-thickness skin graft was chosen because of the location and characteristics of the wound. This kind of graft allowed for good drainage and facilitated acceptance of the graft by permitting fluids to escape from beneath it. The tiny splits allow the skin to be stretched to cover a large area. Besides, it is more flexible and adaptable than sheet grafts and facilitates placement at difficult sites. A sheet graft could have been a good alternative because of the location, because this kind of island skin graft is indicated for the covering of distal defects of the limb to avoid contraction. However, they are only indicated if infection and fluid production are not expected. This was a complicated case and infection and fluid production could not be ruled out. Partial thickness necrosis is commonly encountered in response to full-thickness skin grafts so a split thickness graft was employed in this case (Fowler 2006).

Although the use of corticosteroids is initially contraindicated for wound healing, several precedents exist in the literature. Most of these refer to application in human patients. For example, Monstrey et al. (2014) described the local use of corticosteroids to control keloids and hypertrophic scars in humans. The topical injection of corticosteroids is the most frequent route of administration, even if several complications, including pain at the time of injection, but also depigmentation, telangiectasia and atrophy have been described. This was the route of administration chosen by Avallone et al. (2011). They reported effective intralesional corticosteroid therapy in the management of a limited size hypertrophic scar in the footpad of a dog. They used it as an alternative because of recurrence after lesion excision (Avallone et al. 2011).

We tried to avoid surgical excision of the lesion because of the large size of the affected area and the need for an additional anaesthetic procedure in a patient that had been submitted to several surgical interventions in a short period of time. In the same way, we also decided against intralesional injection to minimise pain and handling. Instead, we opted for topical administration of ointment with reference to the treatment of such diseases in human medicine (Atiyeh 2007). The dog's subsequent course was positive and there were no complications caused by the use of the corticoids. Therefore, the use of topical corticosteroids can be considered as an effective treatment option to control tissue overgrowth in dogs.

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