Paradigm Shifts in Small Animal Plastic and Reconstructive Surgery

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Editorial

Small animal plastic and reconstructive surgery showed a tremendous progress during the last 20 years parallel the progress made in its human counterpart. This progress was based on paradigm shifts or surgical revolutions rather than knowledge accumulation over the years [1]. Small animal plastic and reconstructive surgery deals with the reconstruction of skin defects that were a result of trauma or tumor excision. Historically second intention wound healing was initially employed for the closure of skin defects. Axial pattern flaps, free flaps, skin grafts and skin stretchers are parts of the paradigm shifts that contributed in the progress and advancement of plastic and reconstructive surgery in dogs and cats. Axial pattern skin flaps are pedicle flaps that include a direct cutaneous artery and vein. Axial pattern flaps can be easily designed, elevated and transferred to cover large skin defects in a single stage without using the delay procedure. Axial flaps have a better survival (95%) than subdermal plexus flaps (53%) and may be used to cover defects located in the trunk, limbs or head. The most commonly employed axial pattern flaps in dogs and cats may include the caudal superficial epigastric flap, the thoracodorsal flap, and the cervical cutaneous branch of the omocervical artery, the deep circumflex iliac artery, lateral caudal artery, caudal auricular artery and superficial temporal artery flaps [2-4]. Thoracodorsal flaps may be combined with omental pedicle grafts to address chronic non-healing wounds in cats. Recently scrotal flaps were successfully employed to cover skin defects in the medial thigh or perineum [5]. The whole procedure involves careful positioning of the patient, preoperative measuring and drawing the size of the flap using anatomical landmarks and elevation, rotation or transfer of the flap to the recipient site, where the flap is secured by placing subcutaneous sutures between the edges of the flap and the defect and skin staples. Complications associated with skin flaps may include distant flap ischemic necrosis, seroma formation, edema, dehiscence and infection. Seromas are prevented by properly placed drain for several days postoperatively. Flap dehiscence may be the result of excessive tension in the wound margins. Necrosis may be associated with excessive flap length, which extends further up its vascular territory. Subjective assessment of flap viability is based on color, temperature, pain sensation and bleeding. Necrotic skin should be excised and allow the wound to heal by a delayed procedure. Skin grafts are portions of epidermis and dermis that are excised from the one site of the body and transferred to another (recipient site). Skin grafts are classified as full thickness that include the whole epidermis and dermis and partial or split thickness grafts that contain the epidermis and part of the dermis. Most surgeons are in favor of full thickness meshed grafts for reconstruction of wounds in dogs and cats. Indications for using skin grafts may include reconstruction of wounds located mainly in the distal limb or in other parts of the body where there are no other reconstructive options available. Degloving injuries are a common indication for grafting in dogs and cats. Survival of the graft depends on the presence of a healthy and highly vascular recipient bed. Wounds with healthy and fresh granulation tissue and even surgical wounds are potential sites for skin grafting. Grafts may be also classified as pinch, punch, stamp and strip grafts. These types of grafts are used to promote epithelialization of wounds with granulation tissue that undergo second intention healing. Recently the scrotum was used as a free graft to cover skin defects in the lateral thorax and limbs with promising results. Grafting process starts immediately after graft placement and takes approximately 15 days to complete. Adherence of the graft to the recipient bed, plasmatic imbibition, inosculuation and revascularization are stages of grafting process [6]. Proper bandaging is essential for graft survival. Graft survival ranges from 77% to 38% in cats and dogs respectively.


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Necrosis, infection and early graft movement are the most common complications of grafting. Skin grafting in cats has a better survival than in dogs. Skin stretching is another paradigm shift used to close skin defects by elaborating mechanical creep, a biomechanical property that results in skin elongation under constant loading and delayed primary closure. Skin stretching techniques used in small animal surgery include presuturing, pretensioning and post-tensioning sutures and intraoperative stretching. Complications following skin stretcher application are minimal.

References