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Surgical management of tibial fracture by external skeletal fixator and application of autologous platelet rich plasma in a Dalmatian

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Abstract

A one year old intact Dalmatian male dog weighing around 14 kg was presented to the Department of Veterinary Surgery and Radiology, River, Puducherry with a history of automobile accident a week back. Clinical examination revealed extensive avulsion wound of the skin below the stifle joint to the mid metatarsal region. On radio graphical examination, oblique mid shaft fracture of left tibia was noticed. Under anaesthesia Fracture fragments were reduced and fixed using 22G Orthopedic wire and stabilized with external skeletal fixator. Autologous platelet rich plasma prepared from the whole blood of the animal was infused at the fracture site. Re-constituting collagen wet meshed sheet was applied on the wound and protected with bandage. Complete healing of the fracture was observed.

Keywords: Tibia, comminuted fracture, biomaterial, external skeletal fixation, dalmatian

Introduction

Comminuted Fractures occur in small animals as a result of high energy trauma and pose a considerable challenge to veterinary practitioners due to necessity to fill bone defect as well as possibility of complications (Tomasz szponder *et al.*, 2018) [8]. External fixators are particularly useful for the treatment of fractures of the radius and tibia because of the frequency of open fractures in these bones, the relative paucity of soft tissues surrounding them, and the ability of the clinician to construct bilateral or biplanar frames in order to stabilize the fracture (Johnson *et al.*, 2008) [3]. Topical use of autologous PRP for avulsion type of wounds which requires fresh growth mediators for accelerating the healing process (Monteiro *et al.*, 2009) [4].

Case history and observation

A one year old Dalmatian intact male dog weighing around 14 kg was presented to the Department of Veterinary Surgery and Radiology, RIVER, Puducherry with a history of automobile accident a week back. On clinical examination an extensive avulsion wound with open fracture below the stifle joint to the mid metatarsal region was observed. On radio-graphical examination, oblique mid shaft fracture of left tibia was noticed and the animal is not able to bear its weight on the left hind limb.

Treatment

The wound was debrided and flushed with Metronidazole solution mixed with 5% povidone iodine. It was decided to reduce the fracture fragments and fix with orthopedic wire and stabilize with external fixator. The animal was prepared for surgery under aseptic conditions, pre medicated with Inj. Diazepam @ 0.5mg/kg body weight administered I/V and maintained with Inj. xylazine @ 1 mg/kg body weight and Inj. Ketamine @ 5 mg/kg body weight administered I/V. A longitudinal incision was made on the medio-lateral aspect of the tibia and extended it to the entire length of tibia avoiding the medial saphenous vein and nerve. A 22 G orthopedic wire was used to fix the fracture fragments by full cerclage.

Type II frame, unilateral Transfixation pins were inserted in to the proximal and distal metaphysis of the tibia and connecting bars were applied. Autologous platelet rich plasma was prepared from the 6 ml of whole blood of the animal by centrifugation at 3000rpm. 3ml of autologous PRP was infused at the site of fracture. Muscular layer was sutured with polyglactin 910 by simple continuous suture pattern and skin opposed by skin mesh graft. Re-constituted collagen wet mesh was applied on the surgical site. The external fixation was secured with adequate padding and bandaging was done. Postoperatively Inj. Cefotaxime @ 10 mg/kg body weight administered for 5 days I/V and Inj. Meloxicam @ 0.2 mg/kg body weight administered for 3 days administered I/M. Dressing of the wound was advised weekly twice.

Result and Discussion

Fractures of the radius and tibia are most common in dogs. Spiral and oblique fractures are more commonly occur in radius and tibia in young dogs. The incidence of open fractures are high in case of fractures of long bones. External skeletal fixation is useful in open fractures of long bones and provides stabilization of the bone (Roush, 1992) [5]. In the present case fixation of tibial oblique fracture by external fixation type II provided the necessary stability and immobilization of the limb (Szponder *et al.*, 2018 and Sherman, 2004) [8, 7]. Healing of the fracture was evident on 60th postoperative day with callus formation. Autologous platelet rich plasma application on wound by intra-lesional injection and application of reconstituted collagen wet mesh on the wound site was found beneficial in accelerating of the wound healing (Jee, 2016 and Ruszczak, 2003) [2, 6].



Fig 1: Avulsion of skin below the stifle joint to metatarsal region



Fig 2: Pre-operative radiograph showing comminuted fracture of left tibia



Fig 3: Radiograph showing ESF with unilateral type II frame



Fig 4: Complete wound healing after a months

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