

PANTARSAL ARTHRODESIS BY USING RECONSTRUCTION PLATE IN A DOG

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A two years old non-descript male dog was presented to Teaching Veterinary Clinical Complex with a history of automobile accident leading to severe lameness of left hind limb. On clinical and radiographic examination, a compound distal tibial fracture with dislocation of hock joint was diagnosed. A pantarsal arthrodesis involving distal tibia, tarsal and metatarsal bones was performed for fusion of joint using an eight holed molded reconstruction plate. Animal showed uneventful recovery after two months of follow up.

Key words: Dog, fracture, panarthrodesis.

Arthrodesis, the surgical elimination of joint motion and ultimately bony fusion of joint surfaces, is considered a salvage procedure for patients in which other surgical or medical treatment will not restore normal, pain-free joint function (Lesser, 2003 and Clarke *et al.*, 2009). Pancarpal arthrodesis includes the fusion of the antebrachial, middle carpal and carpo-metocarpal joints, while pantarsal arthrodesis is the fusion of the tibiotarsal, proximal and distal intertarsal and tarsometatarsal joints. Indications for pancarpal and pantarsal arthrodesis can be listed as; shearing injuries, osteoarthritis, standing deformities due to nerve paralysis, painful and unstable conditions unresponsive to reconstruction, incurable tendon and ligament injuries and multiple fractures (Brinker *et al.*, 1998). Plate application is the most frequently used method in pancarpal and pantarsal arthrodesis. In pantarsal application, the plate is applied to the cranial surface of the distal tibia, tarsus and metatarsus with an angle of 135–145 degrees (DeCamp *et al.*, 1993).

Case history and observations

A two years old non-descript male dog weighing about 12 kg was presented to Teaching Veterinary Clinical Complex with a history of automobile accident resulting in non weight bearing lameness of left hind limb. Clinical examination, blood chemistry and haematology did not reveal any other abnormalities. Radiographs of the thorax did not show any signs of concurrent injuries. The tarsal region of the left hind limb was swollen. Medio-lateral and

dorsoplantar radiographs of the tibio tarsus revealed oblique fracture of distal tibia and dorsal separation of the tarso-metatarsal joints without further fragmentation. As it was not possible to correct the bony defect by routine orthopaedic procedures, surgical arthrodesis of affected joint was planned so as to avoid pain and discomfort to the animal and in order to save the affected malfunctioned limb.

Treatment

The dog was premedicated using atropine sulfate @0.04mg/kg I/M. and Xylazine Hydrochloride @1mg/kg I/M and anaesthetized by administering Ketamine Hydrochloride @ 8 mg/kg I/M. Maintenance of anaesthesia was done with isoflurane gaseous anaesthesia @ 1.5% using semiclosed anaesthetic circuit to minimize the cardiopulmonary alterations and to have a continuous source of anaesthesia.

Approach for pantarsal arthrodesis was made by giving a skin incision starting from a point near the distal tibia in a cranial (dorsal) direction towards the distal metatarsi. Following dissection of the subcutaneous tissues, musculus extensor digitalis longus was moved to one side with a retractor, the short ligaments of the tarsocrural, mid-tarsal and tarsometatarsal joints were severed and the joint capsules were destroyed (Fig. 1). A molded reconstruction plate was fixed using three cortical screws placed in the tibia, one in the tarsal and two in the metatarsus (Fig. 2). After closure of wound, external support was

provided with aluminum splints for 3 weeks. Postoperatively, antiseptic dressing of the wound was carried out with povidone-iodine ointment on every alternate day for

one week. Antibiotic (Amoxicillin and clavulanic acid combination 300 mg) was administered I/M twice daily for seven days along with analgesic (Meloxicam 0.4 mg/kg I/M) daily for three days.



Fig. 1: Compound tibial fracture and separation of tibio tarsal articulation



Fig. 2: Application of reconstruction plate for tibio tarsal arthrodesis

Results and Discussion

The limb was radiographed on 7th, 30th, 60th and 75th day after surgery (Fig 3). From 60 to 75 days, radiographically adequate callus formation and complete

arthrodesis were visible. The plate was removed after three months. The dog showed complete weight bearing with slight shortening of leg in caudo-lateral direction.



Fig. 3: Radiograph after 30 days of arthrodesis

Surgical arthrodesis is used for the treatment of hyper-extension injuries, severe degenerative joint diseases, shearing injuries and non repairable comminuted intra-articular fractures. Orthopaedic disorders lead to instability that induces pain due to abnormal movement and the tension placed on the soft tissues and nerves of the joint. In present case animal resumed weight bearing on affected limb may be attributed to relieved pain and rigid

support provided by arthrodesis as also reported by Lesser (2003). No major complication was observed during and after surgical procedure and even during post operative life of animal. However, Nicole *et al.*, (2009) reported that failed arthrodesis may include continued lameness, continued instability at the joint, widening of the joint space on radiographs, sclerosis of metaphyseal bone, and loose or broken implants. The most serious

complication is a nonunion accompanied by failure of the implants with or without a septic joint. Two important causes of nonunion or malunion are incomplete removal of articular cartilage and the lack of an autogenous or allogenic bone graft as also reported by Piermattei and Flo (1997).

In present case use of bone plate proved beneficial to restrict the joint movement. Johnson and Hulse (2007) also reported that pancarpal arthrodesis can be accomplished by using bone plates positioned on the dorsal, palmar or medial aspect, cross pin and external skeletal fixation application. Bone plate fixation probably represents the best combination of rigid fixation, fewest complications, and technical ease of application as observed in present case.

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