Surgical management of long bone fractures in cats: a review of 12 cases

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Long bone fractures are common and account for about 50% of all feline fractures. Fixation methods in cats include external coaptation, intramedullary pinning (single pin, stacked pins), cerclage wire, external skeletal fixation, external skeletal fixation with intramedullary pinning, bone plates, lag screw, plate rod and interlocking nails (Scott, 2005; Scott and McLaughlin, 2007).

Twelve non-descript cats weighing 1.5 kg to 3.2 kg and aged 3 months to 8 years, which included nine males and three females with fracture of humerus (5), tibia (3), femur (3) and radius (1) made the subject of the study. All the cats were examined clinically and radiographically (Fig. 1) and blood was collected preoperatively to assess the patient status. Fixation methods were selected on the basis of age, type of fracture, location, economic status of clients and owners’ compliance. Fixation methods used in this study included intramedullary pinning (6 cases), external skeletal fixation Type-II (two cases), intramedullary pinning and wiring (two cases) (Fig. 2), external skeletal fixation type Ia with intramedullary pinning (two cases). Implants were selected on orthogonal radiographic view of fractured bone. Intramedullary pin sizes ranged from 2.0 mm to 3.0 mm diameter that occupied approximately 70% of the diameter of the medullary cavity and external fixation pin size used were 1.4 mm to 1.6 mm, and size of cerclage wire was 21 to 23 gauge.

In all the animals, surgical fixation was done under 0.02 mg/kg s.c. atropine sulphate premedication, and xylazine hydrochloride, ketamine hydrochloride combination for induction (1 mg/kg and 10 mg/kg i.m., respectively) and maintenance with ketamine hydrochloride and diazepam 5 mg/kg and 0.5 mg/kg i.v., respectively. Intraoperatively antibiotic Intacef Tazo™ (Ceftriaxone and Tazobactam) 20 mg/kg and Melonex® (Meloxicam) 0.2 mg/kg were given i.v. Postoperatively, owners were advised to administer oral antibiotic coverage with Taxim-O® (Cefixime) 20 mg/kg for 7 days and cage rest. Periodical dressing with povidone iodine and supportive bandage with modified Roberts Jones bandage was applied. The surgical wounds healed within 7 to 10 days postoperatively. Fixator stability and functional limb weight bearing were recorded at regular intervals. Healing was assessed at regular intervals by clinical and radiographic examination.

Left limbs were involved in seven and right limbs in five, and two were open fractures (Fig. 3). Regarding location of the fracture, middle diaphysis was highest (6 cases) followed by distal diaphysis (5 cases) and proximal diaphysis (1 case). Out of 12 cases, eight cats had slight weight bearing at one to two weeks (Fig. 3) that gradually improved and full functional limb weight bearing was observed at 4 to 5 weeks postoperatively without any complications. In two cases, pin migration was noticed and healing was delayed up to 60 days and in other two cats of distal tibial open fractures, non-union was noticed because of open wound and poor postoperative management. One case was followed up to 3 months and since no improvement was observed it was decided for amputation and in another case after 4 months revision surgery with type-II external skeletal fixation with cancellous bone grafting was performed, which subsequently showed improvement. Non-union is not uncommon in cats. Nolte et al. (2005) reported a 5.2 per cent (18/344) incidence of non-union in cats and McCartney but MacDonald (2006) reported a very low incidence of 0.85% (2/233). Non-union of fracture may occur as a result of one or a combination of factors including inadequate stabilization, poor vascularity, excessive fracture gap, infection, systemic or local disease and idiopathic factors generally relating to atrophic non-union. In the present cases, non-union possibly occurred due to poor postoperative management.

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that finally resulted in inadequate fracture stabilization.

Limb function may be decreased after external fixators application to the femur and humerus if the transfixation pins penetrate large muscles. Pin sepsis and premature loosening are common complications, particularly in comminuted fractures. Drainage from the pin tracts is often a sign of pin loosening. Non-union or delayed union of the fracture may occur if the fracture is inadequately stabilized or if the fracture site is infected (Johnson et al., 1989; Harari, 1992). Delayed healing may also occur if frame stiffness is excessive (Johnson, 2002). No such complications were observed in the present cases treated using external fixation method.

References