

SURGICAL MANAGEMENT OF FELINE FEMORAL FRACTURES

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[Received: 17.06.2019; Accepted: 15.07.2022]

{DOI 10.29005/IJCP.2022.14.2.107-111}

Cats because of their athletic nature are prone for falls resulting in long bone fractures of which femur is the most common bone involved. Six cats with seven femur fractures were stabilised with intramedullary pinning after open reduction. The cats could attain early partial weight bearing on 2nd and complete weight bearing by 12th post operative days respectively. There were no implant related complications and complete fracture healing was attained by 90 days. Intramedullary pinning is an effective method of fracture stabilization in cats even with bilateral fractures.

Keywords: Cats, Femur fracture, Intramedullary pinning, Fracture healing.

Feline fractures involving long bones account for 50 percent of all fractures usually caused by road traffic accidents, fall, fights and gunshot wounds (Scott, 2005). The common misconception is that repair of feline long bone is simple to perform and not prone to the same range of complications seen in dogs which is not borne out by clinical experience and studies. Certain favourable characteristics of cats like small size, low body weight, naturally athletic, ability to redistribute weight and protect the injured limb and ability to compensate for impaired function make them subjects for internal fixation of long bone fractures. The present paper puts on record about the successful management of seven femur fractures in six cats.

History and Observations

Cats of different age, sex and body weights that were presented with history of trauma and non weight bearing lameness on hind limb(s) to Veterinary Clinical Complex, NTR College of Veterinary Science were included in the study. The cats were off feed since the day of injury but were alert and active. Physical examination revealed crepitation at thigh region with pain on palpation and medio lateral and cranio caudal radiographs confirmed the diagnosis. The details of the signalment, side involved, type of fracture and implant used are given in Table-1. In the present study, majority of the cats were males (n= 4), with a history of trauma as main etiological cause for fracture. All cats were under one year of the age. All the fractures were complete, transverse and were involving the diaphysis with proximal 3rd fractures in 3 cats and distal 3rd fractures in three cats. (Fig.1).

Table-1: Signalment, type of fracture, implant used and clinical outcome

S. No.	Sex, Age, Weight	Etiology	Side involved	Type of fracture	Implant used	Complications	Clinical outcome
1.	Male, 6 months, 4 kg.	Unknown	Left	Complete, proximal 3 rd , transverse, overriding femur fracture	Simple intramedullary pinning using 3 mm pin	Nil	Excellent
2.	Male, 7 months, 4.5 kg.	Unknown	Right	Complete, Mid shaft, transverse, over riding femur fracture	Simple intramedullary pinning	Seroma formation at the site	Excellent

					using 3.5 mm pin	of pin insertion	
3.	Male, 4 months, 3 kg.	Fall	Left	Complete, proximal 3 rd , transverse fracture with a longitudinal split in distal fragment	Simple intramedullary pinning using 3 mm pin and full cerclage wiring using 22 G SS wire	Nil	Excellent
4.	Female, 6 months, 4.5 kg.	Hit	Right	Complete, transverse, distal 3 rd , overriding femur fracture	Simple intramedullary pinning using 4 mm pin	Nil	Excellent
5.	Male, 7 months, 4.5 kg.	Fall	Right and left	Complete, distal 3 rd , transverse, overriding bilateral femur fractures	Simple intramedullary pinning using 3.5 mm pins	Nil	Excellent
6.	Female, 4 months, 3.0 kg.	Automobile trauma	Left	Complete, distal 3 rd , transverse, overriding femur fracture	Simple intramedullary pinning using 3.0mm pin.	Nil	Excellent



Fig.1. Pre and Immediate postoperative radiographs of cat 2 showing good fracture reduction and implant position

Surgical Treatment

Preoperatively the cats were stabilized with intravenous fluids. Open reduction and internal fixation was decided and the affected limb was stabilized with a Robert Jones bandaging till the date of surgery. After aseptic preparation of the limb, the cats were anaesthetised with -Inj. Xylazine @ 0.5 mg/kg. b.wt. and Inj. Ketamine @ 10 mg/kg. b.wt. mixed in a single syringe given intravenously. After induction, the cats were intubated with No. 5 cuffed endotracheal tube smeared with

lignocaine jelly. Maintenance of anaesthesia was done with the same combination given intermittently based on the depth of the anaesthesia required.

The femur bone was approached with a cranio lateral skin incision and cranial fascia lata incision. The vastuslateralis and biceps femoris muscles were separated and the fractured ends of the femur were isolated. Steinmann pin with one trocar end was introduced in a normograde fashion through trochanteric fossa into the

proximal fragment and after anatomical reduction of the fracture fragments, the pin was driven into the cancellous part of the distal fragment. The extra pin was cut close to the level of the bone and intraoperative reduction and stability of the fracture fragments were assessed. The fracture site was flushed with normal saline and the fascialata was closed with No. 2-0 Polyglactin in a simple continuous manner. After subcutaneous tissue closure with No.2-0 Polyglactin the skin was closed using No. 1-0 nylon, by crossed mattress suture pattern. The cats were administered Inj. Ampicillin – Cloxacillin @ 10 mg. /kg. b.wt. I/M twice a day for seven days and Inj. Meloxicam @ 0.2 mg./kg. b. wt. once a day for three days. The limbs were provided additional support in the form of Robert Jones bandage to be changed on every alternate day for 12 days with complete cage rest for first two weeks. The immediate post operative radiography revealed good anatomical reduction of fracture and stable implant position in all the cases.

Results and Discussion

The cats recovered from anaesthesia uneventfully. The skin sutures were dry without any complication at the site of surgery. The cats started to touch the operated limb on the ground from the second postoperative day with progressive improvement in weight bearing. On the twelfth postoperative day the skin sutures were removed and cats showed partial weight bearing on the limb while standing and walking. The 30th postoperative day followup revealed complete weight bearing on the limb with occasional lameness and x-rays revealed opposed bone fragments with signs of bridging callus at the fracture site and intact implant and evident fracture line (Fig. 2). The 90th postoperative day x-rays revealed complete healing of fracture without the evidence of fracture line and signs of remodelling at the fracture site (Figs.3 and 4) and cats showed complete weight bearing on the operated limbs with the paws touching on

the ground (Fig.5). In cat number 2, the proximal tip of the intramedullary pin was protruding beyond the bone limits and under Xylazine and Ketamine anaesthesia, a stab incision was given at the point of palpation of pin tip and intramedullary pin was removed. Follow up revealed that the cat showed considerable improvement in limb usage. The rest of the cats also made uneventful complete recovery.

Feline fractures of hind limbs were common, with reports of 73% as also mentioned by Scott, 2005. Femur was the most commonly fractured long bone, accounting for 18-35% of all fractures as also reported by White hair and Vasseur, 1992. Majority of the femur fractures involves the diaphysis and the distal shaft as also seen in the present study.

Surgical procedure of open reduction via a craniolateral approach provided satisfactory exposure of bone fragments as also recommended by Larin *et al.*, 2001, as this approach, preserves the soft tissue attachments and the blood supply to the fracture fragments. The intramedullary pinning was selected as a means of internal fixation, as it was a popular method of fracture repair, technically easy and the equipment and implants were readily available. The feline femur was a straight tubular bone with a large medullary canal and has abundant extra osseous blood supply which contributes towards rapid healing as also reported by Done *et al*, 1996. Due to its shape, the femur was most suitable long bone for insertion of intramedullary devices and well seated into the distal cancellous bone as also recored by Larin *et al*, 2001. The pins selected was occupied 70% of the medullary canal placed in neutral axis of the bones which minimized the bending fatigue and allowed for greater bending resistance. But contrary to us, Schrader, 1991 and Scott, 2005 opined that use of intramedullary pins in comminuted femoral fracture was associated with a high rate of complications because of inadequate axial and rotational stability but can be employed successfully in combination

with cerclage wiring in selected reconstructable, comminuted long oblique or spiral fractures. In the present study also, cat no.3, which had a longitudinal split in the proximal fragment was stabilised with intramedullary pin along with full cerclage wire. Indications for intramedullary pin removal after fracture healing include pin migration, occasional limping on the limb and seroma formation at the site of pin insertion.

In the present study, as the pin was protruding beyond the bone limits at the proximal end, it was removed resulting in the uneventful recovery of the cat. The common postoperative complications after feline fracture repair like sciatic entrapment, implant failure and non union as also reported by Piras, 2009, were not encountered in the present study and all the cats made excellent recovery with normal limb usage.



Fig. 2. 30th postoperative day radiograph of cat 4 showing signs of bridging callus and evident fracture line



Fig. 3. 90th postoperative day radiograph of cat 2 showing complete fracture healing with signs of remodelling.



Fig.4. 90th postoperative day radiograph of cat 5 with bilateral femur fracture showing complete fracture healing with remodelled bones



Fig.5. 90th postoperative day photograph of cat 1 showing complete weight bearing on the affected left limb after pin removal

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