

MANAGEMENT OF AN INFECTED COMPOUND METATARSAL FRACTURE IN A HEIFER

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SUMMARY

A one-year-old, approximately 150 kg body weight, cow heifer was presented to the clinic with a history of left metatarsal fracture 20 days back. The synthetic cast was seen applied in field and was smelling foul. Radiographs in medio-lateral and dorso-plantar views revealed midshaft comminuted fracture. On removing the cast, pus was oozing from the medial aspect of middle third of the metatarsus. Modified external skeletal fixator using 6 Steinman pins (3.5 mm diameter each), side bars of steel strip and m-seal was applied under xylazine sedation and intravenous regional anaesthesia. Full weight bearing on walking was resumed after 3 months; however, the skeletal fixator was removed only when the owner reported after 16 months with pin tract infection and maggot infestation. The report highlights that external skeletal fixator can be successful in low weight cow heifer but require wound care to avoid pin track infection and osteomyelitis.

Keywords: Compound, External skeletal fixator, Fracture, Heifer, Linear, Metatarsal

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Fractures of metacarpal and metatarsal bones are most common in bovine of all ages. Most of the time, such fractures are open and comminuted due to less soft tissue covering over the bones (Turner, 1984). External skeletal fixation (ESF) is a type of fracture fixation device which provides optimal stabilization for open and infected fracture without affecting joints and also provides space for daily dressing of wound (Tamilmahar *et al.*, 2017). ESF is typically made from stainless steel, carbon fiber, aluminium and polymer (Tyagi *et al.*, 2014). Present report describes management of a compound, comminuted and infected midshaft left metatarsal fracture in a cow heifer by using modified epoxy linear ESF.

A one-year-old cow heifer, weighing approximately 150 kilograms, was presented to the clinic with the history of application of synthetic cast over the fractured left metatarsal bone 20 days back. Lameness was still present and the cast was foul smelling. However, feed and water intake was normal. Latero-medial and dorso-plantar radiographs revealed a compound midshaft metatarsal fracture with multiple bone fragments (Fig. 1a & b). On removing the cast, pus was seen oozing from a wound on the medial aspect of middle third of metatarsus. Clinically there was mobility and crepitation in the bone. Thus, immobilization with a uniplanar bilateral ESF was planned.

The fracture site was thoroughly lavaged with tap water and then flushed with normal saline and betadine solution. Lateral and medial surfaces of the metatarsus were shaved, scrubbed with antiseptic solution. Sedation was achieved using inj.xylazine HCl @ 0.05 mg/kg body weight IM, and analgesia by intravenous regional anaesthesia (IVRA) of the affected limb. The wound was

debrided and 3 (3.5 mm diameter each) Steinmann pins were passed through and through from medial to lateral surface in the proximal and distal fragment each. Normal saline was continuously poured into the pinning tract. Pins close to fracture site were directed at an angle. Holes corresponding to the pins were drilled in two 5 mm thick, 2 inch wide iron strip (of the length of metatarsal). The pins were passed through the holes in the strips, placed one on each side (lateral and medial) to act as side bars. The ends of the pins were bent over the strips and fixed with epoxy putty, leaving one to one and half inch gap by inserting sterile gauze soaked in betadine between the skin and strips to facilitate wound dressing (Fig. 2a, b & c). Finally, a bandage was applied all around the ESF. Post-operatively, anti-inflammatory and analgesic (Melonex, Intas Pharmaceutical Pvt. Ltd, Gujrat) @ of 0.25 mg/kg body weight and antibiotic enrofloxacin (Enrocin; RFCL, Ltd, New Delhi) @ 5.0 mg/kg body weight were administered intramuscularly for 5 and 7 days, respectively. Daily antiseptic dressing of wound and pin tracts was done with 5% povidone-iodine (Betadine; Win-Medicare, Pvt., Ltd., New Delhi) after thorough cleaning with 0.1% KMnO₄ solution. The animal was discharged after seven days with the advice to the owner for daily dressing of the wound and to report after four months or earlier in case of any complication.

The owner informed telephonically that the animal was bearing full weight on affected limb from three months post-operatively. But the animal was presented only after 16 months for the removal of the ESF. Wound and the pin tracts were infested with maggots and animal was limping while walking (Fig. 3a & b). Radiographs revealed excessive callus formation due to movement and multiple bone pieces at the fracture site (Fig. 3c & d). After

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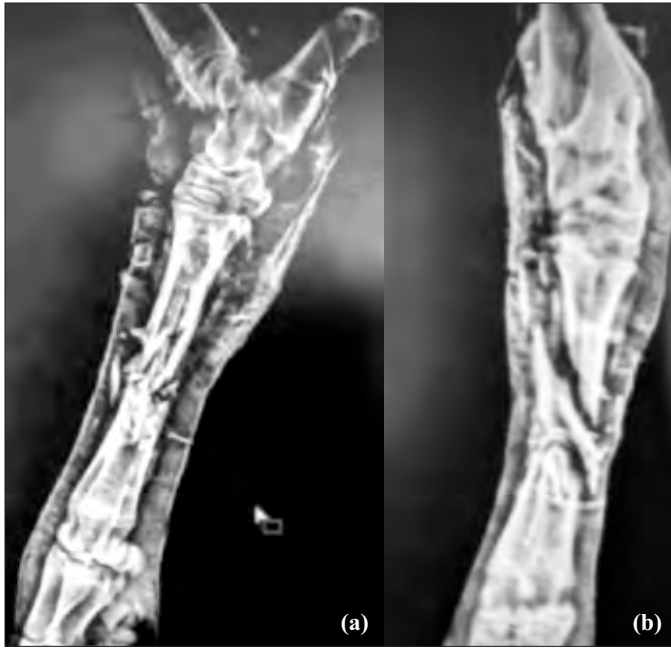


Fig. 1. L/M (a) and D/planter (b) views of left metatarsal bone showing midshaft compound comminuted fracture. Synthetic cast is visible on the radiograph



Fig. 2. After application of bilateral uniplanar linear external skeletal fixator on left metatarsal bone (a) caudal view, (b) cranial view (c) lateral view

cleaning and lavaging of wounds with antiseptic solution, the pins were cut closed to the skin from the lateral side and were removed from the medial side. The wounds were dressed with Betadine after manual removal of the maggots (Fig. 3e-i). There was marked improvement in weight bearing immediately after removal of the ESF (Fig. 3j) and full weight bearing was observed while walking one week later (Fig. 3k). The wound healed in 10 days by topical dressing with betadine and Himax ointment (Natural remedies Pvt. Ltd., Bangalore, India).

The external coaptation is a good and economical technique for management of simple or closed metacarpal or metatarsal fractures; however, recent open fracture can be managed by cast with a provision of window over the

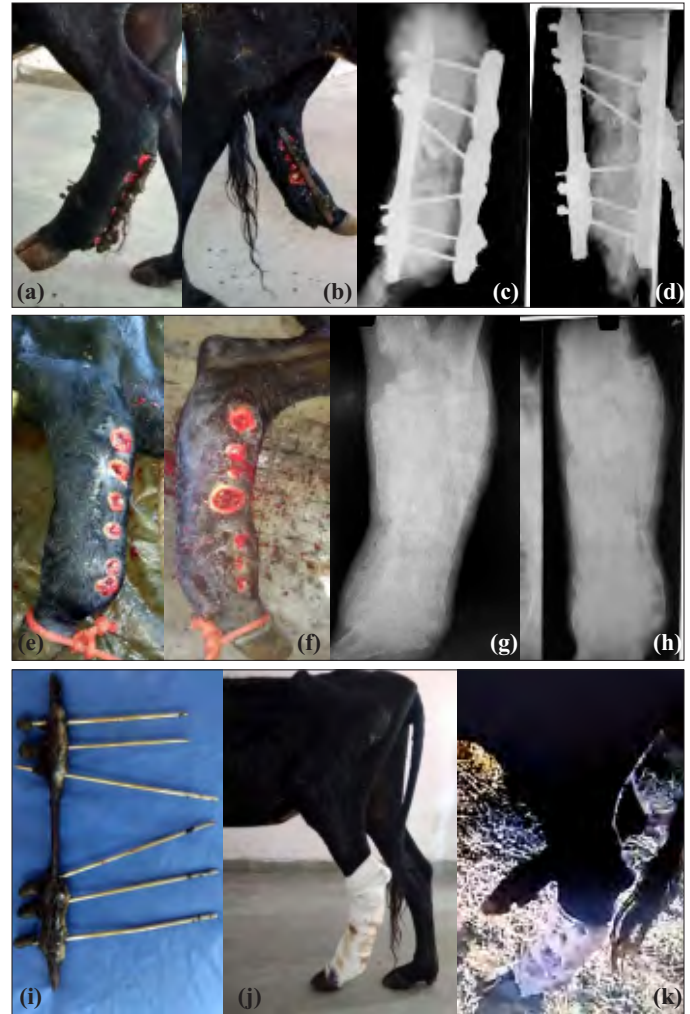


Fig. 3. Post-operative observations after 16 months; MT bone with ESF (a) lateral and (b) medial view; radiographs with fixator (c) lateral and D/planter view; after removal of fixator (e) lateral and (f) medial view; radiographs (g) lateral and (h) D/planter view; (i) removed fixator, (j) weight bearing on the day of removal of fixator; (k) full weight bearing while walking, 7 days after removal of fixator (Entire weight is borne on the affected limb while the normal limb is in air).

wound (Denny *et al.*, 1988; Tamilmahan *et al.*, 2017; Yadav *et al.*, 2020). The case under report had a history of small wound on the medial aspect at the time of fracture and synthetic cast was applied without making a window in field. The wound might have been contaminated at the time of cast application and lack of a window to permit its daily dressing and facilitate drainage of discharge, if any, might have led to setting up of infection and suppuration. These observations indicated that synthetic cast without a window for dressing is not a good option for management of an open fracture even if the wound is fresh and small.

External skeletal fixation provides good stabilization for open fractures and also provides space for daily dressing of wound. In case of midshaft fracture, it also does

not affect joint movement (Ali *et al.*, 2016; Tamilmahan *et al.*, 2017). Bilgili *et al.* (2008) have reported pin tract infection in two calves out of six calves treated with the use of a circular external skeletal fixator. The fact that the owner did not report back after four months, as advised, indicates the careless attitude and probably he had stopped wound dressing few days after discharge from the clinic when the animal started bearing weight normally. It is only when pin tracts developed infection and wounds got infested with maggots, the owner brought the animal back to the clinic. Whole metatarsal region was swollen which could be due to exuberant and unorganized callus formation secondary to continuous mobility at the fracture site and pins sites as well. The weight bearing returned to normal in 7 days after removal of the ESF and daily antiseptic dressing of the pin tract wounds. This could have been because of rapid healing of superficial pin tracts infection and alleviation of pain caused by pins. Even though the ESF was removed after 16 months of its application, it did not affect the time of fracture, however, in young growing animals, ESF should be removed as soon as clinical union is achieved.

The report highlights that external skeletal fixator can be successful in low weight cow heifer but require

wound care to avoid pin track infection and osteomyelitis.

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