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Research Paper

External Skeletal Fixation for Management of Open Comminuted Metacarpal Fracture in a Pregnant Cow: A Clinical Case Report

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Abstract: A five-year-old pregnant cow was presented with a history of right forelimb lameness and an open wound persisting for two months. The case was diagnosed as an open comminuted fracture of the proximal metacarpal bone with chronic wound infection. Previous management with splinting had been unsuccessful, resulting in abscess formation and persistent discharge. External skeletal fixation using multiple cross-passed K-wires and epoxy compound was employed to provide rigid stabilization. Appropriate wound management, systemic therapy, and supportive care facilitated progressive healing. This report highlights the clinical approach and outcome of external skeletal fixation in a chronic metacarpal fracture case under field conditions.

Keywords: Cow, Metacarpal fracture, External skeletal fixation, Open fracture, Orthopedic management

Introduction:

Orthopedic conditions, particularly long bone fractures, are frequently reported in bovines due to accidents, slipping, and external trauma. Among these, metacarpal fractures are relatively common in adult cattle owing to their weight-bearing function and limited soft tissue coverage (Turner and McIlwraith, 2013). Open comminuted fractures are of particular concern due to high risk of infection, delayed union, and poor prognosis. Surgical management by external skeletal fixation offers rigid stabilization, allows wound drainage, and minimizes further contamination (Aithal *et. al.*, 2003; Saini *et. al.*, 2004). This case report documents the

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successful application of an epoxy-K wire external fixator in a chronic metacarpal fracture of a pregnant cow.

Case History and Clinical Presentation

A five-year-old gravid cow owned by Mr. Muralilal, Hathras (U.P.), was presented to the Teaching Veterinary Clinical Complex with a history of right forelimb lameness and an open wound persisting for approximately two months (Fig.1). The animal had sustained trauma resulting in fracture, and initial treatment by local splinting failed due to the development of an abscess with purulent discharge. Despite this, the cow maintained normal appetite, water intake, urination, and defecation. On physical examination, the cow was alert, moderately lame, and unable to bear weight on the right forelimb. An open wound with granulation tissue and purulent exudation was present on the lateral aspect of the proximal metacarpal region. Crepitation and abnormal mobility were evident on palpation. The prognosis was considered guarded.

Diagnostic Investigations

Radiographic examination confirmed a proximal comminuted metacarpal fracture with an open wound. Tentative diagnosis: Open comminuted fracture of the right proximal metacarpal bone.

Treatment and Surgical Management

Under sedation and aseptic preparation, external skeletal fixation was performed:

- Six 3 mm × 25.5 cm K-wires were inserted crosswise at approximately 40° angles in both proximal and distal fragments.
- The pins were bent and secured toward the lateral side of the fracture site.
- A rigid external frame was created by covering the pin ends with epoxy compound (M-seal).
- The wound was thoroughly debrided, lavage with povidone iodine, and topical DC powder was applied.
- The pin insertion sites were dressed daily with povidone iodine and isopropyl alcohol.

Medical Management included:

- Inj. Meloxicam (15 ml IM, once daily × 5 days)
- Inj. Enrofloxacin (12 ml IM, once daily × 5 days)
- Inj. AC Vet (4.5 gm IV, once daily × 5 days)
- Inj. OTC (30 ml applied at wound site)
- Oral calcium and vitamin supplements

Strict stall rest was advised, with daily cleaning and monitoring of pin sites.

Discussion:

Open comminuted fractures in cattle are challenging due to continuous weight-bearing, contamination, and delayed presentation (Kumar and Singh, 2014). Conservative methods like splinting are often inadequate, particularly in chronic cases with wound infection. External skeletal fixation using epoxy-K wire frames is widely reported as an economical and effective technique in bovine orthopedics (Aithal *et. al.*, 2003; Sahu *et. al.*, 2019). The technique provides stability, facilitates wound management, and allows early weight-bearing compared to traditional casting. In the present case, despite chronicity and infection, fracture stabilization was achieved successfully with external fixation. Supportive therapy, proper wound care, and nutritional supplementation further enhanced recovery.

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Conclusion:

This report demonstrates that external skeletal fixation using epoxy-K wire frames is a practical, cost-effective, and field-applicable method for managing complicated open metacarpal fractures in cattle. Even in chronic cases with guarded prognosis, satisfactory functional recovery can be achieved through timely stabilization, aseptic wound care, and supportive management.

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Figure: 1. Photograph showing the application of external skeleton fixation with clinical notes and therapeutic protocol.