



## Case Report

### Surgical Management of Compound Metacarpal Fracture in Black Kite (*Milvus migrans*): A Case Report

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#### ABSTRACT

A young black kite weighing 623 grams with the history of trauma due to unknown cause and unable to fly was presented. Physical examination revealed the bird to be dull and depressed with exposed bones of right wing having sharp edges along with the loss of soft tissue coverage. Radiographic examination confirmed the fracture of the distal third of metacarpal bone of the right wing. The bird was anaesthetized with diazepam followed 5 minutes later by Ketamine. The intramedullary pinning was done and butterfly-cast was applied for external immobilization of whole affected right wing. The bird was confined in a cage to restrict movement for a period of two weeks. Postoperatively, Meloxicam and Enrofloxacin were administered along with antiseptic wound dressing for 10 days. On removal of pin on 25<sup>th</sup> day, complete healing of the area was observed and the bird recovered completely without any complications.

**Key words:** Diazepam, Fracture, Ketamine, Kite, Metacarpal

#### INTRODUCTION

The black kite, *Milvus migrans*, is a medium sized bird of prey in the family Accipitridae, which also includes many other diurnal raptors and thought to be the world's most abundant species of accipitrid, although some populations have experienced dramatic declines or fluctuations in the post industrial period (Ferguson-Lees *et al.*, 2001). The black kite or common Pariah kite, *Milvus migrans govinda*, a race of the black kite, which in various forms has a very wide distribution in the world, is found throughout India including kashmir, Burma and Srilanka, extending still farther east to Hainan island the southernmost part of China (Nanjappa *et al.*, 2013). Bone fractures are common in both wild and captive birds (Fix and Barrows, 1990; Houston, 1993). Avian bones, including the ones of the limbs, are thin brittle and tend to break into fragments upon a variety of natural events like midair collisions, fights with other birds (Houston, 1993) or anthropogenic experiences like gunshot wounds, collisions with automobiles or fences, encounters with traps and attacks by animals like dogs and cats (Fix and Barrows, 1990). The fracture of the wing is not a so common condition in free-range birds like eagle

(Manjulkar *et al.*, 2008) but this may sometime occur because of trauma or accidents as wing bones are thin and brittle with large medullary canal (Bennett and Kuzma, 1992). Factors that complicate the management of metacarpal bone fractures include the paucity of soft tissue structures around these bones to protect them and provide blood supply as well as the high incidence of open comminuted fractures as a result of high-energy collisions with wires or projectile impacts, thereby having a lower rate of successful fixation than other bone fractures (Newton and Zeitlin, 1997). There are two main techniques used in the management of metacarpal and carpal bone fractures are the curved-edge sandwich splint, and External Skeletal Fixation (Type I) or the ESF. While the curved-edge sandwich splints are suitable for stabilizing closed, easily reduced metacarpal fractures, the ESF are ideal for highly, complete and comminuted fractures of the metacarpal bones with extensive soft tissue damage (Peter and Patrick, 2013). Treating wild birds with fractures requires the consideration of a number of factors that are not issues in treating domestic pets. First and foremost, each bird must be fit to be released when healed; even with raptors, available placement for disabled birds is a rare thing. It is even difficult to place

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charismatic species such as eagles. Consequently, reality, and usually rehabilitation licensing, dictates that a bird with an injury that will render it unable to fly or forage should be humanely euthanized and it is both illegal and inhumane to keep most wild birds as pets (Rebecca, 2010).

## CASE REPORT

### History and clinical examination

A young common pariah kite weighing 623 grams with the history of trauma due to unknown cause and unable to fly was brought to the Teaching Veterinary Clinical Service Complex Faculty of Veterinary Sciences & Animal Husbandry, Alusteng, Shuhama, SKUAST-Kashmir. The bird was restless and trying to fly but was unable to fly. Physical examination revealed the bird to be dull and depressed with exposed bones of right wing having sharp edges along with the loss of soft tissue coverage. The fractured fragments were on the ventral surface of the wing with contaminated wound.

### Primary and final diagnosis

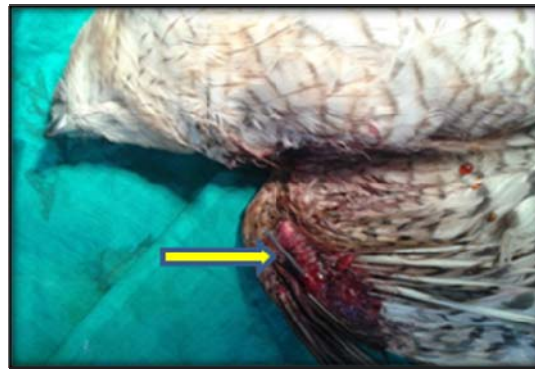
After clinical observation, the case was firstly diagnosed as a compound fracture of metacarpal bone of right wing. Radiographic examination confirmed the fracture of distal third of metacarpal bone of the right wing (Figure 1). Based on the clinical and radiographic findings, intramedullary pinning of the wing was considered.

### Treatment

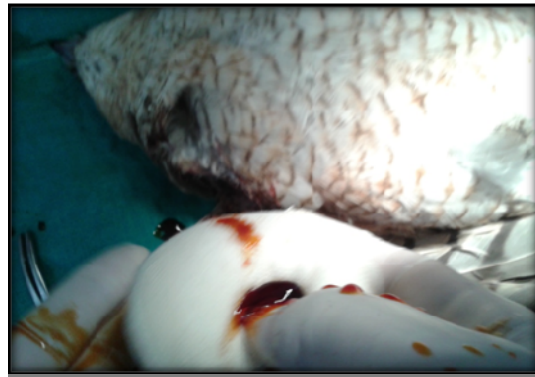
The anaesthetic regime Diazepam/ Ketamine was used as described by Desai *et al.* (2012). Diazepam (Lori<sup>®</sup>, Neon laboratories Limited, Mumbai, India, 1mg/kg, IM) was administered then by Ketamine (Aneket<sup>®</sup>, Neon laboratories Limited, Mumbai, India, 15 mg/kg IM) 5 minutes later. The bird was restrained and held on its left side (left lateral recumbency) and the surgical site was prepared for aseptic surgery by plucking off the feathers. The wounded site was flushed with lukewarm normal saline mixed with 1% chlorhexidine solution and the adjoining feathers were removed around the injury site to prevent further wound infection. The wound was then thoroughly debrided followed by topical application of 5% povidone iodine solution. The skin and the muscles were incised and muscles were transected. A titanium pin was measured against the radiograph of the fractured bone. The pin was introduced into the bone through the fracture and driven proximally while the carpal joint was held in flexion. Following the reduction of the fragments, the pin was seated in the distal fragment and bent at 90° to attach to the fixator (Figure 2). The pin was bent and inserted into the opposite fragment to avoid transgressing of any joint. The subcutaneous tissue and the muscles were sutured using chromic catgut No. 2-0 and the skin was closed by black braided silk No. 2-0 (Figure 3). A butterfly cast was applied for external immobilization or to restrict the movement of whole affected right wing (Figure 4). Before applying bandage, the wound was powdered with antibiotic, Ampicillin. Furthermore, the owner was advised to keep the bird confined in a cage to restrict movement for a minimum



**Fig. 1:** Radiograph showing metacarpal bone fracture of the wing



**Fig. 2:** Intra-medullary pinning in the fractured metacarpal



**Fig. 3:** Skin sutured



**Fig. 4:** Butterfly-cast of whole wing

period of two weeks. On each third day, the bandage was opened and the site was dressed with antiseptic and 50% hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and the powder was dusted around the stitches. Meloxicam (Melonex<sup>®</sup>, Intas pharmaceutical, India 0.5 mg/kg IM, once daily for 5 days) and enrofloxacin (Bayrocin<sup>®</sup>, Pfizer– Bayer; 20 mg/kg IM, once daily for 7 days) were also administered. Antiseptic wound dressing and antibiotic treatment were given for 10 consecutive days post operation. The pin was removed after 25 days. A complete healing of the area was noticed and bird recovered completely without any complications and became normal after 30 days.

## DISCUSSION

Surgical management of fractures in wild birds often presents a significant challenge to the veterinary surgeon (Kumar *et al.*, 2012). Avian bone fractures are often open and frequently comminuted, especially in wild birds (Bennett and Kuzma, 1992). In many cases, the fracture sites are grossly contaminated and the fragments are necrosed and in such cases, fragment stabilization even with standard orthopedic techniques may not be useful and amputation of the wing for the surgical management of contaminated and infected fractures has been suggested (Hatt *et al.* 2007). A number of standard orthopaedic techniques have been used for fracture management in wild birds like eagle and kites by several scientific workers with variable results (Langley-Hobbs and Friend, 2002; Davidson *et al.*, 2005; Guzman *et al.*, 2007; Manjulkar *et al.*, 2008). The majority of the callus tissue during healing is derived from the periosteal surface, and the blood supply to the periosteum from surrounding soft tissues is very important and the intramedullary circulation appears to be of less significance in avian bone healing than in mammals (West, 1996) as the healing in birds is faster than in mammals. Intramedullary pinning alone is not suitable for metacarpal fracture fixation due to the risk of injury to the radius, coupled with the need for supplemental external coaptation to control rotation forces (Peter and Patrick, 2013). Among the birds of prey, kites are well-known for their behavioural strategy of feigning death when being cornered or in response to prolonged manual restraint (Hoagland, 1927). Ketamine-Diazepam combination was found suitable for short term surgery in birds (Desai *et al.*, 2012). The surgery lasted for 15 minutes during that time additional anaesthetic dose was not required and animal recovered uneventfully.

## Conclusion

In conclusion, intramedullary pinning is a safe procedure and may be indicated in metacarpal and other long fractures in birds with external fixation under Diazepam-Ketamine anaesthesia.

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