

*Short communication*

## **Surgical correction of a complete diaphyseal humeral fracture of Brahminy kite -a case report**

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**A R T I C L E I N F O**

Article history:

Received: 19/10/2021

Accepted: 23/02/2022

*Keywords:*

Brahminy kite, fracture, intramedullary pinning, examination, postoperative

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**A B S T R A C T**

A young Brahminy kite (*Haliastur indus*) weighing 600g was presented to the Shahedul Alam Quadary Teaching Veterinary Hospital, at Chattogram Veterinary and Animal Sciences University, with a history of trauma due to collision with electric wire, which was unable to fly. Physical examination revealed temperature 106°F, depressed bird with bluish discoloration of subcutaneous tissue from shoulder to elbow joint of right wing and radiographic examination showed complete transverse diaphyseal right humeral fracture. Retrograde intramedullary pinning was done under general anesthesia with diazepam and ketamine combination. Post-operative radiograph confirmed the implant was in position. The total anesthetic period of the surgery was 60 minutes. The present study suggests that, intramedullary pinning can be successfully used for humeral fracture management in kite with proper anesthetic protocol. Postoperative care is very important for a successful outcome in avian orthopedics.

**To cite this paper:** D. Sarker, T. Paul, S. K. Yadav and B. C. Das, 2021. Surgical correction of a complete diaphyseal humeral fracture of Brahminy kite -a case report. Bangladesh Journal of Veterinary and Animal Sciences, 9(2):79-82.

### **1. INTRODUCTION**

The Brahminy kites, *Haliastur indus*, belonging to the family Accipitridae, many other diurnal raptors such as hawks, eagles, kites, harriers are also including in this family. Those kites are found in Sri Lanka, Nepal, India, Pakistan, Bangladesh and Southeast Asia and as far south as New South Wales, Australia, through which region it is widespread and resident. Fractures are common in both wild and captive birds (Fix and Barrows, 1990; Houston, 1993). Avian bones are tenuous and fragile, pneumatic and tend to break into fragments upon a variety of natural events like midair collisions, fights with other birds (Houston, 1993) or unnatural experiences like gunshot wounds, collisions with automobiles, electric wire or fences, encounters with traps and attacks by dogs, cats and others animals (Fix and Barrows, 1990).

The fracture of the wing is not so usual condition of free-range birds like eagles (Manjulkar et al., 2008), but this may sometimes occur because of trauma or accidents as bones of wing are fragile with large medullary canal (Bennett and Kuzma, 1992). Accidental injury and inadequate care are the most usual etiology behind the avian fractures (Carrasco, 2019). Even though, mammals and avian are having same basic practices for management of fracture, avian anatomical and physiological variations have to be considered when dealing with orthopedic surgical interventions. External coaptation such as bandages, splint and internal fixation like as, intramedullary pinning, bone plating and external skeletal fixation are common orthopedic intervention for management of avian fracture (Bennett and Kuzma, 1992). The aim of treatment is to recover and preserve the normal anatomy and

physiology of the affected body parts (Carrasco, 2019). The case report describes anaesthetic and surgical management of complete transverse mid diaphyseal humerus fracture by the intramedullary pinning technique in a young Brahminy kite.

## 2. HISTORY AND CLINICAL EXAMINATION

A young common Brahminy kite was rescued by a teenager at Feni, Chattogram, with a history of trauma due to a collision with electrical wire and unable to fly. After 72 hours of the incident the bird was brought to the Shahedul Alam Quadary Teaching Veterinary Hospital, Chattogram Veterinary and Animal Sciences University. It was referred by the local veterinarian and an officer of the forest and environment department. The bird was weighed 600g, it was restless and trying to fly but was unable to fly and capable to stand. Physical examination revealed, depressed bird with a 106<sup>0</sup>F temperature, bluish discoloration of subcutaneous tissue from shoulder to elbow joint of right wing (Figure 1). Radiographic examination confirmed the complete transverse mid diaphyseal humerus fracture of the right wing (Figure 2). Based on the clinical and radiographic findings, intramedullary pinning of the fractured humerus was contemplated.



Figure 1. Bluish discoloration was recorded at fractured site



Figure 2. X-Ray revealed transverse diaphyseal humerus fracture

## 3. ANESTHESIA AND SURGICAL PROCEDURE

An anaesthetic protocol of Diazepam- Ketamine was applied as described in a report (Desai et al., 2012). Diazepam (Sedil®, Square Pharmaceuticals Ltd., Bangladesh) and Ketamine (G-Ketamine® Gonoshasthaya Pharma Ltd., Bangladesh) were administered intramuscularly at 2 mg/kg and 15 mg/kg body weight respectively. After anaesthesia, the bird was restrained and positioned on ventro-dorsal recumbency and the surgical site was prepared for aseptic surgery by plucking off the feathers. The surgical table was prepared at 45°C by a heating pad. For aseptic surgery, the surgical site was prepared by application of 7.5% povidone- iodine solution and 70% isopropyl alcohol. A linear skin incision of the sufficient length was made, the muscles were transected and exposed the fractured fragments (Figure 3). The humeral fracture was stabilized by retrograde intramedullary pinning (Figure 4). A 2.0 mm Kirschner wire (K Wires, Bombay Ortho Industries, India) was used for the pinning purpose. The muscle, subcutaneous tissues and skin were sutured using catgut (2-0) in a simple continuous pattern.



Figure 3. Both fracture ends were exposed for reduction



Figure 4. The fracture ends were fixed by IMP

#### 4. POST-OPERATIVE MANAGEMENT

The surgical site was wrapped with sterile gauze after application of 5% povidone-iodine ointment (Viodin®, Square Pharmaceuticals Ltd., Bangladesh). After surgery, oxygenation was done by facemask for early anaesthetic recovery. Antibiotic gentamicin (Genta-10®, ACME Laboratories Ltd., Bangladesh) was administered intramuscularly 50 mg/kg body weight along with meloxicam (Mel-Vet®, ACME Laboratories Ltd., Bangladesh) at 0.5 mg/kg body weight subcutaneously. Calcium supplementation (Caltate®, Gaco Pharmaceuticals Ltd., Bangladesh) was given 75 mg/kg body weight. A post-operative radiograph was taken to observe the implant position and a figure eight bandage was applied to the fractured wing. The rescuer was advised to keep the kite in confinement.

#### 5. RESULTS

The induction time was 4 minutes with diazepam-ketamine anaesthesia. During the intra-operative phase, the bird's heart rate, respiratory rate, and pupillary reflex were all carefully monitored. There was no righting reflex (raising the head, jaw reflex and perching reflex). Heart and respiratory functions were depressed mildly. From incision through closure of the surgical wound, the surgery took 30 minutes. The anesthetic lasted 60 minutes. Post-operative radiograph revealed implant in position (Figure 5). After 24 hours of surgery, the bird died, which was informed by the rescuer. Before death, the history of the bird was depressed, unsatisfactory feeding nature and mild shivering.

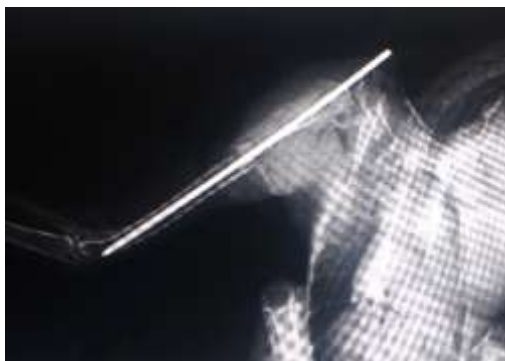


Figure 5. Postoperative x-ray shown implant in position

#### 6. DISCUSSION

The surgical interventions in wild birds such as management of fractures often bring up a variable challenge to the veterinary surgeon (Kumar et al., 2012). Fractures of avian bones are often open, comminuted and frequently closed, especially in the wild birds (Bennett and Kuzma, 1992), but our case study was a closed fracture. Various standard orthopedic techniques have been used for fracture management of the wild birds like eagles and kites by several researchers with variable results (Langley-Hobbs and Friend, 2002; Davidson et al., 2005; Guzman et al., 2007; Manjulkar et al., 2008). Avian fractures can be treated with either retrograde or normograde pinning procedures. Retrograde is more suitable, since the open reduction of fracture is having a better understanding. The disadvantage of retrograde pinning is that there is more trauma to the tissue unless and otherwise the tissue is lightly handled (Carrasco, 2019). The present case study of kite humeral fracture was successfully corrected by retrograde intramedullary pinning. In bird's general anesthesia should be done to perform surgical interventions that provides good muscle relaxation, full unconsciousness and reduction of motor control (Lierz and Korbel, 2012). It is suitable to use diazepam and ketamine combination in birds for short term surgery in field condition. But it was accompanied with shivering and myoclonic cramps (Desai et al., 2012). The case study of humeral fracture management was smoothly performed by using diazepam and ketamine anaesthetics.

The birds with fractures are under severe stress due to trauma, additional restrain and handling (Bennett and Kuzma, 1992). Before fracture management, patient stabilization is very important specially with stress, shock and pain. Surgery may need to delay depends on the stabilization of patients (Bennett and Kuzma, 1992). The prognosis and success rate of surgical management of wild birds are depending on the situation. The survival rate of birds after injury with collision was 34.3% with proper intensive care (Punch, 2001). The nutrition and hydration status should be closely monitored and supported using intravenous fluid therapy and force feeding as necessary (Bush, 1974). High metabolic rate and relatively poor

hepatic glycogen storing capacity were observed in birds. Prolonged recovery period, Trauma, starvation and dehydration induce risk of fatal hypoglycemia (Deem et al., 1998, Mostachio et al., 2008). The present case report, the kite was died probably due to poor post-operative management of feeding and maintenance of temperature by the owner.

## 7. CONCLUSION

Intramedullary pinning technique is a simple and easy internal fixation method for long bone fracture management of birds. The present case report suggests that intramedullary pinning can be successfully used for humeral fracture management in kite with proper anesthetic protocol although postoperative care is very important for a successful outcome.

## ACKNOWLEDGEMENT

The authors are grateful to the rescuer of the bird for well good cooperation by providing valuable information, and post-operative follow up. The authors are also thankful to the Director of SAQ Teaching Veterinary Hospital, CVASU for all kinds of technical supports to perform this work successfully.

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