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Short Communication

Journal of Veterinary and Animal Sciences
ISSN (Print): 0971-0701, (Online): 2582-0605
https://doi.org/10.51966/jvas.2025.56.3.547-549

Management of bilateral wing fracture in two Indian peafowls *(Pavo cristatus)*

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Citation: Syam, K.V., Anoop, S., Laiju, M.P., Sunilkumar, V. and John Martin, K. D. 2025. Management of bilateral wing fracture in two Indian peafowls (*Pavo cristatus*).
J. Vet. Anim. Sci. **56** (3):547-549

Received: 06.02.2025 Accepted: 03.06.2025 Published: 30.09.2025

Abstract

Two adult Indian peahens (Pavo cristatus) were rescued by forest officials with injured wings and inability to fly. Bilateral, open, transverse mid shaft fracture of humerus in both birds were confirmed by physical examination. Open reduction and internal fixation was done with intra medullary pinning under general anaesthesia followed by external coaptation and wing strapping. By the third week onwards, birds started flapping the wings indicating restoration of functionality. Both the birds were released into the wild by the end of the fourth week.

Keywords: *Indian peafowl, fracture, humerus, internal fixation*

The Indian peafowl (*Pavo cristatus*) or common peafowl is a very popular exhibit in most of the zoological parks all around the world and is commonly found all around north India, Pakistan and Sri Lanka. Until the late second half of the 20th Century, they were uncommon in the natural landscape of Kerala. But, may be with change of climate, these birds are have recently been seen widely across Kerala recently to the extent of becoming a pest for the farmland. Indian peafowl (*Pavo cristatus*), a dry-land species was observed to be expanding in Kerala, Southern India, a region falling under the humid tropics (Jose and Nameer, 2020).

Although, these birds are very much prone for accidental trauma, reports on management of surgical conditions, particularly repair of wing fractures are scanty. Hence, a case of successful surgical management and rehabilitation of bilateral wing fractures in two adult peahens by open reduction and internal fixation coupled with wing strapping is placed on record.

Two adult peahens were rescued from the wild by the Kerala Forests and Wildlife Department in injured condition and brought to the forest station late in the evening. As per the request, the veterinary team visited the forest station and examined the birds. Even though the birds were in a state of fear and apprehension, they permitted physical examination of the wings. The wings of both the birds appeared to be droopy and soiled with blood and dirt. A quick examination revealed bilateral mid diaphyseal fracture of humerus which necessitated open reduction and internal fixation to restore

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a fully functional wing to ensure the survival of the bird in the wild.

A detailed examination of the injuries was done after inducing anaesthesia to avoid stress for the birds. Joju *et al.* (2017) recommended that a reduction in stress during capture and handling is very important while considering the welfare implications in zoo and wild animals. General anaesthesia was induced with ketamine hydrochloride administered intramuscular at the dose rate of 30 mg/ Kg body weight (Syam *et al*. 2014). The wounds were washed with potassium permanganate solution and normal saline. In both the birds, identical wounds were noticed midway below the shoulder joint with the exposed fractured ends of the bone. Humerus in both the birds were found fractured at mid diaphyseal region, bilaterally, with the fracture fragments communicating outside. No other signs of tissue laceration, contusion or bruise were noticed anywhere in the body and radiographical confirmation was not possible due to the remoteness of the forest area. The nature of the insult that caused injury could not be elucidated from the inspection of the wounds. In wild birds, fractures of the wing bones can occur due to firearm injuries or as a result of impacts on tree branches, fencing, electric wires or other obstacles (Syam *et al.,* 2014; Gahlot *et al.,* 2015).

Because of the unique anatomic structure of the avian bones, options for fracture treatment were limited (Jinu *et al*., 2021; Nijin *et al*., 2021). It was reported by Jinu *et al*. (2021) that basic principles of fracture fixation as followed in mammalian orthopaedics might be applicable to avian species also, with sufficient modifications and standardisations. It was decided to manage the wing fractures by open reduction and internal fixation, employing intra medullary pinning using Steinmann pin. Feathers were plucked from the region of the wound and wound edges were debrided, cleaned and washed with normal saline followed by povidone iodine solution. The antiseptically prepared site was operated and the exposed fracture fragments were trimmed and reduced. A 10.5 cm long, 4.5 mm Steinmann pin was driven into each of the humerus in a retrograde fashion directed proximally first and then distally, until the pin was seated in the medial epicondylar epiphysis. The muscles were apposed with 3.5 metric polyglactin 910 sutures in simple continuous pattern followed by the skin wound apposition using coarse nylon in horizontal mattress suture pattern. Operated wings were immobilised by 'figure of eight' bandage with moderate flexion using non adhesive bandage followed by a body wrap (Syam *et al*., 2014). Post-operatively, parenteral administration of ceftriaxone (50 mg/Kg) was advised for seven days along with ketoprofen (2 mg/kg) for five days (Syam *et al*., 2014). The body wraps and the bandages were partially disturbed and were removed at the end of the third week along with the skin sutures. Birds started flapping their wings as soon as the bandages were removed and they were kept in a small room to restrict their movements. Palpable callus was observed at the end of fourth week. Since the birds were very active, unmanageable indoors and were able to fly, they were released into the wild at the end of fourth week.

Fracture is a common clinical problem among free-ranging birds, and suitable reduction and fixation are required for successful outcomes. Joy and Syam (2014 b) reported that the primary aim for fracture fixation was to enhance biological response. The cortices of avian long bones are thin and brittle, gets shattered on impact and the fragments may lacerate the skin resulting in open fractures. This might result in acquiring secondary bacterial infection and the associated complications. More over the limited soft tissue cover over the bones and the compromised blood supply in the injured area may worsen the situation resulting in a poor prognosis (Syam *et al*., 2014). Fracture of wing bones on account of trauma were observed more frequently than in other bones in predatory birds, as reported by Caner *et al.* (2019). It is a challenge for the veterinary surgeon to restore a fully functional wing to ensure the survival of the bird in the wild (Bennett and Kuzma, 1992). The challenge multiplies several fold when the fracture is bilateral.

Clinically, fractures in birds recover faster than those in mammals and well aligned stable fractures show clinical improvement within three weeks (Bennett and Kuzma, 1992; Syam *et al.,* 2014). It was reported by Joy and Syam (2014 a) that stabilising the patient, emergency intervention, adequate external coaptation following the surgical intervention and an adequate time of hospitalisation increased the success rate of operative procedure. Due to the thin and fragile structure of the avian bone cortex, pin or screw holding power is weak and they were reported to cause iatrogenic fractures (Nijin *et al*., 2021).

Intramedullary pin application is a widely used technique in the treatment of avian fractures. In this particular case, the authors have used a 4.5 mm sized Steinmann pin, which was sufficient to fit snugly into the medullary canal and to neutralise rotational instability. With adequate stabilisation and immobilisation, clinical stability could be achieved in three weeks in avian fractures (Syam *et al.,* 2014; Jinu *et al*., 2021; Nijin *et al*., 2021). In a study by Caner *et al.* (2019), the removal time of the implants was determined to be 28 days on an average. Generally, implants could be safely removed if adequate stabilisation is achieved and even if radiographic evidence of callus formation was not detected (Bennett and Kuzma, 1992). Figure-of-Eight bandage and other external coaptation techniques were widely used in the distal wing fractures and the birds were released back to nature, as they showed functional improvement. Caner *et al.* (2019) reported in a previous study that intramedullary pin and external coaptation were used in eight free ranging birds with mid diaphyseal fractures of humerus and were returned to the nature with functional recovery.

Summary

Two rescued adult peahens with bilateral wing fractures were treated by open reduction and internal fixation coupled with wing strapping successfully and returned to nature with functional recovery. Optimal surgical and manipulative interventions without much physiological alterations are the key for successful outcome in the case of wild and free ranging birds.

Conflict of interest

The authors declare that they have no conflict of interest

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