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Novel use of IV cannula stylet for tibiotarsal fracture repair in a cockatiel

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Abstract

A two-year-old Lutino Cockatiel was presented with non-weight bearing lameness of the left leg following accidental entrapment in its cage. Radiography revealed a complete, simple, short oblique fracture of the left tibiotarsus. Anesthesia was induced with sevoflurane via chamber and maintained by mask. Surgical stabilization was achieved through a normograde intramedullary pinning technique using a 22G stainless steel intravenous cannula stylet. The fracture was reduced manually without opening the site. The pin was inserted between the cranial and medial tibiotarsal tuberosities and advanced to the distal metaphysis. The animal recovered uneventfully.

Keywords: Cockatiel, intramedullary pinning, tibiotarsus, avian fracture

Introduction

Bone fractures are common in both wild and captive birds (Fix and Barrows, 1990; Houston, 1993) [3, 7]. Tibiotarsal fractures are among the most common fractures seen in pet birds and often are associated with mishandling by human caretakers, cage-related trauma, and injuries caused by another pet in the household (Harcourt-Brown, 2002) [5]. A study on avian fractures during kite festival recorded that out of total limb fractures in birds, 20% had femur fractures while 50% had tibiotarsus fractures (Kothambdi, 2014) [9].

In order to treat orthopedic conditions in birds, nonsurgical methods such as external coaptation, or surgical means including internal and external fixation procedures, or a combination of both are typically used.

External coaptation is a cost-effective and rapid technique that provides good immobilization of the fracture site. It can be used effectively for small sized birds for which anaesthesia and surgical facilities are not available (Redig, 1986) [11]. In this approach, however, periosteal callus predominates despite the long duration of immobilization and it may even contribute to muscle wasting.

The advantages of open reduction include reduced soft tissue trauma, visualization of the fracture site and removal of interposed soft tissues. The direct tissue manipulation, however, can compromise blood supply and produce direct tissue damage which increases the healing time and likelihood of unsuccessful function post-repair (Howard and Branson, 1994) [8].

Radiography is a useful entity as a general approach for the interpretation of skeletal disorders, classification and grading of fractures in birds. Similarly, it's a useful tool for finding post-operative status of fracture fragments, evaluating fracture healing, periosteal reaction and soft tissue changes (Ritchie *et al.*, 1994) [12].

Materials and Methods

A 2-year-old Lutino Cockatiel (*Nymphicus hollandicus*), weighing approximately 90 g, was presented to the small animal OPD, Department of Veterinary Surgery and Radiology, Veterinary College Hebbal, Bengaluru, with the history of non-weight-bearing lameness in the left hindlimb following accidental trauma. According to the owner, the bird had gotten its leg

entangled between cage bars and fractured it while attempting to free itself. The bird was brought to the hospital within 24 hours of injury.

On clinical examination, the bird was bright, alert, and responsive. There was noticeable swelling and limb deformity at the midshaft of the left tibiotarsus. The bird exhibited signs of discomfort while attempting to perch, and the affected limb was hanging loosely with clear absence of weight-bearing. There were no external wounds or signs of hemorrhage but severe soft tissue swelling was noticed at the site [Fig. 1]. Palpation revealed crepitus and instability, indicative of a complete fracture.

Radiographic evaluation under manual restraint confirmed a short oblique, complete, midshaft fracture of the left tibiotarsus [Fig. 2]. No comminution or joint involvement was observed. Based on the location, nature of the fracture, and the size of the bird, intramedullary pinning was chosen as the ideal method for stabilization.



Fig 1: Swelling in the tibiotarsal region.



Fig 2: Preoperative X-ray revealing a simple complete tibiotarsal fracture

After owner consent, the bird was anesthetized in an induction chamber using sevoflurane, and anesthesia was maintained with a face mask throughout the procedure. A heating pad was used to prevent hypothermia. The surgical site was prepared aseptically by plucking feathers over the tibiotarsal region and applying 7.5% povidone-iodine scrub solution.

A 22G intravenous cannula stylet, pre-sterilized and rigid, was selected for use as an intramedullary pin. A small stab incision was made between the cranial and medial tibiotarsal tuberosity, and the stylet was introduced using a normograde technique. The stylet was gently advanced through the proximal metaphysis into the medullary cavity. The bone fragments were aligned using manual traction and digital manipulation without opening the fracture site. Once alignment was achieved, the stylet was advanced into the distal medullary canal [Fig. 3].



Fig 3: Placement of 22G IV cannula stylet



Fig 4: Post operative X-ray confirming apposition of fracture fragments

The pin was trimmed close to the skin, and due to the minimal incision and lack of hemorrhage, no sutures were required. A post-operative radiograph was taken to confirm correct placement of the implant [Fig. 4], and a sterile bandage was applied over the site. The bird recovered smoothly from anesthesia and resumed preening within an hour postoperatively.

Postoperative care included administration of Enrofloxacin (15 mg/kg PO SID for 5 days) and Meloxicam (0.5 mg/kg PO SID for 3 days). The owner was advised to restrict the bird's movement for the week following surgery.

Results and Discussion

Recovery was smooth, and the bird began to perch and bear partial weight by 7th post-operative day. Follow-up radiographs on 14th post-operative day showed callus formation and stable alignment. By 21st post-operative day, radiographic union was evident, and the intramedullary stylet was removed manually without anesthesia.

Bush *et al* (1976) ^[1] studied that callus formation appeared to be similar in birds and mammals. Endosteal callus provided rapid stabilization in bones that were properly aligned. Periosteal callus formation was minimal if the bones are rigidly fixed. Another study observed that the healing of bones was a combination of primary healing, bone to bone healing through Haversian system with minimal callus formation (Doneley, 2011) ^[2]. This could only be achieved with rigid fixation and perfect bone apposition. Endosteal callus formation occurred rapidly where bones were well aligned. This highlights the importance of internal fixation in avians.

Multiple surgical techniques for repairing tibiotarsal fractures in birds have been described. The most commonly described technique involves the use of external skeletal fixation, typically in a type II construct (Meij *et al.*, 1996) ^[10]. Other

methods include the use of interlocking nails (Hollamby *et al.*, 2004) [6] and titanium microplates (Gouvea *et al.*, 2011) [4].

This case showcased the practicality of using a sterile IV cannula stylet as an orthopedic implant in small birds. Given their narrow medullary canals, alternatives like K-wires are often too large. The IV stylet offered the required rigidity and biocompatibility, and was a promising alternative.

Conclusion

The use of a 22G intravenous cannula stylet for the intramedullary fixation of a tibiotarsal fracture in a Cockatiel was successful, leading to complete recovery and return to normal limb function. This method is recommended as a viable alternative in cases where traditional implants are unavailable or impractical due to the bird's size.

Conflict of Interest

Not available

Financial Support

Not available

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