Case Report: Surgical Treatment of Femoral Fracture in Captive Oriental Pied Hornbill (Anthracoceros albirostris)

Chanathip Thammakarn¹, Jamlong Mitchoothai² and Somkiet Huajjantug³

¹Department of Animal Production Technology and Fisheries, Faculty of Agricultural Technology, King Mongkut’s Institute of Technology Ladkrabang, Ladkrabang, Bangkok, 10520, Thailand,
²Faculty of Veterinary Medicine, Mahanakorn University of Technology, Nong Chok, Bangkok, 10530, Thailand
³Faculty of Veterinary Science, Mahidol University, Salaya, Nakhonpathom, 73170 Thailand

Abstract: This report aims to illustrate the problem occurred with the bone of uncommon species in animal clinic or hospital, Oriental Pied Hornbill (Anthracoceros albirostris). A captive bird aged 5 years old had shown a clinical signs of anorexia, depression and left hind limb lameness. Radiographic examination reveals a short oblique fracture at proximal part of the left femur. Surgical treatment was carried out by two stack intramedullary pins fixation. After surgery, Cephalaxin 100 mg per kilogram body weight was medicated orally twice daily for a week. The bird becomes recovered at one week after operation. Normal behavior and appetizing were taken place. The etiology of this fracture could not be explained, because there is no accidental event occurred with the bird and the bone of avian species usually difficult to measure the pathological change by clinical technique.

Keywords: Femur, Hornbill, Intramedullary pins, Surgery
Introduction

Avian species is the common patient in animal clinic or hospital. There are many groups of bird found in Thailand, including psittacine, passerine, raptor, galliforme etc. Some groups are decided as pet animals and raised in cage or aviary. Diseases and pathological disorders usually found in captive or pet birds due to stress and mismanagement. Sometime the diseases becomes by the inappropriate husbandry, which caused the metabolic diseases and harm to many birds.

One of the diseases of the skeleton system, usually shown the abnormalities, includes demineralization, bent bones with pathological fracture, rotation of the distal metacarpi and enlargement of the hock joint (Macwhirter, 2000). These conditions may lead to the occurrence of the fracture,
especially with the femur bone, the longest bone of the bird which weight bearing of the whole body.

The Oriental Pied Hornbill (Anthracoceros albirostris) is a member of hornbill in the Bucerotidae family. Its natural habitat is subtropical or tropical moist lowland forests. It is found in many countries of Asia including Thailand. This species is the endanger group of bird and uncommon animal occurred in the clinics or hospitals. In this clinical case, it illustrates the problem occurred with its bone, which the fracture of femur is appeared. The surgical treatment regarding the intramedullary pins with some technique was applied to this longest bone of the bird, which can immobilize the bone and obtained the satisfy result. The possible causes, treatment procedures and management were explained and discussed.

Case History

A captive Oriental Pied Hornbill aged 5 years old which unidentified sex has shown a clinical signs of anorexia and depression. Left hind limb lameness was taken place. The bird has kept in private aviary, separately from other birds. Water and seasonal fruits were offered ad libitum.

Radiographic examination was performed by plain x-ray films, 45 KV, 25 mA and 0.3 s. The images reveal a short oblique fracture at proximal part of the left femur (Figure 1).

Treatment

Generalized anesthesia was carried out by halothane without endotracheal tube. Anesthetic mast was applied in this case, aims to prevent the damaging of trachea. Because of the complete cartilaginous tracheal rings, an overly inflated endotracheal tube cuff may traumatize or rupture the trachea (Ludders, 1998). Surgical excision was performed laterally on the left leg at tight area. The femoral bone was adjusted for the suitable alignment. Two stack intramedullary pins fixation were used retrograde method, 33 x 3 mm and 22 x 3 mm each, aim to fix the bone and keep it in the normal alignment (Figure 2). After surgery, the bird was received Cephalexin 100 mg per kilogram body weight orally twice daily (Rupiper et al., 2000) for a week. Povidone iodine was used tropically at surgical wound 1-2 times a day until healing.

The bird was kept in the small cage, aimed to restrict the area of living for prevent the dislocation of the bone alignment. Feed and water were accessed freely. Behavior, water and feed consumption were observed for monitoring the postoperative infection.

Results and Discussion

Complete wound healing was found at one week after operation. The bird becomes recovered and uses both of legs normally. The ordinary behavior and appetizing were found. However, to reduce the fracture line
gap and callus formation, the bird was still assigned to stay in the small cage until a month for bone healing (Islam et al., 2002).

Normally, the technique in avian fracture repair should include rigid fixation, short surgery and anesthesia time, minimal disruption to fracture site and callus formation, rapid return to function, and fixation methods (Bush, 1997). The bone plate with screws and external skeletal fixators are usually decided

Figure 1 Plain x-ray films of the sick bird. The circles show left femoral fracture of proximal part. A) Dorso-ventral view and B) Lateral view

Figure 2 Plain x-ray films of the bird after surgical treatment. A) Dorso-ventral view and B) Lateral view
to use in pet animal, especially in the cases of oblique fracture, because they can efficiently reduce the rotation of the bone (Davidson et al., 2005). To obtaining the best result for correction, the bone fracture in birds over 400 g body weight, open reduction is needed (MacCoy, 1992).

In the present case, bone plate with screws was not decided to use, due to the shorten area beside the fracture line to fix the bone tightly with plate and screws. The external skeletal fixators were not suitable to apply at thigh area due to the restriction of legs for perching and moving. Hence, veterinary surgeon had decided to apply the intramedullary pins for fixing the bone in the alignment. The stack pins were performed, aiming to fix the bone and reduce the rotation.

In the procedure of anesthesia, isoflurane is currently the preferred agent for general anesthesia in pet birds. This inhalant is safe and effective (Curro, 1998). While the heart stops at the same time breathing stops may occurred due to little to no margin of safety of halothane (Mader, 2006). But in this case, the veterinarians had decided to use halothane, because it is a common anesthetic drug applied in the hospital at that particular time and there is no isoflurane available in the market as well. However, the monitoring system during the bird under anesthesia condition is very important to reduce the risk of death, due to the action of the halothane as mention earlier and anatomical structures of birds, which no diaphragm and also lungs fixed dorsally in the thoracic chamber. These anatomical structures are affecting to the breathing physiology, probably resulting in apnea. Therefore, pulmonary resuscitation is necessary for sometimes of anesthesia in birds.

For this case, the causative of this fracture cannot be clarified. There are no evidences of the accident in the aviary. The poor husbandry condition is the most possible suspicious for this case. Generally, in captive avian species, change with bone density and bone deformation as the results of poor husbandry or malnutrition can be seen, especially in young birds, caused by hypovitaminosis D, calcium and phosphorus imbalance (Hochleithner et al., 2002). Demineralization of the skeleton could be caused by nutritional imbalance (Macwhirter, 2000). In this case, the radiographic images can not specify the pathological change with the bone, because the bone of bird usually thin and the measurement of the bone density is difficult to perform by the radiographic examination.

To determine the fracture healing, radiographic examination should be assessed by the extent of the endostea callus formation (Junghanns and Trinkaus, 2000). However, the restraint of the bird is also kept in mind for its consequence in the large bird, especially after recovered from the ill. Therefore, this case is not required by the owner. In long
term treatment, nutritional balance could be emphasized. Some nutrients including calcium, phosphorus and vitamin D may be supplemented in appropriate level in order to prevent the decreasing of bone density and fracture of the bone in consequence.

**Conclusions**

Bone fracture in large bird is uncommon case in the animal clinic or hospital, especially in Oriental Pied Hornbill. In this case, the actual cause of this condition could not be drawn, because the bone of avian species is commonly thin and difficult to measure the pathological change in clinical practice and the radiographic examination does not reveal the condition of its bone mass. There are many possibly causes that may make this problem, as well as the inappropriate husbandry and nutritional management. However, the surgical solution gave the good result in this case.

**Acknowledgments**

The authors would like to show our appreciation to Dr.Prasit Damrongsoontornchai, the private veterinary surgeon who gave us the valuable advices.

**References**


