



Clinical Report

Wing Amputation In A Golden Eagle With Humeral Fracture

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Abstract

Case Description-An adult golden eagle with a wound on its right wing caused by gunshot was presented to the University of Tabriz, Veterinary Teaching Hospital.

Clinical Finding-Clinical examination and radiographs, revealed compound fracture in distal third of humerus, severe soft tissue compromise and irreparable loss of blood supply. Anemia and leukocytosis were revealed on CBC test.

Treatment and Outcome- Based on clinical and radiographic figures, amputation of the wing was considered to save the bird life. The bird was treated with Ringer's lactate solution and Lincospectin, preoperatively. Under general anesthesia with intramuscular injection of Ketamine 10mg/kg and Xylazine 1mg/kg amputation of wing at proximal third of the humerus was done. The bird recovered without any complication. Healing was uneventful and no complications were observed during six months postoperatively.

Clinical Relevance-Hereby, we reported unilateral wing amputation for management of humeral fracture due to gunshot in a Golden eagle. Amputation of the humerus at its proximal third was recommended to prevent osteomyelitis and as a life-saving treatment in such a complicated case.

Keywords: Golden eagle, wing, fracture, amputation

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Case description

An adult golden eagle weighing 3 kg was presented to the University of Tabriz, Veterinary Teaching Hospital. Twenty days before admission the eagle had been wounded in the right wing with a gun-blast.

Clinical Findings

Physical examination revealed the bird to be reluctant to move, depressed, open distal humeral fracture along with loss of tissue coverage. Neurovascular assessment indicated irreparable loss of blood supply leading to avascular necrosis of the distal portion of the wing.

However, the wing nerves were intact. The fracture site was grossly contaminated and the fragments were devitalized (Fig. 1). However, contralateral wing appeared normal and no injury or abnormality was found in the rest of the body.

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Radiographic examination confirmed the fracture of distal third of the humerus (Fig. 2). However, the shoulder joint did not reveal any injury. A CBC test revealed anemia (PCV=22%) and heterophilic leukocytosis and regenerative left shift.

Treatment and outcome

based on the clinical and radiographic findings, amputation of the wing was considered. Ringer lactate (10 ml/kg/hr, SC) and Lincospectine (3 mg/kg, SC) were administered before surgery to stabilize the bird condition (Fig.3).



Figure 1. Presence of compound fracture with contaminated wound.

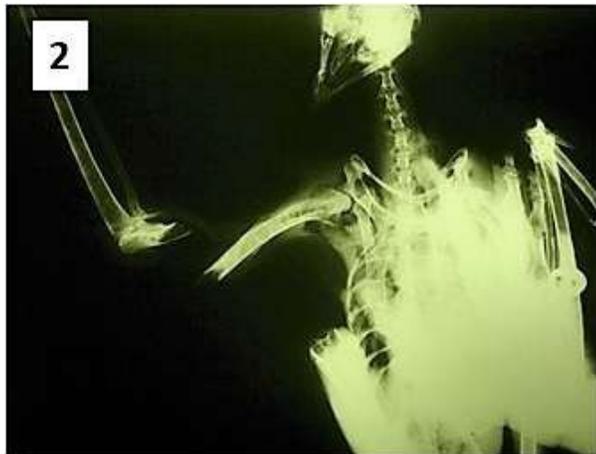


Figure 2. Radiograph showing fracture at distal third of humerus (right wing)

Under general anesthesia with IM administration of 1 mg/kg Xylazine 2% (Alphasan, Woerden, Holland) and 10mg/kg Ketamine 5% (Alphasan, Woerden, Holland) the bird was restrained on the heating pad and the surgical site was prepared for aseptic surgery by plucking the feathers. Before irrigating the surgical site, the medullary canal of the proximal fragment of the humerus was covered with moisturized gauzes to prevent fluids or necrotic debris flushed into the pneumatic bone. The necrotic tissues were debrided and removed surgically (Fig.4). The wounded site was flushed with normal saline mixed with 1% povidone iodine solution. The skin was incised at the distal humerus just proximal to the elbow. The muscle was transected at the musculotendinous junction near the elbow (near the insertion). The radial and median ulnar nerves were injected with Lidocaine 2% (Abu Reyhan Pharmaceuticals Co., Tehran, Iran) for short term post-operative analgesia prior to their transection. A transverse osteotomy was carried out at the proximal third of the humerus. The muscle was sutured using Vicryl No.2-0 over the bone stump. Subcutaneous and skin were sutured routinely (Fig.5). Drain was applied for 3 days. After surgery radiographs were taken from affected limb (Fig.6). Postoperatively, Enrofloxacin (20 mg/kg, IM) and Meloxicam (0.2 mg/kg, Po) were administered for 7 days after surgery. Healing was uneventful and no complications were observed in the six months post-surgery.



Figure 3. Preoperative fluid therapy



Figure 4. Surgical debridement and removal of necrotic tissue.



Figure 5. Postoperative view of amputated wing.



Figure 6. Postoperative radiograph of the affected limb.

Clinical Relevance

The golden eagle (*Aquila chrysaetos*) is one of the best-known birds of prey in the Northern Hemisphere. It is the most widely disturbed species of eagle. It is also one of the best-known birds of prey in the high altitude mountainous regions of Iran.^{1,2} Bone fractures are common in both wild and pet bird. Falling, collisions with a window or ceiling fan, a crushing incident such as being stepped on, or anthropogenic experiences like gunshot wounds, encounters with traps are the most common cause of avian bone fractures.^{3,4} Avian bone fractures are often open and frequently comminuted, especially in wild birds.⁵ In such cases, fragment stabilization with standard orthopedic techniques may not be useful. The selection of a proper technique for definitive repair will depend on several variables, including the patient's role (pet, breeder, wild bird), the function required of the injured limb, the type of injury and the age the bird. Amputation is a surgical procedure that involves removal of an extremity or limb or a part of a limb usually as a result of chronic trauma to the wing, unresectable tumors, non-union or open severely contaminated fractures and severe infection and, at times, is a life –saving procedure. Hence, to save the life may be only Choice.⁶ After amputation, the bird unable to use its wing for balance, but most birds appear to be able to adjust to this without complications.⁷ Wings play an important part in maintaining balance, after recovery bird unable to fly. In situations where use of the wing for balance is important, it may be beneficial to amputate as distally as possible. This function is especially when working with birds to be used in breeding programs and as surrogate parents. It may be difficult to obtain adequate soft tissues for stump coverage with distal amputation, however, amputation of the proximal thirds of the bone provide adequate soft tissue coverage and creates a stump short enough to prevent self-trauma.^{7,8} Avian bones have high calcium content and a thin brittle nature. An addition, portions of the medullary canal of the humerus in many birds are connected to the air sacs (pneumatic) and are believed to contribute to the respiratory cycle during flight. It is best to cover the medullary canal to the proximal fragment of a humeral fracture before irrigating the surgical site. Fluids or necrotic debris flushed into the pneumatic bone may cause asphyxiation, air sacculitis or pneumonia. If

exposure of a fracture site requires the transection of the muscle, it is best to do so near the muscle's origin or insertion in order to minimize trauma and hemorrhage and to facilitate reattachment.⁹

In the present case, bone and soft tissue avascular necrosis and infection were seen on presentation of the bird. Therefore, amputation of the wing at proximal third of humerus was done to save the bird life and to prevent further spread of infection to other bones. Healing was uneventful and because of appropriate postoperative treatment no signs of dehydration and infection were observed during six months postoperatively. Any bird that has sustained injuries requiring amputation of a leg, a foot, or a wing at the elbow (humero-ulnar joint) or above, and/or is completely blind must be euthanized. We must not sustain the life of any migratory bird that cannot after medical management feed itself, perch upright, or ambulate without inflicting additional injuries to itself.¹⁰ However, this bird is a caged animal and is used to be fed by hand, and after the therapeutic intervention will be fed by hand until the end of its life. The only reason for the surgery was saving the life of the bird as requested by its owner. Therefore, amputation of the humerus at its proximal third is recommended to prevent osteomyelitis and as a life-saving treatment in such a complicated case.

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Conflict of interest

None

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چکیده

قطع بال در یک بهله عقاب طلایی همراه با شکستگی بازو

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توصیف بیمار- یک بهله عقاب طلایی بالغ با زخم روی بال سمت راست به درمانگاه تخصصی دانشکده دامپزشکی دانشگاه تبریز ارجاع داده شد.

علایم بالینی- در معاینه بالینی و عکس رادیوگراف شکستگی باز در ناحیه یک سوم پایینی استخوان بازو، درگیری بافت نرم و تخریب غیرقابل ترمیم عروق خونی ناحیه دیده شد. یافته های آزمایشگاهی کم خونی و لکوسیتوز را نشان داد.
درمان و نتیجه- با توجه به یافته های رادیولوژی و معاینات بالینی تصمیم به عمل قطع بال گرفته شد. با تجویز سرم رینگر لاکتات و لینکوسپکیتین و بهبود نسبی حال بیمار، حیوان برای جراحی آماده شد. تحت بیهوشی عمومی با تزریق داخل عضلانی کتامین ۱۰ mg/kg و زایلازین ۱ mg/kg قطع عضو با قطع استخوان بازو در یک سوم بالایی آن جهت نجات جان بیمار انجام شد. بهبودی از بیهوشی پرنده بدون عارضه جانبی بود. التیام ناحیه به خوبی انجام شده و تا شش ماه بعد از جراحی هیچ گونه عارضه جانبی مشاهده نشد.

کاربرد بالینی- بدین وسیله، گزارش حاضر قطع یکطرفه بال عقاب طلایی جهت مدیریت شکستگی بازو ناشی از اصابت گلوله می باشد. در چنین موارد پیچیده ای قطع بازو در یک سوم قدامی آن برای جلوگیری از بروز استئوملیت و همچنین نجات جان پرنده به عنوان روش درمانی پیشنهاد میشود.

کلید واژگان- عقاب طلایی، بال، شکستگی، قطع عضو