

Osteosarcoma in a Sulphur-Crested Cockatoo (*Cacatua galerita*)

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CASE REPORT

A twenty-eight year old, female Sulphur Crested Cockatoo (*Cacatua galerita*) was presented to the Brisbane Bird and Exotics Veterinary Service with a dropped wing. The bird had fallen from the owner's shoulder onto a cement surface a week prior to presentation. After the incident the bird did not eat for two days but at the time of the consultation, the bird's appetite had slowly returned. On physical examination the bird was in good body condition and weighed 966 grams. The right wing was held in a dropped position and crepitus was palpable near the shoulder. The bird was admitted the following day for radiographs under general anaesthesia. Mask induction with isoflurane (Delvet Isoflurane®, Delvet, Seven Hills, NSW) and oxygen was performed and the bird was intubated with an uncuffed endotracheal tube for maintenance of anaesthesia. Ventrodorsal and lateral radiographs of the wing showed a complete, transverse fracture of the proximal humerus approximately 5mm from the head of the humerus (Figure 1). There was also a fissure present on the lateral aspect of the bone, which was approximately 1.5cm in length. Some change in the bone texture was observed and this was thought to be due to the duration of the fracture.

The owner elected to attempt external coaptation as treatment. A figure of eight bandage was placed on the right wing and around the body using Co-plus® (BSN medical GmbH, Hamburg, Germany) and Leucoplast® (BSN medical GmbH, Hamburg, Germany). The following day the bird had removed part of the bandage and it was no longer immobilising the fracture. The bandage was replaced and a soft collar with an attached Elizabethan collar was placed to prevent reoccurrence. The bird was discharged with meloxicam (Metacam®, Boehringer Ingelheim Pty Limited, North Ryde, NSW) to be administered by the owner at 0.25mg/kg orally every twelve hours for the next three days.

The bird was seen weekly for the following six weeks as long acting doxycycline was being administered for the treatment of psittacosis, diagnosed with an antibody test (Biogals' Immunocomb, Biogal Galed Labs, Kibbute Galed, Israel). The bandage was removed fourteen days after placement and on palpation the fracture appeared to have healed. There was a mild reduction in the range of motion of the right carpus and a moderate reduction in range of motion of the right elbow at the time of bandage removal. No further issues with the right wing were detected over the following four weeks as the doxycycline course was completed.



Figure 1. Initial radiograph showing the first humeral fracture.

Four months after initial presentation, the bird presented as the owner had observed a sudden onset of a dropped right wing again. On this occasion there was no history of trauma. On physical examination a fracture of the proximal humerus was again palpable. Radiographs under general anaesthesia revealed a complete, transverse fracture of the proximal humerus, slightly more distal to the previous fracture (Figure 2). The previous fracture callus and remodelling was evident around the current fracture. All of the bird's long bones exhibited increased radiopacity. In addition, the fractured humerus displayed irregular cortices and a mottled appearance within the medulla of the entire bone. The bird had recently laid five eggs so polyostotic hyperostosis was considered the likely



Figure 2. Radiograph showing the second humeral fracture, humeral changes and polyostotic hyperostosis.

cause for the increase in radiopacity. At this point neoplasia and osteomyelitis became differential diagnoses for the cause of a repeat fracture. The owner elected to try external coaptation again with the view to amputating the wing and performing histopathology if the fracture did not heal.

A figure-of-eight bandage was again placed, as well as an Elizabethan collar. The bandage was removed fourteen days later and subtle movement at the proximal humerus was detected, consistent with fibrous callus formation. The bird was sent home without a bandage and seven days later the subtle movement was still present at the fracture site. Repeat radiographs (Figure 3) under general anaesthesia showed a combination of sclerosis and lysis of the entire right humerus. Malunion of the fracture was also evident with soft tissue opacity filling the fracture site. There was mild periosteal reaction present at the fracture ends. The proximal humerus had multiple areas of lysis, with a particularly large lytic lesion in the distal humeral diaphysis. The other long bones still demonstrated presumed polyostotic hyperostosis, but to a lesser degree.



Figure 3. Malunion of the second humeral fracture, after attempted external coaptation

A high index of suspicion for neoplasia led to the right wing being amputated two days later by disarticulation of the shoulder. Anaesthesia was induced and maintained as previously described and an intravenous catheter was placed to enable surgical fluids to be delivered throughout the procedure. The entire wing was sent to the Veterinary Diagnostic Laboratory at Charles Sturt University, New South Wales for histopathology. The histopathological findings were consistent with an osteosarcoma of relatively low grade malignancy. A pathological fracture of the proximal cortices due to neoplastic proliferation of relatively well differentiated bony trabeculae was identified. There was a relatively low mitotic rate. Ongoing monitoring for respiratory system metastasis was recommended. A guarded prognosis for long term survival was made, providing that the pulmonary air sac system had not been invaded centrally.

Initially the wing amputation site seemed to heal well. The bird was admitted for boarding for a short period, two months post surgery as the owner was going away on holiday. At this point an excoriated area of skin at the previous suture site was detected. The bird was boarded again a month and a half later and the skin lesion appeared to have increased in diameter. The bird had not been seen by the nursing staff or the owner to be self mutilating the area. Excision of the lesion and histopathology was elected for at this point, in case of tumour reoccurrence or incomplete surgical excision. This procedure was performed without complication.

Histopathology of the excised skin lesion, again performed by the Veterinary Diagnostic Laboratory, revealed focal, well demarcated ulceration. A rich heterophilic inflammatory cellular infiltration and exudation was present. The inflammatory reaction extended into but was contained within the mid dermis. A diagnosis of chronic skin ulceration was made, with no evidence of neoplastic reoccurrence present in the submitted sample.

An Elizabethan collar was maintained on the bird until the surgical wound had completely healed. To date the bird has shown no evidence of tumour reoccurrence or metastasis.

DISCUSSION

Osteosarcoma is generally considered to be a rare tumour in birds and primarily arises from the appendicular skeleton, as in this case, though cases arising from the axial skeleton and from soft tissue have also been reported (Fordham et al., 2010). Osteosarcoma has been reported in both captive and free-ranging birds. For example, there have been reports of osteosarcoma in the hemimandible of a wild American robin (Hartup and Steinberg, 1996), the tibia of a domestic white goose (Mawdesley-Thomas and Solden, 1967), the synsacral vertebrae of a domestic chicken (Dittmer et al., 2012) and in the eye of a domestic umbrella cockatoo (Fordham et al., 2010).

Neoplasia and a pathological fracture were not suspected the first time this bird presented with a fractured humerus because there was a history of trauma. There was also no firm evidence of neoplasia on the radiographs at this point (Figure 1). However, the assumed remodelling noted on the radiographs may have in fact been early neoplastic changes. Radiographs after removing the first bandage may have been beneficial for confirming this.

Neoplasia became a differential diagnosis in this case when the bird fractured the same bone again without any history of trauma. The changes seen on the radiographs also prompted this to become a differential. At this point osteomyelitis was also another valid differential diagnosis. Neoplasia was not confirmed in this case until the bone was submitted for histopathology. If the bone changes had been present when the humerus was intact, an alternative method of diagnosis would have been biopsy and histopathology.

Interestingly the skin lesion, which was found on histology to be chronic skin ulceration, was not significant in this case. This may have been due to suture reaction, infection or self mutilation, though this was not witnessed.

In most reported cases of osteosarcoma in avian species, treatment is not attempted or is focused on surgical excision. Because the lateral diverticulum of the clavicular air sac communicates with the humerus, (Doneley 2011) perhaps another mode of treatment, such as chemotherapy or radiation therapy, should have been utilised to ensure complete treatment of the osteosarcoma.

Although the tendency for avian tumours to metastasize seems to be low, utilising more than one treatment modality has been shown to improve outcomes in birds with tumours, such as tumour free times and survival times (Filippich, 2004). Amputation and intralesional carboplatin has been recommended as a treatment option for osteosarcoma in avian patients and was reported to successfully treat a case in a rose-breasted cockatoo (Filippich, 2004). Carboplatin can also be administered intravenously or intraosseously, with only mild and transient gastrointestinal side effects (Filippich et al., 2004). Cisplatin has also been used, with increased risks of toxicity (Filippich et al., 2000). The patient needs to be diuresed prior to, during and after administration to minimise these toxic effects (Filippich et al., 2000). Radiation therapy was utilised in a case of intraocular osteosarcoma in an Umbrella Cockatoo (Fordham et al., 2010). However, the bird developed neurological signs three months after radiation treatment and died (Fordham et al., 2010). Necropsy was declined by the owners so it was not known if this had been due to metastatic osteosarcoma, radiation-induced central nervous system damage or another disease process (Fordham et al., 2010).

Surgical resection alone has so far been successful in this case, though another modality of treatment may have been beneficial for the long term outcome of this patient. Continued monitoring for tumour reoccurrence and metastasis, particularly respiratory, should be ongoing.

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