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# What Is Your Diagnosis?

## History

An 18-month-old white cockatoo (*Cacatua alba*) was presented as an emergency with a 4-month history of subcutaneous emphysema involving the left axillary region. The bird was being treated by removing the air with a syringe and needle every 2 weeks at another veterinary hospital. However, the emphysema was recurrent and the area involved was enlarging. The owner reported a decrease in appetite, vocalization, and activity level. Other presenting signs included abnormal posture and regurgitation within the 24 hours before presentation. The bird had no history of trauma and the owner could not correlate any event with the appearance of the emphysema.

On physical exam, the bird was quiet, alert, and responsive with a calm demeanor. Its abnormal posture suggested discomfort, because the left wing was held away from the body and the general posture was not erect. Subcutaneous emphysema of the left axillary region caused distention (approximately 1.5–2 cm in diameter). The left wing was warm on palpation with crepitus of the propatagium. Considerable unilateral atrophy of the left pectoral muscle and slight blunting of the choanal papillae was observed. The bird weighed 442 g. No other abnormalities were observed. A complete blood count (CBC), plasma biochemical analysis, and full body radiographs were performed. Antibiotic treatment was initiated with enrofloxacin (15 mg/kg PO q12h; Baytril, Bayer, Shawnee Mission, KS, USA) and metronidazole (50 mg/kg PO q12h; TEVA Pharmaceuticals, Sellersville, PA, USA). Abnormal results of the CBC[1] were total white blood cell count, $22.2 \times 10^3$ cells/μl (reference range, $5–12 \times 10^3$ cells/μl); packed cell volume, 33% (reference range, 42%–51%); heterophils, 91% (reference range, 45%–72%); lymphocytes, 3% (reference range, 20%–50%); and monocytes, 4% (reference range, 0%–1%). Abnormal results of the plasma biochemical analysis[1] were aspartate aminotransferase, 1262 U/L (reference range, 145–346 U/L), and creatine kinase, 2910 U/L (reference range, 150–397 U/L). The full-body survey radiographs are shown in Figures 1 and 2.

*At this time, please evaluate the history, results of the physical examination and diagnostic tests, and Figures 1 and 2. What are your differential diagnoses as to the cause of the subcutaneous emphysema and what are your treatment options?*

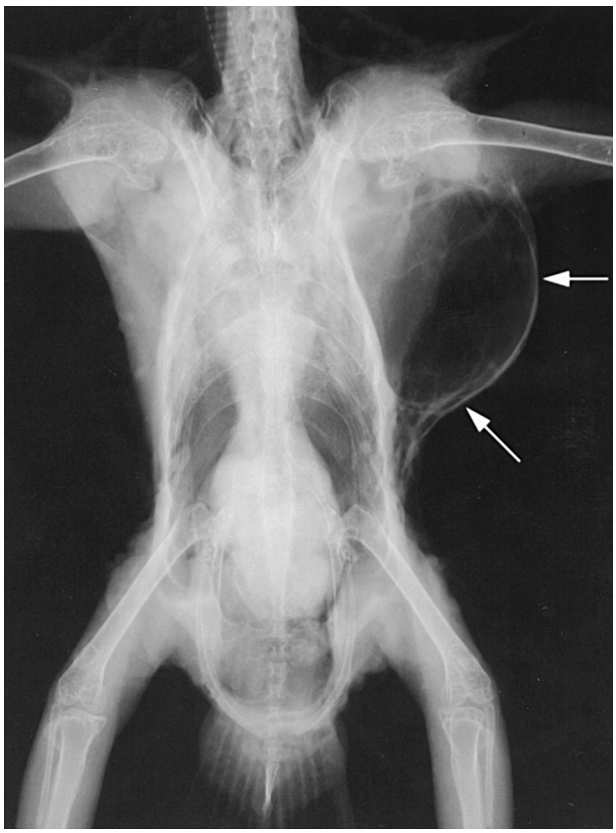

**Figure 1.** Dorsoventral radiograph of an 18-month-old white cockatoo that presented with a 4-month history of subcutaneous emphysema involving the left axillary region (arrows).

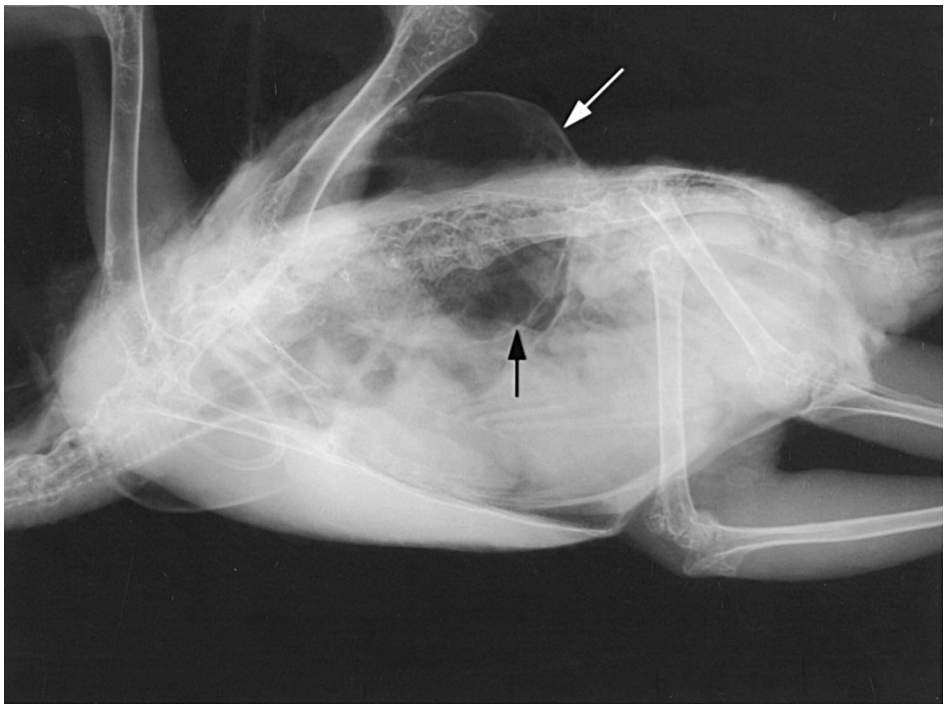

**Figure 2.** Lateral radiograph of the white cockatoo described in Figure 1. Arrows point to the subcutaneous emphysema involving the left axillary region.

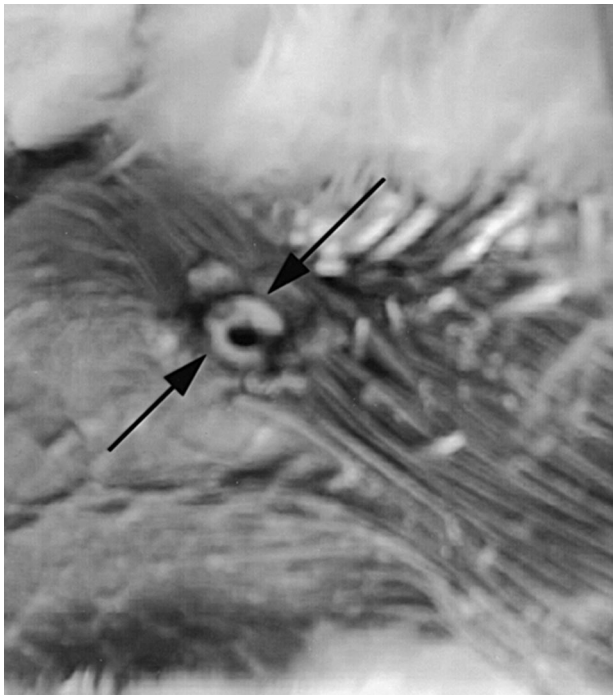

**Figure 3.** Stent opening (arrows) placed to relieve subcutaneous emphysema in the white cockatoo described in Figure 1.

## Diagnosis

Differential diagnoses included fracture of the humerus or luxation or subluxation of the humeroscapular joint with damage to the clavicular air sac extension; trauma to the thoracic wall and the cranial thoracic air sac; and infection with gas-producing bacteria. Some of these differentials have been proposed in poultry with signs of subcutaneous emphysema.[2–4] Multiple attempts were made to remove the air by using a syringe and hypodermic needle but the area began filling with air immediately after. This technique has been used in wild birds presented to our clinic and in other cases of subcutaneous emphysema with good success.[5] Radiographs revealed subcutaneous emphysema evidenced by the presence of air opacity between the thoracic wall and the skin margin on the left axillary region. No evidence was found of humeral fracture or luxation or subluxation of the humeroscapular joint. Evidence was found of a fractured rib, which appeared to be healing as evidenced by callus formation. Although a rib fracture was present near the affected region, it was unclear if this would be enough to cause the amount of emphysema observed.

## Comments

Attempting to find the air sac rupture and source of leakage is usually frustrating if not impossible.[4] The election was made to surgically place a permanent Teflon dermal stent (McAllister Technical Services, Coueur d'Alene, ID, USA) to relieve the air accumulation at the site.[4]

The cockatoo was anesthetized with isoflurane and oxygen (induction 5%, maintenance 2.5%) and the left axillary region was prepped surgically and draped for surgery. A longitudinal incision was made caudoventrally along the affected area. This area was chosen for stent placement to reduce friction caused by the stent, thereby reducing irritation and subsequent trauma by the patient. We elected to use a larger stent with a diameter of 3.17 mm at the center opening to allow air to flow continuously and because of the size of the bird. A larger opening would allow easier airflow and cleaning, because granulation tissue would form after the surgery. The stent was placed in position and attached to the skin with stainless steel sutures, with the smaller surface of the flanged stent facing out and the larger surface remaining under the skin (Fig 3). A purse-string suture was placed around the rim of the stent that remained above the skin. The bird recovered from anesthesia without any complications.

Postoperative care in a case such as this includes cleaning the opening of the stent multiple times during convalescence to prevent obstruction by granulation tissue. Sterile swabs should be used for this purpose to decrease bacterial contamination. When the opening of the stent is cleaned, the remaining air can be pushed out of the site by pressing against the skin. The frequency of cleaning should decrease with time as the granulation bed forms around the stent and the friction over the area decreases. An Elizabethan collar may be needed to prevent the patient from removing the stent and causing additional trauma. A broad-spectrum antibiotic should be administered until cleaning and air extraction manipulations are minimal and healing has occurred. Owners of birds with similar conditions should be reminded that the implant is permanent. The owner of this patient reported on reevaluation that the attitude, appetite, and posture of the cockatoo had improved and that the bird appeared to be more comfortable. Air still accumulated at the site, but the amount was less and the whole area deflated after cleaning the opening.

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## References

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