

Aspergillus Sinusitis in a Cockatiel

**By Fern Van Sant, DVM
For The Birds**

1136 South De Anza Blvd, Suite B.
San Jose, CA 95129

and

Maui Animal Rescue and Sanctuary
Haiku, HI, 96708

Introduction

Aspergillus sp. is a ubiquitous soil saprophyte that is the causative agent of a number of disease syndromes in avian medicine. It is regarded as an opportunistic pathogen and disease caused by this organism usually implies some degree of immune system compromise.¹ In pet birds there are numerous conditions of conventional management that predispose pet birds to aspergillosis. Environmental and nutritional status can play a significant role in this disease process. An understanding of the underlying processes involved is imperative in successfully treating this disease.

Many of the commonly accepted practices of companion bird management contribute to the frequency of this disease. Many of our companion birds are maintained on diets composed largely or entirely of seed. This ration is lacking in many vital nutrients, most notably vitamin A and minerals.² Unfortunately, a lack of vitamin A leads to changes in the squamous epithelium lining respiratory passages. These predictable changes in cellular structure translate into decreased function.³ The normal clearing and local immune functions that protect against respiratory disease are depressed or lacking. ⁴ This commonly puts the bird at risk for significant disease. *Aspergillus* sp. is one of a host of potential pathogens that can cause disease in these situations.⁵

The use of bedding on the cage floor is often adopted for esthetic reasons but can be poorly maintained and often moist due to water spillage and droppings. The most common bedding available is ground corncob. *Aspergillus* grows readily in this litter, and the litter itself is often seeded with *aspergillus* spores. ⁶ Poor ventilation and dusty environments can contribute to this process by contributing to conditions of airway inflammation. Other respiratory irritants such as second hand cigarette smoke, smoke from fireplaces or wood stoves, or aerosolized chemicals can contribute.

Aspergillosis occurs in two principal forms, acute and chronic. The acute form usually results in the formation of milliary granulomas from inhalation of an overwhelming number of spores.⁷ Acute aspergillosis is usually fatal. The chronic form usually occurs when a bird is unable to eliminate or contain even a small number of *aspergillus* spores. The prognosis in this case usually depends on the site of the primary infection and the immune status of the host. Unfortunately the primary lesion is often in an airway and usually in a site with minimal blood supply. *Aspergillus* granulomas are often seen in the trachea at the chonina.⁸ It is speculated that the frequency of lesions at this site is due to airflow patterns. ⁹ This same explanation can account for air sac lesions.

Aspergillus sinusitis is not commonly reported. Most reported sinusitis cases are attributable to hypovitaminosis A or bacteria. ¹⁰ The external site of these infections makes the process somewhat easier to manage and diagnose. The presence of an *aspergillus* granuloma in an accessible sinus can indicate a limited process or can be a sign of systemic disease.

Diagnosis of this disease is often challenging and patients often present in an advanced stage of a chronic process. Dyspnea, debilitation and emaciation are common presenting signs. Management history can be crucial to diagnosis. Stabilization of the patient is crucial with supportive care that will usually include oxygen, heat and fluids. Diagnosis can be obtained with radiographs, endoscopy, cytology and culture. High WBC counts and a low-grade anemia are expected in this disease. Titers for *aspergillus* antibodies can be run, but results can be inconclusive in psittacines.¹¹ Many severely affected birds have no measurable antibodies.

Treatment with antifungal agents should be started quickly and continued for months. Amphotericin B remains the initial treatment of choice followed by oral itraconazole and nebulization of an antifungal drug. 12

It is imperative that the predisposing factors of diet and management be identified and corrected if therapy is to be successful. Depletion of specific nutrients can result in whole body changes that are potentially reversible. Reversal of these processes will largely depend on the stage of debilitation of the patient.

Clinical Report

Anamnesis

Hankie, a four-year-old cockatiel (*Nymphicus hollandicus*) was first seen in June of 1995. She belonged to a family whose infant was undergoing chemotherapy. The owner was interested only in a screen for psittacosis as a precaution for her infant. Hankie was maintained on an all seed ration. On the floor of the cage was soiled corncob bedding. Gray, fluffy material, consistent with fungal mycelia was present under the water dish. A CBC and psittacosis fecal antigen test was run. The owner declined further workup and recommendations about management and diet change. The bird was housed at a neighbor's house for several months until it was surrendered to our practice for placement in a new home.

Hankie was surrendered because she had not seemed well for weeks. She was not eating well, was quiet and she had developed a swelling by her eye. Hankie had a history of egg production. She averaged 8-10 eggs a year. Hankie had seemed slow and depressed recently. The owner interpreted the bird's lethargy to depression since none of the eggs had hatched.

Physical Findings

Hankie was thin, weighing 71gms. Her pectoral musculature was diminished. She appeared very debilitated but not in distress. Her pattern of respiration was labored. There was a slight tail bob at rest. Both nares appeared swollen, dry and plugged with debris. There was a 5mm raised mass midway between her nares and her eye. Her left periorbital area was moderately swollen. Conjunctival tissues were inflamed on the left side. Oral exam revealed extreme inflammatory changes in her pharynx with dystrophic blunted papilla. Tissues around the tongue and glottis appeared very red and moist. Both ear canals had moist inflammatory changes. Auscultation revealed a rapid heart rate but no murmurs and increased airway sounds. She was in normal feather. Her abdomen was slightly doughy but her cloacal tone was normal.

Diagnostic Methods and Results

An initial workup included a CBC and panel. Cultures were obtained from choanae and cloaca. Gram stains and cytology slides were examined from choanal samples. Fecal gram stains and saline wet mounts were examined. A fine needle aspirate of the mass was obtained and prepared for gram stains and cytology. The bird was hospitalized pending the results, for supportive care.

Preliminary results showed an anemic bird with an elevation in her plasma proteins. Gram stains indicated significant numbers of gram negative bacteria from the choanae and feces. Wet mounts of droppings were negative. Slides from the fine needle aspirate were non diagnostic. Her lab results the following day showed a heterophilia, a lymphopenia, and an eosinophilia. The white cells were noted by the lab to be dark and shrunken. Her plasma proteins were elevated to 8.6gm/dl. Chemistries were unremarkable with the exception of calcium of 7.5mg/dl. Culture results followed and showed heavy growth of *Klebsiella* sp. and *Staph aureus* from the choanae and cloaca. Both recovered organisms were susceptible to Claforan.

After seven days of stabilization, Hankie was anesthetized with isoflurane administered by mask. The swelling was opened and curetted. The wound was gently flushed. Her lacrimal ducts were flushed and observed to contain caseous debris. Her trachea and

choanae were examined with an endoscope. Whole body radiographs were taken. The curretted material was prepared for cytology and submitted for culture. Hankie recovered uneventfully.

Examination of the caseous material showed fungal hyphae typical of aspergillus. Cytology was typical of a fungal granuloma. Fungal culture isolated Aspergillus Sp. Radiographs revealed bony changes at the site of the granuloma and abnormal cranial thoracic densities. Films were sent to Dr. Sam Silverman for review. His report described the soft tissue swelling adjacent to the left orbital region with underlying bone loss. He noted abnormal patterns of gas within the GI tract. Ill defined soft tissue opacities were noted in the region of the thoracic inlet.

Dr. Tina Burling also saw hankie for a thorough eye exam. She noted a normal fundic exam but marked inflammation of the conjunctival membranes. She also noted inflammation of the lacrimal ducts.

Differential diagnosis

Initial analysis of the patient and preliminary results lead to list of significant problems. At the root of the problem were a complex set of management and nutritional deficiencies that resulted in a loss of immune competency. The differential diagnoses considered for this patient included hypovitaminosis A, hypocalcemia, inflammatory and infectious sinusitis and possible pneumonia and or air sacculitis. The list of possible causative agents included bacteria, chlamydia, mycoplasma and fungus.

Treatment and Results

The initial therapeutic plan involved aggressive medical and nutritional support. Hankie was treated with vitamin AD3, cefotaxime, calcium gluconate and sub cutaneous fluids. She was housed in an incubator heated to 82F. She was offered a transition diet of a pellet and seed cake. Supplemental feedings by gavage were given twice daily. Hankie stabilized with medical support but the swelling did not go down.

When fungal elements were identified, amphotericin B was started at a dose of 1.5mg/kg q 12h. The drug was diluted in 5% dextrose and given slowly IV twice daily in the ulnar vein. This was continued for three days. Oral itraconazole was started at a dose of 10mg/kg q 12 h. It was given twice daily for two weeks then decreased to once daily. Nebulization was started with 10%chlortrimazole. The nebulization time was 10 minutes daily, three days on and two days off.

At Dr. Burling's suggestion an antifungal eye drop was started. Local irritation was noted and reported to Dr. Burling. As the bird was improving we elected to discontinue the ophthalmic preparation.

Hankie received daily wound care with sterile saline flushes. Any accumulated debris was removed and examined for fungal elements.

Hankie tolerated all therapy remarkably well. She began this process with a depressed attitude and a poor appetite. She was underweight and demonstrated labored respiration. She ate only if prompted. Restraint for the IV amphotericin B was stressful. Real progress was observed after the amphotericin B was discontinued.

Recheck blood work two weeks later showed an increase in her PCV, a normal WBC and plasma proteins of 2.6 gm/dl. Her eosinophils were 4%. Her WBC morphology was normal.. Her surgical wound closed on the 12th day. Daily flushes with saline were discontinued. Her antibiotics were discontinued after 14 days. Recheck cultures were taken 3 days after antibiotics were discontinued. They were negative though her choanae remained inflamed. At this time Hankie began her transition back to her cage. She was removed from her incubator and housed in a large Plexiglas box with a heating pad underneath. She was allowed several hours of cage time as tolerated. Her cage time was slowly increased over a 2 week period. The temperature in her Plexiglas box was slowly decreased to ambient temperature. Heat was supplied only at night. A four week recheck showed a normal PCV, a normal plasma protein, a normal WBC but an SGOT of 1620 IU/L. Clinically the bird was much improved. The surgical site had healed completely. She had gained 6gms. After four weeks of antifungal therapy she had been reduced to maintenance itraconazole and every other day nebulization with chlortrimazole. By this time she had been completely converted to a premium organic formulated diet.

Based on the significant elevation of her SGOT, nebulization was reduced to twice weekly. The time in the chamber was reduced to 5 minutes. Recheck CBC and SGOT two weeks later showed dramatic improvement in her SGOT and a moderate increase in her WBC. Her HCT had returned to normal. Her plasma proteins were also normal. Her weight was up to 79gms. She was bright, alert and showed no signs of illness. A two week recheck with radiographs was scheduled. Her itraconazole was continued once daily and her nebulizations were twice weekly.

At Hankie's eight week recheck a CBC, panel, cultures and radiographs were done. All tests returned with normal results. Hankie weighed 81gms. She had transitioned completely to a cage and a pelleted diet. She was provided with a vitalite and a cage cleaning daily. She appeared to be and acted like a vigorous bird.

Oral itraconazole was continued for a total of three months. Nebulization was discontinued after two months when recheck data supported resolution of clinical disease.

Final diagnosis and Outcome

The final diagnosis in this case was fungal respiratory disease with a confirmed fungal granuloma in the infraorbital sinus. Additional fungal lesions were suspected to be present in the cranial thorax. Visualization and sampling of these would have been risky and difficult. Evidence of these masses and their resolution on radiographs was deemed appropriate and conclusive. The presence of pathogenic bacteria in the feces and choanae was considered secondary. The underlying and predisposing factors that lead to this disease were considered critical to its development. Those underlying problems specifically were poor nutrition and poor husbandry.

Discussion

Aspergillus sp. may be a mere saprophytic fungus, but for a number of reasons it is responsible for a number of significant disease processes in companion birds. Species of birds differ dramatically in their susceptibility to this disease. There is a clear geographic influence to this process with higher incidences occurring in more humid climates. Several species of birds are considered more likely to be at risk to this disease. African Greys, pions and amazons are considered susceptible. Cockatiels are usually considered to be resistant.

This case report describes a serious sinusitis in a cockatiel.

This case report describes a case that is unusual in several respects. On one hand the circumstances that put this bird in serious condition are typical of accepted conventional management. Our tradition of feeding a seed diet of temperate climate seeds grown for oil production is one that has persisted despite volumes of evidence that it is lacking in many vital nutrients and will not support sustainable health. 13 This coupled with the practice of introducing potential pathogens into the birds immediate environment are a one two punch that are often delivered to a companion bird.

This case involves a cockatiel. Whereas many cockatiels are kept as pets, they are often viewed as having an insignificant monetary value. Cockatiels are hardy animals that typically retain their ability to look healthy in spite of multiple degenerative processes. This unfortunately leads to expensive workups and treatments when the bird is presented for care in an advanced stage of debilitation. In this bird's case, the response of the original owner was not uncommon. The bird was given up due to family circumstance. This individual bird was lucky to be adopted by a person able and willing to provide the long and complicated workup and therapy.

The workup provided this bird was thorough and not typical of the medical care usually provided to a cockatiel. Hankie was adopted by the clinic staff and was able to benefit from the combined talents of a number of people.

Hankie presented in an advanced state of disease. Supportive care was necessary to stabilize her before diagnostics could be completed. Stabilization of the critical avian patient requires fluid and caloric support, vitamin and mineral supplementation, heat support in addition to specific therapy. 14 Initially fungal disease was not considered to be the most likely problem

since there were no predisposing factors and our climate is not one where fungal disease is common.

Hankie's original blood work and cultures were not typical of fungal disease.¹⁵ Unfortunately fine needle aspirates were nondiagnostic and yielded only acellular debris. Our efforts at stabilization certainly improved the patient's ability to tolerate the surgical debridement and the antifungal protocol. Identification of the hypocalcemia allowed us to address this deficiency. Evidence supports that the risk of anesthesia is aggravated by conditions of hypocalcemia.¹⁶ Our definitive diagnosis was obtained from radiographs, culture and endoscopy. Our endoscopy was limited to the choanae and trachea. The decision not to visualize lungs and air sacs was made to minimize surgical stress and based on the success of cytology and radiographs to identify our problems. Visualization of the trachea was considered imperative due to the high percentage of birds with aspergillosis that develop obstructing airway lesions.¹⁷

Development of a treatment plan for fungal disease in a cockatiel necessitates consideration of the bird's size and ability of the peripheral vessels to tolerate multiple IV injections. Amphotericin B remains the drug of choice for initial therapy.¹⁸ Oral itraconazole has become widely accepted but takes several days for an effective blood level to be achieved.¹⁹ We were also concerned about the possibility of spread of fungal elements secondary to surgical debridement and flushing. Recognizing the limits of blood borne antifungals we elected to add nebulization with 10% chlortrimazole. Although there is minimal data from controlled studies, chlortrimazole has been shown in clinical situations to be very useful in reversing what can be a devastating process.²⁰ Topical therapy, specifically flushing with Amphotericin B has resulted in tremendous scarring and tissue damage.²¹

Summary

This case report describes a serious fungal infection in a cockatiel. Critical to the development of disease in this bird were many accepted conditions of conventional management that have been proven to cause disease in birds. Two principal factors in this bird were nutrition and cage bedding and maintenance. The first provides the predisposing condition of hypovitaminosis A and the second provides the opportunistic pathogen. Many possible diagnostic procedures were used and discussed. The therapies that worked in this case were chosen by considering the disease, the underlying predisposing factors and the species of bird. Key to the outcome of this case was the supportive management and nursing care that provided an environment conducive to recovery.