

Aspergillosis: A Respiratory Fungal Disease in Companion Parrots

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Often called 'asper', Aspergillosis is a non-contagious but infectious fungal disease caused by a variety of *Aspergillus* species found in our homes and outdoors. Like the mushrooms often found on our pizzas, *Aspergillus* produce spores. Animals such as our companion parrots inhale these spores on a daily basis. Often *Aspergillus* does not cause infection, as the immune system can fend off inhaled spores before they lead to disease. However, when immune systems are compromised, *Aspergillus* is more likely to cause infection and can cause death. This is especially true if the concentration of spores in the environment is higher than normal.

If *Aspergillus* is almost everywhere, then what can you do to prevent Aspergillosis? In this article, we provide ways to detect and deter *Aspergillus* from 'moving in' and help with the recognition of Aspergillosis symptoms. We also discuss treatment options often given by our avian veterinarians and give hope to those still on the road to recovery.

Detecting and Deterring Mold in Your Environment

- Warm, moist environments harbor *Aspergillus* and other fungi. Check areas around your home for drainage problems, leaky pipes, ineffective fans in your bathroom or kitchen, and places water could be entering your home such as vents along the outside of your home.
- Spot-clean mold growth in bathrooms, kitchens, etc. to keep *Aspergillus* at bay. Bleach is extremely irritating to a bird's respiratory system, so never use bleach or any household cleaners around your bird, even if they say they are bird-safe! A bird's respiratory systems are extremely sensitive. Ask your veterinarian if you are unsure of the product's safety.
- Contact a professional to remove serious mold problems in your home. It is wise to move your birds to another location while any construction occurs to your home. Construction can allow spores to escape and become airborne. This allows the concentration of *Aspergillus* spores to become higher in the environment than normal, increasing the chance of Aspergillosis.
- Consider investing in a HEPA filter to capture mold spores in your home.

Predisposing Conditions for Aspergillosis

- Birds with compromised immune system due to stress or another illness. The very young and old are more susceptible.
- Certain parrots are more prone to developing Aspergillosis: African greys, Amazons, *Pionus*.
- Unsanitary conditions can allow *Aspergillus* over-growth. Clean cages and cage papers often. Never use corn cobs or other shredded material. These materials can provide the perfect habitat for fungi, as well as bacteria. Replace old toys, especially ones that can hold fungal growth such as those with fabric or cotton rope parts.
- Malnutrition. Keep your bird's immune systems working at top-notch effectiveness by supplying your friends with vitamins and other phyto-nutrients. These can be found in dark leafy vegetables and super fruits such as blueberries, to name a few.
- Respiratory irritants such as cigarette smoke, fumes from cleaning products, perfumes, and other aerosol sprays will damage your bird's delicate respiratory system, which can increase susceptibility to *Aspergillus*.

- Medications such as antibiotics can remove some natural defenses during treatment for other diseases. Talk to your avian veterinarian about the possibility of your bird contracting Aspergillosis during this time.

Foods with Possible Fungal Contaminates

- Peanuts, especially those in their shells. Peanuts are very susceptible to fungi, including *Aspergillus flavus*. This type of fungus can be an Aspergillosis source and a producer of a type of poison called aflatoxin.
- Seeds and nuts can also harbor mold growth. Sunflower seeds and the shells of walnuts are big carriers of *Aspergillus*.
- Unwashed, overripe/older fruits and vegetables. Thoroughly wash fresh fruits and vegetables before serving them to your birds to remove any outer-laying fungi. Fruits and vegetables past their prime should not be fed your bird, as fungi are more likely to be associated with overripe and older produce.

Symptoms of Aspergillosis

- Weight loss.
- Open-mouth breathing or gasping for breath.
- Tracheal movement or in-out-in movements in the region of the neck.
- Tail-bobbing or movement of the bird's tail up and down while breathing in and out.
- Heavy breathing after flight or exercise.
- Change in voice.
- Persistent itching or rubbing of cere, nares or other places on the head.

When to Take Your Bird to the Vet

- Often by the time symptoms are recognized, birds can be very sick. *Immediately* make an appointment to see your avian veterinarian if you see *any* of the symptoms above. Do not wait to see if his/her condition improves!
- If it is after-hours for your avian veterinarian, take your bird to an animal emergency hospital. Often the hospital can be 'walked-through' treatment by your avian vet by telephone. Always keep your vet's number with you and try to obtain an after-hours number in case of an emergency.

Treatment

- Your avian vet may suggest a treatment program that includes an anti-fungal such as Itraconazole to combat *Aspergillus* infections.
- An anti-inflammatory such as Meloxicam could be prescribed by your vet to decrease inflammatory responses to infection. Medicines such as these can help your bird breathe easier while the anti-fungal gets to work.
- Antibiotics can be used in combination with anti-fungals to ensure a secondary infection does not occur.
- Blood panels to track white blood cell and heterophil counts. In the bird body, these cell types are the first line of defense against fungi and will stick around for some time to 'patrol', even after the fungal infection is gone.
- Medications may be given orally, intravenously, or with the use of a nebulizer. Your avian vet will determine the best way to administer treatment based on the species of your bird.
- An x-ray may be suggested to determine whether the infection is an upper or lower respiratory infection. Opacity in the area of the lungs on an x-ray can be an indicator of a fungal infection. Anesthesia is usually needed during x-rays.
- Endoscopy is more commonly used in larger birds to determine the extent of the infection, to take a fungal sample in an effort to identify the species, and to treat infected areas directly. This is where an incision is made to insert a camera or another device. In smaller birds, endoscopy is more difficult to perform. Anesthesia is usually needed for endoscopy.

The Road to Recovery

- Treatment can be over many months, with multiple visits to the veterinarian's office. Keep up with appointments and scheduled exams. Receiving treatment often and consistently can help fight the infection.
- Sometimes your bird will need to stay overnight at the vet's office. This is to ensure that your bird receives care that may be difficult to administer at home or requires a trained professional. Don't worry as your bird is in the best of hands! This is one of the many reasons it is very important to have a relationship with an avian vet you trust.
- Some days will be better than other days for your bird during recovery. Remember that your bird's body is trying its hardest to fight *Aspergillus* and that this can take a lot of energy.

Personal Accounts

A few Mickaboo volunteers graciously answered questions about their birds' *Aspergillus* infections. We hope the following information will help others identify oncoming symptoms of Aspergillosis in their own birds, compare treatment options, and save lives.

The Story of Ellie, a Plum-headed Parakeet

How did your bird contract Aspergillosis?

Our apartment in North Berkeley was built such that the first floor was too close to the approaching water table. When spring rains came, water splashed up into the crawl space, into the vents, and caused tremendous mold growth in our bedroom, office, and living room. One day we came home from work to black walls in our bedroom, guest room, and living room—literally thousands of mold colonies had started to grow in our house. That same evening, Ellie developed respiratory symptoms associated with Aspergillosis: gasping for air, tail-bobbing indicating labored breathing, and tracheal movement. The spore count was probably very high in the air before colonies became visible in our apartment. Infection was confirmed a variety of ways: a positive *Aspergillus* test for the mold colonies in our apartment via a lab in San Jose, response to medication, high white blood cell and heterophil counts, and x-ray.

How soon did you take your bird to the vet?

As soon as Medical Center for Birds (Oakley, California) opened the next morning, I set up an appointment with Dr. Olsen. Based on our description of the mold in our apartment and Ellie's symptoms, Dr. Olsen suspected Aspergillosis. I believe that acting quickly and taking Ellie right away to the vet saved her life.

How was the infection treated?

Immediately, Ellie was placed on orally-administered Itraconazole (anti-fungal) and Meloxicam (anti-inflammatory) to reduce any swelling associated with the infection. Thankfully we had a blood panel for Ellie a few months prior which could act as a baseline to compare new blood tests. When diagnosed with Aspergillosis, Ellie's white blood cells and heterophils were considered very high as compared to her baseline blood test—an indicator of infection, which matched Dr. Olsen's *Aspergillus* hunch. After somewhat stabilizing her condition at the vet office (3 days), we were allowed to take Ellie home on condition of administering the anti-fungal and anti-inflammatory.

The following week we started seeing Medical Center for Birds' Dr. Fitzgerald, who became Ellie's primary doctor. Dr. Fitzgerald suggested the next few steps to combat the *Aspergillus* infection: an *Aspergillus*-specific blood panel, x-ray to see if the infection was in her upper or lower respiratory tract, and/or endoscopy to take a fungal sample and to determine the extent of infection. After some debating, the *Aspergillus*-specific blood panel was skipped due to its unreliability to pinpoint if *Aspergillus* was the cause of infection when blood was taken for the panel. This is due to a few reasons: as *Aspergillus* spores are relatively common, organisms can develop antibodies to *Aspergillus* at any point in their life, and therefore we would be unsure if Ellie developed *Aspergillus* antibodies many years before or more recently. More concretely, an x-ray of Ellie's body gave us a sense that the infection was occurring in her lower respiratory system, specifically in the left lung and lower airsac. With this new information, Ellie continued on the

same medication as she had started with and was given an antibiotic to ward off secondary bacterial infections.

A few months passed. Though Ellie's symptoms improved, tail-bobbing and tracheal movements were still apparent. Dr. Fitzgerald then suggested endoscopy, a procedure where a small incision into Ellie's side could allow for a camera to be placed into the body to take pictures to search for *Aspergillus*. If an infected area is found during endoscopy, a sample can be taken and an anti-fungal can be placed on the site of infection. Thankfully, the endoscopy performed by Dr. Speer revealed an absence of fungal infection. A very good sign! Ellie's lingering symptoms were then attributed to inflammation caused by healing and possible scarring from the infection itself.

How long did the treatment take?

Treatment continued from late May to October. On December 16, 2010, Dr. Speer gave me a high-five and called her 'cured'! In addition, visual inspection of recovery after flight in the vet office showed good lung capacity. The entirety of *Aspergillosis* was a huge battle and there were many times we thought we might lose Ellie. The initial hospitalization and complications during anesthesia prior to x-ray are a few examples. Thankfully, Medical Center for Birds has been amazing through it all and having a team of vets that bounce ideas off each other is a winning combination. Dr. Fitzgerald was always open to my sending emails with questions and sometimes a scientific journal article or two to her on *Aspergillosis* in Indian ringnecks. Also, we couldn't have done it without the support of Dr. Mal Raff and Ms. Connie Woods, who allowed us to keep Ellie at their house until we found a new apartment to move into where Ellie would be safe.

How is your bird now?

Ellie is relatively back to normal! Occasionally we will see a tail-pump, but this is attributed to possible scarring from the prior *Aspergillus* infection as Dr. Fitzgerald suggested. Dr. Speer told us she is just being 'Ellie'—that sometimes it's hard to remember what she was like before the entire episode. I can agree with that! We will certainly be super cautious and aware of every breath Ellie takes for a long while. She is flying strong, recovers from flight well, eats like a piggy, and is louder than ever. 'Little Miss Miss', as Dr. Fitzgerald calls her, is fixed.

The Story of Eddie, a Blue-headed *Pionus*

How did your bird contract Aspergillosis?

Only nine weeks after Eddie was adopted by a young woman, he became suddenly sick. Eddie's mom lived in an apartment building which was built in the '70s. The week before Eddie got sick, the landlord had finished a month's worth of painting and construction on the outside of the apartment building; this included replacing part of the building's staircase that had started to rot, opening up and re-building a wall that had been leaking, as well as a lot of sanding, painting and replacing parts of the roof.

During the construction, Eddie's mom had made a point to keep her apartment's windows closed during the day when the workers were there—to keep out the dust and fumes. During the evening, however, it was hot and stuffy, so she opened the windows to air the rooms.

She suspects that some sort of toxic mold or fungus was released into the air during construction and entered the apartment when the windows were opened in the evening. Also, the wall that was leaking and opened up for re-construction was on Eddie's window's side of the building.

The vet said that this might be kind of a canary-in-the-coal-mine sort of thing—that we are all exposed to the mold or fungus, but Eddie got sick first because birds are more sensitive.

Eddie's mom also had a Maximillion's *Pionus* who did not get sick. Eddie may have been more susceptible to *Aspergillosis* because he had been moved between four (original and foster) homes during the nine months prior to being adopted into his fifth home. Moving a lot can be stressful on a bird.

How soon did you take your bird to the vet?

On Sunday, Eddie's mom noticed that he wasn't as playful as usual and seemed to be fluffed up and resting more. Since she'd only had him nine weeks, and he was still eating and drinking water fine and looked fine, she thought he might be adjusting to her and his new environment. But on Tuesday night when he wouldn't take his favorite treat and seemed to be struggling to climb, she called the vet and booked an appointment for 8:00 am the following morning.

How was the infection treated?

The vet weighed Eddie. He had lost a significant amount of weight since his last check up two months earlier. They also took x-rays of his chest, but they said that besides what looked like a little extra mucus in his throat, his organs appeared normal. Even though he just had his blood work and a check up nine weeks ago, they did another round of blood work, because they still didn't know what was wrong.

The doctor recommended they keep him overnight in an incubator, while they waited for his test results Thursday morning.

How long did the treatment take?

By Thursday morning Eddie had gone downhill fast and looked very, very bad. The vet brought him out of the incubator and let his mom hold him for over an hour. He could barely lift up his little head.

The vet got the blood work back on Thursday, and it showed his white blood cell count off the charts. His red blood cell count and internal organs were fine. The vet said it did not seem like a bacterial infection, but rather, some sort of air-borne fungal infection. She was treating him with an anti-fungal medication released into his incubator.

The vet said Eddie's type of fungal infection usually came from one of three sources: contaminated feed; old, wet contaminated bedding; or air at a construction site.

How is your bird now?

Eddie died the following Friday morning.

An autopsy analyzed by Dr. Anderson of UC Davis confirmed Eddie's Aspergillosis infection. At sometime during his life, *Aspergillus* had entered Eddie's bloodstream, spread at an extremely rapid rate to the heart, brain and kidneys. What was unusual about Eddie's Aspergillosis was the centralization of infection around the heart and aorta. Dr. Anderson was uncertain of the fungal infection "[...] as [she] could find no evidence that the infection arose from either the respiratory tract or the digestive tract".

Veterinarian Dr. Brons thought that Eddie could have had some sort of immunodeficiency, either genetic or induced from the stress of moving to a new home, which could have made him more susceptible to this fungus. In humans, she said that *Aspergillus fumigatus* in particular is a big issue for AIDS patients. Dr. Brons also made a point that Aspergillosis is not usually painful, and that Eddie was probably not in pain at the end—just extremely tired and sleepy.

The Story of Chance, a *Pionus*

How did your bird contract Aspergillosis?

Mold spores are all around us in the air. The vet said that this last year has been worse because it has been damp/wet and cool causing mold to grow followed by days of very hot weather causing the mold to dry out and release spores into the air. Our next door neighbors are hoarders and they have tons of junk that mold is growing on and around. We know they were out in the back moving junk around and we think that it released a lot of spores into the air which then made their way into the bird room via the open windows and fans. After seeing the x-ray the vet felt that Chance had been exposed to a huge amount of spores at once.

What I was led to believe is contrary to a statement made above; this illness does not come on quickly. The bird breathes in the mold spores and then the spores grow and fill up the lung cavity. By the time you see the symptoms and get your bird to the vet, the fungus has been growing and developing for an extended period of time.

We did look at a number of other possibilities:

- Was there mold in the room that the birds live in?
- Was there mold outside the room?
- Were we doing any remodeling?
- Do we live by Eucalyptus trees?
- Do we have dogs who we take hiking by *Eucalyptus* trees?
- Do we have any bird toys that are made of rope/material that are thick and could have gotten wet and not dried out all the way (the mold grows deep inside)? I have seen wreaths (round perches/swings) made of this.
- Is there mold in the bathroom where we mist the birds?
- Do we run the shower for a few minutes before introducing the birds?

How soon did you take your bird to the vet?

Chance always wants to be on her “tree” once we get home from work. She will call out until I get her. This day she didn’t want to leave her cage, so I gave her that option and left her alone. The next day she again didn’t want to get out so I forced the issue. She really was unsettled so I put her back. The following morning, her breathing was labored; her whole body moved as she breathed. She was at the vet’s office in under two hours.

The beginning of the saga

Chance had a really red throat, she was hoarse (laryngitis in a bird) and she couldn’t breathe. The vets took blood and prescribed an antibiotic (Cipro) while they rushed the blood work.

Two days later, her white blood cell count came back at 45,000 and she was at the vets’ office again the same day. They told me she had Asper (for short).

- They prescribed Itraconazole 0.1 CC twice a day. They also prescribed heat and isolation. She was kept in a crate on heat and covered during the nights, but would live in a small cage in a heated room.
- They also prescribed Chance be nebulized using Clotrimazole daily for 60 minutes a day. We created a nebulization tank and purchased the nebulizing machine (from Walgreens).
- They also suggested an x-ray which at that time I did not do.

I medicated her for six weeks (medication and nebulization as prescribed) and then took her back to the vets’ office. She still had a red throat although her voice had been restored and she still had labored breathing.

The beginning of the downfall

Her white blood cell count was down to 32,000 which the vets said was “extremely elevated and the cells are still degranulated and toxic looking”. Her liver values were elevated too, as a side effect of the Itraconazole. At this point:

- They recommended an x-ray and I agreed to it.
- They recommended adding 0.1 CC Lactulose/Milkthistle twice daily to help with the liver irritation
- She was also dehydrated.

Her lungs were solid white on the x-ray which confirmed that they were filled with the fungus. The only clear spot was a tiny area at the bottom of the lungs. At this point Chance had already been on treatments for six weeks. The doctor was surprised that she had made it that far.

At this point I was told I needed to keep Chance in the crate and on heat at all times. The stress between all the handling with the blood work, the x-rays, being in a crate which she hated seemed to be too much. She needed to get lactated ringers injected under the skin to get hydrated. She stopped eating, she started losing weight, she needed to be hydrated, and she had gotten to the point where the only way to get enough calories in her was to gavage feed her.

How was the infection treated?

I believe in quality of life and having to force feed Chance to keep her going was the final straw. I took a week off of work and decided to keep her happy. I first took her out of her crate and put her on her tree, I fed her seeds, and I stopped all her medications. Chance started to respond positively. After a few days of Chance staying stable, I started her back on her medications at .05 CC and added .01 CC a day until she was back to 0.1 CC twice a day. I then started her nebulization at 30 minutes and increased by 15 minutes each day until she was at 60 minutes. Eventually I would wean her off of the seeds and back on to the pellets, fruits, and veggies.

Lesson Learned: I think that Chance was so unhappy with her living arrangement (being in the crate all the time) she just stopped eating. She may have been sick, but I knew she was unhappy and I should have fixed the issue sooner. She just needed some balance between what was best for her and what she wanted.

How long did the treatment take?

Three months later, after daily medication and nebulization we once again paid the vet a visit for more blood work. By now she had been sick for five months.

They took blood and checked her out. Once again Chance had a very red and irritated throat. I asked the vet to check her nares and it turned out that they were stuffed shut. It looked like she had an infection and it had hardened up, stuffing up her nose. Forty-five minutes later they got her nose cleared.

Her blood cell count was up to 34,000 but the cells looked a little better. Her cholesterol was off the charts (due to the seeds). She had since been weaned off of the seeds but they had a negative effect on her body.

How is your bird now?

We have a vet visit again in three weeks. At that point I am hoping that her throat comes up normal (for the first time) and that without the secondary infection in the nares, her white blood cell count will have started to come down. I am also hoping that since she is back on a healthy diet that her other levels will be heading back to normal.

Chance will probably be on medications for another 3 - 6 months before she is healthy. If her white blood cell count is still high I will be taking her to another vet for more tests to find out what is keeping the white blood cell count high.

The Story of Charlie, a Blue-headed *Pionus*

How did your bird contract Aspergillosis?

My beloved pet parrot, Charlie, died unexpectedly on March 31, 2008. She was a five-year-old, blue-headed *Pionus* hen. She was a survivor of Aspergillosis (four years of recurring illnesses and recovery) and was very prone to respiratory infections. Charlie was only a year old when her person had to rehome her due to his own health crisis. Charlie had the sniffles when I adopted her and would rub her cere with her knuckle but she ate like a little horse and otherwise appeared to be in wonderful condition. When I took her in for her baseline exam, she was diagnosed with Aspergillosis.

How was the infection treated?

After years of symptoms, treatment and recovery, Charlie had had a great winter with mostly good health. A month before she died, she got another respiratory infection. Our vet, Dr. Fern Van Sant, prescribed Clavamox. It began working immediately and she was great in a couple of days. She was really feeling good, full of energy and enthusiasm. About a week after finishing the Clavamox, she got sick again. It started up slowly on a Tuesday. We tried the Clavamox again and I started her medicine on a Friday. Saturday was a little worse, Sunday a little more so and Monday morning I called For the Birds [San Jose, California] and even though Dr. Van Sant was scheduled to be off that day, she said to bring in Charlie. I did and we put her in an incubator with oxygen and she was doing better. She got Baytril and subcutaneous fluids.

How is your bird now?

When I called to check on her at 4:30, she was eating and making a hell of a mess dunking her pellets in her water dish. Before 8 am the next morning, Dr. Van Sant called to tell me that she had died in the night. I miss her terribly. She was a really good friend of mine.

The Story of Greenbean, a Severe Macaw

How did your bird contract Aspergillosis?

Greenbean got sick with Aspergillosis after being treated for Psittacosis - prolonged high doses of antibiotics left his body open to a fungal infection.

How soon did you take your bird to the vet?

I actually didn't know he was sick yet when he was diagnosed - he was at the vet for a nail trim and the vet told me she was concerned about poor feather quality and asked if she could run a blood-test. His white cell count was really high, and she could hear his breathing was funky, so she ran an *Aspergillus* panel.

How was the infection treated?

Greenbean was prescribed oral medications for the fungus, oral anti-inflammatories, and anti-fungal nebulizer treatments. We also let his wings grow out and taught him to fly to build up his lung capacity, his endurance, and his overall health so he'd be more resistant to illness.

How long did the treatment take?

He had to go through two full rounds (but I can't remember how long each round took) - we did a round, but then over the winter he either got re-infected or he hadn't been fully cured and it was able to take hold again during the months he was exposed to dry central-heating air.

How is your bird now?

Greenbean is 100% clear, per a follow-up blood-test after his second winter. I get him tested each spring, just to be sure.

As a Reminder...

Please remember that none of the authors are licensed avian veterinarians and anything your veterinarian says supersedes the information in this article. This article references both scientific literature and personal accounts of Aspergillosis in birds.

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