

Avian Mite Bites Acquired From a New Source—Pet Gerbils

Report of 2 Cases and Review of the Literature

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Background: Cutaneous manifestations of avian mite bites are not well recognized by physicians or patients. Clinical signs and symptoms are usually caused by bites from avian mites that have infested domestic poultry or birds nesting in or near human habitation. This report details 2 cases of pruritic papules acquired from avian mites that had infested pet gerbils and reviews the dermatologic literature about avian mites.

Observations: An 11-year-old boy and an unrelated 10-year-old girl each had mysterious, pruritic papules for many months before their pet gerbils were found to be

infested with *Ornithonyssus sylviarum* (the northern fowl mite) and *Dermanyssus gallinae* (the chicken mite), respectively. Symptoms resolved when the gerbils were removed from the home.

Conclusions: Because infestation of pet gerbils with avian mites has never been reported, cases of avian mite bites and dermatitis may have gone unrecognized or misdiagnosed. Inquiry about ownership of pet gerbils may be helpful in patients with mysterious bites.

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CUTANEOUS manifestations of avian mite bites are not well recognized in dermatologic or primary care medicine. Avian mite dermatitis, also known as gamasoidosis, acarriasis, and fowl or bird mite dermatitis, has been reported from exposure to a variety of birds since the first description in 1634.¹⁻¹⁸ *Ornithonyssus sylviarum* (the northern fowl mite) and *Dermanyssus gallinae* (the chicken mite) have been the most common mites identified. Clinical manifestations in humans include pruritic papules, vesicles, and dermatitis. We describe 2 patients with avian mite bites from different sources, *O sylviarum* and *D gallinae*, acquired not from birds but from infested pet gerbils. We also review the literature about avian mites from 1936 to the present. We believe that these mites may be occurring often on gerbils but are not usually recognized as a cause of skin disease.

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REPORT OF CASES

CASE 1

An 11-year-old boy from Cincinnati, Ohio, presented in April 1998 for evaluation of pruritic papules that began to appear in November 1997. The papules would come

and go in crops, each producing about 10 papules at a time, and did not respond to topical or oral antibiotic therapy. Initially, papules appeared on his legs, but just before presentation he developed a more widespread eruption involving his waist and trunk. The patient denied having any pets, but he noted that he spent a great deal of time playing with his best friend's pet gerbils. His best friend, and his best friend's parents, were developing similar pruritic papules. When questioned, the child noted that he had seen "little red bugs" in the gerbil cage.

On physical examination, the patient had several dozen 1- to 2-mm erythematous blanching papules, each of which had a central punctum. The papules were located in some areas in clusters and in other areas in linear arrays under both axillae up and down his trunk and in a wide band across the top of his underwear, stopping at the elastic waistline (**Figure 1**). There were also a few lesions on his upper thigh. Most of the lesions were excoriated.

The friend's gerbils were taken to a veterinarian (J.D.A.) and found to be infested with small mites. Samples of the mites were sent to the Ohio State University Agricultural Extension and identified as *O sylviarum* (**Figure 2**). The ger-



Figure 1. Linear arrays of erythematous papules on the left chest wall of an 11-year-old boy (case 1).



Figure 2. Photomicrograph of a northern fowl mite, *Ornithonyssus sylviarum*, taken from an infested gerbil (case 1).

bills and cages were removed from the home, and all of the symptoms resolved in the patient and in his friend's family.

CASE 2

A 10-year-old girl from Fort Collins, Colo, was in good health and without any history of skin conditions until her spring break from school. During this break, the patient noted the onset of a pruritic papular rash on her trunk and extremities that was asymmetrically distributed. No one else in the home was affected. During this period, her elementary science teacher had given her and several other students gerbils to take care of during their holiday. In addition, the patient's family was visited by friends from Florida. Coincident with the onset of the rash, fleas were discovered in a fur coat brought from Florida, and a causal association was made. However, the eruption continued

after the coat was gone. The family dog and gerbil were examined by the family and found to have no infestation. Subsequently, the gerbils were examined by a veterinarian on many daytime occasions and were never found to be infested. They were treated empirically and the home was fumigated. While the house was being fumigated, the gerbils were carried outside in their cage.

Despite antiflea treatment, the bitelike rash persisted. Symptomatic treatment with antihistamines and topical corticosteroids controlled the rash, but it never cleared until the patient visited her grandmother in New England. On her return, the rash recurred.

During the next 2 months, multiple pesticide treatments were carried out on the home and pets. All agreed that bites were the most likely cause of the rash. The father was asked to look the child's room over at night and found her white furniture alive with small, but visible, dark mites. He examined them under a child's microscope and then took them to a local veterinary parasitologist who identified the organisms as *D gallinae*.

The home was then refumigated, with special attention given to the gerbil and its cage—the source of the mite infestation—resulting in successful resolution of the eruption. On calling the child's school, it was learned that other cases of bites were occurring, arising from a group of chickens kept in the science classroom that were found to be infested with the same mite, *D gallinae*.

The **Table** reviews the cases of avian mite dermatitis reported in the English literature since 1936.²⁻¹⁸

COMMENT

Avian mite dermatitis is rarely diagnosed in dermatologic practice. It has been reported under a variety of names, including gamasoidosis, fowl or bird mite dermatitis, and acariosis.¹⁵ All previous case reports of this entity have been traced to contact with birds, chickens, and pigeons being the most common, but also canaries, sparrows, robins, swallows, tiger finches, parakeets, starlings, and white wag-tails being reported previously.²⁻¹⁹ Although *O sylviarum* has been recovered from the Norway rat (*Rattus norvegicus*) and the house mouse (*Mus musculus*) in the wild, it is believed that these rodents are merely temporary vectors on which the mite cannot complete its life cycle.¹⁸ Gerbils have been reported to be infested with mesostigmatid mites of the *Amdroelaelaps* species in the wild in Israel,²⁰ but *O sylviarum* and *D gallinae* have not been previously reported in gerbils, to our knowledge.

Identification and differentiation of avian mites from other parasites is important in arriving at a proper diagnosis.^{21,22} Ticks and mites, unlike spiders and insects, bear no distinct separation between the head and the abdomen. The anterior gnathosoma (also called the false head or capitulum), is a specialized feeding tube bearing sensory palps and paired chelicerae, which are appendages for tearing or cutting. The central idiosoma is generally soft but can be covered in one or more sclerotized shields. Mites differ from ticks in that the last palpal segment usually carries apotele, which can be clawlike for tearing or styletlike for piercing.

The northern fowl mite, *O sylviarum*, and the chicken mite (also known as the red poultry mite), *D gallinae*,

Reported Cases of Avian Mite Dermatitis (1936-2000)

Source	Vector	Patients	Study
<i>Ornithonyssus sylviarum</i> (northern fowl mite)			
Nests in window air conditioner	Not specified	35-year-old woman	Cahn and Schecter, ² 1958
Nest outside window	Robin	23-year-old woman	Martalock, ³ 1971
Nest in tree near window and vent on third floor	Sparrow	45-year-old man	Braun, ⁴ 1979
Nests near air conditioner; adjacent to cracks in wall and warm pipes leading to hospital room*	Pigeon	3 Intensive care unit patients in the same hospital bed, sequentially	Vargo et al, ⁵ 1983
Nests outside bedroom window	Swallow	42-year-old woman	Congly, ⁶ 1985
Nest in attic near vent over bed	Sparrow	30-year-old woman	Gupta et al, ⁷ 1988
Deserted nests outside room	White wagtail	2 handicapped women on Tatami mats	Miamoto and Sakaino, ⁸ 1997
Pet gerbil and cage	Gerbil	11-year-old boy	Present study (patient 1)
<i>Dermanyssus gallinae</i> (chicken mite)			
Pet canary and, after death of canary, its cage	Canary	38-year-old man and family	Sulzberger and Kaminstein, ⁹ 1936
3 mo after acquiring pet canary, bird, and cage	Canary	40-year-old woman and husband	Sulzberger and Kaminstein, ⁹ 1936
Nests in eaves outside closet of child's room	Pigeon	5-year-old boy and infant sibling	Shaw and Pommerening, ¹⁰ 1955
Nest in vent over hospital bed	Pigeon	Hospital patients and visitors	Sexton and Haynes, ¹¹ 1975
Nests on window ledges and air conditioners	Pigeon	Hospital patients and employees	Auger et al, ¹² 1979
Nests near air conditioner; adjacent to cracks in wall and warm pipes leading to hospital room	Pigeon	3 Intensive care unit patients in the same hospital bed, sequentially	Vargo et al, ⁵ 1983
Roosting on air conditioners on porch outside hospital rooms	Pigeon	38-year-old man and other hospital patients and employees	Regan et al, ¹³ 1987
Radio taken to attic-nest in eaves	Pigeon	Adolescent siblings	Baselga et al, ¹⁴ 1996
Nests on balcony outside office	Pigeon	39-year-old woman (bookkeeper) and coworkers	Kowalska and Kupis, ¹⁵ 1976
Pet gerbil and cage	Gerbil	10-year-old girl	Present study (patient 2)
<i>Dermanyssus hirundinis</i>			
Nest near window	Starling	54-year-old woman and family	Uesugi et al, ¹⁶ 1994
<i>Dermanyssus americanus</i>			
Nest outside bedroom window	Sparrow	34-year-old woman	Naltsas et al, ¹⁸ 1980
Not identified			
Adopted injured bird	Wild mourning dove	77-year-old woman	Schulze and Cohen, ¹⁷ 1994

*Both mites found in nests.

belong to the suborder Mesostigmata (Gamasida) within the order Parasitiformes. They have had an adverse effect in the poultry industry, affecting the health of the birds²³ and producing skin disorders and asthma in poultry workers.^{24,25} *Ornithonyssus sylviarum* (family Macroonyssidae) is a common parasite of birds, mammals, and reptiles. It is found in temperate regions around the globe but is particularly well known in North America and Europe. This mite has 2 dorsal shields, which are broad but do not cover the body surface. The genitoventral shield is posteriorly narrowed. The ventral shield bears 2 pairs of setae. The chelicerae are short, with toothless chelae. *Dermanyssus gallinae* (family Dermanyssidae) parasitizes birds and mammals and is a serious pest of domesticated and wild birds. In the absence of birds, their preferred hosts, they will attack humans. In contrast to *O. sylviarum*, this mite has a single dorsal shield, and the anal shield is not egg shaped. The chelicerae are long and whiplike, tapering apically, and the chelae at the tips are reduced or absent.

Both mites have a 4-stage life cycle consisting of egg, hexapod larva, octopod nymph, and adult stages. The entire life cycle from egg to adult can take place in as little as a week. Their feeding habits, however, aid in distinguishing them. *Ornithonyssus sylviarum* lives on its host, whereas *D. gallinae* remains on the host only to feed, usually at night, after which it drops off into the nest material.

Avian mites are blood suckers, in contrast to *Sarcoptes scabiei*, which are burrowers. Avian mites have been described as "nocturnal marauders" that "bite and run." The

clinical manifestations of avian mite bites are varied. The most common manifestations are pruritic papules, sometimes with a hemorrhagic center, located in exposed surfaces of the skin. Vesicular, urticarial, and dermatitic eruptions also have been described. Some patients describe a sensation of pain at the time of the bite. Pruritus is nearly universal. Not all exposed humans develop bite reactions. Because the mite does not burrow, it is difficult to recover it from the skin because it leaves the host after its blood meal and moves extremely rapidly. It is apparently attracted to any warm-blooded animal.

The life cycle of the mite becomes important in diagnosis and eradication. Because *O. sylviarum* lives on the host full time, it can be found on the host animal or bird and in nesting material. This was the situation in patient 1. In contrast, because *D. gallinae* is not a full-time parasite but feeds only at night, residing during the day in the bedding of nests, in cages, or in cracks and crevices of buildings, it may not be found on a suspected animal or bird. Thus, examination of the gerbils involved with patient 2 on several occasions during the day did not reveal the infestation. If a suspected pet is not found to be infested, careful examination of the cage and bedding and the animal at night may be helpful in making the diagnosis.

Therapy for avian mite dermatitis revolves around removing the source of the mite from the patient. In our patients, removal of the gerbils and cages effected complete cures. In cases acquired directly from nesting birds, the literature shows that the nests must be removed and destroyed and the nesting areas prepared so that other birds do not

remake nests in the same location. Treatment of an affected gerbil is difficult, partly because of the emerging resistance of avian mites to many of the insecticides currently available.²² However, the pet owner should be encouraged to contact a veterinarian familiar with exotic pets and discuss the diagnostic and therapeutic options currently available. In addition, house cleaning, fumigation, and removal of old cages and bedding material should be helpful.

In summary, we believe that these are the first reports of clinical dermatitis from avian mites acquired from pet gerbils. We postulate that the gerbils involved with patient 1 might have acquired *O sylviarum* within the environment of the pet store in which they were kept. This suspicion is fortified by the observations of one of us (J.D.A.) who knows of several other subsequently affected gerbils in the same neighborhood in Cincinnati. In fact, 2 other dermatologists in the Cincinnati area discovered and treated 4 families with similar "bites" from infested gerbils (Debra Anderson, MD, and Paul Lucky, MD, oral communication, 1999-2000). In the case of our patient 2, it is proposed that the classroom chickens shared their avian mites with the classroom gerbils. We propose that because the association of avian mites and gerbils has never been reported, such cases have gone unrecognized or misdiagnosed as bites from other arthropods such as fleas or scabies mites.

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Correction

A typographical error appeared in the Table of "Odds Ratios and Relative Risks" by Michael Bigby, MD, in the June 2000 issue of the ARCHIVES (136:770). The correct formula to calculate relative risk is $[a/(a+b)] / [c/(c+d)]$.