Avian mite bites acquired from pigeons: Report of three cases and review of the literature

Les morsures d'acariens aviaires acquises chez les pigeons : Rapport de trois cas et revue de la littérature

Sarra Cheikhrouhou, Sonia Trabelsi, Dorsaf Aloui, Meriem Bouchekoua, Samira Khaled

Service de Parasitologie, Hôpital Charles Nicolle, Faculté de Médecine de Tunis, Université de Tunis El Manar, Tunis, Tunisie.

RÉSUMÉ

Introduction : les lésions cutanées causées par les piqûres d'acariens aviaires sont peu fréquentes et souvent mal diagnostiquées. Elles sont habituellement causées par des morsures d'acariens aviaires qui ont infesté des volailles ou des oiseaux domestiques nichant dans ou près d'une habitation humaine. Nous signalons trois cas de lésions cutanées humaines causées par des acariens aviaires infestant des pigeons.

Observations : Trois personnes travaillant au même endroit ont développé simultanément des papules prurigineuses cutanées similaires. Le diagnostic est resté inconnu jusqu'à ce que Dermanyssus gallinae (acarien du poulet) soit trouvé sur la table de l'ordinateur du lieu de travail des trois personnes, situé près d'une fenêtre où vivaient des pigeons. Un traitement antihistaminique a été effectué avec une désinfestation de la peau. Dans deux cas, les symptômes ont disparu après une semaine de traitement. Dans le troisième cas, des corticostéroïdes ont été nécessaires.

Conclusions : Les lésions cutanées dues aux morsures d'acariens peuvent rester non reconnues ou mal diagnostiquées. Une enquête sur la proximité avec des pigeons ou des volailles peut être utile chez les patients présentant des lésions dermatologiques d'origine indéterminée.

Mots clés : Lésions dermatologiques ; Pigeons ; Morsure d'acariens ; Dermatologie ; Parasitologie.

SUMMARY

Background: Skin lesions caused by avian mite bites are uncommon and often misdiagnosed. They are usually caused by bites from avian mites that have infested domestic poultry or birds nesting in or near human habitation. We report three cases of human skin lesions from avian mites infesting pigeons.

Observations: Three persons working in the same place developed similar skin pruritic papules simultaneously. The diagnosis remained unknown until Dermanyssus gallinae (chicken mite) was found on the computer's table of the three individuals workplace, situated near a window where pigeons used to live. Antihistaminic treatment was carried out with a skin disinfestation. In two cases, symptoms resolved after one week of treatment. In the third case, corticosteroids were needed.

Conclusions: Avian mite bites skin lesions can remain unrecognized or misdiagnosed. Inquiry about contact with pigeons or poultry may be helpful in patients with nonspecific skin lesions.

Key words: Skin lesions; Pigeons; Mite bite; Dermatology; Parasitology.

Correspondance

Sarra Cheikhrouhou
Hôpital Charles Nicolle / Université Tunis El Manar / Faculté de Médecine de Tunis,
sarra.cheikhrouhou@fmt.utm.tn

INTRODUCTION

Dermanyssus gallinae, a part of Mesostigmata superfamily, was first identified by De Geer in 1778, and the first description of human infestation was reported by Willian in 1809. In 1828, Saint-Vincent spotted this parasite on the skin of a human, but the first observation of its feeding on human blood was published by Williams in 1958 [1]. This disease is named gamasoidosis, psoradermanyssica, pseudogale, or fowl mite dermatitis; and the agent is called chicken mite, poultry red mite or roost mite [2-3]. *D. gallinae* turns yellow-brown when hungry and turns red-black when full. It is reported that these ectoparasites can live up to 8 months without feeding, under the right conditions, with resistance to dry weather and no tolerance against high humidity [4,5]. It prefers pigeons, hens, starlings, and lovebirds as hosts. When these normal hosts are unavailable, various mammals including humans serve as parasitic objects. These mites reside in obscure nooks and crannies of columbaries, coops, and cages during day time and become active at night time infesting winged animals in general but also attacking mammals including humans for bloodsucking. Cutaneous manifestations of avian mite bites are not well recognized in dermatologic or primary care medicine. *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.

In practice, skin lesions caused by avian mite bites are uncommon and often misdiagnosed. They are usually caused by bites from avian mites that have infested domestic poultry or birds nesting in or near human habitation. Skin lesions are represented by non-specific pruritic papules. Even though it is not a severe illness, it can initiate an anaphylactic reaction in vulnerable patients as well as a risk of another illness vector.

We analyzed the clinical features of avian mite bites from *D gallinae,* acquired from infested pigeons through a report of three observations and a review of the literature.

REPORT OF CASES

We report three cases of pigeon mite infestation involving three persons working in the same area.

They developed simultaneously scalp pruritus and noted the onset of a pruritic papular rash on the trunk and extremities that were asymmetrically distributed (Figure1).

Figure 1. Erythematous papules on the right shoulder.

In the three cases, there was not any history of skin conditions, contact with animals or someone similarly affected at home.

No treatment was taken initially with persistence of the same symptoms.

An investigation was undertaken, leading to the detection of moving “little red bugs”, Arthropoda smaller than 1 mm, upon careful examination of the table of the computer used by the three persons.

The ectoparasites were mounted on slides in a potassium hydroxide (KOH) solution and identified microscopically as *Dermanyssus gallinae,* De Geer 1778 according to the key characters [6]. The two key elements used to identify the mites were the existence of a long second cheliceral article, far exceeding the basal segment in length with no distinct fixed and movable digit, and a truncated or keystone shaped anal plate (Figure n°2).

Pigeons roosting on the nearby tree and windowsill near the computer’s table were the source of the mites which were blown in by the wind. Control measures were instituted that prevented pigeons from roosting on the nearby tree, windowsill, and the roof.

The area was immediately disinfected; in the aftermath, no *D.gallinae* were detected in inspections.

The itching subsided spontaneously within a week in two cases with antihistaminic treatment. In the third case, corticosteroids were needed.

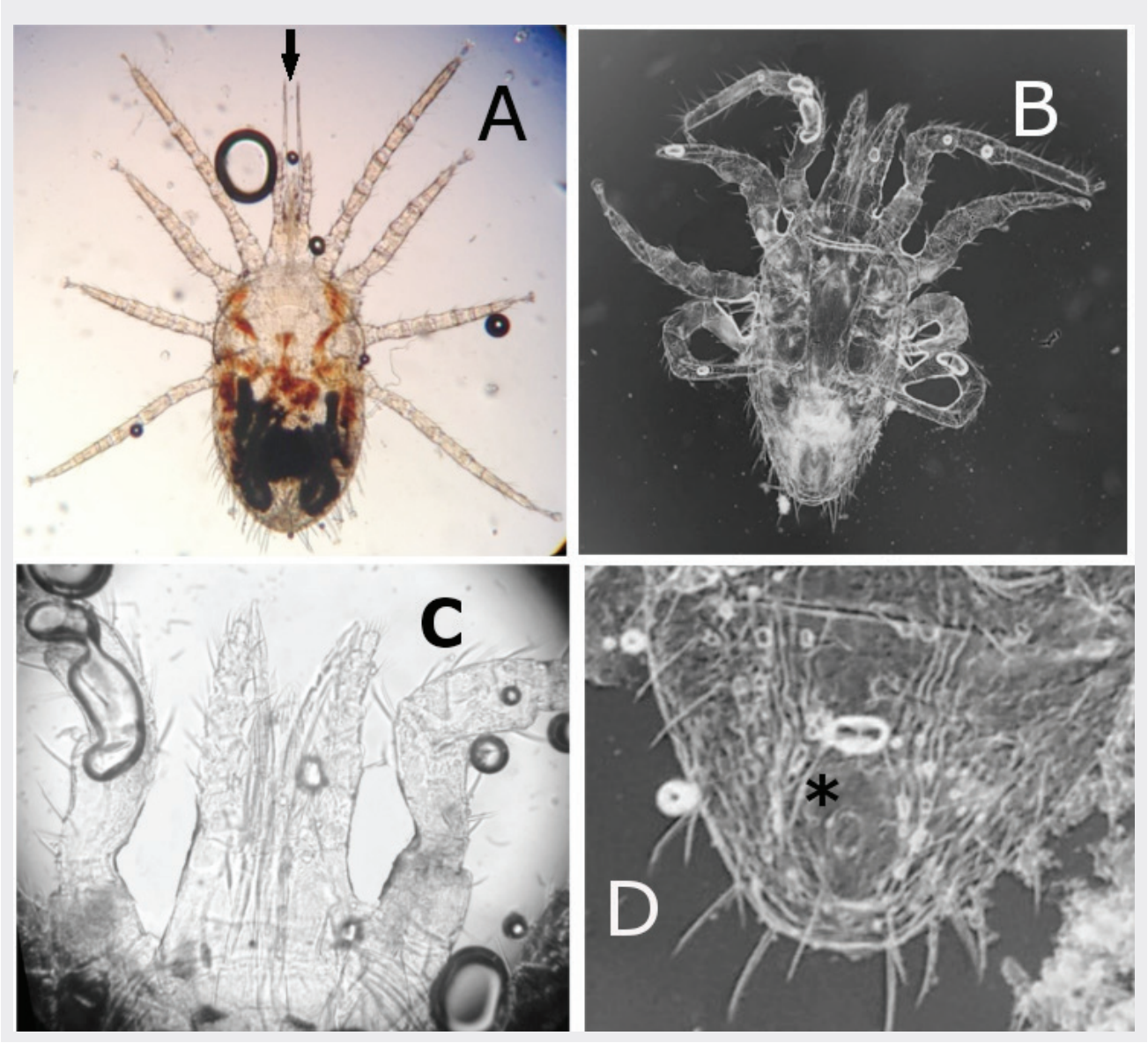

Figure 2: Direct examination *Dermanisus galinea* (A. Optical microscope x4 ; B Optical microscope x4 photographic negative; C: Anterior region of the body focusing on the rostrum (x40); D: Posterior region of the body (x40)). **2.**A Black arrow : long second cheliceral article. 2.D Asterisk: truncate or keystone shaped anal plate

Following this episode, other wards have reported similar infestations accompanied by severe pruritus and an erythematous rash of the trunk and limbs of those infested.

The hygiene service intervened in the department with a disinfestation using organophosphorus pesticides on the areas close to the windows. Moreover, an external company was hired in order to remove all the pigeon nests from the windowsills and the roof as well as on the trees.

DISCUSSION

Dermanyssus gallinae (Dermanyssidae), also known as red poultry mite, belongs to the phylum Arthropoda, class Arachnida, subclass Acari, order Parasitiformes, suborder Mesostigmata (Gamasida). Natural hosts of *D. gallinae* include domestic and wild birds; however, it is not a host specific and, if the primary host is not available, it will attack humans in close proximity [7].

The avian Mites are involved in the transmission of both bacteria (*Borrelia species, Pasteurella multocida, Salmonella gallinarum, Rickettsia species*) and viruses (*Hantaviruses; St Louis, Eastern Equine, and Western Equine encephalitis viruses; and West Nile virus*) and therefore they can transmit them to humans [8,9].

Avian mite dermatitis is rarely diagnosed in dermatologic practice [10]. Physicians and dermatologists are often unaware of the role of red mite in urban areas. In fact, case reports are rarely recorded in the human medical literature due to the difficulty of detecting and accurately identifying the red mite, and of matching the symptoms with the parasite. However, feral pigeons are among the most successful avian settlers in urban environments due to the abundance of food and the absence of predators. They are distributed worldwide and live close to human populations.

The clinical manifestations of avian mite bites are non-specific and polymorphic: redness, itching, papules, vesicles, and dermatitis [10-11]. 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 [12].

In general, pin's head size papules and vesicles accompanied by intense itching would emerge on people after 1-3 days of contact with infected organisms; and while some infection cases stay limited with navel area, armpits, and forearms, in many other cases the infection starts from the nape, the neck, and the arms and spread to other body surfaces. Papules can also be covered with a bloody crust due to violent itching [03,13].

In our cases, patients developed a pruritic papular rash on the trunk without severe signs.

However, the diagnosis was unusual for dermatologists who thought about scabies or pediculosis or Ekbom syndrome.

Avian mites are bloodsuckers, in contrast to *Sarcoptes scabiei*, which are burrowers.

Because the mite does not burrow, it is difficult to recover it from the skin because it leaves the host after its bloodmeal and moves extremely rapidly. Avian mites have been described as "nocturnal marauders" that "bite and run" [12].

Usually, blood tests don't show high eosinophilia. Histopathological examination of the superficial derm could show a perivascular eosinophilic infiltration [14].

D. gallinae may not be found on a suspected animal or bird because it 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.

If a suspected pet or bird 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. However, dermoscopy with Dermlite 4 QNB dermoscope coupled to the microscopic examination of the collected mite samples would be of added value to confirm the diagnosis [10].

The differential diagnosis should include bedbug bites, flea bites, scabies, pediculosis, urticaria, and various dermatitis associated with other avian mites such as Ornithonyssus sylviarum (the northern fowl mite) or Ornithonyssus bursa (the tropical fowl mite) [15].

The successful identification of the mite is absolutely fundamental to manage the clinical episodes correctly: specimens should be collected from the environment and sent to the laboratory of entomology for further identification based on key characters such as the dorsal and anal shields [6,16].

Therapy for avian mite dermatitis revolves around removing the source of the mite from the patient. 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.

The source of the infection must be eradicated. Pigeon nests should be removed and access to breeding sites has to be obstructed to avoid further breeding. Disinfection of the environment of former breeding sites with appropriate insecticides prevents human infestations by hungry parasites. To frustrate breeding outside buildings, bird proofing should be used to protect these places [17].

In conclusion, Physicians and health care personnel working in metropolitan areas are alerted to mites as a cause of pruritic dermatitis that may be chronic recurrent, or unresponsive to ectoparasiticides. It might be misdiagnosed as the skin lesions are nonspecific. A brutal appearance among a person in contact with pigeons might alert the physician and a parasitological examination would be needed.

Conflict of interest: None

REFERENCES

1- Williams RW. An infestation of a human habitation by Dermanyssus gallinae (De Geer, 1778) (Acarina: Dermanyssidae) in New York City resulting in sanguisugent attacks upon the occupants. Am J Trop Med Hyg 1958;7:627–9.

2- Auger P, Nantel J, Meunier N, Harrison RJ, Loiselle R, Gyorkos TW, 1979. Skin acariasis caused by Dermanyssus gallinae (de Geer): An in-hospital outbreak. CMA Journal,120:702-3.

3- Akdemir C, Gülcan E, Tanritanir P: Case report: dermanyssus gallinae in a patient with pruritus and skin lesions. Act parasitol 2009,33:242–4.

4- Chauve C, 1998. The poultry red mite Dermanyssus gallinae (DeGeer, 1778): current situation and future prospects for control. Vet Parasitol, 79: 239-45.

5- Nordenfors H, Höglund J, and Uggla A. Effects of temperature and humidity on oviposition, molting and longevity of Dermanyssus gallinae (Acari: Dermanyssidae). J. Med. Entomol. 1999;36:68-72.

6- Di-Palma A, Giangaspero A, Cafiero MA, Germinara GS. A gallery of the key characters to ease identification of Dermanyssus gallinae (Acari: Gamasida: Dermanyssidae) and allow differentiation from Ornithonyssus sylviarum (Acari: Gamasida: Macronyssidae). Parasit Vectors. 2012;5:104.

7- Varma MGR. Ticks and mites (Acari). In: Lane RP, Crosskey RW, eds. Medical Insects and Arachnids. Cambridge: Cambridge University Press, 1993: 597–658.

8- Valiente Moro C, Chauve C, Zenner L. Vectorial role of some dermanyssoid mites (Acari, Mesostigmata, Dermanyssoidea). Parasite 2005;12:99-109.

9- Valiente Moro C, De Luna CJ, Tod A, Guy JH, Sparagano OAE, Zenner L. The poultry red mite (Dermanyssus gallinae): a potential vector of pathogenic agents. Exp Appl Acarol. 2009; 48:93-104.

10- Toukabri N, Souissi A, Abidi H, Mokni M. Dermoscopy aspects in Dermanyssus gallinae infestation. Int J Dermatol. 2019;58(8):e159–e160.

11- Vargo J, Ginsberg M, Mizrahi R. Human infestation by the pigeon mite: a case report. Am J Infect Control 1983;11:24-5.

12- Lucky AW, Sayers CP, Argus JD, Lucky A. Avian mite bites acquired from a new source-pet gerbils. Arch Dermatol. 2001;137: 167-70.

13- Regan AM, Metersky ML, Craven DE. Nosocomial dermatitis and pruritus caused by pigeon mite infestation. Arch Intern Med, 1987;174: 2185-87.

14- Lodde B, Bizien-Le Dez V, Roguedas-Contios AM, Misery L et Dewitte JD. An itchy occupational disease affecting a poultry farmer due to bites from Dermanyssus gallinae: Effect of sensitization to Dermanyssus pteronyssinus. Arch Maladies Prof Environ 2012;73(1):51-61.

15- Bellanger AP, Bories C, Foulet F, Bretagne S, Botterel F. Nosocomial dermatitis caused by Dermanyssus gallinae. Infect Control Hosp Epidemiol. 2008;29(3):282–3.

16- Cafiero MA, Camarda A, Circella E, Santagada G, Schino G, Lomuto M. Pseudoscabies caused by Dermanyssus gallinae in Italian city dwellers: a new setting for an old dermatitis. J Eur Acad Dermatol 2008, 22:1382–83.

17- Haag-Wackernagel D: Parasites from feral pigeons as a health hazard for humans. Ann Appl Biol 2005;147:203–10.