Household Papular Urticaria

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Key words: cat flea, Ctenocephalides felis, human, papular urticaria, outbreak

Abstract

Background: Papular urticaria often occurs after bites of insects such as mosquitoes, sandflies, bed bugs and fleas. Multiple bites and local pruritus are characteristic symptoms. Treatment is usually symptomatic and includes antihistamines and corticosteroids. The reappearance of the symptoms can be prevented by successful control of the parasite.

Objectives: To find the causative agent of papular urticaria in affected households with involvement of numerous family members, all in a narrow geographic area.

Patients: We describe the cases of 20 patients belonging to seven families, who presented to the local primary clinic, suffering from papular urticaria.

Results: The cat flea, Ctenocephalides felis, was the hematophagous insect responsible for all infestations. The pruritus and the papular urticaria were treated symptomatically with calamine lotion, topical corticosteroids or oral antihistamines. All clinical symptoms disappeared within a few weeks after effective control of the parasites by spraying and fumigating the Infested locations.

Conclusions: Thorough investigation – including, at times, environmental inspection – is necessary to reach the rewarding discovery of the etiology of household papular urticaria. This condition may arise in other environments of similar character.

IMAJ 2002;4(Suppl):911–913

Case Series

Family 1

A 34 year old woman arrived at the clinic complaining of bites around her waist, lower back, calves and feet that had been troubling her for at least 2 weeks. Physical examination revealed both typical urticaire papules and secondarily excoriated or infected lesions dispersed predominantly over the distal lower limbs. The family history revealed that her 8 year old son and 6 year old daughter suffered pruritus and similar skin lesions. After a few days her 3 year old son began to suffer similar complaints. The family had recently moved into a new house. Little improvement was observed after treatment for suspected Pediculus corporis. Several weeks after the first visit, the mother noticed a small, black, jumping insect under her son’s clothing. The following week she found the same insects inside her stockings and on her children’s clothing. Upon request the patient brought a sample of the insect, which was identified in our laboratory as the cat flea, Ctenocephalides felis (Figure 1). The symptoms ceased following intervention 2 months after onset of the infestation.

Family 2

A 31 year old woman presented with urticarial papules, 4–10 mm in size, that were distributed over her lower legs, posterior heels and

The adult stage of fleas is blood-sucking ectoparasites of mammals and birds. One of the most common peri-domestic fleas in Israel is the cat flea, Ctenocephalides felis [1]. Other fleas of medical importance in this country are the dog flea, Ctenocephalides canis; the human flea, Pulex irritans, which occurs mainly in communities with low standards of hygiene; the rat flea, Xenopsylla cheopis, which is the vector of bubonic plague (not present in Israel) and endemic typhus; and the rodent fleas, Leptopsylla segnis and Nosopsyllus fasciatus [1,2].

Due to the fact that most of the stray cats and dogs around human habitations are infested with fleas, and because adult fleas can survive for months in the absence of animal hosts, flea-borne epidemics are difficult to detect and eradicate [3–8]. Mass flea outbreaks causing public health problems have been described [9,10]. We report the cases of 20 patients with flea-bite eruptions from 7 families residing in a single rural residential area, and review the etiology and treatment of cat flea dermatitis.

Figure 1. Ctenocephalides felis; actual size in comparison to the tip of a ballpoint pen.
plantar surfaces. The patient had been suffering for several weeks. The next day, her 10 year old daughter complained of similar lesions all over the trunk and limbs. After being instructed on how to search for parasites the patient found small blackish insects on the bedspreads, sheets, mattresses and clothing. It was also found that their roof served as a shelter for stray cats. Examination of the roof area revealed hundreds of fleas. Two separate fumigations were sufficient to control the infestation. The patient recalled that 3 years previously, one of her children entered the home bitten by “bugs” after playing inside the roof. At the time the bites on the child's face were attributed to insects carried by pigeons.

Family 3
A 6 year old boy presented with a pruritic urticarial rash consisting of 14 bites on the abdomen and proximal thighs (Figure 2). Examination revealed discrete urticarial papules. Two weeks later the rash spread to the head, limbs and trunk, and two additional siblings aged 3 and 5 presented with the same type of eruptions. The family was instructed to search for jumping, brownish-black insects about the size of a speck of ground pepper. This led to the immediate discovery of a flea on the leg of one of the infested children. The infestation occurred while the children were playing in the sandy yard, in an area known to harbor stray cats and newly born kittens.

Family 4
A 27 year old woman with intense pruritus, which had begun a few days earlier, was examined and found to have grouped papular urticarial lesions around her wrists. Her children were also affected.

As above, the woman sought and found fleas, which she brought to the clinic for identification.

Family 5
A woman arrived at our clinic complaining that she and two of her children were suffering from a pruritic rash. Examination disclosed clustered papular urticaria and excoriations. The woman recalled that strange cats had been searching for food in her backyard, and were often seen on a garden chair where the children liked to play.

Family 6
The complaints in this family started when the 43 year old father experienced itching below the knees caused by approximately 20 bites. His 15 year old son awoke the same morning with six bites mainly on the lower limbs but also on the abdomen. The following day, the mother, and 3 days later the 1 year old baby, began scratching all over their bodies. The remaining member of the family, a 10 year old boy, had a number of lesions on his legs. The family denied any contact with cats or other pets. On the third day of the infestation they found several fleas on the tiled floor of the balcony. The woman recalled that cats had recently been howling outside the house and that a cat had given birth on the balcony. Relief was achieved only after the whole house was appropriately fumigated.

Family 7
The family members involved were the parents and the younger daughter; the other three siblings, residing in dormitories away from home, were free of symptoms.

Results
All cases of papular urticaria were seen within a period of 3 years. The patients resided in the rural residential area of Gush Katif located on the southern Mediterranean shore of Israel. The patients did not initially realize they had been bitten by insects, nor did they recall any contact with cats or dogs. All fleas collected by the patients and brought to our laboratory were identified as the cat flea, *Ctenocephalides felis*.

The pruritus and the papular urticaria were treated symptomatically with calamine lotion, topical corticosteroids or oral antihistamines. All clinical symptoms disappeared within a few weeks after effective control of the parasites by spraying and fumigation of the dwellings with insecticides containing permethin.

Discussion
*C. felis* is a very common ectoparasite of cats and dogs in Israel and is found on a variety of domestic and wild animals [1]. Recently, *C. felis* has become adapted to cattle and goats. Calves from seven farms in Israel were found to be heavily infested with these fleas [7]. In this series the coincidental combination of a sequence of environmental factors contributed to the formation of a group with a common ailment. Efforts to find the basis of this pathology finally led to the discovery of cat fleas in all of the homes. It is possible that the warm, humid climate along the Mediterranean shore area...
and the large number of stray cats and dogs in and around human habitations facilitate contact with the fleas. In several cases the household infestation probably started with children playing in areas abundant with the parasites. Once a household member contracted the fleas and brought them into the home, the parasites infected other family members and caused a household infestation.

During the past 3 years 10 patients and members of their families who were infested with fleas were examined by one of the co-authors (K.Y.M.) in the Department of Parasitology, Hebrew University, Jerusalem. Of the 27 individuals involved 19 were females and 8 were males, and their ages ranged between 4 and 36 years (average 13.4). In nine cases C. felis, and in one case the hedgehog flea, Archaeopsylla erinacei, was the source of infestation. Five families had a dog or a cat, while four families did not keep any house pets. One of the patients was infested by the hedgehog flea while sleeping outdoors. The fleas were collected directly from the patients, or from house dust collected with a vacuum cleaner. The stings were mainly concentrated on the legs of adults, whereas in children they were also frequently found on the arms, thorax and neck areas. The bites were normally multiple, often with a tendency to clustering and sometimes dispersed in a linear form. In the center of the bite reaction a red hemorrhagic punctum could be seen. The immediate reaction was characterized by an erythema and a weal formation, whose diameter ranged between 0.5 and 2 cm. This reaction lasted for 1–3 hours and was extremely itchy. Twelve to 72 hours later, a skin reaction appeared with a central papule and erythema, which reached a diameter of several centimeters. This lasted for 5–14 days and the patients complained of intense pruritus. In one case a bullous reaction to the bite was observed. Excoriations after scratching were very common and in one case a secondary infection was noted. Most of the symptoms disappeared 1–2 weeks after the first treatment with insecticides.

In order to effectively control an infestation, fleas should be eliminated from the pets, the home and the yard (3,6,8). Removal of fleas from the animal alone is insufficient, since the environment, i.e., the house and the yard, may be heavily infested with all developmental stages of the flea, which can act as a source of subsequent re-infestations. The floor, carpets, sofas and mattresses should be vacuumed, and bedding and clothes washed at 50°C and above.

In conclusion, a complete patient and family history including interrogation for non-volunteered information is essential in order to discover the source of a communal outbreak of infestation. Only eradication of the parasite from the immediate environment of the patients can prevent re-infestation and the reappearance of clinical symptoms.

References

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**Capsule**

**Placental malaria**

Pregnant women are particularly vulnerable to malaria because Plasmodium parasites, usually resident in red blood cells, readily switch by binding tissue tropism to colonize the placenta, where heavy infections develop with malign consequences for mother and child. Infected red blood cells display adhesive parasite ligands, encoded by the var genes, on their surface. These ligands mediate attachment to vascular epithelium, thus ensuring that the parasites are sequestered and can avoid clearance via the spleen. The adhesive ligands mediate tissue tropism and, like many Plasmodium proteins, have a huge capacity for variation—another means of immune evasion. Malaria parasites respond to pregnancy by switching expression to a surprisingly conserved gene, varCSA, encoding a ligand for chondroitin sulfate A, which is present in the placenta. Vázquez and co-workers have shown that, unlike most subtelomeric genes, varCSA is transcribed in the opposite direction to other var genes and is under the control of a distinct flanking element. These attributes might explain its conservation among genetically distinct malaria strains and might offer a route to therapy.

*Mel Microbiol* 2002;45:155