Journal of Pakistan Association of Dermatologists. 2020; **30(3)**: 408-411.

Original Article

Salalah eruption: Regional variant of papular urticaria

Pramod Kumar

Liwa Health Centre, Ministry of Health, Oman.

Abstract

Background Papular urticaria is hypersensitivity reaction to bites from various insects viz. mosquitoes, fleas, gnats, mites, bed bugs, caterpillars, and moths. Few of them may be too small to be visible to unaided eye. Mosquitoes are commonly incriminated in south Asia, while fleas are common in San Francisco. Antigen deposited during bite is disseminated haematogenously leading to reaction in sensitive patients. Extremely hot, climate and scarce rains in Middle Eastern countries makes it a hostile environment for insects to breed. Salalah, to the south-east of Oman enjoys plenty of rains during autumn, which makes for a popular tourist destination during this period. Several returning tourists present with itchy rash, popularly known as "Salalah eruption" among the locals.

Methods We observed the clinical characteristics of "Salalah eruption" over a period of 4 years and present our findings.

Results Of the 68 cases, males (52.94%) constituted more than females in the study population. Pruritic rash was most common complaint while limbs were the most often affected. The suspected insect was identified as biting midge.

Conclusion Some areas in arid land may receive rains and provide breeding grounds for insects. We present a study of 68 cases presenting as "Salalah eruption". Physicians inexperienced with papular urticaria may find it challenging to identify and deal with this condition as it is unexpected in this geographic area. Also it is extremely important to identify the culprit insect, which may be a vector, so as to expect any transmissible disease(s) through these bites if any.

Key words
Papular urticaria, salalah, insect bites, hypersensitivity.

Introduction

Papular urticaria is regarded as hypersensitivity or id reaction to bites of various insects such as mosquitoes, fleas, gnats, mites, bed bugs, caterpillars, and moths.[1] It is often difficult to pinpoint an actual culprit in a given patient. Some insects may be too small to be visible by unaided eye. The reaction to insect bite is thought to be caused by a haematogenously disseminated antigen deposited by an insect bite in a patient who is sensitive.[1] Inhabitants and tourists may all be vulnerable, though papular urticaria is more commonly observed in children from 2 to 10 years of age.[2] It is usually chronic or recurrent papular eruption on usually exposed areas and is associated with intense pruritus. Exposure to arthropods may take place during one's work for example in forest or plantations or playing in gardens or travelling to mountains especially in summers or rainy seasons.

Oman, by virtue of its location in the middle-east has a hot and humid climate during summers with temperatures ranging from 30 to

Address for correspondence
Dr. Pramod Kumar
Liwa Health Centre,
Ministry of Health, Oman.
Email: kumarpramod5@rediff.com

40 degrees Celsius and scant rains, while Salalah records temperatures from 20 to 30 degrees Celsius[3] and also "receives 200-250 mm of rains in the mountains and 110 mm in Salalah's coastal plains, during khareef (autumn) season[4] tourists therefore, converge from all over the Middle Eastern countries to escape the heat. Salalah hosts tourists for its flowing seasonal rivers "*wadis*" and green mountains, once the season is over, the rivers and hills turn dry again. Landscape comes alive with flora and fauna in the khareef season. Swarms of gnats/ midges attack visitors particularly near wadi darbat. One thing the tourists do not want is a nasty rash after their vacation which almost all returning tourists from Salalah manifest. Visitors returning from Salalah present with pruritic papular lesions usually on the limbs and less commonly on face. It is remarkable that the itch and lesions usually do not develop till one is still in Salalah. Children may develop desensitization to papular urticaria after multiple exposures,[5] however in the case of salalah eruption (SE) the rash recurs on almost each visit to this tourist destination.

The features unique to this eruption are: 1) The eruption affects individuals of all ages alike, 2) It begins few days after the tourist has left the town and 3) Recurs in the individuals on subsequent visits also. We present our observations on SE studied over a period of 4 years.

Material & Methods

This study included cases from autumn of 2015 to 2018 presenting as SE to dermatology clinic at Saham hospital and Khabura extended health center. A questionnaire was read out to returning tourists, their responses recorded, results were tabulated and analysed using Microsoft Excel sheets. Routine laboratory investigations were performed where necessary, clinical photographs and skin biopsy taken in consenting cases. All cases were treated symptomatically with antihistamines, topical steroid creams and if required with systemic steroids or antibacterial agents. A representative insect was trapped for specimen, collected in a plastic jar from the site and identified as the suspected organism.

Results

Sixty-eight cases presented with SE during this study period. The youngest subject was 11 months of age and the oldest 56 years, demographic details are shown in **Table 1**. The duration of symptoms ranged from 2 days to 1 month. SE did not show particular preference towards either gender; males were (52.94%, n=36), and females (47.06% n=32). Various symptoms reported are enlisted in **Table 2**. Most common complaint was itch or burning on the papular lesions and the most common affected sites were limbs **(Table 3)**. Two of the SE cases were pregnant; one each also had concomitant atopic dermatitis and thalassemia. Three cases were on medication for hypertension, 2 cases for diabetes mellitus and 1 case for both diabetes and hypertension.

The causative insect was identified as biting midge on the basis of microscopic phenotype,

Table 1 Distribution according to age & gender

Age Groups	*Males*	*Females*	*Total*
<12 Years	2 (5.55%)	10 (31.25%)	12 (17.64%)
>12 Years	34 (94.44%)	22 (68.75%)	56 (82.35%)
Total	36 (100%)	32 (100%)	68 (100%)

Table 2 Lesions observed in cases of Salalah eruption

Papules	60(88.24%)
Erythema	59(86.76%)
Excoriation	28(41.18%)
Plaques	18(26.47%)
Erosion	02(2.94%)
Crusting	01(1.47%)
Vesicles	01(1.47%)
Pustules	01(1.47%)

Table 3 Sites involved

Legs	54 (79.41%)
Forearms	49 (72.06%)
Hands	24 (35.29%)
Feet	22 (32.35%)
Arms	20 (29.41%)
Face	14 (20.59%)
Neck	06 (8.82%)
Trunk	03 (4.41%)

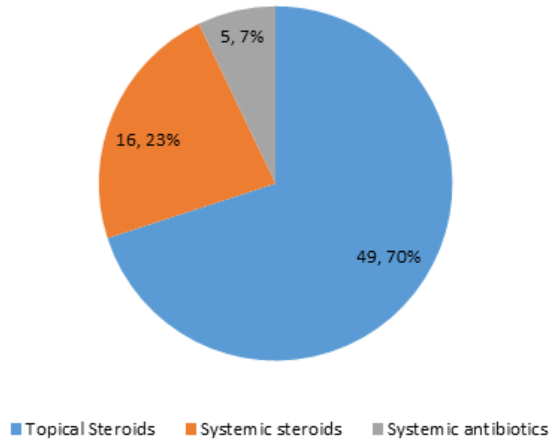

Figure 1 Various treatments used for cases of SE.

fly of the order Diptera, in the family Ceratopogonidae, which includes over 4, 000 species in 78 genera worldwide.[6]

Predominant histopathologic features from lesions were spongiosis, superficial and deep perivascular interstitial lymphocytic infiltrate admixed with eosinophils and neutrophils. No evidence of vasculitis was seen in any of the biopsies. One case presented with erythema multiforme. Majority of the cases were treated with oral antihistamines **(Figure 1)**, topical steroid creams; few required oral steroids and fewer with signs of secondary infection were also treated with systemic antibacterial agents.

Discussion

Papular urticaria is uncommon in extremely hot weather of middle-eastern countries since the weather condition is inhospitable to arthropods, however Jacobson[7] reported it for the first time in immigrants and children during summers in Palestine.[8] Insect bite reaction is most commonly observed in children between 2 to 10 years of age, however adults too may be affected, albeit at a much lower rate. In our study the youngest case was 11-months-old child while a majority were adults.

Type I hypersensitivity may cause a wheal, while delayed papule may result from type IV hypersensitivity.[9] Type I reaction is thought to be caused by a haematogenously disseminated antigen deposited by an arthropod bite in a patient who is sensitive.[1] Immediate reactions are due to histamine, serotonin, formic acid or kinins. Delayed reactions are manifestations of the host's immune response to the injected arthropod salivary protein allergen.[10] In almost all cases in our study, patients experienced the rash after few days of departure from Salalah.

Which particular insect is the cause of papular urticaria varies with geographic location; in San Francisco fleas cause papular urticaria in children,[11] while mosquito bites are more common in countries like Egypt[12] and India.[13] Biting midges are tiny insects ranging from 1-3 millimeters in length.[6] They inhabit coastal lagoons, estuaries, mangrove swamps, ponds. Typically midges are greyish, more reddish after a blood meal. They disperse only short distances from their breeding sites and only females feed on blood of vertebrates.

Flies of the order of Diptera: *Haematobia minuta*, *Musca crassirostris* and *Forcipomyia whitcombei* were identified in Salalah region as impeding pasturing.[4] These bloodsucking flies are terrestrial and appear during rainy season. F. *whitcombei* are diurnal flies known to suck blood voraciously and cause irritation and allergic response in cattle and in man and animals.[4] Though they are potentially infective vectors in many parts of the world, no such

association has been linked in Oman, which may be due to scarce studies.

Omani men wear a loose white robe which covers the whole body while women dress in black robe (*abaya*) and their traditional salwars hidden underneath; both genders have their limbs covered in their dress yet presented with SE as the tiny midgets are able to swarm into the loose dresses.

In conclusion we present SE which is a unique variant of papular urticaria due to biting midgets. SE typically develops few days after exposure and individuals of all ages are affected. Physicians not experienced in tropical dermatology may be unable to identify and treat this condition as it does not belong to common prevalent conditions in this geographic region. Moreover causative agents of papular urticaria are potentially pathogenic vectors apart from malaria, filaria, leishmaniasis etc. hence apart from treatment, identification of these agents is also important for protection from future public health perspective.

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