Section: Dermatology

Research

CLINICAL STUDY OF MILIARIA

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Abstract

Background: Miliaria is a skin condition which occurs due to blockage of the eccrine sweat ducts due to excessive sweating predisposed by hot and humid conditions. In the year, 2016, an outbreak of the same was noticed in due to a heatwave which was recorded in India. To determine the etiological factors and various clinical presentations of miliaria in a setting of a heat wave generated outbreak. **Materials and Methods:** All patients with clinical features suggestive of miliaria, visiting the outpatient department of this tertiary care hospital over a period of 4 months between March 2016 to June 2016 were included in the study. Patients with pustular lesions were subject to relevant investigations i.e., Gram stain and Culture and Sensitivity. **Result:** Majority 50/86 case(58.1%) were comprised of miliaria rubra while only 6/86 (6.9%) were miliaria crystallina. 30/86 cases were complicated by periporitis of which 13 cases (43.3%) were culture positive. Methicillin Sensitive Staphylococcal aureus (MSSA) was the most common isolate accounting for 53.8%. 62(72.1%) were less than 10 years and a male preponderance was observed. **Conclusion:** The study gives an indication of the various clinical types and the possible predisposing factors for the occurrence of miliaria that were reported in a short period. Clinically, miliaria rubra is the most common variant encountered which may be complicated with periporitis staphylogenes.

INTRODUCTION

Miliaria is an acute skin condition which arises due to the occlusion or disruption of eccrine sweat ducts in hot and humid conditions, resulting in a leakage of sweat into the epidermis (miliaria crystallina and miliaria rubra) or dermis (miliaria profunda). It is especially common among non-acclimated individuals who are exposed to hot and humid environment.[1] India, for the most part, has a tropical climate, presenting conditions of high heat and humidity that lead to excessive sweating. In the summer of 2016, an intensive heatwave was recorded with the maximum temperatures reaching upto 51º C, as per the Indian Meteorological Department (IMD).[2] This resulted in a sudden outbreak of miliaria among the patients. Hence, this study was undertaken to determine the predisposing factors and clinical types of miliaria.

MATERIALS AND METHODS

All the patients with clinical features of miliaria attending the dermatology OPD in this Tertiary Care Hospital between the period of March to June of 2016 were included. All the patients were interviewed regarding predisposing factors like fever, physical activity, occlusive clothing, occupation, drug intake and associated disorders. These patients were later examined regarding clinical morphology and distribution of the lesions. Relevant investigations in the form of Gram staining and culture and sensitivity was performed in patients with pustular lesions.

Relevant statistical analysis was done using the software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1. Microsoft word and Excel were used to generate graphs and tables. Results on continuous measurements were presented as Mean±Standard Deviation (SD) (Min-Max) and results on categorical measurements were presented as numbers and percentages (N, %). Significance was

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assessed at 5 % level of significance. Chi-square/ Fisher Exact was used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS

A total of 86 patients with miliaria were encountered during the study period of 4 months. Majority, 62(72.1%) were in the age group of less than 10 years, followed by eight (9.3%) in the age group of 41-50 years, seven (8.1%) in the age group of 21-30 years, five (5.8%) in the age group of 31-40 years, three (3.5%) in the age group of more than 50 years and two patients (2.3%) in the age group of 11-20 years respectively [Table 1]. Males 47(54.7%) outnumbered females 39 (45.3%) with a male to female ratio of 1.2:1. As depicted in [Figure 1], the most common clinical type noted was miliaria rubra (N=50,58.1%) [Figure 2], followed by periporitis (N=30, 34.8%) [Figure 3] and miliaria crystallina (N=6, 6.9%). Among the 30 cases of periporitis, 13 cases (43.3%) were culture positive. Methicillin Sensitive Staphylococcal aureus (MSSA) was the most common isolate accounting for 53.8%, followed by Methicillin Resistant Staphylococcal aureus (MRSA) in 23.2%. Coagulase Negative Staphlyococci (CONS) accounted for 15.4% and Citrobacter was isolated from 7.6% of cases. Majority of these cases (60.4%) were noted in the month of April with an average environmental temperature being more than 35 ºC (Fischer Exact test p - <0.001 significant). The other predisposing factors noted were increased physical activity and use of tight garments in 45% and 20% of patients respectively.

Table 1: Age distribution of patients studied

Age in years	Total
	N (%)
0-10	62(72.1%)
11-20	2(2.3%)
21-30	7(8.1%)
31-40	5(5.8%)
41-50	8(9.3%)
51-60	2(2.3%)
>60	1(1.2%)
Total	86(100%)
Mean ± SD	13.89±16.27

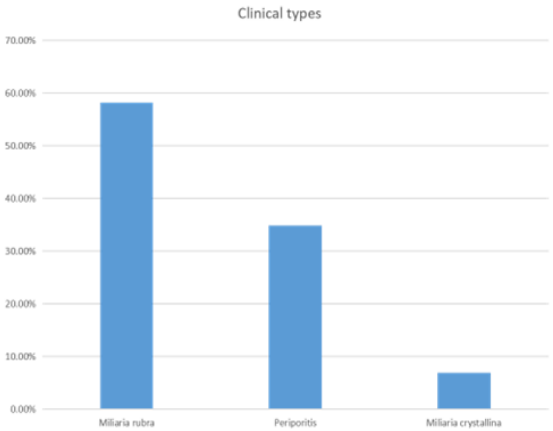

Figure 1: Chart showing the clinical types of miliaria

Figure 2: Miliaria rubra

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Figure 3: Clinical Photograph showing papules and pustules of Periporitis Staphylogenes

DISCUSSION

Miliaria is a generic term characterized by various cutaneous changes resulting from simple, mechanical obstruction of sweat duct opening. In consequence, sweat is trapped and retained within the skin leading to four types of clinical manifestations: (1) miliaria crystallina, superficial retention of sweat in stratum corneum, (2) miliaria rubra, retention of sweat within the epidermis, (3) miliaria pustulosa, retention of sweat in the epidermis with secondary leukocytic response, and (4) miliaria profunda, retention of sweat within the dermis.[3] Sometimes, the miliaria can result in severe complications like periporitis staphylogenes which is characterized by inflammation around the sweat duct caused by superimposed infection by Staphylococcus. They present as pin- head to pea-sized papules and pustules distributed over scalp, forehead and neck.[4]

India experienced a heat wave in April and May of 2016 with a maximum temperature reaching to 51 ºC in the state of Rajasthan.[2] During this period a sudden outbreak of miliaria cases was experienced at our tertiary care centre with majority of the patients in the age group of less than 10 years and the most common clinical pattern being miliaria rubra. At this hot climate, in an unacclimatized individual, the exposure to ultraviolet radiation may result in splitting of the upper epidermis and disruption of ducts of sweat glands. The new stratum corneum that grows beneath, further blocks these sweat ducts with collection of sweat leading to microcysts and hence miliaria.[5]

Prolonged exposure of the skin to sweat results in overhydration of the stratum corneum (outermost layer of the epidermis skin) causing initial blockage of sweat ducts. This is followed by proliferation of the normal skin flora Staphylococcus epidermidis which produces an extracellular polysaccharide material or slime that in turn blocks the lumen of the sweat duct. The repair process that follows eventually results in parakeratotic plug in the later stage of the disease, resulting in further obstruction, subsequently resulting in anhidrosis lasting for 3 weeks.[6]

In this observational study, majority of the patients were males in the age group of less than 10 years as children are more physically active and involved in outdoor activities. Apart from physical activity, occlusive clothing was also noted as a predisposing factor. Occlusive clothing with increased sweating may alter the skin pH to an alkaline level (8.8) which may predispose to skin irritation in sensitive individuals.[7]

Rarely, miliaria may be associated with pseudohypoaldosteronism wherein the high sweat sodium levels produce damage of the eccrine ducts, causing lesions similar to those seen in miliaria rubra. Drugs such as bethanechol, isotretinoin and doxorubicin have also shown to cause similar eruptions.[1]

In this case study, we came across 6.9% cases of miliaria crystallina presenting as thin walled vesicles and browny desquamation. Miliaria crystallina commonly occurs in infants due to delay in the development of patency of sweat ducts. It is also noted following a febrile episode. We did not come across any case of miliaria profundus. A very high percentage of periporitis staphylogenes (34.8%) was noted in this observational study which maybe due to secondary infection with the resident bacteria. The most common isolate in the present study was Staphylococcus aureus followed by Staphylococcus epidermidis which is similar to the organism isolated in the previous case reports.[4,8] Sylvest B also reported an outbreak of periporitis staphylogenes in the summer of 1971.[8]

This study highlights the various clinical types and the possible predisposing factors for the occurrence of miliaria. To date, such a conglomeration of cases in a short period of 3 months has not been reported. Clinically, miliaria rubra is the most common variant encountered which may be complicated with periporitis staphylogenes. Though a high temperature was reported in subsequent years, some degree of acclimatization has made the disorder less prevalent.

CONCLUSION

Miliaria rubra is a common sweat gland disorder encountered in extremely hot climatic conditions in an unacclamatized child, which may or may not be associated with periporitis.

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