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Original Research Article

Cutaneous manifestations of Rickettsial fever in paediatric age group

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ABSTRACT

Background: Rickettsial fever is well known to have various cutaneous manifestations that can help in the probable clinical diagnosis especially in the context of non availability of resources and aid in prompt administration of treatment, hence reducing mortalitiy and morbidity. The main objective of this study was to estimate the prevalence of cutaneous manifestations in patients with a positive Weil-Felix and also to study the plethora of cutaneous manifestations seen in Rickettsial fever.
Methods: All the consenting patients admitted in in the Department of Paediatrics below 18 years and with a positive Weil-Felix test were thoroughly screened for cutaneous manifestations.
Results: Of the 114 patients screened, 29 children (21.05%) had cutaneous manifestations. The various cutaneous manifestations encountered in the study are erythematous rash, maculopapular rash, petechial rash and cutaneous necrosis.
Conclusions: Though cutaneous manifestations was seen in only 21% of the patients with fever, when present it could help in suspecting rickettsial fever in a case of pyrexia of unknown origin.

Keywords: Rickettsial fever, Mortalitiy, Petechial rash

INTRODUCTION

Rickettsial fever is caused by the members of the order Ricketsiales; they are gram negative obligate intracellular organisms. Rickettsial infections have a worldwide distribution and are an emerging cause of febrile illness in paediatric age group in India. The disease has been reported from the states of Karnataka, Kerala, Tamilnadu, Maharashtra and parts of north eastern India. This bacterial infection has achieved endemic status in many countries such as Thailand, Taiwan and China.[1]

High levels of clinical suspicion is required for the clinical diagnosis of Rickettsial fever due to its vague and nonspecific signs and symptoms and also the fact that, it is not considers as a major causes of febrile illness in India. In most of the clinical setting Rickettsial infection is not considered an important differential when pyrexia of unknown origin is being evaluated, this can be attributed to the fact that Rickettsial infection is not a commonly encountered entity when compared to dengue or malaria.[2]

With the non-availability of gold standard tests such as immunofluorescence assay, the less reliable Weil Felix test is the most commonly available test used in India, diagnosis is mainly clinical. In depth knowledge regarding the plethora of signs and symptoms of Rickettsial fever would be essential for the clinical diagnosis of the infection.[2]

The rash is considered a characteristic feature of Rickettsial fever but it is not seen in all cases and it may

not be present during the clinical presentation of the patient. The onset of the rash is usually 3-5 days after the onset of the symptoms. It may be macular, maculopapular, petechial or haemorrhagic. Characteristically the rash is seen over the ankles, legs, wrist, palms and soles. A pink erythema which is blanching on diascopy can be seen over the trunk and extremities. Haemorrhagic manifestations include petechiae, ecchymosis associated with the necrosis of digits, nose, scrotum and ear lobe . They may turn gangrenous.[3]

A pathognomic cutaneous manifestation of Rickettsial fever is an Eschar. The eschar forms after the bite of the vector. Following the bite a vesicle/papule develops and ulcerates. it heals with the development of a black eschar and is associated with regional lymphadenopathy. The eschar which is pathognomic of the disease is seen in up to 50 per cent of the cases. Most common sites include axilla, groin, genitalia, chest, abdomen and neck.[3]

METHODS

Source of data

Children admitted in the Paediatric department of were included in the study.

Duration of study

The duration of the study was from November 2018 to October 2020.

Method of collection

Children diagnosed to have Rickettsial fever and supported by a positive Weil-Felix test.

Inclusion criteria

All the patients aged between below 18 years with a diagnosis of rickettsial fever and supported by a positive Weil-Felix were included in the study. A written consent was taken from the care takers/guardians were taken before inclusion in the study.

Exclusion criteria

The children whose caretakers/guardians didn't give consent for inclusion in the study.

Methodology

A proforma was made and the findings were recorded. All the children who were diagnosed clinically and have undergone Weil-Felix test were thoroughly examined for cutaneous manifestations and those who had cutaneous manifestations were included in the study.

RESULTS

A total of 114 patients were included in the study and the following observations were made.

Age

The mean age of the study subjects were found to be 7 years. Children in the age group of 5-10 years formed the majority of the study group with 55 children representing 48.2 per cent of the study population followed by 39 children below the age of 5 who made up 34.2 per cent of the study population. Seven (6.1 per cent) and thirteen (11.4 per cent) children of the age groups of 16-18 years and 11-15 years respectively formed the minority age groups of this study.

Table 1: Distribution of the study subjects according to skin lesions.

	Frequency	Percentage
Erythematous rash		
Present	9	31.0
Absent	20	69.0
Total	29	100.0
Maculopapular rash		
Present	16	55.2
Absent	11	44.8
Total	29	100.0
Petechial rash		
Present	2	6.9
Absent	27	93.1
Total	29	100.0
Skin necrosis		
Present	2	6.9
Absent	27	93.1
Total	29	100.0

Sex

The majority of the children included in the study belonged to the male gender. Of the 114 study subjects 68 were male and the female population were 46 in number forming 60 per cent and 40 per cent respectively of the study population.

Constitutional symptoms

Fever

Fever was the presenting complaint in all the children included in the study and it was the predominant reason for seeking medical intervention.

Headache

Of the 114 study subjects, sixty five (57 per cent) children presented with headache and the symptom was absent in the remainder of 49 (43 per cent) subjects.

Table 2: Distribution of the study subjects according to regions.

Regions	Present		Absent	
	Frequency	Percentage	Frequency	Percentage
Face	20	68.9	9	31.03
Neck	8	27.5	21	72.4
Chest	16	55.2	13	44.8
Abdomen	23	79.3	6	20.7
Axilla	5	17.2	24	82.8
Back	15	51.7	14	48.3
Upper Limb	21	72.4	8	27.6
Lower Limb	20	69	9	31
Buttocks	7	24.1	22	75.9
External Genitalia	4	13.8	25	86.2
Groin	3	10.3	26	89.7
Palm	13	44.8	16	55.2
Soles	13	44.8	16	55.2

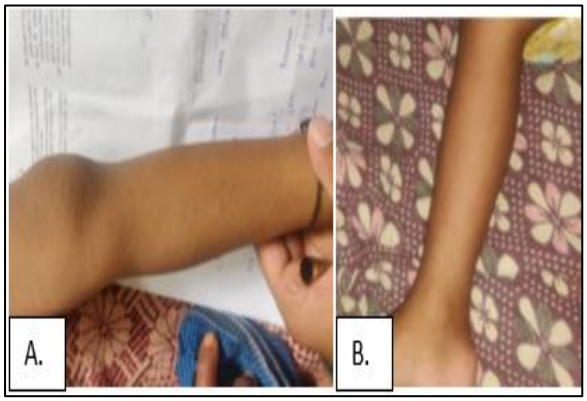

Figure 1: (A) Erythematous papular rash seen in the lower limb of a patient with Rickettsial fever and (B) Erythematous rash see on the lower limb of a patient with positive Weil-Felix.

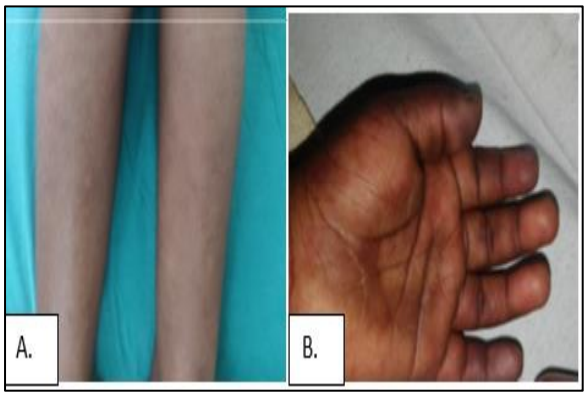

Figure 2: (A) Erythematous maculopapular rash seen in the lower limbs of a 15 years old patient. (B) Erythematous rash seen over the palms of a patients along with a few necrotic changes seen over the little finger.

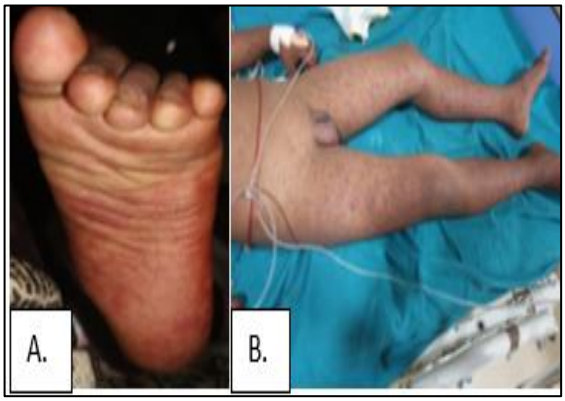

Figure 3: (A) Erythematous rash seen involving the sole of a patient with Rickettsial fever. (B) Rickettsial fever patient with a petechial rash seen involving the tunk and lower limbs.

Figure 4: (A) Petechial rash involving the face seen in a case of Rickettsial fever. (B) Fern leaf type skin necrosis seen in both upper limb of patients with Rickettsial fever.

Figure 5: (A) Skin necrosis seen in both lower limbs of a patient with Rickettsial fever. (B) Skin necrosis seen over the face in a patient with Rickettsial fever.

Figure 6: (A) Sharply defined purpric patches seen in a child with rickettsial fever. (B) The areas of purpura progressed to form necrotic and ulcerated areas of skin.

Chills

Sixty three children presented with chills, contributing to 55.3 per cent of the study population. The other 44.7 per cent (51 children) of the study population didn't present with the symptom.

Myalgia

Myalgia was found to be the presenting complaint in 39 children (34.2 per cent of the study population) whereas it was absent in the majority of the study population of 75 children making up 65.8 per cent of the study population.

Pain abdomen

Pain abdomen was seen in the three children of the study population and was absent in the other majority of 97.4 per cent of the study population.

Edema

Edema was seen in 3 children making up 2.6 per cent of the study population and was absent in the other majority of 97.4 per cent of children.

Altered sensorium

Altered sensorium was present in 4 of the study subject making up 3.5 per cent of the study population and was absent in the other 96.5 per cent.

Seizures

Seizures was encountered in 6.1 per cent of the study population but was absent in the other 93.9 per cent (107 children).

Hepatosplenomegaly

Hepatospleniomegaly was picked up on examination in 15 children of the study population, making up 13.2 per cent of the study population and was absent in the remainder 86.8 per cent.

Cutaneous manifestations

Erythematous macular rash

Erythematous rash was seen in 9 of the 29 children with cutaneous manifestations. hence erythematous macular rash was seen in 31% of children with cutaneous manifestations.

Maculopapular rash

On examination maculopapular rash was seen in the sixteen children of the 29 children having cutaneous manifestations making up 55.2% of the patients with cutaneous manifestations.

Petechiae

Petechiae was seen in 2 children making up 7% of children presting with cutaneous manifestations.

Skin necrosis

Skin necrosis was seen in 7% (2 children) of the 29 children with cutaneous manifestations.

Distribution of skin rash

In the children with cutaneous manifestations, abdomen was the most common site of involvement (79.3%) followed by upper limb (72.4%), lower limb (69.%), face (68.9%), chest (55.2%), back (51.7%), palms and soles (44.8%), neck (27.5%), buttock (24.5%), axilla (17.2%), external genitalia (13.8%) and groin (10.34%).

DISCUSSION

Rickettsial fever is a re-emerging cause of pyrexia of unknown origin. It should be included in the differentials and should be investigated further. In a resource poor

setting like India, the gold standard test IFA is limited to only the most sophisticated and advance laboratories. The lab diagnosis of Rickettsial fever in India is mostly by the commonly available and less reliable Weil-Felix test. In a country where febrile illness are mainly caused by the dengue virus and the malarial parasite, high level of clinical suspicion is required for the diagnosis of Rickettsial fever, in depth knowledge about the epidemiological and clinical feature would help in suspecting Rickettsial fever clinically.

The characteristic manifestations of Rickettsial fever such as the presence of an eschar, maculopapular rash, petechial rash and a rash involving palms and soles would aid in the diagnosis when these features are carefully examined for. Therefore, an in-depth knowledge regarding the various cutaneous manifestations of Rickettsial fever would help to identify the disease clinically. Early diagnosis and prompt antibiotic therapy would help in reducing the mortality and morbidity of the disease.

Age distribution

A total of 114 children were included in the study. The age of the study subjects ranged from 1 month to 18 years. The mean age of the study subjects was calculated to be 7.09 years with a standard deviation of 4.09 years. The majority of the study subjects were in the age group of 5-10 years consisting of 55 children making up 48.2 percent of the study population. This finding is in the concordance with findings in a study by Kumar et al where the mean age of the study population was 7.2 years with a standard deviation of 4.56 years and the majority of the study subjects belonged to the age group of 6-15 years.[5]

Sex distribution

Of the 114 study subjects, 68 were male children making up 59.6 per cent of the study population while the female patients made up 40.4 per cent.

Male preponderance was also seen in a studies conducted by Dass et al and a majority of the male children were encountered in a study conducted by Kumar et al in a study conducted by them at the department of paediatrics in Kasturba Medical college.[5,6]

The reason for male preponderance may be attributed to the fact that the male child is more frequently seen playing or working outdoors.[7]

Constitutional symptoms

Fever

Fever was seen in all the participants of the study. This finding is in concordance with the study conducted by Kumar et al 5 and similar finding were also observed in the study conducted by Weerakoon, Kularatne et al in the central province of Srilanka.[8]

Headcahe

Headache was seen in 65 children of the 114 children, hence headache was seen in 57 per cent of the study population. Headache is a nonspecific symptom which is commonly rickettsial fever.

In studies conducted by Dass et al and by Chunchanur et al, headache was seen in only 25 per cent of the study population.[6,9]

In a study conducted by Kamarasu, Malathi in Tamil Nadu headache was found to be the most common symptom after fever, seen in 93.8 per cent of the study population.[10]

Chills

Chills was a symptom seen in 63 children of the study population making up 55.3 per cent of the 114 study subjects.

To the best of our knowledge there are no studies to compare this parameter.

Myalgia

In this study, myalgia was seen in 34.2 per cent (39 children) of the study group.

Similar results were found in the studies conducted by Kumar et al where 30.6 per cent of the study subjects presented with myalgia.71 Myalgia was seen in only 25 per cent of the patients in a study conducted by Dass et al.[6]

Myalgia was found to be present in 71.9 per cent of the study population in a study conducted by Kamarasu et al.[10]

Pain abdomen

Pain abdomen was seen in only 3 children participating in the study, forming 2.6% of the study population.

This finding was not in concordance with findings of a study conducted by Dass et al where pain abdomen was found in 25% of the study population.[6]

A study conducted by Kumar et al pain abdomen was found to be present in 22.6% of the study population.[5]

Edema

Edema was found to be present in 2.6% of the study group (3 children) on the contrary in a study conducted

by Kumar et al edema was seen in 33.9% of their study group.[5]

Altered sensorium

In the study altered sensorium was seen in 4 children, that is 3.5% of the study population. In a study conducted by Kumar et al, altered sensorium was found in a higher number making up 8.9% of their study group.5 It was encountered in 10% of the study population in a study conducted on 69 patients by Chunchanur et al.[9]

Seizures

Seizures were seen in 7 children, i.e 6.1% of the study population. In a study conducted by Thomas, Puranik et al seizures were encountered in 19.1% of the 262 patients studied.[9] In an other study conducted by Dass et al seizures were encountered in 12.5% of the 31 children studied.[6]

Hepatosplenomegaly

On examination hepatosplenomegaly was found to be present in 13.2% of the children participating in the study (15 children). It was seen in 51% of the patients examined in a study conducted by Chunchanur et al in Bangalore medical college and research institute.[10] Hepatosplenomegaly was found in 39.5% patients in a study conducted by Kumar et al.[5]

Vomiting

Vomiting was one of the presenting complaint in 19 children, making up 16.6 % of the study population. Vomiting was found in a higher number of patients (38.9% of the study group) in a study conducted by Krishnan et al.[6] Similarly vomiting was seen in 46.8% of the study subjects in a study conducted by Kumar et al.[5]

Cough

Cough was one of the presenting complaints seen in 7.8% of the study population (9 children). Thirty nine per cent of the patients were found to have a cough in a study conducted by Krishnan et al.[7]

Cough was found to be present in 19.4% of the study subjects in a study conducted among a total of 124 patients Kumar et al in Kasturba Medical College, Manipal, India.[5]

Loose stools

Four children (3.5%) participating in the study presented with loose stools as one of the presenting complaints. In a study conducted by Dass et al in Meghalaya, Loose stools were found to be present in 8.3% of the study population.[6] Ten per cent of the study population presented with loose stools in a study conducted on 1-12 year old children by Krishnan et al.[7]

Miscellaneous

Apart from the above manifestations, the following clinical manifestations were encountered: burning micturition, discoloration of urine.

To the best of our knowledge there are no studies available to compare these above parameters.

Cutaneous manifestations

Of the 114 patients screened, 29 children (21.05%) had cutaneous manifestations. The various cutaneous manifestations encountered in the study are erythematous rash, maculopapular rash, petechial rash and cutaneous necrosis. In a study conducted by Krishnan, Pillai et al in southern Kerala cutaneous manifestations was seen in 23.15% of the 108 study subjects.[7] Kumar et al in a study performed in the department of paediatrics, Kasturba Medical College, Manipal cutaneous manifestations was encountered in 18.5% of the total 124 patients studied.[5] In a study conducted by Chunchanur et al cutaneous manifestations was encountered in 40% of the 69 patients screened.[10]

Erythematous rash

Erythematous rash was seen in 31.03% (9 children) of 29 children who had cutaneous manifestations. In a study conducted by Weerakoon et al in central province of Srilanka erythematous macular rash was seen in only 1% of the patients who had cutaneous manifestations.8 Macular rash is difficult to pick up in dusky individual and is visible only when the skin is examined in at an angle in broad sunlight.[8] Papular rash can be felt by tactile examination of the skin but macular rash cannot be picked up only by visual examination.

Maculopapular rash

Sixteen children, i.e 55.17% of the 29 children with cutaneous manifestations had a maculopapular rash. In a study conducted by Weerakoon et al in central province of Srilanka, maculopapular rash was seen in 98% of the 134 patients studied.[8]

Petechiae

On clinical examination petechiae was seen in 2 children (6.8%) of the 29 children with cutaneous manifestations. To the best of our knowledge we couldn't find a study to compare this parameter.

Skin necrosis

Necrotic skin lesion was seen in 2 children (6.8%) of the 29 children with cutaneous manifestations. In a study

conducted by Weerakoon et al in central province of Srilanka, eight patients had necrotic skin manifestations making up 6% of the study population.[8]

Distribution of skin lesions

In the children with cutaneous manifestations, abdomen was the most common site of involvement (79.3%) followed by upper limb (72.4%), lower limb (69%), face (68.9%), chest (55.2%), back (51.7%), palms and soles (44.8%), neck (27.5%), buttock (24.5%), axilla (17.2%), external genitalia (13.8%) and groin (10.34%). On the contrary in a study conducted by Weerakoon et al in central province of Srilanka, majority of the patients had cutaneous lesions in upper limbs (81%) and legs (67%) whereas palms and soles were found to be involved in a higher number of patients (55%). In this study lesions on the anterior trunk was found be present in only 46% patients.[8]

CONCLUSION

Among the 114 children screened, the majority belonged to the age group of 5-10years. This could be attributed to the fact that children belonging to this age group spend a large amount of time playing outdoors and are not old enough to be aware of dangers from vectors such as ticks and fleas and hence cannot protects themselves form the bites of these creatures. The incidence of Rickettsial fever was found to be higher in males. Less protective clothing compared to females and comparatively more outdoor activities of the male children could have led to this male preponderance. Though rickettsial fever is a bacteria systemic disease, cutaneous manifestations was seen in 21% of the children screened. Though cutaneous manifestations was seen in only 21% of the patients with fever, when present it could help in suspecting rickettsial fever in a case of pyrexia of unknown origin. Maculopapular rash was found to be the most common cutaneous manifestations (55.2% of the children with cutaneous manifestations) followed by macular rash seen in 31% of the children with cutaneous manifestations. Cutaneous manifestations such as petechiae and skin necrosis were in 6.8% each among the 29 children studied. In the children with cutaneous manifestations, abdomen was the most common site of involvement (79.3%) followed by upper limb (72.4%), lower limb (69.%), face (68.9%), chest (55.2%), back (51.7%), palms and soles (44.8%), neck (27.5%), buttock (24.5%), axilla (17.2%), external genitalia (13.8%) and groin (10.34%).

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