

Serological profile of febrile rash in patients at a tertiary care hospital in Telangana

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Abstract

Introduction: Evaluating the patients who presents with fever and rash can be challenging because the differential diagnosis is extensive and includes minor and life-threatening illnesses. **Materials & Methods:** A total of 300 patients with provisional diagnosis of acute febrile illness were evaluated during the period of August 2016 to July 2017 at Sir Ronald Ross Institute of Tropical and Communicable Diseases, Nallakunta, Hyderabad. All the clinically suspected cases of febrile rash were subjected for serological study. **Results:** Most commonly affected age group is 14-40 years. Fever is the most common symptom. NS1ag was detected in 44.7% of cases. Secondary dengue infection is 12.3%. IgM is positive in 57.1% of chikungunya cases. The chicken pox IgM positivity was reported in 80% of cases. About 82.8% of measles serologically confirmed cases. **Conclusion:** Diagnosis can be established serologically in 63.6% of cases there by emphasizing the need for Clinico-serological correlation of rashes. Acute febrile illness comprises infection due to malaria, influenza, leptospirosis, scrub typhus, typhoid fever, and dengue, of which some infections necessitate specific treatment. As antibiotics will be required to treat bacterial diseases, knowing the viral etiology will help in avoiding unnecessary administration of antibiotics.

Key words: Fever, Rash, Serology, Age

Introduction

Evaluating the patients who presents with fever and rash can be challenging because the differential diagnosis is extensive and includes minor and life-threatening illnesses [1].

In recent times, with increased travel and population movements imported Infections with secondary local transmission are of great concern. Viral exanthems are by far the most common cause off ever Viral exanthems are by far the most common cause off ever. There are number of viruses causing cutaneous manifestations. Rubella or measles caused by paramyxovirus, a major public health problem with significant mortality and morbidity in developing countries.

Febrile rashes are classified in to maculopapular rash, generalized diffuse erythema, and vesicular, pustular, nodular, petechial, and purpuric rashes [2]. Currently, viral exanthems are by far the most common cause off ever with rash in children.

Morphological patterns, seasonal occurrence, and the presence of type of exanthema can help the physician make a clinical diagnosis, which when confirmed by specific diagnostic tests, ensures timely and appropriate treatment, avoiding unnecessary therapy. The present study is taken upto evaluate the role of serological investigations in establishing the cause off febrile rash

Materials and Methods

The study was conducted at Department of Microbiology, Sir Ronald Ross Institute of Tropical and Communicable diseases (SRRIT & CD) over a period of one year from August 2016 to July 2017. A total of 300 cases of Fever with Rash are included in the study. An informed consent was obtained.

All Patients underwent minimum diagnostic work up along with serological tests. Institute's ethics committee approval was taken.

Inclusion criteria: Patients of all ages presenting with acute fever and a rash.

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Exclusion criteria

1. Patients presenting with fever of long duration.
2. Clinically diagnosed drug induced fever with rash.
3. Patient not willing to give consent.

Serological tests for febrile rashes

IgM Elisa for dengue fever:

1. IgM ELISA kit for Dengue was procured from NIV DEN MAC ELISA Kit (Version No 2.4) NIV, Pune. The sensitivity and the specificity of the test are 98.5% and 98.84% respectively.

2. IgMELISAKit for Measles was procured from Euroimmun diagnostics (Order No. EI 2610-9601 M) The sensitivity and specificity of the test are 100% and 98% respectively.
3. IgM ELISA kit for Chickunguniya was procured from NIV CHIK MAC ELISA Kit (Version No 3.4) NIV, Pune. The sensitivity and the specificity of the test are 95% and 98% respectively.
4. IgMELISAKit for VZV was procured from Euroimmun diagnostics. The sensitivity and specificity of the test are 100% and 100% respectively.

Results

A total of 300 patients with provisional diagnosis of acute febrile illness were evaluated during the period of August 2016 to July 2017 at Sir Ronald Ross Institute of Tropical and Communicable Diseases, Nallakunta, Hyderabad.

All the clinically suspected cases of febrile rash were subjected for serological study.

Most commonly affected age group is 14-40 years (Table.1) Clinical manifestations of patients with a clinically suspected cases of acute fever with rash. (Table2) Most common symptom was fever followed by rash.

Table-1: Age and sex –wise distribution of cases

S. No	Age (years)	% of cases	Male	Female
1	<5	16.0	22	26
2	6-13	30.0	40	50
3	14-40	44.0	75	57
4	41-60	10.0	22	8

Table-2: Clinical manifestation of suspected cases with febrile rash.

S. No	Clinical feature	Number n (300)	Percentage (%)
1	Fever	277	92.3
2	Rash	212	70.6
3	Headache	100	33.3
4	Body pains	159	53.0
5	URTI's	94	31.3
6	LRTI's	41	13.6
7	Vomiting	120	40.0
8	Diarrhoea	94	31.3

Febrile rash with seropositivity was more in measles (82.8%) followed by chickenpox (80%). Among dengue and chickungunya cases fever (100%) was the most common symptom followed by arthralgia (97.3%, 93.8%) respectively. Among measles & chicken pox cases most common symptom was rash (100%) followed by fever (98%).

Routine diagnostic work-up included complete blood picture, Erythrocyte sedimentation rate, Platelet count. Anaemia was observed in 30% of cases, leucopenia 10%, thrombocytopenia 5%, leucocytosis 18%, elevated liver enzymes in 7% cases. Complete urine examination did not reveals any abnormality.

Seropositive cases for Leptospirosis and Rickettsial diseases, did not present with rashes. None of the samples gave the positive results for typhoid fever

Table-2: Data showing serologically confirmed cases of fever with rash

S.No.	Disease	No. of positive cases (%)
1	Dengue	63(21)
2	Chikunguniya	28(9.3)
3	Measles	63(21)
4	Chickenpox	36(12)

A total of 43.7 % (NS1) of the samples were from acute phase serum samples and 48.1% (IgM) and 12.3% (both IgM & IgG) were from early convalescent phase out of 49 cases of Chikungunya-28 cases (57.1%) were positive, out of 76 cases of measles 63 (82.8%), were found to be positive and out of 45 cases of chickenpox 36 cases (80%) were found to be positive. None of the cases were positive for Widal HBsAg, HIV tests while *Leptospira* in 2 and Weil felix positivity was detected in 5 cases.

Discussion

The present study was conducted at the Department of Microbiology, Sir Ronald Ross Institute of Tropical & Communicable Diseases Hospital, Hyderabad. The study population included 300 hospitalised patients, clinically suspected of fever. This group included only those patients in whom there was no history of drug allergies.

In this study male: female ratio is 1.2:1. In case of Dengue, the commonest age group with febrile rashes is 14-40 years (73.4%). This observation goes in accordance with studies done by Seema Awasthi et al and Prafulla Dutta et al who reported 58.8% and 67.1% of cases respectively [2,3].

In this study, fever (100%) is the most common symptom followed by myalgia 97.3%. Similar observation was seen in the study done by Badawy A. Abdul Aziz et al who also reported fever as most common symptom in 100% cases [4].

In this study, the results of NS1 Antigen (43.7%) was comparable with the study done by S Datta et al [5]. They proved that early detection of NS1 assay can help in early confirmation and management of vulnerable groups. The study done by Badaway A.

Abdul Aziz et al, found the IgM positivity in 38.5% and rash in 28.125% of cases, and in the study by S Datta et al IgM positivity was reported in 39.1% of cases while in our study it was 48.1% [4,5].

A.K Hati et al showed the seropositivity rate of both IgM+IgG as 12.6% [6]. Dengue serosurveillance studies may give some idea about advent, intensity, transmission, waxing and waning, and impending epidemic of dengue and DHF.

In the study done by Ahmed Mohamed Ashshi et al, the seropositivity of the cases were 4.2% for both IgM+IgG. In this study, the percentage of IgM+IgG is

found to be 12.3% indicating the presence of secondary dengue infection [7].

In the study of Neeraja M et al, the adults are affected more due to Dengue fever, 70% [8]. This findings were similar to our study showing 66%. As per the study done by Kumar A et al in 2010, this pattern was also evident in the study conducted in Kerala [9].

True endemicity will be reached when the adult infection declines and only the new entrants into the population, that is, the children, are affected more by the disease [9].

This shows that the epidemiology of dengue in most endemic regions has shifted to older-age cases, possibly due to extreme climatic or environmental events, prolonged periods of vector control, migration, and urbanization that lead to escalation of mosquito borne-vector susceptibility [10].

Chikungunya- In this study, the results of male: female ratio is slightly higher in comparison to the. The ratio of male: female is 1.5:1. This probably could be due to more outdoor workers in the population residing in our town, hence more exposure to the vector borne diseases.

The study showed male preponderance, (60.7%) which was well correlated with the studies done by Gianandrea Borgherini et al, who also found male preponderance with 56.6% cases getting affected [11]. However, Debabrata Bandhyopadhyay et al study showed equal preponderance in males and females [12].

The present study showed 57.1% of cases presenting with rash. Correlate well with the study done by Winfried Taubitz et al [13] Also in study of Galate L.B. et al found 36.85% of Chikunguniya cases present with rash [14].

Study done by Winfried Taubitz et al during in travellers returning home from countries involved in

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epidemics, showed the IgM ELISA confirmed cases as 43.9% indicating the importance of adequate pre-travel health advice, including dissemination of information about high risk areas and consequent protection from mosquito bites [13]. Also in the study done by Ahmad N et al, showed IgM result as 96% and the study by Gianandrea Borgherini et al in Adult patients during 2007 showed the 75% of IgM positive cases [11,15].

The serological results goes in accordance with the study done by Supriya Satish Patil et al who conducted a cross sectional study at Kasegaon, Maharashtra. A total of 1599 patients were included in the study, of which 62.5% showed IgM positivity [16]. In this study, the IgM was positive in 57.1% of cases.

Chickenpox- The male-to-female ratio in our study is 1.1:1. In the study done by M.P Singh et al shows female preponderance with females percentage of 77.77%, indicating poor vaccination status among the females, in a country like India [17].

The present study showed a contradictory result with the study done by M.P. Singh et al and goes well in accordance to other above-mentioned studies, with male preponderance [17]. The most common age group of patients affected with Chickenpox in our study correlate well the studies showing Singh M.P. et al showing 67% in age ≤ 15 years [17].

Similar presentation is seen in the study done by M.P. Singh. et al. of the 18 laboratory confirmed cases, majority (67%) of the affected cases were < 15 years of age with IgM positivity of 76.5% [17]. The fact that, chickenpox is more severe in adults than in children, suggest that tropical countries may be at a higher risk of morbidity and mortality due to the disease.

Varicella is one of the leading causes of vaccine-preventable deaths in India. The Indian Academy of Paediatrics-Committee on Immunisation recommends the administration of varicella vaccine in children aged 15 months or older [17]. The presence of vesicles in our study is similar to the study done by M.P. Singh et al showing 66.6% of cases. In the study done by Singh MP et al in 2011, showed only 10% of the cases with vesicles, is contradictory with our present study [17].

The IgM results are in concordance with the study done by Singh MP et al showing 80% of cases. Also in the study done by M.P. Singh et al showed IgM values as 100%, it has been proposed that the transmission potential of the Varicella Zoster Virus might be adversely affected by a combination of high ambient temperatures and humidity in tropical regions [17].

Measles- The male-to-female ratio in our study is 0.7:1. In our study, ratio of females is more than males, while in study done by Kasper S et al, showed a female preponderance [18]. In the study done by Amir Mohammed et al, among the pediatric age group, showed male preponderance of cases, with males as 53% [19].

In this study, the age most common affected is > 2 years. (84.2%) Also in study by Tepebasili et al, similar finding was observed [20]. The study done by Anis-ur-Rehman et al in contradictory to our study where > 2 years of age children are commonly affected, indicating the presence of maternal antibodies in the age < 6 months [21].

Hence Children should go for MR vaccination at the age of 18-24 months with the first booster of DPT/Polio.

In our study secondary complications like Pneumonia is also seen, which correlates well with other studies. In the study done by Kasper S et al in 2009, showed fever (92.3%), rash (92.3%), coryza (92.3%), pneumonia (62.2%) and diarrhoea as 38.1%. In study of Amir Mohammed et al in 2011 showed fever and rash in 100% of cases with complications like pneumonia in 51% of cases. Also in study by Deepa K.S et al showed the cases of fever and rash 100% , coryza 83.8%, pneumonia as 12.9% and diarrhoea 22.5% of cases [22].

The IgM results (82.8%) in our study goes well in accordance with studies. Anne Michel et al the IgM ELISA positivity as 85% [23]. The study done by Surrender N Gupta et al showed the IgM positivity of 85% while Hashmi S et al, showed IgM positivity of 90% [24,25].

Conclusion

Acute febrile illness comprises infection due to malaria, influenza, leptospirosis, scrub typhus, typhoid fever, and dengue, of which some infections necessitate specific treatment. As antibiotics will be required to treat bacterial diseases, knowing the viral etiology will help in avoiding unnecessary administration of antibiotics.

In view of high mortality and morbidity associated with dengue especially in tropical countries, it is imperative to diagnose the disease during the early phase in order to provide information for appropriate management and avoidance of complications. The NS1 antigen is found together with endothelium, free or soluble in the serum

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of patients, and can be detected on days 0-9 after the onset of symptoms. Laboratory diagnosis is important in differentiating primary and secondary infection which helps clinicians to anticipate complications of dengue.

To strengthen measles surveillance through the upcoming Integrated Disease Surveillance Program. Refresher trainings to the workers of the affected areas for proper cold chain maintenance. Information, Education and Communication activities should be targeted towards modifying the help seeking behaviour of mother, education and communication in the district, especially in the measles affected areas

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