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Original Research Article

Chikungunya in infants: a descriptive study in a district hospital

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ABSTRACT

Background: To define the clinical profile of Chikungunya in infants admitted at a District Hospital in South India.
Methods: All infants admitted in Government District Headquarters Hospital, Namakkal from January 2019 to December 2019 with fever (defined as axillary temperature > 99.6 F) and any one of the following features; seizure, loose stools, peripheral cyanosis, skin manifestations or pedal edema in children less than one year with chikungunya IgM ELISA positive were included in this study. Details of disease from onset of illness till admission were noted. This was a descriptive observational study.
Results: Fifty-six (46) infants were included in this study, out of it 27(58.69%) were males and 19(41.30%) were females. 7(15.21%) infants were less than 1 month of age, 21(45.65%) were 2-6 months old and 18(39.13%) were 7-12 months old. Fever was invariably present but associated constitutional symptoms in infants consisted of lethargy or irritability and excessive cry. The most characteristic feature of the infection in infants was acrocyanosis and symmetrical erythematous rash were noted in most infants. Erythematous macules and patches were observed which later progressed to morbilliform rashes.
Conclusions: Atypical clinical manifestations of chikungunya infection in infants as compared to older children to be carefully observed for its proper management. The morbidity and mortality of the disease may be avoided by the rational use of drugs and close monitoring of all infants.

Keywords: Atypical manifestations, Chikungunya virus, Children, Infants

INTRODUCTION

Chikungunya was first isolated by R.W. Ross in 1952 in the Newalla district of Tanzania.[1] It causes a dengue-like illness, characterized by fever, rash, painful myalgia and arthralgia and sometimes arthritis. In the Indian sub-continent, first isolation of the virus was done in Kolkata in 1963 followed by multiple epidemics in different parts of the country till 1973.[2-3] The chikungunya virus is an envelope, positive stranded RNA alpha virus belonging to the Togaviridae family and transmitted by Aedes mosquito bites (mainly Aedes aegypti and A Aedes albopictus[4] The mosquito, well adapted to life in urban settings, breeds in clean puddles of stagnant water and collections of water in artificial containers. The mosquito is highly susceptible to the virus, prefers to live close to people, seeks a blood meal during daytime and bites several people in a short period for one meal.[5] Most descriptions of chikungunya fever are based on data obtained during epidemics mostly in adults. Children are among the group at maximum risk for severe manifestations of the disease and some clinical features in this group are distinct from those seen in adults.[5,6] During the recent epidemic of chikungunya peculiar clinical pattern was observed.[7] Children presenting with fever, skin manifestations, cough, corhyza, headache and diarrhea without joint manifestations were found to be positive for chikungunya IgM antibodies. Due to paucity of literature about detailed clinical profile and these atypical manifestations of the chikungunya fever in children, the study was carried out to analyze various

manifestations of chikungunya cases in a district hospital in Tamil Nadu state.

METHODS

A retrospective analysis of laboratory confirmed chikungunya patients who were admitted in Government District Headquarters Hospital, Namakkal, Tamil Nadu, India from January 2019 to December 2019 was done. These cases were laboratory confirmed for chikungunya infection by detection of IgM antibodies against chikungunya virus (CHIKV IgM) by IgM Elisa Method. All infants admitted in Government District Headquarters Hospital, Namakkal from January 2019 to December 2019 with fever (defined as axillary temperature >99.6 F) and any one of the following features; seizure, loose stools, peripheral cyanosis, skin manifestations or pedal edema in children less than one year with chikungunya IgM ELISA positive were included in this study. Infants with negative chikungunya IgM Elisa and mixed infections were excluded. Details of disease from onset of illness till admission were noted. This was a descriptive observational study. Routine investigations (total leucocytes count, differential leucocytes count, platelets count, and haemo-parasites in peripheral smear, liver function test, renal function test), specific biochemical and radiological investigations i.e. chest X-ray, USG abdomen were reviewed. Other significant investigations were also done according to the clinical manifestations. The data thus collected from hospital clinical records were compiled on Microsoft excel 2010 spread sheet and results were expressed in percentage.

Inclusion criteria

- All infants admitted in Government District Headquarters Hospital, Namakkal from January 2019 to December 2019 with fever (defined as axillary temperature >99.6 F) and any one of the following features; seizure, loose stools, peripheral cyanosis, skin manifestations or pedal edema in children less than one year with chikungunya IgM ELISA positive were included in this study.

Exclusion criteria

- Infants with negative chikungunya IgM Elisa were excluded.

Those patients with concomitant malaria, typhoid, leptospirosis etc. were not included in study.

RESULTS

A total number of 46 laboratory confirmed chikungunya patients were observed in this study period. Clinical presentation, progression of disease, hematological and biochemical profile and outcome of these cases were assessed and recorded. Authors observed a male predominance (M: F ratio 1.4:1), that is 27(58.69%) were male babies and 19(41.30%) were female babies (Table 1). Out of 46 patients, 7(15.21%) were less than one month, 21(45.65%) were 1-6 months and 18 (39.13%) were 6-12 months age group (Table 2).

Table 1: Sex distribution.

variable	Number	Percentage
Male	27	58.69
Female	19	41.30

Table 2: Age distribution.

variable	Number	Percentage
<1 month	7	15.21
1-6 months	21	45.65
6-12 months	18	39.13

Most common clinical features were fever (100%) followed by Irritability/ Poor feeding (67.39%), Generalized erythema (52.17%), Loose stools (43.47%), and Peripheral cyanosis (41.30%). Infants with chikungunya were unusually irritable probably due to pain in the extremities but older children were able to complain leg pain and refuse to walk. Both palms and soles of infants with chikungunya were cyanosed during the early febrile phase which could not be observed in older children. Hyper pigmentation and Maculopapular rash were noted in 34.78% and 26.08% babies whereas vesiculobullous lesions were noted in 6.52% cases. Early in the febrile phase babies usually presented with erythematous, maculopapular rash and vesiculobullous lesions and hyperpigmentation was noted during recovery phase (Table 3). CNS manifestations were in the form of seizure in 10(21.73%) patients and altered sensorium in 4(8.69%) patients. Among the four patients presented with encephalitis (CSF - Positive for chikungunya IgM), all infants recovered completely without residual sequlae. Leucopenia (<4000/cu.mm) and thrombocytopenia (<1, 00,000/cu.mm) were noted in 47.82% and 41.30% cases.

Table 3: Clinical presentation.

Clinical presentation	Number	Percentage
Fever	46	100
Irritability / Poor feeding	31	67.39
Generalized erythema	24	52.17
Loose stools	20	43.47
Peripheral cyanosis	19	41.30
Hyper pigmentation	16	34.78
Maculopapular rash	12	26.08
Seizures	10	21.73
Edema of extremities	7	15.21
Encephalitis	4	8.69
Vesiculobullous lesions	3	6.52
Leucopenia (<4000/cu.mm)	22	47.82
Thrombocytopenia (<1,00,000/cu.mm)	19	41.30

DISCUSSION

The chikungunya epidemic epitomizes the classic interaction between agent, host and environment.[3,5] Children are among the group at maximum risk for severe manifestations of the disease and some clinical features in this group are distinct from those seen in adults.[6] Following transmission, chikungunya replicates in the skin, and disseminates to the liver, muscle, joints, lymphoid tissue (lymph nodes and spleen) and brain, presumably through the blood. Typically, joint damage fluctuates over time, but always affects the same parts of the body, mostly the extremities (hands, ankles, knuckles).[5-8] The reasons for the re-emergence of chikungunya in the Indian subcontinent and for its unprecedented incidence rate in the Indian Ocean region are unclear. Plausible explanations include increased tourism, chikungunya virus introduction into a new population, and viral mutation. The incubation period can be 2-12 days but is usually 3-7 days. "Silent" CHIKV infections do occur; but how commonly this happens is not yet known.[9] A. Swaroop et al, reported that the fever in chikungunya is of sudden onset with chills and rigors (>104 F), subsides in 2-3 days and is associated with conjunctivitis, anorexia, arthralgia and vomiting.[10] The results of the present study confirm that fever is invariably present, but associated constitutional symptoms in infants consisted of irritability and excessive cry (67.39%). Joint manifestations which are an inseparable entity in older children and adults were absent in infants as per authors observation for which authors unable to find out an explanation.

Seizures which have been described as an association of the disease [Alladi Mohan et al,] was observed in 10 (21.73%) infants which roughly correlates with those with fever greater than 1040 F.[11] Peripheral cyanosis without any hemodynamic alteration was noted in 41.30% (19 children) in the study. This sign is unique and was mentioned in a study by Joseph J. Valamparampil et al, in which peripheral cyanosis was noted in 75%.[12] These new manifestations may be explained by the fact that the African strains which are the cause of the present epidemic exhibit wider sequence diversity and have been shown to undergo genetic microevolutions even during the course of an epidemic.[13]

Hochedez et al, in their study noted that skin manifestations occurred in 77% of patients, no lesions were found on the face but palms and soles were involved in a small number of patients.[14] According to them erythema followed the onset of fever by 1-2 days, lasted 3-7 days and disappeared without scaling in all cases.[14] The present observations revealed that at least one skin manifestation was present in all the infants and hyper pigmentation and Maculopapular rash were noted in 34.78% and 26.08% babies whereas vesiculobullous lesions were noted in 6.52% cases. Early in the febrile phase babies usually presented with erythematous, maculopapular rash and vesiculobullous lesions and hyperpigmentation was noted during recovery phase. Palms and soles were involved in 67.74% of cases while facial involvement was rare, but not absent. The first skin lesion to appear were generalized erythematous rashes which developed abruptly during first two days of fever only to subside within the next two days. Next to appear was maculopapular rashes in a centrifugal pattern on the second day after the onset of fever and disappeared by the sixth day.

Diarrhea was observed in 20(43.47%) of infants with onset on the third to fifth day, but was never associated with blood in stools which is comparable with Joseph J. Valamparampil et al, study where they observed loose stools in 41% patients.[12] None of the babies developed dehydration and diarrhea subsided by seventh to eight day. They were managed with oral rehydration solution as per WHO protocol.

A Swaroop et al, described the presence of acral edema in chikungunya infection in children.[10] In Joseph J Valamparampil et al, study where they observed edema of lower extremities by third to fourth day of illness in 19.64%.[12] In this study, authors noted edema of lower extremities in 30.43% infants. The edema subsided spontaneously by around seventh day. Hematological testing in chikungunya may reveal leukopenia with relative lymphocytosis by day 3 to 6 of the illness. Insignificant rise in hematocrit may occur by day 2 to 4 of the illness. Thrombocytopenia may occur but is not severe and bleeding manifestations often do not correlate with platelet counts particularly in infants.[2,5,6] In this study 41.30% of patients had thrombocytopenia.

Chikungunya is a self-limiting illness with recovery being the rule.[2] Authors also found that all children completely recovered without any residual sequelae at the time of discharge. In the present study, duration of hospital stay ranged from 3 to 9 days (mean 6.2 days). No deaths were noticed in the present study.

CONCLUSION

An entirely different spectrum of disease is seen in infants with chikungunya as compared to older children. So, authors should keep these atypical manifestations of chickungunya in infants to reach appropriate diagnosis early to prevent the morbidity and mortality of the disease by the rational use of drugs and close monitoring of all infants.

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