Original Article

Indian Journal of Communicable Diseases
Volume 4 Number 1, January - June 2018
DOI: http://dx.doi.org/10.21088/ijcd.2395.6631.4118.2

Clinical Presentation and Complications of Dengue Fever in Infants: A Retrospective Study

Prateek Kumar Panda[1], Kalpana Panda[2]

Author Affiliation:
[1]Senior resident,
Department of Pediatrics, AIIMS,
Ansari Nagar, New Delhi,
Delhi 110029, India.
[2]Senior resident,
Department of Pediatrics,
ESI Hospital, Basaidarapur,
New Delhi, Delhi 110015, India.

Reprint Request:
Kalpana Panda,
Senior Resident,
Department of Pediatrics,
ESI Hospital, Basaidarapur,
New Delhi, Delhi 110015, India.
E-mail: drkalpanapanda@gmail.com

Received on 11.03.2018
Accepted on 05.05.2018

Abstract

Introduction: Dengue in infants is not often studied in detail due to practical limitations and the information in Indian literature regarding the same are limited to only a few case series. However, even primary Dengue illness can have life threatening complications in infants. *Methods:* In this single institution retrospective study, case records of all the infants admitted with confirmed Dengue fever between January 2013 and December 2017 were analyzed for their clinical presentation, physical examination findings, laboratory and radiological parameters, complications and final management outcome. *Results:* Out of the 295 confirmed pediatric Dengue cases, 14 cases (4.8%) were infants. Predominant clinical presentation was fever, rash, irritability, vomiting and poor oral intake. Complications like hemodynamic instability, internal and external hemorrhages, hepatic dysfunction and disseminated intravascular coagulation were more common in infants as compared to other age groups. *Conclusion:* Infantile Dengue cases, although being rare, are at more risk for life threatening complications and thus require intensive clinical and biochemical monitoring, judicious fluid rehydration and other symptomatic management as required. Larger studies with greater sample size are required to clearly elucidate the novel pathogenetic mechanisms for increased virulence of primary Dengue illness in infantile age group and also to optimize the management for these cases.

Keywords: Dengue; Infants; Hemorrhages.

Introduction

Approximately one million cases of dengue are reported annually to the World Health Organization [1] .Currently it is a major cause of morbidity in tropical and sub-tropical regions. This is usually spread by bite of infected Aedes mosquitoes, which have a predilection to breed in artificial containers in the vicinity of human residence [2]. Dengue virus (DENV) infection can cause illness of varying severity ranging from a benign illness like dengue fever to a severe life threatening illness like dengue hemorrhagic fever or dengue shock syndrome (DHF/DSS) that is characterized by systemic capillary leakage, thrombocytopenia and hypovolemic shock [3]. Currently dengue fever is classified according to levels of severity as dengue without warning signs, dengue with warning signs (abdominal pain, persistent vomiting, fluid accumulation, mucosal bleeding, lethargy, liver enlargement, increasing haematocrit with decreasing platelets) and severe dengue (dengue with severe plasma leakage, severe bleeding, or organ failure) [4]. Patients who recover following defervescence are considered to have non-severe dengue, but those who deteriorate tend to manifest warning signs. These patients are likely to recover with intravenous rehydration, proper hemodynamic monitoring, careful watch for fluid overload and other complications as well as judicious blood product administration whenever indicated [5]. DHF/DSS occur mainly due to secondary infection by a heterotype DV infection in children and adults, but in infants even primary infection by DV causes DHF/DSS. Clinical manifestations of DHF/DSS are more significantly

associated with death in infants compared with older children [6]. Vertical transmission of dengue virus as well as anti dengue virus IgG neutralizing antibody has been reported to be responsible for the pathogenesis of enhanced severity of dengue viral illness in infants. The complex pathogenesis of DHF/DSS during primary dengue in infants, with multiple age-related confounding factors, offers unique challenges to investigators [7]. Dengue in infants is not often studied in detail due to practical limitations and the information in Indian literature regarding the same are limited to only a few case series. However, looking at the magnitude of current Dengue pandemic globally in infants and as infantile dengue constitutes around 5% of total pediatric cases with several times more mortality; there is a need to focus on this problem emergently [8]. Also, the novel pathogenetic mechanisms of passively transmitted neutralizing antibodies in enhancing the severity of illness in infants provide unique opportunities for research.

Methods

The current retrospective study was carried out in a tertiary care hospital in New Delhi, where Dengue fever claims several lives each year in the epidemic seasons. In our hospital, all the facilities for confirming the diagnosis of Dengue fever as well as management of complications of Dengue fever in critical care setting are available. Before starting the study, due permission was taken from the concerned Institute ethics Committee. All the case records of infants who were admitted with Dengue fever and subsequently microbiologically confirmed in the last 5 years from January 2013 to December 2017 were retrieved and analyzed. The information obtained was entered in a predesigned questionnaire. The age and sex distribution, presenting symptoms, past history of confirmed Dengue fever in family members especially mother, physical examination findings, biochemical and microbiological laboratory and radiological parameters were noted. Also the complications in these infants during hospital course and their management as well as final outcome are also documented. Statistical analysis was carried out using SPSS statistical software.

Results-In our centre, total of 295 pediatric cases of confirmed Dengue infection were admitted within January 2013 and December 2017. Out of these, 14 children (4.8%) were of the age group less than 1 year. Out of these 15 children, 8 were males and 6 were females, mean age at presentation was 7 months (range 5 months-11 months). All 14 infants (100%) had fever at presentation, 11 infants (79%) had erythematous macular rash, 6 infants (43%) had vomiting, 13 infants (92%) had poor oral intake, 4 infants (29%) had history of cold extremities, 7 infants (50%) had increased irritability and 5 infants (47%) had lethargy (Table 1). None of the infants had joint swelling and as these infants were preverbal, so history of myalgia, pain abdomen or joint pain could not be elicited. 6 infants (43%) had history of coryza or cough in the current illness, 2 infants (14%) had respiratory distress and cyanosis at presentation and one infant required mechanical ventilation. Mothers of 11 infants (79%) had a history of febrile illness with rash within the 5 years of the illness of the child, but only 2 cases were confirmed microbiologically or immunologically to Dengue fever. None of the mothers required hospitalization for their illness and none had any severe complications. None of the infants have any family member affected with the same illness at the time of presentation or recently within a month. On physical examination, 8 infants (57%) had hepatomegaly, 7 infants (50%) had facial puffiness, 3 infants (21%) had ascites and 2 infants (15%) had hemodynamic instability (Table 2). Although, none of the infants had severe internal or external hemorrhage at presentation, but later on 5 infants (36%) required platelet transfusion. Only one infant (8%) had upper gastrointestinal bleeding and 3 infants (22%) had minor bleeding in the form of gum bleeding or excessive bleeding from venipuncture site. 4 infants (29%) developed some signs of fluid overload during critical phase of the illness and only one infant required furosemide, rest all were managed with judicious fluid administration.

In laboratory parameters, all the infants had thrombocytopenia and relative lymphocytosis with mean platelet count of 46,000/ul, 13 infants (93%) had leucopenia with mean TLC of 5700/ul, 12 infants (86%) had >10% rise in hematocrit from baseline during hospital stay. Average value of the maximum hematocrit was 46. 11 infants (79%) had deranged liver function tests, but none have clinical jaundice. Prothrombin time was prolonged in 2 infants only with INR > 2.0 and one infant only required transfusion of fresh frozen plasma. Dengue IgM was positive in serum of 10 infants (71%) and their duration of illness at presentation was at least 5 days. The other four children were positive for NS1 antigen of Dengue virus and the duration of illness in them was less than five days. Dengue IgG testing report was available in only 6 mothers and out of them 5 (83%) were positive for Dengue IgG in blood. Chest X ray showed pleural effusion in 3 infants (21%) and USG abdomen showed significant free fluid in abdomen in 4infants (29%) and gall bladder wall

Table 1: Prevalence of different presenting symptoms of infants with Dengue fever

Presenting symptoms	Number of infants(n=14)	Percentage
Fever	14	100%
Poor oral intake	12	86%
Rash	11	79%
Irritability	7	50%
Vomiting	6	43%
Coryza	6	43%
Lethargy	5	36%
Cold extremities	4	29%
Respiratory distress	2	14%
Hematemesis	1	7%

Table 2: Prevalence of different physical examination findings in infants with Dengue fever

Physical examination findings	Number of infants(n=14)	Percentage
Rash	11	79%
Hepatomegaly	8	57%
Ascites	3	21%
Ecchymosis, gum bleeding	2	14%
Hemodynamic instability	2	14%
Tachypnea	2	14%
Cyanosis	2	14%

oedema in 2 cases (14%). Out of the infants, who had hemodynamic instability and required ionotropic support, one infant improved after 2 days and another one succumbed to the severity of illness. The survival rate was 93% and mean duration of hospital stay was 6 days (range 4 days-13 days).

Discussion

In our study, 4.8% of the total pediatric cases diagnosed with Dengue fever were infants. In previous studies by Halstead et al, also the infantile cases constituted about 5% of the total cases [2]. In current study, 5 infants (36%) had severe complications like Dengue hemorrhagic fever or Dengue shock syndrome and this is quite higher as compared to other age group. Similar finding was also reported by Jain et al [4]. Although, the mortality of 7% in infants the current study is higher as compared to other age group, but due to small age group, it is difficult to extrapolate to general population. However, Hammond et al had already shown in their study, Dengue fever causes more morbidity and mortality in infants as compared to other age group [6]. At birth, maternal antibodies protect infants from dengue infection. In previous studies by Martinez et al, usual age group of infants affected were in between four and nine months [6]. The current study also has similar age distribution. Although, no neonatal cases have been recorded in our cohort, but vertical transmission of Dengue and neonatal cases have been reported by Samara et al and Sinabahu et al [7,8]. About 14% of children had respiratory distress and cyanosis requiring oxygen inhalation or mechanical ventilation. Similar high prevalence of cyanosis in infantile Dengue cases has been already reported by Martinez et al. Previous studies by Halstead et al have already showed infantile Dengue in most cases is a primary infection and still at higher risk for DHF/DSS due to passively transmitted neutralizing antibodies and mothers are usually positive for IgG Dengue antibody [2]. As IgG antibodies are catabolized, a period of risk to enhanced infection ensues, followed in turn by the loss of enhancing antibodies and a corresponding decline in risk for DHF/DSS. The IgG neutralizing antibodies at lower titres further add to the severity of infection. In our study also, the Dengue IgG was positive in 83% of mothers [5]. About 79% of mothers had a history of febrile illness with rash in last 5 years. In a nutshell, the clinical presentation, complications and outcome of the cohort in current study is more or less consistent with the previous literature described on Dengue fever in infants

Conclusion

Infantile Dengue cases, although being rare, are at more risk for severe complications like Dengue

hemorrhagic fever, Dengue shock syndrome, other organ dysfunction like hepatic dysfunction and disseminated intravascular coagulation and thus require intensive clinical and biochemical monitoring, judicious fluid rehydration and other symptomatic management as required. The vaccines for preventing Dengue infection are still in preclinical stage and hence, clinical suspicion and physician awareness about occurrence of Dengue cases in infants is must for timely diagnosis and management in areas prone for Dengue epidemics in specific seasons. Larger studies with greater sample size are required to clearly elucidate the novel pathogenetic mechanisms for increased virulence of Dengue virus in infantile age group and also can optimize the goal directed management for these cases.

Acknowledgement

The authors would like to thank all the paramedical staffs of our hospital as without their immense help and support, this work of research would not have been possible

Conflict of interest: Nil

Source of funding: None

References

1. Aurpibul L, Khumlue P, Issaranggoon na ayuthaya S, Oberdorfer P. Dengue shock syndrome in an infant. BMJ Case Rep [Internet]. 2014 Jul 29 [cited 2018 Mar 11];2014. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4120039/.
2. Al SBH et al. Dengue Hemorrhagic Fever in Infants: Research Opportunities Ignored - Volume 8, Number 12—December 2002 - Emerging Infectious Disease journal - CDC. [cited 2018 Mar 11]; Available from: https://wwwnc.cdc.gov/eid/article/8/12/02-0170_article.
3. Choudhry SP, Gupta RK, Kishan J. Dengue shock syndrome in newborn: a case series. Indian Pediatr. 2004 Apr;41(4):397–9.
4. Hadinegoro SRS. The revised WHO dengue case classification: does the system need to be modified? Paediatr Int Child Health. 2012 May;32(s1):33–8.
5. Maroun SLC, Marliere RCC, Barcellus RC, Barbosa CN, Ramos JRM, Moreira MEL. Case report: vertical dengue infection. J Pediatr (Rio J). 2008 Dec;84(6):556–9.
6. Dengue in babies and toddlers - BabyCenter India [Internet]. [cited 2018 Mar 11]. Available from: https://www.babycenter.in/a1021718/dengue-in-babies-and-toddlers.
7. Doctors surprised as dengue doesn't spare babies its bite [Internet]. ReliefWeb. [cited 2018 Mar 11]. Available from: https://reliefweb.int/report/india/doctors-surprised-dengue-doesnt-spare-babies-its-bite.
8. Sinhabahu VP, Sathananthan R, Malavige GN. Perinatal transmission of dengue: a case report. BMC Res Notes [Internet]. 2014 Nov 14 [cited 2018 Mar 11];7. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4237779/.