

A Study of Clinical Profile of Dengue Fever in Children at a Tertiary Care Centre in Kalol Town of Gandhinagar District in Gujarat, IndiaNirav Parmar¹, Hiral Solanki², Ramesh Bajaniya³, Ashwin Dangi⁴¹Assistant Professor, Department of Pediatrics, Ananya College of Medicine and Research, Kalol, Gandhinagar, Gujarat, India²Assistant Professor, Department of Anesthesiology, Ananya College of Medicine and Research, Kalol, Gandhinagar, Gujarat, India³Assistant Professor, Department of Pediatrics, C. U. Shah Medical College, Surendranagar, Gujarat, India⁴Professor and Head, Department of Pediatrics, Nootan Medical College and Research Centre, Visnagar, Gujarat, India

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Corresponding author: Dr. Ashwin Dangi

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Abstract:**Background and Aim:** Dengue fever remains a significant public health concern, particularly in tropical regions. This prospective observational study aimed to comprehensively analyze the clinical manifestations, laboratory findings, and outcomes of dengue fever cases in a specified geographic area.**Material and Methods:** The study was conducted at the Department of Pediatrics, Ananya College of Medicine and Research, Kalol, Gandhinagar, India, from September 2022 to August 2023. A total of 53 cases were enrolled, with demographic distribution reflecting a prevalence of patients from nearby village areas.**Results:** The clinical presentation exhibited the hallmark symptom of fever in all cases, accompanied by symptoms such as body ache, headache, retroorbital pain, abdominal pain, and breathlessness. Laboratory investigations demonstrated hematological abnormalities, including leukocytopenia and thrombocytopenia. Serological analysis revealed positive IgM antibodies and NS1 antigen, aiding early diagnosis and confirming recent infection. Complications included abnormalities in prothrombin time and activated partial thromboplastin time, hemorrhagic manifestations, and raised hematocrit levels.**Conclusion:** This study provides a comprehensive understanding of dengue fever's clinical manifestations, laboratory features, and outcomes in the studied region. The findings contribute to existing knowledge, facilitating improved clinical management and public health strategies. Further multi-center studies are recommended to validate these observations and enhance their applicability.**Keywords:** Children, Dengue Fever, IgM antibody, Prothrombin time.

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Introduction

Dengue is an acute viral infection that can be fatal. The first clinically recognized dengue epidemics emerged in Asia, Africa, and North America in the 1780s. The earliest documented clinical case dates back to 1789, during the 1780 epidemic in Philadelphia, when Benjamin Rush coined the term "break bone fever" to describe the symptoms of myalgia and arthralgia. In India, the first outbreak was reported in Madras in 1780. [1,2] Dengue viruses (DVs) belong to the Flaviviridae family and are classified into four serotypes: DV-1, DV-2, DV-3, and DV-4. DVs are positive-stranded, enveloped RNA viruses that contain three structural protein genes encoding the nucleocapsid (C) protein, a membrane-associated (M) protein, and an enveloped (E) glycoprotein, along with seven non-structural (NS) proteins. DVs are transmitted

primarily through the bite of the *Aedes aegypti* mosquito, although *Aedes albopictus* can also transmit the virus. [3,4]

All four serotypes of DV can cause a range of disease, from subclinical infections and mild self-limiting dengue fever (DF) to severe and potentially fatal conditions such as dengue hemorrhagic fever/dengue shock syndrome (DHF/DSS). The World Health Organization (WHO) estimates that around 50 million dengue infections occur annually, and nearly half of the world's population resides in countries where dengue infection is endemic.

Over the past 10-15 years, DHF has emerged as a leading cause of hospitalization and death among children in Southeast Asian Region (SEAR)

countries, second only to diarrheal and acute respiratory infections. Dengue Fever has been reported in India for an extended period, but the first occurrence of DHF was documented in 1963 in Calcutta city. [5,6] Understanding the exact clinical profile of dengue is vital for patient management and, consequently, critical for saving lives. The present study aims to describe the clinical and laboratory findings of serologically confirmed hospitalized cases of dengue fever during the study period.

Materials and Methods

This is a single centered, prospective observational study conducted in the Department of Pediatrics at Ananya College of Medicine and Research, Kalol, Gandhinagar (India) during the period of September 2022- August 2023. A total of 53 cases were included in the study. Informed consent was taken from parents of all the patients in the study.

Inclusion criteria

All laboratories confirmed cases of dengue fever (Dengue NS1 or Dengue IgM Positive) between the age group of 01 month to 18 years were included.

Exclusion Criteria

All the patients above 18 years, patients with only clinical diagnosis, but not backed up with laboratory reports, and all patients who refused for blood investigations were excluded from the study.

Detailed History was taken on the admission, and clinical examination of all the patients was done daily 2 times a day throughout the admission duration. Blood investigations, including, but not limited to the following were done in all the patients.

- CBC (Hb, TC, DC, PC, Hct, PS)
- ALT, AST, ALP
- Urea, creatinine
- Dengue NS1, Dengue IgM
- Ultrasound examination of Abdomen

Other investigations were done as and when required according to the clinical presentation. The treatment guidelines followed were taken from Revised NBVDCP guidelines for management of Dengue.

Results

A total of 53 cases were studied, out of which 29 were males (54.71%) and 24 were females (45.28%). The majority of cases (37) were from nearby rural areas. The peak admission season due to dengue was observed in the months of July to October, following the monsoon rains. All patients had a history of fever.

Associated symptoms included body ache (n = 36, 67.92%), headache (n = 23, 43.39%), retroorbital

pain (n = 13, 24.52%), abdominal pain (n = 22, 41.50%), and breathlessness in 8 cases (15.09%). During clinical examination, tachycardia was observed in 43 cases (81.13%), and hypotension in 31 cases (58.49%). Hepatomegaly was detected in 11 cases (20.75%). Erythematous rash was seen in 36 cases (67.92%), while icterus was noted in 5 cases (9.43%).

Clinical signs of ascites were present in 8 cases (15.09%). Petechial skin rashes were identified in 13 cases (24.52%). Gum bleeding was observed in 2 patients (3.77%), and subconjunctival hemorrhage in 1 patient (1.88%). Investigations revealed leukocytopenia in 32 cases (60.37%) and thrombocytopenia in 48 cases (90.56%). Leucopenia manifested earlier than thrombocytopenia during the course of the disease. Notably, the majority of patients exhibited a platelet count within the range of 50,000-100,000 (30.23%), followed by 20,000-50,000 (30.3%). Among the liver enzymes examined, SGOT demonstrated elevated levels in a larger proportion of patients (47.42%) compared to alanine aminotransferase (SGPT) (30.92%), signifying its specificity as a marker for dengue.

Among the observed patients, abnormalities in PT and aPTT were noted in 11 cases (20.75%). Notably, 21 out of 53 patients (39.62%) exhibited presenting signs of bleeding, underscoring the clinical relevance of hemorrhagic manifestations. Raised hematocrit levels were observed in 33 out of 53 cases (62.26%), reflecting a potential marker for disease severity.

Dengue serology revealed that 31 out of 53 patients (58.49%) tested positive for IgM antibodies, indicative of recent infection, while 35 out of 53 patients (66.04%) tested positive for NS1 antigen, highlighting its usefulness in early diagnosis. The tourniquet tests yielded positive results in 17 out of 53 patients (32.08%), indicating its potential as a diagnostic tool.

Biochemical markers displayed significant variability, with 8 out of 53 patients (15.09%) presenting elevated CPK-MB levels, and 3 out of 53 patients (5.66%) showing elevated troponin-I levels, suggesting cardiac involvement in a subset of cases.

Additionally, ECG changes were noted in the patient subset diagnosed with myocarditis, with 1 out of 53 patients (1.89%) displaying a prolonged QT interval, highlighting the cardiac implications of dengue fever.

Pleural effusion was observed in 14 cases (26.4%), hepatomegaly in 12 cases (21.9%), and gall bladder edema in 8 cases (15.1%). Among complications, hepatitis affected 11 cases (20.8%), myocarditis 8 cases (15.1%), dengue shock 6 cases (11.3%),

encephalitis 2 cases (3.8%), dengue hemorrhagic fever 2 cases (3.8%), and acute respiratory distress syndrome (ARDS) 1 case (1.9%). Fluid accumulation was evident as pleural effusion in 14 cases (26.4%), ascites in 8 cases (15.1%), and edema in 6 cases (11.3%). Right-sided effusion was prevalent in 11 cases (20.8%), with bilateral effusion noted in 3 cases (5.7%). Coinfections were observed, with malaria affecting 5 cases (9.4%), enteric fever 3 cases (5.7%), hepatitis 1 case (1.9%), and urinary tract infections (UTI) 2 cases

(3.8%). Treatment interventions included intravenous fluids for 50 cases (94.3%) and dopamine administration for 5 cases (9.4%). Severe dengue cases necessitated platelet concentrate for 6 patients, fresh frozen plasma (FFP) for 8 patients (15.1%), and packed cell volume (PCV) for 5 cases. Among the 53 patients, 48 successfully recovered, while 5 patients (9.4%) faced mortality due to complications such as ARDS, encephalitis, dengue shock syndrome, and dengue hemorrhagic fever.

Table 1: Demographic Distribution of Patients

Parameter	Number of Cases	Percentage (%)
Total Cases Studied	53	100
Male	29	54.71
Female	24	45.28

Table 2: Clinical Presentation and Examination Findings

Symptom / Finding	Number of Cases	Percentage (%)
Fever	53	100
Body Ache	36	67.92
Headache	23	43.39
Retroorbital Pain	13	24.52
Abdominal Pain	22	41.50
Breathlessness	8	15.09
Tachycardia	43	81.13
Hypotension	31	58.49
Hepatomegaly	11	20.75
Erythematous Rash	36	67.92
Icterus	5	9.43
Ascites	8	15.09
Petechial Skin Rashes	13	24.52
Gum Bleeding	2	3.77
Subconjunctival Hemorrhage	1	1.88

Table 3: Hematological and Biochemical Findings

Finding	Number of Cases	Percentage (%)
Leukocytopenia	32	60.37
Thrombocytopenia	48	90.56
Elevated SGOT Levels	25	47.42
Elevated SGPT Levels	16	30.92
Elevated CPK-MB Levels	8	15.09

Table 4: Dengue Serology and Complications

Finding	Number of Cases	Percentage (%)
Positive IgM Antibodies	31	58.49
Positive NS1 Antigen	35	66.04
Abnormal PT and aPTT	11	20.75
Bleeding Manifestations	21	39.62
Raised Hematocrit Levels	33	62.26
Pleural Effusion	14	26.4
Hepatitis	11	20.8
Myocarditis	8	15.1
Dengue Shock	6	11.3
Encephalitis	2	3.8
Dengue Hemorrhagic Fever	2	3.8
ARDS	1	1.9

Discussion

The present study aimed to comprehensively analyze the clinical manifestations, laboratory findings, and outcomes of dengue fever cases within the context of a prospective observational study conducted at the Department of Pediatrics, Ananya College of Medicine and Research, Kalol, Gandhinagar, India, from September 2022 to August 2023. The study enrolled a total of 53 cases, shedding light on the epidemiology and clinical characteristics of dengue fever in the region.

Demographically, the majority of patients originated from nearby village areas, reflecting the local prevalence and potential clustering of dengue cases within specific geographic regions. This observation underscores the importance of understanding local dynamics and potential risk factors that contribute to the transmission and spread of the disease. It's noteworthy that the study's demographic distribution provides valuable insights into the geographic distribution of dengue cases, facilitating targeted public health interventions and awareness campaigns in these areas. [7]

The clinical profile of the patients in this study closely aligns with the well-documented symptoms of dengue fever. The hallmark symptom of fever was universally present among all patients, consistent with the acute febrile nature of the disease. Additional symptoms such as body ache, headache, retroorbital pain, abdominal pain, and breathlessness were prevalent, further emphasizing the multisystemic nature of dengue fever. These findings resonate with previous studies that have highlighted the diversity of clinical presentations associated with dengue infection. [8]

Clinical examination findings indicated a significant proportion of patients with tachycardia and hypotension, suggesting the potential for circulatory disturbances associated with dengue infection. Additionally, hepatomegaly, erythematous rash, and icterus were observed in a subset of patients, corroborating the hepatic and cutaneous manifestations often seen in dengue cases. The presence of ascites and petechial skin rashes further accentuates the systemic impact of dengue infection on various organ systems.

Laboratory investigations revealed characteristic hematological and biochemical abnormalities in alignment with dengue infection. Leukocytopenia and thrombocytopenia were consistent with the hematological alterations frequently observed during dengue infection which is similar to findings of Gomber S et al. [9]. Notably, the platelet count distribution within specific ranges provides insight

into disease severity, supporting the utilization of these parameters as markers for disease progression and management. The detection of elevated liver enzymes, including SGOT and SGPT, underscores the potential hepatic involvement in dengue infection. These results are similar to the findings of previous studies. [10]. The distinct patterns of elevation between these enzymes may indicate varying degrees of hepatocellular damage, warranting further exploration into their clinical implications and relevance in disease monitoring. [11]

The study's serological findings align with established diagnostic markers for dengue infection. The prevalence of IgM antibodies and NS1 antigen positivity in a substantial proportion of cases highlights their utility in both early diagnosis and confirmation of recent infection. Additionally, the tourniquet test's positive results further emphasize its diagnostic potential as a simple and cost-effective tool in resource-limited settings. [12]

The study's findings regarding complications provide valuable insights into the clinical spectrum of dengue fever. The observed abnormalities in prothrombin time and activated partial thromboplastin time, along with the prevalence of bleeding manifestations, reflect the potential coagulopathy associated with severe dengue cases. Raised hematocrit levels emerged as a potential marker for disease severity, aligning with the established association between hematocrit and plasma leakage in dengue infection.

The incidence of cardiac involvement, as indicated by elevated CPK-MB and troponin-I levels, underscores the multisystemic impact of dengue infection. ECG changes, particularly the prolonged QT interval, highlight the potential cardiac implications of the disease, emphasizing the need for vigilant cardiac monitoring in dengue patients.

The study's results provide significant clinical and epidemiological insights into dengue fever in the specified region. However, it is important to acknowledge the study's limitations, including the single-center design and relatively small sample size. Further multi-center studies with larger patient populations are warranted to validate and extend these findings, enhancing the generalizability and robustness of the observed trends.

Conclusion

Present prospective observational study offers a comprehensive understanding of the clinical manifestations, laboratory findings, and outcomes of dengue fever cases in the specified region. The study's results contribute to the existing body of knowledge on dengue infection, facilitating

informed clinical management and public health strategies.

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