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Acute Abdominal Pain Causes in Dengue Patients and Their Influence on Outcome A Cross Sectional Study

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ABSTRACT

Dengue viral infections represent a significant global health concern transmitted primarily by mosquitoes. The clinical spectrum ranges from asymptomatic cases to various manifestations such as undifferentiated fever, dengue fever (DF), dengue hemorrhagic fever (DHF), or dengue shock syndrome (DSS). Abdominal discomfort is a common symptom in DF, with severe abdominal pain being notably associated with DHF. The study aims to assess the prevalence of acute abdominal pain causes among dengue-infected patients, investigate the correlation of acute abdominal pain with dengue infection. This was a hospital-based cross-sectional analytical study conducted in an Indian Medical College and Hospital. The study population comprised dengue fever cases with acute abdominal pain admitted to the ward. A sample size of 156 cases was included in the analysis. The predominant causes of acute abdominal pain in dengue fever cases were ascites, followed by pleural effusion, hepatitis, mesenteric lymphadenopathy, pancreatitis, calculous cholecystitis and appendicitis. Common clinical features observed included fever, vomiting, skin rash, headache, myalgia, arthralgia and bleeding tendency. The majority of cases were in the 31-40 years age group and predominantly male. The association between acute abdomen and dengue infection was statistically significant in the age group of 31 years and above. Most cases (92%) had a favorable clinical outcome and were discharged. Ascites emerged as the most prevalent cause of abdominal pain in dengue fever cases, with fever being the most common clinical feature. The study highlighted a higher proportion of dengue cases in the 31-40 years age bracket and the majority of cases had a favorable clinical outcome corresponding to dengue fever stage.

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Key Words
Abdominal pain, ascites, dengue, fever

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INTRODUCTION

India is a country where dengue virus infection is prevalent. This infection can manifest as asymptomatic or as undifferentiated fever, namely dengue fever (DF) or dengue hemorrhagic fever (DHF). The progression to dengue shock syndrome (DSS) can result in hypovolemic shock, with abdominal pain being a commonly reported symptom in dengue fever cases. Particularly, abdominal pain is strongly associated with DHF, with up to 40% of DHF patients experiencing abdominal pain upon presentation[1,2]. Over the past decade, there has been a gradual increase in the number of dengue cases in India. The rise in dengue cases is influenced by intricate interactions among the host, vector and virus, which are further shaped by climatic factors. Since 2001, there has been a significant surge in the total number of dengue cases in India. Initially, dengue was endemic to select southern and northern states; however, it has now expanded its reach to encompass various states, including union territories. Apart from the escalation in case numbers and disease severity, there has been a notable shift in the geographical distribution of dengue. While previously confined to urban settings, dengue has now spread to rural areas[3,4]. The expansion of dengue in India is attributed to factors such as unplanned urbanization, alterations in environmental conditions, host-pathogen interactions and population immunological factors. Inadequate measures for vector control have also created conducive environments for dengue virus transmission and its mosquito vectors. Aedes aegypti and Aedes albopictus are the primary competent vectors for dengue virus transmission in India. Globally, there has been a thirty-fold increase in dengue cases over the past five decades. Dengue is endemic in over 100 countries, causing an estimated 50 million infections annually. Approximately 3.97 billion individuals from 128 countries are at risk of dengue infection[5-9].

Individuals infected with dengue may display a wide range of clinical symptoms, from asymptomatic cases to severe manifestations such as dengue shock syndrome. The Southeast Asia (SEA) and western Pacific regions account for approximately 75% of the current global burden of dengue[10,11]. The World Health Organization (WHO) has established case definitions for DF, DHF and DSS[12]. This study aims to evaluate the prevalence of acute abdominal pain causes among patients infected with dengue and to explore the correlation between acute abdominal pain and dengue infection.

MATERIALS AND METHODS

This study employed a hospital-based cross-sectional analytical design conducted in an Indian Medical College and Hospital. The study population consisted of dengue fever cases exhibiting acute abdominal pain who were admitted to the ward. The inclusion criteria for this study encompassed children between the ages of 1 year to 12 years exhibiting both dengue fever and acute abdominal pain, supported by positive dengue serology test results. Exclusion criteria comprised individuals with negative dengue serology, those who passed away within 24 hours of admission and patients who were discharged against medical advice within the same time frame. A total of 156 cases were included in the study, utilizing a convenient sampling technique. A pre-designed and pre-tested questionnaire was utilized to gather necessary information, including demographic details such as age, sex, religion, parental occupation, residential address, socioeconomic status and date of admission. Medical history, including chief complaints, past medical history, immunization history, nutritional status, general examination and systemic examination, was also recorded.

Patients who provided consent and had a definitive diagnosis of DF with acute abdominal pain were included in the study. Diagnosis of DF was based on clinical findings supported by a positive enzyme-linked immunosorbent assay (ELISA) result for specific dengue IgM or NS1 dengue test in acute-phase serum. The severity of DF was categorized according to World Health Organization (WHO) definitions, with grade III and IV DHF grouped as dengue shock syndrome (DSS)[12]. Acute abdomen cases due to surgical or medical causes were ruled out based on investigations per WHO guidelines and management followed WHO protocols for DF. Data were entered into Microsoft Excel and analyzed using SPSS version 19. Analysis involved the use of percentages in frequency tables and correlation analysis of acute abdominal pain with age. A significance level of $p<0.05$ was considered using the Chi-square test.

RESULTS AND DISCUSSIONS

(Table 1) illustrates that the majority of cases presented with ascites (41.67%), followed by pleural effusion, hepatitis, mesenteric lymphadenopathy, pancreatitis, calculous cholecystitis and appendicitis. (Table 2) demonstrates that the majority of cases presented with fever, followed by vomiting, skin rash, headache and myalgia. Most cases were found in the 31-40 years age group, followed by the >40 years age group. The majority of cases were observed in males. The predominant condition in most cases was normal total leukocyte count (TLC), followed by leucopenia and leucocytosis. The majority of cases were diagnosed with dengue fever (DF), followed by dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). (Table 3) indicates that the majority of cases had a clinical outcome of being discharged, followed by cases categorized as Discharge Against Medical Advice (DAMA) and death in 2 cases. (Table 4) reveals that the

Table 1: Prevalence of different causes of abdominal pain in dengue cases

Cause	n	percentage
Appendicitis	2	1.28
Ascites	65	41.67
Calculous cholecystitis	5	3.21
Hepatitis	31	19.87
Mesenteric lymphadenopathy	9	5.77
Pancreatitis	7	4.49
Pleural effusion	36	23.08
Total	156	100.00

Table 2: Clinico-demographic parameters in dengue cases

Parameter	n	percentage
Age		
<20 years	21	13.46
21-30 years	32	20.51
31-40 years	61	39.10
>40 years	42	26.92
Total	156	100.00
Gender		
Male	84	53.85
Female	72	46.15
Clinical symptoms		
Arthralgia	6	3.85
Bleeding tendency	5	3.21
Fever	156	100.00
Headache	33	21.15
Myalgia	28	17.95
Skin Rash	45	28.85
Vomiting	67	42.95
Severity of Dengue		
Dengue Fever	148	94.87
Dengue Haemorrhagic Fever	6	3.85
Dengue Shock Syndrome	2	1.28
Total WBC Count		
Leucocytosis	41	26.28
Leucopenia	51	32.69
Normal	64	41.03

Table 3: Clinical outcome of dengue cases

Outcome	n	percentage
Death	2	1.28
Discharge	143	91.67
DAMA	11	7.05
Total	156	100.00

Table 4: Association of Age with Acute Abdominal Pain in Dengue cases

	Acute Abdominal Pain					
Age	Present		Absent		Total	
	n	%	n	%	n	%
<20 years	5	3.21	16	10.26	21	13.46
21-30 years	27	17.31	5	3.21	32	20.51
31-40 years	48	30.77	13	8.33	61	39.10
>40 years	26	16.67	16	10.26	42	26.92
Total	106	67.95	50	32.05	156	100.00

statistical analysis using the Chi-square test showed a statistically significant proportion of acute abdomen cases associated with dengue illness in the age group of 31 years and above ($p<0.05$).

Dengue viral infections are significant mosquito-borne illnesses globally, presenting with a range of manifestations from asymptomatic to various syndromes such as dengue fever (DF), dengue hemorrhagic fever (DHF), or dengue shock syndrome (DSS). Early detection and timely treatment are crucial to mitigate disease-related complications and mortality. Dengue is prevalent in several regions including southeast and southern Asia, Central and South America and the Western Pacific. Common symptoms include fever, malaise, headache, musculoskeletal pain, nausea and vomiting, while complications may involve bleeding, effusions, hepatic or renal failure, seizures, myocarditis, encephalitis, or DSS. Abdominal pain in dengue infections can vary from specific conditions like acute pancreatitis or cholecystitis to non-specific presentations, sometimes resembling surgical emergencies such as gastrointestinal bleeding or appendicitis, although in many severe cases, the cause remains undetermined[13,14,2]. Abdominal pain is a prevalent symptom in DF, with severe abdominal pain being closely linked to DHF. Approximately 500,000 individuals with severe DF require hospitalization annually and the mortality rate among them is around 2.5%[15]. Severe abdominal pain can mimic various surgical emergencies such as acute cholecystitis, appendicitis and pancreatitis. Our study observed that the majority of cases presented with ascites, followed by pleural effusion and hepatitis. This finding is consistent with the results reported by Satya Sudhish Nimmagadda *et al.*[16] in their prospective observational study conducted at Kasturba Medical College hospitals in Mangalore, India, over a two-year period. The study included 150 DF patients, among whom hepatitis was observed in 40.6% of cases, followed by renal failure (8%), acalculous cholecystitis (6.66%) and acute pancreatitis (1.33%).

Similarly, Khanna *et al*.[17] conducted a cross-sectional study at a Tertiary care center in India during specific periods in 2003 and 2004, involving 100 patients presenting with fever and abdominal pain, with a mean age of 7 years (range 1-12 years). The study found a higher prevalence among males (54%) compared to females (46%), with 55 DF patients included. Among these, 35 were male and 20 were female. Our study also observed a higher prevalence of DF compared to DHF. This trend was consistent with the findings of Wasay *et al*.[18], who reviewed 225 confirmed dengue virus infection cases from 2000 to 2004 and found that 73% had DF, 24% had DHF and 2.4% had DSS. Subsequent to 2005, the proportions changed to 58% DF, 39% DHF and 3% DSS. Regarding clinical outcomes, the majority of cases in our study were discharged, followed by Discharge Against Medical Advice (DAMA) and mortality. This finding aligns with the observations made by Wasay *et al*.[18], who reported a mortality rate of 2.6%, with shock, coma at presentation and seizures being identified as important predictors of mortality.

CONCLUSION

The primary cause of abdominal pain in dengue fever cases was identified as ascites. The most prevalent clinical features observed in dengue cases were fever, followed by vomiting and skin rash. A notable concentration of cases was found within the 31-40 years age group. Moreover, the highest proportion of dengue infection stage recorded in the study was dengue fever.

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