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General Medicine

PRESENTATION OF ADMITTED DENGUE PATIENTS - A COMPREHENSIVE INVESTIGATION AND TREATMENT ANALYSIS

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ABSTRACT **Background:** Maharashtra has the second highest burden of Dengue cases in India after Tamil Nadu making it highly endemic. As majority of cases of dengue occur in the monsoon season where ample breeding of Aedes mosquitoes occurs, it is indispensable to study clinical presentation, biochemical parameters and outcome of dengue fever in a population during this period. **Methodology:** A prospective observational study was conducted from July to August 2023 in sixty-eight NS-1 antigen or (IgM) Dengue positive patients attending a tertiary care hospital. Clinical features, laboratory parameters and outcome of dengue patients were noted. **Results:** We observed a consistent decrease in hemoglobin levels and a declining trend in platelet counts over a four-day period with rise in bilirubin levels on days 2 and 3. Liver Liver enzyme levels also showed variations, indicating potential hepatic involvement. Symptoms varied, with fever and headache (100%) being nearly universal, other symptoms such as joint pain [34.85%] and organomegaly [34.13%] showed varying prevalence. Antibiotics were commonly administered [80.88%], while platelet transfusions [4.41%], steroids [11.76%], and blood transfusions [2.94%] were relatively infrequent. These findings highlight the complexity of dengue management, emphasizing the need for personalized attention for each patient. Notably, there was no shock or mortality in the observed patients. **Conclusion:** Dengue management remains a complex endeavour due to the wide spectrum of symptoms and potential complications associated with the disease. This analysis highlights the importance of personalized patient care to address the varying manifestations of dengue. It also underscores the significance of continuous monitoring, early intervention, and judicious use of treatments to optimize patient outcomes while minimizing unnecessary interventions.

KEYWORDS :

INTRODUCTION

Over the past two decades, South-East Asian countries, including India, have faced escalating epidemics of dengue fever. The period from 2002 to 2007 witnessed a consistent rise in cases, peaking in 2007, particularly post-monsoon in September. The disease control program should prioritize vector surveillance, integrated vector control, emergency response, early clinical diagnosis, and effective case management [1]. The increasing frequency of dengue fever outbreaks in rural areas across Indian states is attributed to changing rural lifestyles due to urbanization, demanding a robust prevention and control policy. This entails strengthened surveillance, community health education, and proper training of health personnel [2].

Dengue, dengue haemorrhagic fever (DHF) and Dengue Shock Syndrome (DSS) has emerged as a significant health concern in India, with certain regions being endemic and contributing to annual outbreaks. The infection manifests as undifferentiated fever or dengue haemorrhagic fever, leading to substantial hospitalizations rate. The prevention and control of dengue outbreaks hinge on disease surveillance, ensuring timely case management, and vector surveillance to implement emergency control measures against the Aedes aegypti vector [3]. The clinical spectrum of dengue fever ranges from asymptomatic infection to severe haemorrhage and sudden fatal shock. The diagnostic feature of DHF is increased capillary permeability.

The pathophysiology of dengue and its complications are linked to sequential infections with 4 virus serotypes, variations in virus virulence, interaction with environmental or host factors, and a combination of various risk factors. Low virulence strains are considered responsible for the infrequent occurrence of serious dengue disease in India. However, with all four serotypes implicated in various outbreaks since 1963, and recent emergence in Sri Lanka, the potential for further epidemics remains high. Considering the disease's capacity to spread, effective preventive and control measures are imperative [4].

Aedes aegypti and the four dengue viruses have disseminated to nearly all tropical countries, affecting around 2 billion people in dengue-endemic areas with tens of millions infected annually. Dengue pandemics, documented in the 18th and 19th centuries, were contained through organized anti-Aedes aegypti campaigns and urban improvements. The 20th -century dengue pandemic has brought simultaneous circulation of multiple serotypes, leading to endemic dengue haemorrhagic fever/dengue shock syndrome (DHF/DSS) (0.1 million cases and 100 deaths in 2023 in India). Recent outbreaks in various countries underscore the high intensity and rapid spread of dengue transmission, requiring urgent improvements in early warning surveillance and the capacity to study underlying disease mechanisms [5]. Hence the current was planned to generate more data on dengue, especially in the monsoon season in patients visiting tertiary care hospital.

Objectives

- To assess the trend of hematological and biochemical parameters (Hb, WBC, platelet count, ALT, AST, bilirubin) during the four days of hospitalization.
- To evaluate ultrasonography findings for ascites and organ involvement.
- To evaluate chest Xray for pleural effusion.
- To record the utilization and effectiveness of antibiotics, antipyretics, IV fluids, platelet transfusion, blood transfusion, and steroids in the management of dengue patients.

Methodology

The study was a prospective observational study and was conducted in patients admitted in a tertiary care hospital with confirmed dengue infection. The duration of study was 3 months of monsoon period of the 2023.

Patients of all ages and gender with confirmed diagnosis of dengue infection through laboratory tests (e.g., NS1 antigen, IgM antibody) and who provided informed consent (or guardians' consent for minors) were included in this observation study. Whereas, patients with comorbidities that may interfere with the interpretation of study results, patients with incomplete medical records and those who did not give consent for the study were excluded from the study.

Data Collection

A) Clinical data - The Clinical clinical Data data included age, gender, and medical history. The diagnosis confirmation was done by either Ns1 or IgM. Vital signs: Temperature, heart rate, blood pressure, respiratory rate were recorded for 4 days. - Presence of warning signs / clinical presentation during hospitalization were noted over 4 days.

B) Laboratory Investigations (to be conducted daily for four days) –– Theese included Complete blood count (CBC) (White blood cells, Red blood cells, hemoglobin, platelet, Alanine aminotransferase (ALT) and Aspartate aminotransferase (AST), Total and direct bilirubin levels, Chest Xray, Ultrasonography.

C) Treatment Interventions - Record of antibiotics usage and types, Administration of antipyretics and their effectiveness, Intravenous (IV) fluids administration and volume, Platelet transfusion if performed and the number of units transfused, Blood transfusion if performed and the number of units transfused, Steroids administration.

Data Analysis

Descriptive statistics was used to summarize the demographic characteristics and clinical features of the participants on Microsoft Excel 2019 and SPSS Software. Informed consent was obtained from all participants or their guardians before the start of the study. Ethic Committee approval was taken.

RESULTS AND DISCUSSION

Table 1: Table Showing Symptoms Of Dengue Patients N=68).

Fever with head-ache	Arthra-lgia	Bleed-ing tend-encies	Hepa-to meg-aly	Sple-no meg-aly	Ascite s	Pleural effusion	Rash - purpura, blanch-ing	Shock
68	23	3	10	12	19	13	9	0
100. 00%	34. 85%	4. 55%	15. 38%	18. 75%	29. 23%	19. 70%	17. 65%	0. 00%

Table 2: Treatment Of Dengue Patients

Antibiotics	Antipyretics	IV fluid	Platelet transfusion	Steroids	Blood
55	67	68	3	8	2
80.88%	98.53%	100.00%	4.41%	11.76%	2.94%

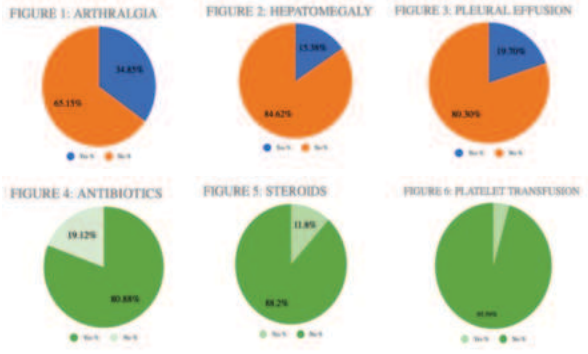

Table 3: Hematological Parameters On Days 1 To 4

	Age	HB (gm/dL)				WBC (per mL)				Platelet (per mL)			
		Day 1	Day 2	Day 3	Day 4	Day 1	Day 2	Day 3	Day 4	Day 1	Day 2	Day 3	Day 4
mean	31	12. 68	11. 86	11. 58	10. 93	532 5	553 7	531 3	492 7	779 11	698 08	749 98	121 400
min	13	5.3	5.5	5.6	8.2	120 0	130 0	544 0	257 0	130 00	800 0	800 0	210 00
max	70	17. 7	18	17. 9	12. 8	379 0	433 4	402 8	998 0	326 000	313 000	320 000	400 000

Table 4: Liver Function Tests Results On Days 1 To 4

	AST (units/L)				ALT (units/L)				Bilirubin (mg/dL)			
	Day 1	Day 2	Day 3	Day 4	Day 1	Day 2	Day 3	Day 4	Day 1	Day 2	Day 3	Day 4
mean	103 .64	109 .39	82.2 0	46. 00	71. 25	91. 66	57. 30	32. 67	1.69	4.36	2.95	0.75
min	12	18	33	40	6	10	25	20	0.34	0.3	0.3	0.5
max	541	328 .3	195	50	334	462	91	40	17.6 1	13.8	7.05	1

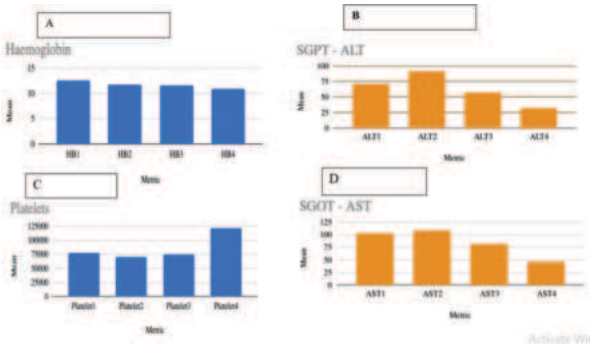

Figure 7: The Above Figures 7a, 7b, 7c, 7d Shows Trends In Values Of Haemoglobin, Platelets, Alt And Ast Respectively.

Symptoms Analysis

Prevailing Symptomatology observed in the study

This dataset offers valuable insights into the spectrum of symptoms among dengue patients. Fever with headache emerges as nearly universal, aligning with typical dengue presentation. Arthralgia is observed in about one-third of patients, a common yet not universal symptom similar to study by Mallhi, T.H. et. Al[6]. Bleeding tendencies are rare, affecting a minority. Hepatomegaly and splenomegaly are reported in a minority, indicating non-universal occurrence. Ascites is was notable, suggesting potential abdominal complications, while pleural effusion indicates respiratory involvement as suggested by Suwarto, S. et. Al[7]. Purpuric and blanching rashes are present in some, consistent with known symptom variation. Importantly, no cases of shock are reported, a positive indicator given the potential severity of dengue shock syndrome. In summary, this dataset underscores the prevalence of varied symptoms in dengue, emphasizing the commonality of fever with headache and the potential for complications in the abdominal and respiratory domains, with a reassuring absence of shock cases.

Investigation Analysis

Laboratory Parameters Observed in the study

The study reveals dynamic changes in various parameters among dengue patients over a 4-day period. Hemoglobin levels exhibit a decreasing trend from 12.68 g/dL on Day 1 to 10.93 g/dL on Day 4, with notable variability among patients. White blood cell counts decrease from 5325.37 cells/mm³ to 4927.86 cells/mm³, showing variability in leukopenia as shown by Udaya R. et. Al[8]. Platelet counts steadily decline from 77911.76/mm³ to 69808.82/mm³, stabilizing by Day 3 but remaining below the normal range, suggesting potential platelet transfusions similar to as shown by Das S. et. Al[9]. Liver function markers (AST and ALT) peak on Day 2, indicating possible hepatic involvement, bilirubin levels, initially elevated, normalize by Day 4, similar to studies by Mruthyunjaya A. et. Al[10].

Treatment Analysis

In analysing the treatment patterns for dengue patients, several key trends emerge. Notably, a substantial majority of patients received antibiotics, despite their limited efficacy against viral infections like dengue. This prescription might be attributed to possible concurrent bacterial infections. Antipyretic medications were widely administered, aligning with standard practices to alleviate fever and associated discomfort in dengue cases. Intriguingly, all patients received intravenous fluids, underscoring the importance of maintaining hydration and electrolyte balance, particularly in severe dengue cases similar to study done by Marra, A.R. et. al.[11]. Platelet transfusions were only given to a small percentage of patients, suggesting that severe thrombocytopenia was not prevalent in this dataset. Steroid administration was infrequent, consistent with guidelines discouraging routine use in dengue treatment; however, it was considered in specific cases with severe complications or inflammation, involving low doses of Methylprednisolone for a limited duration. Blood transfusions were rarely administered, indicating that severe hemorrhage or substantial blood loss was

uncommon among these patients. This nuanced treatment analysis highlights variations in the therapeutic approaches employed, indicating a need for further exploration into the rationale behind these decisions and their impact on patient outcomes.

DISCUSSION

The analysis of dengue patients' investigation data from a tertiary care hospital over four days reveals varying trends. Strikingly to note was that no mortality was observed in this study. Other notable but different observation was that Hemoglobin levels consistently decreased from an average of 12.68 g/dL on Day 1 to 10.93 g/dL on Day 4 as against the normal trend of increased haemoglobin in dengue patients. White blood cell counts decline from 5325.37 cells/mm³ to 4927.86 cells/mm³, aligning with expected leukopenia in dengue. Platelet counts steadily decrease but stabilize by Day 3, possibly influenced by interventions like platelet transfusions. Liver function markers (AST and ALT) peak on Day 2 and Bilirubin levels initially rise but normalize by Day 4 (0.75 mg/dL) indicating liver involvement. Crucial investigations, like chest Xray showing Pleural pleural effusion is observed in a notable portion (19.70%), indicating the potential for respiratory issues. Ultrasonography showed Hhepatomegaly and splenomegaly which was reported by a minority (15.38% and 18.75%, respectively). Ascites is notable in a significant proportion (29.23%), suggesting potential abdominal complications. On analysis of the symptoms of dengue patients high, fever with headache is nearly universal (100%), aligning with the typical dengue presentation. Arthralgia occurs in approximately one-third of patients (34.85%), while bleeding tendencies are relatively rare (4.55%). Purpuric and blanching rashes, characteristic of dengue, are reported by 17.65% of patients. No instances of shock, a severe dengue complication, are reported in this dataset. The treatment analysis reveals key insights into the management of dengue patients at the tertiary care hospital. A majority received antibiotics (80.88%), potentially indicating treatment for concurrent bacterial infections or diagnostic uncertainties. Antipyretics, administered to 98.53%, align with standard dengue management. Intravenous fluids, given to all patients, are crucial for severe dengue cases. Platelet transfusions (4.41%) were selectively used, suggesting limited instances of severe thrombocytopenia. Steroids were relatively infrequent (11.76%), consistent with guidelines. Blood transfusions (2.94%) were rare, indicating limited severe hemorrhage. Overall, this data underscores the challenges in managing dengue, emphasizing the need for tailored care based on dynamic clinical presentations. The prevalence of symptoms and varied treatments reflects the complexity of addressing diverse manifestations, highlighting the importance of individualized patient care

CONCLUSION

In conclusion, the analysis of dengue patient data from a tertiary care hospital provides insightful perspectives on the intricate dynamics of this infectious disease and its associated management.Interestingly no mortality or shock was reported. Trends in laboratory parameters, such as declining hemoglobin and platelet levels alongside fluctuations in liver enzyme levels, emphasize the diverse nature of dengue infections, necessitating vigilant monitoring and timely interventions to address the varied clinical presentations. In our study we found an overall reducing trend in hemoglobin. This is not a very common presentation and has been described mostly in case reports. More studies are needed to look into this aspect. Very few patients needed blood transfusion.

Symptom analysis highlights the near-universal occurrence of fever with headache, while the prevalence of other symptoms like joint pain, bleeding tendencies, and organomegaly varies. The notable presence of ascites and pleural effusion indicates potential abdominal and respiratory complications, although the absence of reported shock is reassuring.

Treatment strategies underscore the challenges in dengue management. Common antibiotic use, despite limited efficacy against viruses, may indicate concerns about concurrent bacterial infections or diagnostic uncertainties. Widespread use of antipyretics and intravenous fluids aligns with standard practices for fever management and hydration maintenance.

Selective administration of platelet transfusions suggests that severe thrombocytopenia is not widespread, while infrequent use of steroids and blood transfusions aligns with guidelines discouraging routine steroid use and reserving blood transfusions for severe hemorrhage cases only.

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