Original Article

Clinical profile of critically ill patients admitted with Dengue in a tertiary level hospital in Nepal: A retrospective study

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Abstract

Background and aims: Dengue is a viral disease transmitted by mosquitoes. The burden of disease related to Dengue is considerable in tropical and sub-tropical countries. Recently, many countries observed the outbreak of Dengue. Our study aims to explore the clinical profile and outcome of the dengue positive cases admitted in the intensive care unit (ICU) of a tertiary level hospital in Lalitpur.

Methods: We conducted a retrospective single center study in patients with proven Dengue, admitted to ICU. Data were collected between 20th August and 15th October 2022. Data collected were the baseline characteristics of patients, signs and symptoms and need for organ support. Patients were graded according to WHO severity scale.

Results: A total of 31 cases were admitted during the study period. Fever, vomiting and malaise were the common presenting symptoms. Comorbidities like hypertension and diabetes were common. Hypotension, requiring inotropic support was present in nine (29.0%) of cases. Ten patients (32.3%) required respiratory support. Derange hepatic and renal function were common. Five patients (16.1%) presented with clinically significant bleeding. Six (19.4%) of the cases expired in ICU. Among the non-survivors, five (83.3%) had severe Dengue and one (16.7%) case had Dengue with warning signs.

Conclusions: Critically ill patients with Dengue have multisystem involvement. Severe Dengue and Dengue with warning signs is associated with significant morbidity and mortality.

Introduction

The burden of disease related to Dengue is considerable in tropical and sub-tropical countries. It is a viral disease transmitted by mosquitoes particularly by *Aedes aegypti* and to a lesser extent by *Aedes albopictus*. Stagnant water is commonly found in many places of urban and suburban areas, which is a common breeding ground for mosquitoes and thus has contributed for the rapid spread of the virus. Dengue was first reported in Nepal in 2004 and since then, the disease burden has increased progressively. In Nepal, recently there was a surge in number of cases of Dengue in all seven provinces. Between January and September 2022, there were 28,109 cases and 38 confirmed deaths.[1]

There are four Dengue sero-types DENV 1, 2, 3 and 4. Infection by any one serotype provides life-long immunity to the same serotype and provides partial immunity to other serotypes. Dengue can cause

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a wide variety of symptoms such as fever, myalgia, arthralgia, retro-orbital pain, nausea and vomiting, maculopapular rash which require hospitalization and frequently severe cases may require admission to the intensive care unit (ICU). The World health organization (WHO) has classified Dengue into three types: Dengue without warning signs, Dengue with warning signs and severe Dengue. Prompt recognition and appropriate management of severe Dengue can decrease mortality and morbidity due to Dengue. The typical natural course of disease has three phases - febrile phase, critical phase and recovery phase. During the critical phase, patients may have life threatening features such as leucopenia, thrombocytopenia, plasma leakage leading to severe hypovolemia, pleural effusion or ascites, hemorrhagic manifestation, shock and severe multi-organ dysfunction. Need of admission to ICU for patients with Dengue depends on the severity of disease and the phase of illness. Various parameters and indicators have been shown to predict the outcome of patients with Dengue in ICU.[2,3]

This study aims to explore the clinical profile and outcome of the dengue positive cases admitted in the ICU of a tertiary level hospital in Lalitpur.

Materials and Methods

We conducted a retrospective single center study in patients with proven Dengue, admitted to ICU of Alka Hospital Pvt, Ltd at Lalitpur, Nepal. The patients were positive for non-structural antigen (NS1) strip test and/or Immunoglobulin M (Ig M) positive. Data were collected between 20th August and 15th October 2022, during the period of disease outbreak. Data collected were the baseline characteristics of patients, signs and symptoms and need for organ support. Patients were graded according to WHO severity scale and presence of organ failure was defined using sequential organ failure assessment (SOFA) score at admission.[4] SOFA score was calculated only in those patients for whom value of all the components of the score could be obtained from the medical record. Patients were managed as per the WHO Nepal national guidelines and surviving sepsis campaign guidelines.[5] Supportive care was provided as per the current standard of care. Blood products like whole blood, fresh frozen plasm (FFP) and platelet rich plasma (PRP) were used as per the standard recommendations and as per the discern of the treating physicians. Outcome of the patients were categorized as ICU survivors, ICU non-survivors and those who were discharged against medical advice. The data were analyzed using SPSS software version 23.

Results

During the study period, a total of 31 patients with confirmed Dengue were admitted to ICU. Of them, 17 (54.8%) were males and 14 (45.2%) were female. The age group and sex distribution of patients is shown in Table 1. The diagnosis at ICU admission was severe Dengue in 15 (48.4%) cases, Dengue with warning signs in 7 (22.6%) and Dengue without warning signs in 9 (29.0%). Fever was the predominant symptom, accounting for 27 (87.1%) of the patients. Eight (25.8%) patients were admitted with malaise and vomiting, along with fever. Presenting clinical features of the patients is shown in Table 2. The age group of the admitted patients were between 15 and 94 years (mean age of 56.25±22.37 years). Almost half of the admitted patients had comorbid conditions with significant proportion of them having hypertension 45.2% (n=13) and type 2 diabetes mellitus 41.9% (n= 13). COPD was present in 5 (16.1%) patients. Of the 31 patients admitted to the ICU, SOFA score was calculated only in 7 patients with the mean score of 3.57±1.51. The mean PaO_2/FiO_2 ratio was 232.89±137.12 with 32.3% (n=10) requiring respiratory support. Hypotension as defined by a decrease in systolic blood pressure below 90 mm of Hg or a decrease in mean arterial pressure below 65 mm of Hg and was present in 22.6% (n=7) The mean arterial pressure on the day of admission was 69.41±13.13 mm of Hg. A total of nine (29.0%) patients required vasopressor support. Seven of them requiring single agent and two of them requiring double agents. Deranged liver function test was present in six out of 16 patients (37.5%), with a mean SGPT of 153.4 IU/L and SGOT of 213.66 IU/L and a mean total bilirubin of 2.27 mg/dL. On the day of admission, mean INR was 1.4±0.47 and mean platelet count was 1,28033/cu mm. Of all the cases, five patients (16%) were admitted with clinically significant bleeding. Of these patients, one expired during ICU stay. The amount and type of blood products administered was not recorded. The mean total leucocyte count was 10,916/cu mm. The renal function of the admitted patient were assessed using serum creatinine level, with a mean value of 1.98 mg/dL on admission and a mean urine output of 1617.5 ml over the first 24 hr. In half of the non-survivors (three cases), serum creatinine was raised.

A total of 22 (71%) patients were ICU survivors, 6 (19.4%) were ICU non-survivors and 3 (9.7%) were discharged against medical advice. Age distribution, sex and WHO disease classification of non-survivors is shown in Table 3. Among the non-survivors, the mean platelet count was 1,03833 per cu mm.

Table 1. Demographic characteristics of the patients:

Demographic characters	Number	Percentage
Age group (years)		
15-24	4	12.9%
25-44	6	19.3%
45-54	3	9.7%
>55	18	58.1%
Sex		
Males	17	54.8%
Females	15	45.2%

Table 2. Presenting clinical features of the patients:

Symptoms and signs	Frequency	Percentage
Fever	27	87.1%
Vomiting	8	25.8%
Malaise	4	25.8%
Hypotension	7	22.6%
Headache	4	12.9
Chills & Rigor	2	6.5%
Abdominal Pain	2	6.5%
Retro orbital pain	2	6.5%
Exanthema	2	6.5%
Respiratory Distress	1	3.2%
Anorexia	1	3.2%

Table 3. Age distribution, sex and disease classification of non-survivors:

Parameters	Number	Percentage
Age group in years		
45-54	1	16.7%
55-64	2	33.3%
64-74	1	16.7%
75-84	2	33.3%
Sex		
Males	3	50%
Females	3	50%
WHO Classification		
Dengue without warning signs	0	0
Dengue With Warning signs	1	16.7%
Severe Dengue	5	83.3%

Discussion

Dengue, when associated with organ dysfunctions, is life threatening and is associated with high mortality rate. We found a high ICU admission rate in patients with age of over 55 years and noted almost half of the patients being admitted had severe Dengue. In our study, the patients admitted in ICU were predominantly males, which is similar to the findings of the study conducted by Juneja et al. who reported a 61.1% of admitted cases to be males.[6] The mortality rate in our study was 19.4%, which was slightly higher than that reported by other studies. The mortality rate in a study conducted in New Delhi was 6.1% and in the study conducted in Northern India, it was 11.1%.[6,7] In our study, close to half of the patients were admitted with severe Dengue and majority of the patients were elder than 55 years. These together might have contributed to higher mortality rate. Of the non-survivors, 83.3% had severe dengue and 16.7% had dengue with warning signs. None of the patients without warning signs died.

The most common symptom of the admitted patients was fever, malaise and vomiting which is similar to the study conducted by Padyana et al.[8] Similar to the findings of other studies, bleeding was a common cause of ICU admission, with 16.1% of cases admitted with clinically significant bleeding.[7,9]

In our study the mean SOFA score was 3.57, which was lower than that reported in other studies. Juneja et al. reported a mean SOFA score of 4.52.[6] As the SOFA score could be calculated only in seven cases, probably, the value obtained did not reflect the severity of illness of all the cases. The majority of the admitted patients had multiorgan involvement with around 37.5% of the patients having transaminitis, which is less as compared to study conducted by Padyana et al, in which, transaminitis was present in 96.8% of the patients. Again, we could obtain the parameters of liver function test in only around half of the cases, limiting generalizability of the value.

Coagulopathy in our study was defined by either an increase in international normalized ratio or a drop in platelet count. In our study platelet counts were decreased significantly among non-survivors with a mean platelet count of 1,03833 per cu mm. This is similar to the findings of the study by Padyana et al. where the non-survivors had significant thrombocytopenia.[8]

During the critical phase of illness, due to capillary leakage, patients may present with pulmonary oedema, respiratory distress and shock. In our study 29.0% patients requires inotropic support and and 32.3% required respiratory support, which is similar to the findings of study conducted by Chen et al.[9] The mean creatinine in our study was 1.98mg/dL which is similar to the study conducted by Chen et al.[9] Serum creatinine was deranged in three of the non-survivors.

Our study has several limitations. It was a single center study, limiting the findings from being generalizable. The study was retrospective in nature and significant amount of data was missing, precluding reflection of the exact clinical scenario. Also, we collected only the clinical data and laboratory parameters at the time of ICU admission.

Conclusion

Critically ill patients with Dengue have multisystem involvement. Severe Dengue and Dengue with warning signs is associated with significant morbidity and mortality. Well-designed prospective studies can be helpful for the better understanding of disease.

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