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Case Series

Internal Medicine Section

Managing Severe Dengue Patients in Intensive Care Unit: Case Series

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ABSTRACT

Dengue is an endemic infection causing significant mortality. The important causes of mortality are plasma leakage, shock, ischemic hepatitis thrombocytopenia, bleeding, and multiorgan failure. Effective treatment includes use of intravenous fluids, antipyretics, and blood products. Experimental therapies such as steroids, lovastatin and antivirals are tried in various studies but there is no significant benefit shown. Here, we are presenting seven cases of severe dengue who were managed in Intensive Care Unit (ICU) with standard resuscitative measures and all of them were benefitted by this.

Keywords: Thrombocytopenia, Treatment, Supportive care

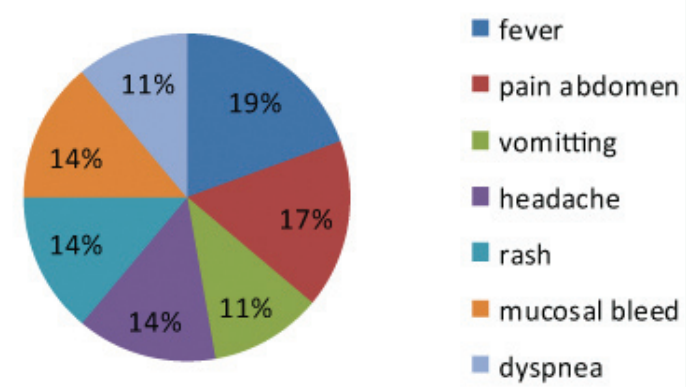
INTRODUCTION

Dengue is a vector born disease having varied presentation. It can be fatal in certain high risk patients. Severe dengue, as classified by World Health Organization (WHO) is characterised by hypotension, peripheral circulatory failure, bleeding manifestations, acute liver injury and metabolic acidosis [1]. Outcome of dengue patients in ICU depends upon platelet count at admission, serum bilirubin, presence of multiorgan failure. Timely recognising the severity and starting supportive management is crucial for survival. The course of dengue fever is self-limiting in majority of cases, only few progresses to severe disease. Here, seven cases of severe dengue fever who are admitted in ICU from June 2018 to November 2018 are presented.

CASES SERIES

This is a series of seven cases of severe dengue fever, admitted in the ICU. During the study duration, dengue was diagnosed in 83 admitted adult patients of whom these seven got admitted to ICU for various reasons. The clinical course of these patients is described here.

The age ranged from 24-81 years. All were males except one. Mean duration of fever was six days. Other symptoms are summarised in [Table/Fig-1]. Dengue NS1 antigen, detected by qualitative rapid diagnostic kit, was positive in all patients. Clinical profile is described in [Table/Fig-2].



[Table/Fig-1]: Presenting symptoms of patients.

All patients were admitted in ICU, and managed according to WHO guideline with intravenous fluids and transfusion of blood products [2]. Laboratory parameters are summarised in [Table/Fig-2]. Platelet transfusions were done if patient had bleeding manifestations or his platelet counts dropped below 10,000/cumm. Five patients were given platelet transfusion. Mean platelet concentrate transfused were 3.5 units. Single Donor Platelet (SDP) were given to those that were indicated and according to its availability. Two patients got SDP transfusion. Only single patient required packed cell RBC. All laboratory parameters are summarised in [Table/Fig-2]. Mean of important laboratory parameters are summarised in [Table/Fig-3]. Outcome was favourable in all patients.

DISCUSSION

Dengue is a viral illness. Admission criteria in ICU includes severe vomiting, dehydration, shock, severe thrombocytopenia (<50,000/cumm) and bleeding manifestations. Pathogenesis of severe disease include Antibody Dependent Enhancement (ADE), complement system activation, various host factors like age, nutritional status, race, and gender, autoimmunity and cross-reaction, and viral factors including secondary infection [3]. Sequential infections or secondary infections are the important determinant of severity of the disease. Classical dengue fever has three phases: febrile, critical and recovery phase. It is the critical phase i.e., 3-5 days after the fever starts, in which condition of patient can deteriorate.

Most of the index patients presented in first week of illness, in this series. All of them had normal blood pressure and pulse rate except one who had profound shock. The bleeding manifestations were not severe. Most had body erythema and rash, one bleeding per vagina and one haematuria. Bleeding manifestations in dengue ranges from mild mucosal bleed (epistaxis, haematuria) to gastrointestinal bleed and haemoptysis, subcapsular splenic bleeding and rupture, uterine haemorrhage results in spontaneous abortion, and severe postpartum bleeding [4]. It is important to differentiate it from bleeding diathesis which accompanies hypotension and circulatory failure. Hepatitis frequently complicates dengue fever, as in this series [5]. Most patients had very high liver enzymes. Severe dengue is defined as significant bleeding (DHF), evidence of plasma leakage (high or progressively rising haematocrit, pleural effusion, ascites, circulatory compromise or shock), and expanded dengue syndrome (atypical manifestation) with severe multiorgan involvement. All the index patients qualified definition of severe dengue. The poor prognostication markers are persistent vomiting, clinical fluid accumulation, mucosal bleeding, high haematocrit with sudden fall in platelet count, high transaminase level, serum creatinine, and serum lactate level [6].

Patient	1	2	3	4	5	6	7
Age (y)	35	38	25	53	81	28	24
Sex	M	M	M	F	M	M	M
Co-morbidity	-	-	-	Asthma	Parkinson's	-	-
APACHE II	6	12	6	7	15	17	15
Duration of fever (days)	7	10	7	4	4	8	4
Bleeding manifestation	Yes (peteichae and minor bleed)	No	Yes (peteichae and minor bleed)	Yes (bleed per vagina)	Yes (hematuria)	Yes (peteichae and minor bleed)	Yes (peteichae and minor bleed)
MAP (mmHg)	100	73	85	70	78	65	0
Pulse (/min)	80	86	110	94	78	90	110
Temperature (°F)	100	101	101	100	104	100	102
Respiratory rate (/min)	20	26	20	18	32	30	24
Haematocrit	41	29.5	40	47.6	52.4	42	46
Platelet count at admission ($\times10^3$/cumm)	17	17	21	18	30	16	20
Lowest PC ($\times10^3$/cumm)	15	16	14	14	9	7	14
TLC ($\times10^3$/cumm)	4.3	5.6	3.4	2.1	4.0	1.6	2.6
SGOT (u/dL)	20	332	212	558	199	932	2998
SGPT (u/dL)	33	113	121	168	100	1160	1245
T BIL (mg%)	2.1	5	3.3	2.0	1.9	3.5	4.1
B urea (mg/dL)	29	28	18	28	22	154	70
Creatinine (mg/dL)	0.8	0.6	1	0.4	0.9	2.5	1.2
pH	7.34	7.16	7.35	7.30	7.25	7.1	7.07
Lactate	1	3.7	1	1	1.2	3.5	4.0
Platelets transfused	0	4	0	4	11	4	1

[Table/Fig-2]: Clinical and biochemical profile of patients.
TLC: Total leukocyte count; SGOT: Aspartate transaminase; SGPT: Alanine transaminase; T BIL: Total bilirubin; B urea: Blood urea; APACHE II: Acute physiology and chronic health evaluation II; MAP: Mean arterial pressure

Laboratory parameters	Mean value
Haematocrit	36.9
Haemoglobin	12.5
Total leucocyte count	3.37 x 10^3/cumm
Lowest Platelet count	12,700/cumm
SGOT	750 u/dL
SGPT	420 u/dL
Lactate	2.2 mg%

[Table/Fig-3]: Mean of important laboratory parameters.
SGOT: Aspartate transaminase; SGPT: Alanine transaminase

Although the number of patient studied are less but it should be noted that, generalised erythema, persistent vomiting and inability to take adequate amount of fluids, anasarca, thrombocytopenia, increased haematocrit and transaminitis were present in all patients admitted in ICU. The patient that was admitted with profound shock had highest rise in transaminase levels and serum lactate level. Timely and judicious use of fluids saved his life.

The treatment of dengue include judicious fluid therapy, vasopressors, antibiotics if secondary infection suspected, transfusion of platelets and other blood products as needed [1]. There are few studies regarding effects of corticosteroids in severe dengue, but final outcome did not show significant benefit [7]. There are few new drugs like lovastatin and celgosivir, but their effect is also not established [8,9]. The authors did not use steroid in any patient. Important part of therapy was intravenous fluid management.

There are various studies done in ICU. The study done in AIIMS, New Delhi comprised of 72 patients and showed mortality of 11% [10]. A study done in Eastern India showed mortality of 4.4% among all admitted patients of dengue fever. They showed that although transaminase level among patients that died were quite high from median value, but still it didn't significantly predict the mortality [5]. A study in Taiwan shows mortality of 23%. This study had few peculiar features like mean age of patient was 70 years, quite high in comparison to other studies, they had high APACHE II score which showed higher severity of infection. Around 60% of patients developed secondary bacterial infections [11].

In this series all patients survived. It might be due to less severity of infection, better immunity and timely treatment. It was observed that only <10% of admitted patients required intensive care. Rest all were managed inward with supportive care. None of the patients developed secondary bacterial infections too. It may be due to good preventive measures that were undertaken in the ICU.

Managing dengue is simple if one can understand the phases of it and plan appropriate treatment accordingly. Late presentation, delayed escalation of treatment and overaggressive treatment with fluids are important causes of fatalities. It is important to recognise impending circulatory failure and using normal saline and crystalloids to improve it [7]. Giving prophylactic transfusion of blood products can do more harm. So, judicious use of platelet concentrates is a key to manage patients successfully.

CONCLUSION(S)

While managing severe dengue in ICU, we should be prompt enough for basics of resuscitation according to stages of the illness. To have further insight on this viral illness, we need further long term observations on a larger number of the patients.

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