Research Paper Medical Science

Analysis of Role of Platelet Transfusion Support in First Ever Dengue Epidemic in Jammu Province

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ABSTRACT

The study was done in the Department of Transfusion Medicine Govt. Medical College & Hospital, Jammu during first ever reported Dengue Fever Epidemic in Jammu region in 2013. The aim of the study was to analyze the appropriateness of use Platelets in patients diagnosed with Dengue Fever Seropositive dengue cases were included in the study. Clinical data, platelet count and platelet transfusion was assessed in these patients. WHO guidelines for platelet transfusion in dengue patients were taken as a standard to compare the platelet transfusion Among the 479 serologically positive patients, 382 (79.75%) were thrombocytopenic (platelet count < 100,000/cumm) and 28 (5.84%) patients had bleeding manifestations Out of 479 patients 116 (24.2%) patients received platelet transfusion. Of 116 who received platelet transfusion 53 (45.68%) patients had a platelet count <20,000/cumm, 46 (39.66%) had platelet count in the range of 21000-40,000/cumm and rest 17 (14.66%) had platelet count between 41000-100,000/cumm. Inapproprite platelet transfusions were given in 39.65% of the dengue cases

KEYWORDS dengue fever, platelet transfusions, bleeding manifestations.

Introduction

Dengue fever has emerged as a global public health problem worldwide. The Southeast Asian countries such as India, Indonesia, Myanmar and Thailand are at the highest risk of dengue accounting for nearly half of the global risk [1]. Dengue fever is caused by four closely related serotypes of the family Flaviviridae which are enveloped, single stranded, positive sense RNA viruses and is transmitted by aedes aegypti mosquitoes [2]. Dengue viral infection may be asympatomatic or may cause undifferentiated febrile illness, dengue fever, dengue hemorrhagic fever including dengue shock syndrome. This feared complication is characterized by bleeding diathesis due to thrombocytopenia and plasma leakage as a increased micro vascular permeability[3]. Platelet transfusion is adopted as standard clinical practice in dengue fever. Data on the relationship between the platelet count and hemorrhagic manifestations in dengue fever is conflicting. (1,4,5].

First outbreak of dengue fever in Jammu province in September-November in 2013 created a lot of concern among the people of Jammu. There was immense rush into administering platelet transfusion. Thus present study was conducted to know the appropriateness of platelet transfusions during dengue epidemic with respect to the platelet count and hemorrhagic manifestations.

Material and Methods

A retrospective study was done in Department of Blood Transfusion Medicine, Shri Maharaja Gulaab Singh Hospital, Government Medical College Jammu during first ever reported dengue fever outbreak from 1st September to 30th November 2013 in Jammu Province. Only seropositive(IgM) dengue cases were included in this study. Clinical data, platelet count and platelet transfusion was assessed in these patients. WHO guidelines for platelet transfusion in dengue patients were taken as a standard to assess the appropriateness of platelet transfusion.[6] (Table1 about here)

Results

During the study period 1032 dengue suspected cases were admitted in Government Medical College, Jammu. Of these 479 cases had positive serology to dengue virus by ELISA. Among these confirmed dengue fever there were 371 pediatric cases and 108 adult cases with majority of cases falling between the age of 11-20 years (40%)[Table 2 about here]. The male to female ratio was approximately 2.07 (323 males and 156 females). Fever was the most common clinical presentation. Headache, myalgia, vomitting and diarrhoea were other common presentations.

Bleeding manifestations were seen in 5.85%(28 cases) of the patients in the form of petechiae (10 cases), gum bleeding (8), epistaxis (5), upper gastrointestinal bleed (3), menorrhagia (1) and melena (1).

Thrombocytopenia (platelet count <100,000) was present in 79.75%(382/479) patients. Platelet transfusion were given in 24.2%(116/479) in serlogically confirmed cases, of these 71 were males and 45 were females(Table2). On categorizing the patients as per WHO guidelines, 31.5% patients were having platelet count between 21000-40,000 (Table 3). Out of 126 patients with platelet count less than 20,000, 53(43%) cases received platelet transfusions. Fourteen cases with bleeding manifestations were having platelet count of less than 20,000 (Table 4 about here).

In patients with platelet count of more than 20,000 only 14 cases had bleeding manifestations whereas 53 patients received platelet transfusions, 39.65% cases received inappropriate transfusion (Table 5 here). The total units of platelet transfused during epidemic were 1928 units, with an average of 4.02 per patient with minimum of 2 units and maximum of 14 units. Five patients also received whole blood. None of the patients received Fresh Frozen plasma.

Discussion

Dengue fever is the most common arthropod-borne viral dis-

ease worldwide. It is endemic to 100 countries, 2.5 billion persons are at risk for infection, and an estimated 50 million infections occur each year[1]. The World Health Organization estimated that the incidence of dengue fever has increased by a factor of 30 over the past 50 years[7]. Dengue epidemic in Jammu province created panic due to feared complication such as severe thrombocytopenia, hemorrhagic fever and shock syndrome. This caused concern not only in patients and relatives but also attending clinicians.

Our study noted the preponderance in the age group of 20 -40 similar to Ayub et al[8] and Lye et al[9] with majority of cases between 20-40years, whereas in a study by Pallavi et al[10] where majority of cases were less than 10 years of age. Thrombocytopenia was found in 79.95% of cases comparable to findings by Makroo et al[1] and Chairulfatah et al[11], 84.88% and 83%. Thrombocytopenia in dengue is primarily immune mediated and platelet transfusion are said to aggravate the thrombocytopenia by an exalted immune response by presenting a strong antigenic stimulus. Besides, the short life span of transfused platelets result only in a transient non-sustained elevation of the platelet count they also evoke hypersensitivity reactions and fluid overload [12,13].

In present study, 116 patients who received platelet transfusions only 28 had bleeding manifestations. There was slight increase in bleeding tendencies in patient with <20,000 similar to reports by[9,10,14] where no correlation between bleeding score and platelet count was found. Two independent predictors in a univariate analysis by in dengue shock syndrome in pediatric patients were shock and hematocrit[15]. Inappropriate platelet transfusion was seen in 39.65 % patients in our study which was higher than other studies (Table 7about here). This actually led to the non availibility of platelets along with the blood bags used for preparation of platelets during epidemics. This practice results in resources being wasted, elimination of platelet supplies, putting extra burden of cost on health care system and also exposing the patients to the risk of alloimmunization HLA and platelet specific antigens. There is also unnecessary exposure to transfusion transmitted infections. Many studies emphasized that prophylactic use of platelets is irrational and offer no benefit to patients and there was no associated increase in morbidity and mortality with a conservative approach [1,10,11]. Tewari et al[17] reported that average hospital stay in patients who received platelet transfusions was significantly more in those who received transfusion than those who were not given platelet transfusion.

The crux in treatment of dengue patients is maintenance of good hydration, monitoring for any over bleeding and not 'panic' if the platelet count is more than 50,000/cumm. This 'syndrome' of chasing platelet count in dengue patients who are otherwise completely asymptomatic and improving can be labelled as 'Dengue panic syndrome' [18]. Platelet transfusions are hardly ever required even with counts as low as 10,000/cumm because the circulating platelets are hematological active and sufficient to prevent bleeding by thrombocytopenia per se [10]. However, definite guidelines regarding platelet use in dengue fever is lacking. Early detection of hemoconcentration and shock and their prompt management, rather than platelet transfusion may be the best measure to decrease the cost, morbidity and mortality associated with dengue fever. In present study it was observed that guidelines by WHO were not followed properly which led to the marked inappropriate use of platelets may be because of panic associated with unexpected emergence dengue epidemic in Jammu province.

To conclude, dengue has become endemic in this part, its resurrengence can be expected at intervals. Thus proper hospital based guidelines should be prepared to avoid unnecessary cost, allergic reactions fluid overload and risk of transmission of transfusion transmitted infections due to unnecessary platelet transfusions. The study emphasized coordination between clinicians and transfusion services for implementation of guidelines for optimal utilization of platelets.

Table 1: WHO Guidelines for platelet transfusion in dengue haemorrhagic fever

INDICATIONS
Prophylactic transfusion (in a non-bleeding patient) Platelet count <20 x 10^9/ L (<20,000/mm^3).
Therapeutic transfusion (in a bleeding patient) Significant active clinical bleeding with platelet count <50 x 10^9/ L (<50,000/mm^3).
Proven disseminated intravascular coagulation.

World Health Organization (2009) Dengue: guidelines for diagnosis, treatment, prevention and control. World Health Organization, Geneva, pp 40–41.

Table 2: Age and sex distribution of patients with dengue fever and received platelet transfusion.

Age group (in years)	No. of IgM +ve dengue cases			No. of dengue patients who received platelet transfusion		
	Males	Females	Total	Males	Females	Total
0-10	122	54	176	19	16	35
11-20	126	69	195	28	18	46
21-30	29	15	44	13	7	20
31-40	22	6	28	6	1	7
41-50	16	9	25	2	2	4
>50	8	3	11	3	1	4
Total	323(67.4%)	156(32.6%)	479	71(61.2%)	45(38.8%)	116

Table 3: Pre-transfusion Platelet counts in seropositive & transfused dengue cases

Platelet counts (cells/cumm)	No of seropositive dengue Cases	No of transfused dengue Cases
<20,000	126	53
21-40,000	151 (31.5%)	46
41-100,000	105	17
>100,000	97	0
Total	479	116 (24.2%)

Table 4: Bleeding manifestations among dengue cases

Platelet counts (cells/cumm)	No of dengue patients	Number of cases who received platelet transfusion	Number of cases with bleeding manifestations
<20,000	126	53	14
21-40,000	151	46	12
41-100,000	105	17	2
>100,000	97	0	0
Total	479	116 (24.2%)	28 (5.85%)

Table 5: Appropriateness of platelet transfusion among various risk categories

Risk category	PLT count (cells/ cumm)	No. of transfused dengue cases	No of cases in whom platelet transfu-sion was indicated	No of Inap-propriate Transfusion
High risk	<20,000	53	53	0
Moderate risk	21-40,000	46	12	34
Low risk	40-100,000	17	2	15
No risk	>100,000	0	0	0
Total		116	67 (53.45%)	49 (39.65%)

Table 6: Comparison with other studies

Study	No of dengue Cases	No of cases with platelet transfusion	No of cases with haem-orrhagic symptoms	Inappropri-ate platelet transfusion
Kumar et al	1837	208 (11.3%)	65 (3.54%)	71 (34.1%)
Makroo et al	225	96 (42.6%)	34 (15.11%)	31 (32.3%)
Pallavi et al	343	71(20.7%)	21(6.12%)	26 (36.62%)
Present study	479	116 (24.2%)	28 (5.85%)	49 (39.65%)

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