

Role of platelet transfusion in the management of dengue patients in a tertiary care hospital

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Abstract

Background and Objective: While medical fraternity globally recognizes the role of platelet transfusion in the management of hospitalized dengue patients the exact indications and situations in which these are to be transfused may vary. Since there is inherent risk associated with the transfusion of blood/blood-component, it is imperative for each institution (or country) to lay their own criteria for transfusion of these blood components. The present study was conducted to lay precise criteria and transfusion trigger for platelet transfusion in our set-up. **Materials and Methods:** The present study was conducted on 225 serologically confirmed dengue patients admitted at Indraprastha Apollo Hospitals between 1st of August to 30th of November 2005. Clinical data, reports of hematological investigation, platelets requirements and data obtained from daily follow-up were analyzed. The clinicians followed the guidelines issued by the Directorate of Health services, NCT of Delhi. **Results:** In the serologically confirmed cases, the prevalence of thrombocytopenia (count less than 100,000/cumm) was 84.88% on admission and bleeding was recorded in 22 (9.7%) patients. About 96 (42.6%) patients of dengue cases received platelet transfusion. Among them 47 (20.88%) patients had a platelet count <20,000/cumm, 43 (19.11%) had a platelet count in the range of 21-40,000/cumm while 6 (2.66%) patients had the platelet count in between 41 and 50,000/cumm. Out of 49 patients with a platelet count >20,000/cumm, 18 patients had haemorrhagic manifestations such as petechiae, gum-bleeding, epistaxis, etc., which necessitates the use of platelet transfusion. However, 31 patients received inappropriate platelet transfusion. **Conclusion:** This study suggests that bleeding occurs more often in patients with severe thrombocytopenia. High-risk patients having platelet count <20,000/cumm and risk of bleeding require urgent platelet transfusion. Patients with platelet count 21-40,000/cumm are in moderate risk and require platelet transfusion only if they have any haemorrhagic manifestations and other superadded conditions.

Key words:

Dengue patients, thrombocytopenia, platelet transfusion

Dengue fever and dengue haemorrhagic fever have emerged as a global public health problem in recent decades. The South-East Asian countries such as India, Indonesia, Myanmar, and Thailand are at the highest risk of DF/DHF accounting for nearly half of the global risk. Dengue infection is usually a benign syndrome caused by an arthropod borne virus. Bleeding in dengue is one of the dreaded complications and is associated with higher mortality in dengue hemorrhagic fever (DHF)/Dengue shock syndrome (DSS). Bleeding manifestations are highly variable and do not always correlate with the laboratory abnormalities in the coagulation profile. Factors like mild degree of disseminated intravascular coagulation (DIC), hepatic derangement and thrombocytopenia act synergistically to cause bleeding in dengue patient.^[1] Severe bleeding is related to severe thrombocytopenia.^[2] Platelet transfusion is given in those patients who is either bleeding or having other haemorrhagic symptoms along with thrombocytopenia.

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The aim of this study is to show the relationship between thrombocytopenia and bleeding and to evaluate dengue patients as to when and whom to transfuse platelet.

Materials and Methods

The study was conducted on clinically suspected cases of dengue infection attending the inpatient department of Indraprastha Apollo Hospitals, New Delhi, between 1st of August and 30th of November 2005. According to specific inclusion criteria, 242 clinically suspected patients with fever (presenting within 5-7 days of onset with body temperature above 100°F at the time of blood sample collection) and fulfilling the case definition criteria of dengue fever (DF) and dengue haemorrhagic fever (DHF) of WHO^[3] were included in the study.

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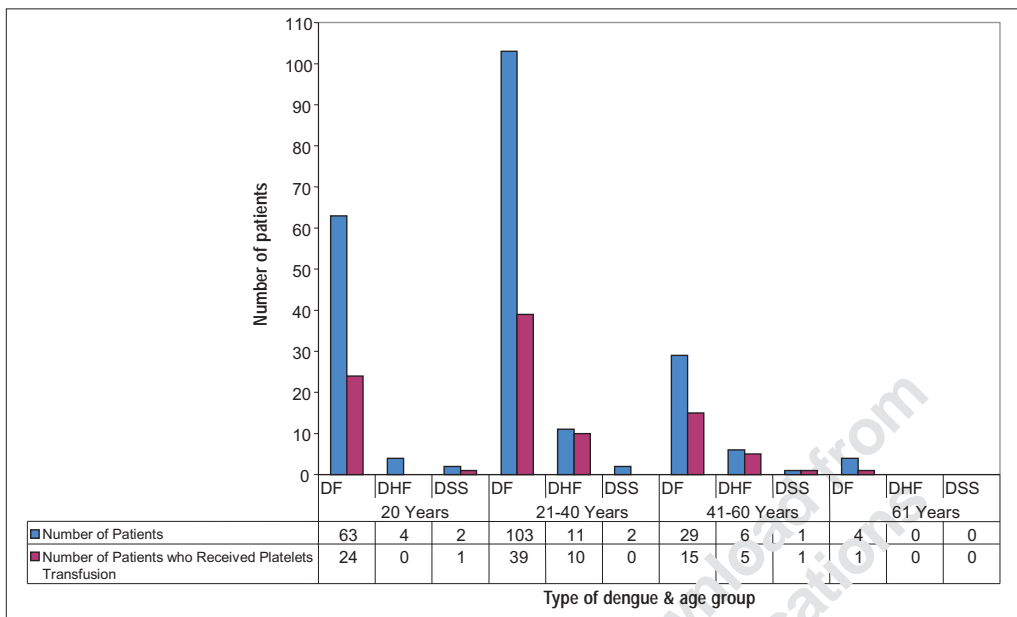


Figure 1: Correlation of platelet transfusion with stage of dengue and age distribution

Clinical data were collected through interviewing the patients or their attendants and meticulous physical examination of the patients conducted by their treating physician. Reports of haematological investigations, dengue serology, platelet requirements and data obtained from daily follow-up were analyzed.

Results

Of the 242 clinically suspected dengue patients, 225 were positive for anti-dengue IgM antibodies. Among the of 225 serologically positive dengue cases, 199 (88.4%), 21 (9.3%) and 5 (2.2%) were classified as DF, DHF and DSS, respectively according to WHO^[4] classification. The involvement of all age groups, especially an adult predominance was observed. The mean age of the dengue patient was 27 years and the most belonged to the 21-30 year age group, which included 73 patients (32.44%) [Figure 1]. Platelet count of <100,000/cumm was detected in 191 (84.88%) patients and haematocrit value of >45% was observed in 32 patients (14.22%) at the time of admission. Hemorrhagic manifestations were present in 34 (15.11%) patients of dengue infection, which mainly included petechiae-21 (9.3%) patients, epistaxis-6 (2.7%) patients, haematemesis-5 (2.22%) patients, melaena-3 (1.33%) patients, gum bleeding -8 (3.55%) patients. Bleeding occurred more often in patients with severe thrombocytopenia and was frequent when the platelet count was below 20,000/cumm [Table 1]. About 96 among the 225 serologically confirmed patients (42.60%) received platelet

transfusion therapy. Among them 58 patients were male and 38 patients were female. About 79 (39.69%) of the 199 patients with dengue fever required platelet transfusion. Similarly among the 21 DHF patients, 15 (71.42%) patients and out of 5 DSS patients only 2 (40%) patients required platelet transfusion [Figure 1].

All the 10 patients having platelet count <10,000/cumm had received platelet transfusion. Out of 40 patients having platelet count in between 11-20,000/cumm, 37 patients received platelet transfusion whereas 43 patients out of 77 had received platelet transfusion whereas 43 patients out of 77 had received platelet transfusion that were having the platelet count in the range of 21-40,000/cumm. 6 patients having platelet count in the range of 41-100,000/cumm received platelet transfusion. None of the 19 (8.4%) patients having platelet count >100,000/cumm, received platelet transfusion [Table 1]. Out of 49 patients having platelet count >20,000/cumm, and receiving platelet transfusion, 18 patients had haemorrhagic manifestations while 31 patients had no haemorrhagic manifestations.

Most of the patients receiving platelet transfusion recovered completely and were discharged within 2-5 days of their last platelet transfusion. The platelet count had picked up considerably and the average platelet count of the patients at discharge who received platelet transfusion were 95,000/cumm.

Besides platelet transfusion, FFP and PRC were also transfused to the dengue patients. Out of 12 patients who were transfused with FFP, seven had abnormal PT/ PTT, INR and four patients

Table 1: Dengue patients with thrombocytopenia and bleeding who received platelets transfusion

Platelet count (000)/cumm		≤10	11-20	21-30	31-40	41-50	51-100	>100	Total
Number of patients with	Haematemesis	2	2	0	1	0	0	0	5
	Melena	1	2	0	0	0	0	0	3
	Gum bleeding	1	1	6	0	0	0	0	8
	Epistaxis	1	3	2	0	0	0	0	6
	Number of patients who received platelet transfusion	10	37	30	13	6	0	0	96
Number of dengue patients	10	40	49	28	25	54	19	225	

were transfused with FFPs along with platelet transfusion. Five dengue patients had received PRC transfusion whose hemoglobin level was <8.0 gm/dl.

During the study period there were 50 patients whose platelet count was <20,000/cumm. Out of these, 47 were given platelet transfusions and there were three patients with a platelet count between 15,000/cumm and 20,000 who did not bleed and improved without any transfusion.

There was one patient who was suffering from falciparum malaria along with dengue fever. Only two patients died during hospitalization (mortality being 0.88%). One had additional clinical manifestations like septicaemia, while the other had severe bleeding with multi-organ failure and both belonged to 31-40 years age group.

Discussion

Dengue fever is a major public health problem in India. Delhi is one of the big cities in India where dengue is endemic. This study showed that the majority of dengue cases were adult with the largest proportion in the age group of 21-30 years. This is in accordance with the findings of Pervin *et al.* Thrombocytopenia was found in 84.88% of the confirmed cases on admission. This prevalence is comparable with the findings of Chairulfatah *et al.* who found a similar incidence of 83% in hospitalized dengue patients. Bleeding occur significantly more often in patients with severe thrombocytopenia most often in patients with platelet count less than 20,000/cumm which is similar to the finding of Shivbalan *et al.* but Chairulfatah *et al.* found significant bleeding in patients with thrombocyte count less than 15,000/cumm. Bleeding during DHF may result from a combination of factors such as thrombocytopenia, coagulation defects and vasculopathy.^[2] Therefore before platelet transfusion coagulation profile should be done to rule out the cause of bleeding.

Published data from various institutions^[5-7] and country have put varying figures as the trigger for platelet transfusion in hospitalized dengue patients. The DHS guidelines stipulate that platelet transfusion should be given to patients with platelet count <20,000/cumm. In our study, 47 of the 97 patients receiving platelet transfusion followed the norms laid down by DHS for the hospitalized dengue patients. 49 patients had a platelet count greater than 20,000/cumm, 18 out of whom had hemorrhagic manifestations like petechiae, gum bleeding, epistaxis, etc. that necessitated the use of platelet transfusion. However, 31 (13.77%) patients received inappropriate platelet transfusion. Kumar *et al.* had found 56.2% of inappropriate platelet transfusion during dengue epidemics in Delhi during 1999. Many times the prescription for this blood component are not based on medical rationale, but as a response to an intense social pressure on the treating physicians by the patients and their relatives.

All the patients of DSS required platelet support. Two patients in age group of 31-40 years were not given platelets as they died soon after admission. None of the DHF patients <20 years required platelets. The transfusion of platelets in DF was more in patients above the age of 11 than below 11 years as the possibility of repeat infections was higher.

On the basis of the close monitoring of the 242 hospitalized

cases, dengue patients can be categorized into the four categories based on their platelet count at the time of admission:

1. High risk
2. Moderate risk
3. Low risk
4. No risk

High risk patient

The patients belonging to this group have platelet count <20,000/cumm and they are at high risk of bleeding. Such patients by the rule of the thumb should be receiving prophylactic platelet transfusion. The patients in this category whose platelet count is less than 10,000/cumm have even a greater risk and need to be prioritized in case of an epidemic or, in case of limited resources.

Moderate risk

All the patients whose platelet count is in between 21-40,000/cumm belong to moderate risk category. The patients of this risk group should be transfused with platelet only if they have any haemorrhagic symptoms.

Low risk

Those patients whose platelet count >40,000/cumm but <100,000/cumm for the age and sex should be observed and monitored carefully but should not receive unnecessary platelet transfusion because of the risk of transmission of blood borne infection (with no benefit of platelet transfusion).

No risk category

Patients falling in this category usually have the platelet count >100,000/cumm. They should never be transfused with platelet and should be managed on intravenous fluids and supportive therapy.

Conclusion

All hospitalized dengue patients can be categorized into the high, moderate, low and no risk patients based on their platelet count at the time of hospitalization. The high-risk patients should be given priority and the treating physician should take decision for platelet transfusion. Moderate risk patients should be observed carefully and platelet is transfused only if they have any haemorrhagic manifestations. Low risk patients should not be given platelet transfusion and should be managed on intravenous fluids and supportive therapy.

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