ORIGINAL RESEARCH

Rational use of Platelets during Dengue Malaria Epidemics

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ABSTRACT

Aim: Overcome Platelet shortage during the epidemics Of Dengue and Malaria. Objective: To identify the need of platelet transfusion in dengue/malaria cases with thrombocytopenia and fever. Background: Critical shortage of platelets in the city has led to preferential transfusion of platelets. 600 patients were tested for NS1, screened for platelets count, mean platelet volume (MPV), IGG and IGM.A significant difference in Chi Sq ($p < 0.05$) value was observed in patients with low platelet count, high MPV, not associated with overt bleeding as compared with patients with low platelet count, normal mean platelet volume and overt bleeding. A regular follow up of platelet count test at six hourly interval revealed that the crisis period for an active dengue patient persists only for "twenty four hours", and it can be easily overcome with simple intravenous (IV) saline transfusion for flushing and/or oral hydration. Conclusion: we can avoid transfusion in around 60.2% of patients who are tested positive for NS1 dengue parameters with low platelets, and thereby overcoming the platelet shortage in management of dengue in India.

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INTRODUCTION

Thrombocytopenia is a commonest outcome of dengue infection, and bleeding complication of dengue fever.

Approximately 33000 cases of dengue fever have been reported in India (National Vector Borne Disease Control Program [NVBDCP]) annually, however, this number may be less, perhaps due to the ongoing COVID-19 pandemic[1]. Case fatality rates for the South-East Asian region are 1%, but is it varies in India, Indonesia and Myanmar from 3% to 5% [2].

Palghar district is a predominantly tribal district. A study aimed to understand the sero prevalence for dengue and malaria and to identify the circulating serotypes using retrospective data analysis done by the Model Rural health Research unit (MRHRU), department of Health and Research Dahanu(3) revealed that there is presence of   28% of

prevalence and circulation of multiple dengue serotypes (DENV 3 & 2) in Palghar district. This leads to , the existence of multiple serotypes of the virus in the rural area of Palghar district increasing the risk of Dengue Haemorrhagic fever/Dengue shock syndrome and fever out brakes leading to increased morbidity and mortality.

Indian blood centres have been going through rollercoaster ride for want of platelets during Dengue /malaria epidemics, ever since prophylactic platelet therapy has been used to prevent bleeding in the management of dengue fever with patients with platelet counts below 20000mm3,and transfusion beloe 10000mm3{ 4,5), A poor health care system with underdeveloped blood transfusion facilities as in this tribal area, necessitates appropriate use of blood and components especially platelets and to ensure the availability of the same for patients in whom it is really indicated & also to avoid transfusion reactions and transmissible diseases[6] and making platelets available in the tribal region of Palghar district is a challenge to both –the blood centres and the treating Physicians.

Wide spectrum of clinical presentation, with unpredictable clinical evolution and outcome is in three phases. *Febrile phase, Critical phase, Recovery phase. The critical phase is sub grouped into;* Grade 1: fever, non specific constitutional symptoms; (+) TT- only high manifestation, Grade 2: Grade 1 manifestation + spontaneous bleeding, Grade 3: signs of circulatory failure (rapid weak pulse, narrow pulse pressure, hypotension, cold clammy skin)Grade 4: profound shock with undetectable pulse and BP

MATERIAL AND METHODS

This study included 600 febrile patients. These were screened for CBC processed on Erba Hematology analyser, peripheral smear with manual microscopy using giemsa stain, malaria using lordsmed rapid kits and dangue NS1, IgM &IgG using J mitra rapid kits.

RESULTS

Among the 600 samples tested 120 were tested negative for dengue and malaria,68 were positive for malaria and 322 were positive for dangue. Among the 490-positive for dengue and malaria, 346(71%) had low platelet count (<80) and 154(29%) had normal platelet count. Analysing the 346 patients with low platelet count (<80), the results were as follows:216(63.4%) had High Mean Platelet Volume (MPV), 130(38%) had normal PCV, NS1was positive in 233(67%), IgM positive70(20%), IgG positive in 3(8%), Atypical lymphocytes were present in 156 (45%) and 30(8.7%) indicated haemorrhagic Dehydration . There were 70 (20%) among the 346 with low platelets who belonged to the critical category, presented with dehydration. Among these 70,62(69%) had normal MPV and 8(11.4%) had high MPV.

Table 1: This study includes 600 febrile patients

120	Viral
168	Malaria
322	Dengue

Table 2: 346 with low platelets <80

High MPV	Normal MPV	NS1	IgM	IgG	Atypical Lymphocyte(ATL)	Hemorrhagic Dehydration
216	130	233	70	3	156	30
63.4%	38%	67%	20%	0.8%	45%	8.7%

Table 3: 216 patients with HIGH Mean platelet Volume (MPV)

NS1	IgM	IgG	Atypical Lymphocyte(ATL)	Hemorrhagic Dehydration
120	10	3	86	8
56%	5%	1.4%	40%	3.7%

Table 4: 130 patients with Normal Mean platelet Volume (MPV)

NS1	IgM	IgG	Atypical Lymphocyte(ATL)	Hemorrhagic Dehydration
113	60	-	70	62
87%	46%	-	54%	48%

Table 5: 70 Patients admitted for dehydration with low platelets

62 Normal MPV	8 High MPV
89%	11.4%

Statistcs

When we compare the patients having high MPV with normal MPV:

Patients with normal MPV have a higher incidence of hemorrhagic/ dehydration outcomes.

DISCUSSION

Thrombocytopenia is a common problem in dengue, which causes a lot of concern to the patients well as to the physicians. No clear guidelines are available for the management of thrombocytopenia in dengue. The natural-tendency is to transfuse platelets in such patients. The thrombocytopenia in dengue is primarily immune mediated and platelet transfusion is said to worsen the thrombocytopenia by an exalted immune response by a strong antigenic stimulus [7], Platelet transfusion is a transient short cut to prevent bleeding and however they can create complications like pulmonary oedema ascites etc(8,9)

Observing the clinical prognosis between the two groups of cases with high MPV and Normal MPV, we observe that patients with normal MPV have a higher incidence of haemorrhagic /dehydration outcomes

This is due to the fact that juvenile large platelets grow into regular platelets and protect the haemorrhagic mechanism. Cases with Normal Mean Platelet volume have either lost their functionality or are dead platelets. (10). Platelet transfusions are hardly ever required even with counts as low as 10,000/cumm because the circulating platelets are haematologically active and sufficient enough to prevent bleeding by thrombocytopenia per se. In general, platelet transfusions are required only when there are serious haemorrhagic manifestations [11,12].

The NS1 cases were higher among the normal MPV cases however it is not statistically significant (p>0.5) indicating the presence is common in all dengue case. Presence of atypical Lymphocytes was noticed in cases who were at the peak of the illness, therefore may be considered as a marker to predict or identify the severity of the infection response. All patients suspected for Hemorrhagic outcome were hydrated and monitored for platelet count with CBC every eight hours. It is observed that patients with high MPV improved and were rehydrated. However, among the 62 patients with normal MPV: 2 expired of bleeding,40 became critical and required massive platelet transfusion (MORE THAN 40 RDPs) and 20 recovered slowly with 4-5 units of RDP. Just Hydration therapy has responded miraculously (13)

CONCLUSION

Not all Dengue /Malaria Patients with low Platelet Counts should be transfused for Single donor/random Donor Platelets. Hydration therapy is a better alternative. We can save/avoid about 60% of platelet transfusion for the needy patients.

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