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Research Article

Platelet transfusion in a dengue epidemic as per recent WHO classification

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ABSTRACT

Background: The objective was to study the role of platelet transfusion in a dengue epidemic as management to the reduced platelet count and associated hemorrhagic manifestations.
Methods: The study was conducted for a period of four months over 3115 cases of clinically and serologically positive cases of dengue for non-structural protein antigen (NS 1).
Results: The patients diagnosed as dengue fever without warning signs constituted the maximum number of cases 2418 (77.6%) followed by dengue fever with warning signs 667 (21.4%), severe dengue 30 (1.0%). In serologically confirmed cases, only 154 patients had platelet count <10000/cumm. The prevalence of bleeding was reported in 667 cases and platelet was transfused in only 724 cases constituting 508 cases of dengue with warning signs and 30 cases of severe dengue.
Conclusion: Prophylactic platelet transfusion can be done in thrombocytopenic patients with platelet count less than 10000/cumm and associated hemorrhagic manifestations with count more the above label.

Keywords: Dengue, Platelet, Thrombocytopenia

INTRODUCTION

Dengue fever and dengue hemorrhagic fever have become a global issue in many tropical and sub-tropical regions of the world. The incidence has increased affecting 50 million people each year with 500000 cases are hospitalized as Dengue Hemorrhagic Fever (DHF).[1] In India though Dengue is endemic in Delhi in the monsoon season, but our study is based on the epidemic emergence of this disease on a huge scale in Odisha. Though dengue is a benign syndrome caused by an arthropod- borne virus and was classified into Dengue Fever (DF), Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) according to WHO bulletin, 1997, it is the bleeding associated in DHF and DSS that is the culprit of high mortality. Bleeding in dengue can be caused due to Disseminated Intravascular Coagulation (DIC), hepatic derangement and also due to severe thrombocytopenia.[2] In the present study, the patients have been classified into dengue without warning signs, dengue with warning signs and severe dengue according to the WHO bulletin, 2009.[3] Prophylactic platelet transfusion is recommended in patients with platelet count less than 10000/cumm and platelet transfusion is advised in patients with associated bleeding or hemorrhagic manifestation along with thrombocytopenia (count more than 10000/cumm).[4]

The aim of the current study was to evaluate the requirement of platelet transfusion in dengue patients associated with thrombocytopenia and bleeding as opinion on the role of platelet transfusion in the management of dengue patients vary in the medical fraternity.

METHODS

The study was conducted in the S.C.B. medical college and hospital, Cuttack in Odisha where there was sudden epidemic outbreak of the disease and over 3115 patients of clinically and serologically positive cases of dengue were included in the study in duration of 4 months from mid-July to mid-November of 2013. Due to outbreak of the epidemic, Non-Structural protein (NS) 1 Antigen (Ag) positive patients with fever, malaise, headache, joint pain, vomiting and decreased appetite as early symptoms and hemorrhagic manifestations like generalized rash, ecchymosis, petechiae were included in the study. Clinical data were collected from the patients admitted in the indoor ward. Reports of hematological investigations, dengue serology, platelet requirements and data obtained from daily follow-up were analyzed.

RESULTS

The study conducted on 3115 patients in epidemic of dengue of having Non-Structural protein Antigen (NS 1 Ag) positive .Samples were collected in active phase of the patients reporting within one to four days of fever. The age of the patients ranged from nine months to 81 years and 1812 (58.2%) male patients were in majority. Most belonged to 21-30 year age group, which included 1227 (39.4%) patients and the study included 388 (12.5%) children and 2727 (87.5%) adult patients. These constituted 2418 (77.6%), 667 (21.4%) and 30 (1.0%) cases of dengue fever without warning signs, dengue fever with warning signs and severe dengue, respectively according to the new WHO classification.[3] As the study was based on epidemic emergence of the entity and majority of the patients reported within one to two days, thus hemorrhagic manifestations like epistaxis, hematemesis, melena, gum bleeding were reported only in 538 (17%) cases. Bleeding occurred more frequently in children below 10 years and in patients with severe thrombocytopenia. Platelet transfusion was done only in 724 (23.2%) cases which constituted 508 cases of dengue fever with warning signs and 30 cases of severe dengue.

All the patients with platelet count <10000/cumm had received prophylactic platelet transfusion. Similarly, all the patients with platelet count ranging from 11,000 to 20000/cumm had received the platelet therapy and one patient had received PRBC along with platelet as he was anemic with hemoglobin count of 5 gm%. All the patients with count between 20000 to 40000/cumm received the platelet transfusion. But, 146 patients with platelet count between 40,000 to 100000/cumm had received the platelet therapy and 7 cases were given fresh Whole Blood (WB) due to the low count of hemoglobin of 4.0 gm%. Only 13 (0.4%) cases with count between 100000 to 150000/cumm were inappropriately transfused with platelet due to the decision taken by the clinicians reviewing the deterioration of status of the patients along with the fluctuating report of the platelet count in various laboratories. Only 22 (0.7%) patients were suffering from falciparum malaria, 08 (0.2%) with vivax malaria, 15 (0.5%) patients had associated diabetes mellitus and one patient was five months pregnant along with the dengue fever.

The patients were managed conservatively and those who received transfusion recovered completely and were discharged from the hospital except 21 cases consisting of 06 deaths due to severe dengue and 15 cases with associated other co- morbidity factors who succumbed to death.

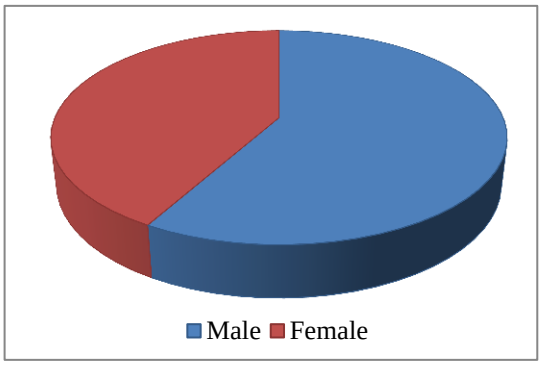

Figure 1: Sex distribution of the dengue patients.

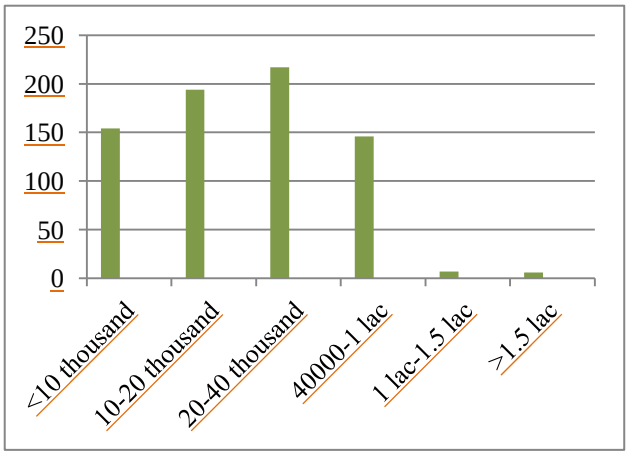

Figure 2: Distribution of patients receiving platelet according to their platelet count (per cumm).

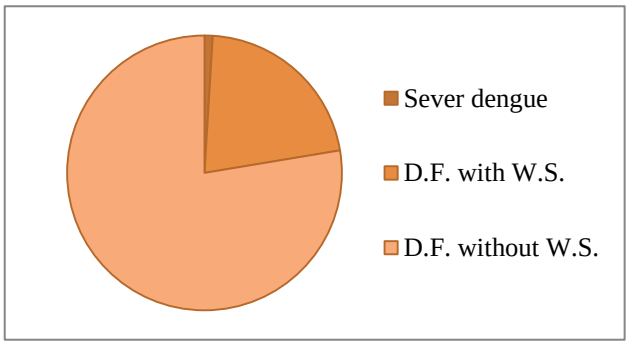

Figure 3: Distribution of patients according to spectrum of disease. (D.F.: Dengue Fever, W.S.: Warning Sign).

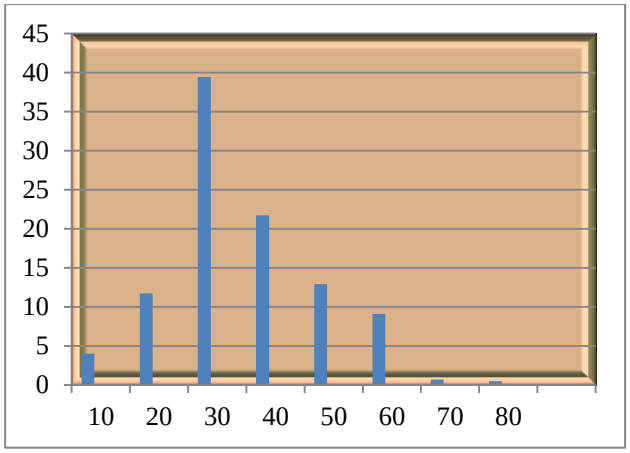

Figure 4: Percentage distribution of patients according to their age.

DISCUSSION

Dengue being one of the major public health problems in India is endemically seen in the national capital, Delhi in the monsoons. A severe epidemic outbreak was seen in Cuttack situated in Odisha state. In the present study, the disease was prevalent in the age group ranging from nine months to 81 years and majority of cases were adult in the age group of 21-30 years. Since the epidemic affected a large number of patients (3115) within a short interval of time, the patients were admitted within one to two days of the onset of fever and thus thrombocytopenia was detected in only 935 (30%) patients.

The classification of dengue into DF/DHF/DSS was being widely used. WHO in 2009 classified dengue according to the level of severity. It stressed on the fact that using clinical and/or laboratory parameters can be differentiated into patient with severe dengue & non-severe dengue. The non-severe dengue is for practical reasons is again subdivided into patient with warning sign and those without them. Positive NS-1 test found in patient with fever and any two of the parameters like anorexia & nausea, aches & pains, leucopenia and positive tourniquet test are considered dengue fever without warning sign. Some of the patients were presented with certain warning sign like abdominal pain/tenderness, persistent vomiting, lethargy and restlessness, hepatomegaly, mucosal bleeding, and increase in HCT concurrent with rapid decrease in platelet which are classified into dengue fever with warning sign. Similarly we followed certain criteria like shock with respiratory distress, severe bleeding and severe organ impairment, to consider severe dengue. So in our study out of 3115 patients, 77.6% patients are without warning sign, 21.4% patient with warning sign and 1% patient are classified into severe dengue.

Bleeding occurred mostly in patients with severe thrombocytopenia, the platelet count being less than 10000/cumm.[2] Bleeding in dengue can be attributed to combination of various other factors like thrombocytopenia, coagulopathy and vasculopathy.[3] Thrombocytopenia may be associated with alteration in megakaryocytopoiesis by the infection of human hematopoietic cells and impaired progenitor cell growth, which can result in platelet dysfunction, increased destruction or consumption. A transient and reversible imbalance of inflammatory mediators, cytokines and chemokines occurs during severe dengue, probably driven by a high early viral burden, and leading to dysfunction of vascular endothelial cells, derangement of the hemocoagulation system then to plasma leakage, shock and bleeding. Although the dengue patients with platelet count less than 20000/cumm have more tendency for bleeding but, patients with platelet count less than 10000/cumm should be prophylactically given platelet transfusion and should be prioritized in case of epidemic or, in case of limited resources as they carry greater risk. All patients with platelet count more than 10000/cumm should be given platelet transfusion if associated with hemorrhagic symptoms.[6]

Different institutes have emphasized on different cut-off values for the platelet transfusion in hospitalized dengue patients.[5-7] The Directorate of Health Services (DHS) guideline for the prophylactic platelet transfusion is the platelet count <10000/cumm. The thrombocytopenic patients with more than this count can receive platelet therapy if associated with other hemorrhagic manifestation.[6] In our study 154 patients with platelet count less than 10000/cumm received prophylactic platelet therapy and 354 thrombocytopenic patients with platelet count more than 10000/cumm, having other hemorrhagic manifestations like petechiae, gum bleeding, epistaxis, etc. received platelet transfusion. However, 29% patients received inappropriate platelet transfusion. Often, blood components are not prescribed on medical ground rather due to dissimilarity or delay in the laboratory reports on platelet value and intense social pressure on the treating physicians, by the patients and their relatives.

All the dengue patients with warning signs received platelet transfusion, but unfortunately as they had come very late, 6 patients succumbed to death. The adults suffering from dengue with and without warning signs received platelet therapy more commonly than the children.

CONCLUSION

During dengue epidemic, demands for platelet transfusion were frequently encountered due to panic reaction. Even if the platelet count is more than 10000/cumm without any associated bleeding manifestations, platelet therapy is advised by the clinicians which may lead to subsequent non-availability of the component due to scarcity of stock. Thus, all the hospitalized patients should be categorized into dengue fever without warning signs, with warning signs and

severe dengue depending on the clinical features, platelet count, associated hemorrhagic manifestations at the time of admission. Always, the patients with count less than 10000/cumm should be given priority for prophylactic platelet transfusion. Thrombocytopenic patients should be observed carefully and platelet should be transfused only if they have any hemorrhagic manifestations. Rest of the dengue patients should not be given any transfusion; rather they should be managed on supportive therapy.

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