ISSN- O: 2458 - 868X, ISSN –P: 2458 - 8687

International Journal of Medical Science and Innovative Research (IJMSIR)

IJMSIR : A Medical Publication Hub

Available Online at: www.ijmsir.com

Volume – 3, Issue –1, January - 2018, Page No. : 272 - 275

Role of transfusion in dengue patients

[1]Dr Vijay Sawhney, [2]Dr Vidushi Gupta, [3]Dr Kajal Khajuria

[1]HOD, Dept. of Transfusion Medicine

[2]Post graduate, Dept. of Transfusion Medicine.

[3]Post graduate, Dept. of Transfusion Medicine.

Correspondence Author: Dr Vijay Sawhney, HOD Dept of transfusion Medicine

Type of publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Introduction: Dengue is rapidly spreading arbovirus infection caused by Dengue virus and transmitted by aedes aegypti mosquito. Every year during dengue outbreak there is immense pressure on transfusion facilities to meet the requisition of blood and blood components**.**

Aims and objective We conducted a prospective study to know the role of transfusion of blood and blood components and their misuse in dengue patients.

Result: Total of 76 patients received platelet transfusion with 38 receiving both blood and platelet transfusion. 20 patients received only blood transfusion and 1 patient also received FFP transfusion. In our study 27 out of 58 patients received inappropriate blood transfusion and 15 out of 76 received inappropriate platelet transfusion. Out of 12 patients with platelet count between (10000 - 30000) who didn't receive transfusion because of shortage of platelets, only 3 progressed to bleeding manifestations. Out of 19 patients who received prophylactic platelet transfusion, 5 still progressed to bleeding manifestations. Platelet transfusion did not prevent development of bleeding**.**

Conclusion: There is a need to prevent inappropriate transfusion by creating awareness among clinicians. Our study also necessitates the need of transfusion committee for proper utilization of blood and its components in dengue patients on individual basis.

Keywords

Dengue, platelet, whole blood, bleeding manifestation, corrected count increment, transfusion reaction

Introduction

Dengue is an arbovirus infection caused by Dengue virus and transmitted by aedes aegypti mosquito. It has emerged as an important public health problem with outbreaks after monsoon. There are 4 serotypes all producing similar clinical syndrome and type specific immunity which is life long. Severe dengue infection occurs in individual who are immune to one serotype and then infected with another. Prior immunity results in increased virus uptake by cells expressing antibody Fc receptors and increased T cell activation and cytokine release causing capillary leak and DIC(1). Diagnosis is by NS1Ag or IgM or IgG Elisa. Thrombocytopenia is an essential feature of dengue infection but bleeding manifestations are highly variable and don't always correlate with lab abnormalities (2). Treatment is supportive with emphasis on fluid replacements and appropriate management of shock. Transfusion is given in many patients because of intense pressure on clinicians rather than medical rationale.

Materials and methods: This was a prospective observational study conducted in tertiary care hospital of

north India from 1st August to 31st October 2017 to know the role of blood and blood component transfusion and its misuse in dengue patients. 240 serologically positive adults were detected by NS1Ag or IgM or IgG Elisa. Study included serologically positive adults who came to blood bank with requisition of blood or blood component transfusion. Clinical findings like presence of bleeding manifestations (petechiae, melena, hematemesis, epistaxis, gum bleeding, hematuria, menorrhagia) and vitals (B.P, pulse rate) and lab investigations- pre and post transfusion platelet count, Hb, CBC, LFT, RFT, were recorded

Results: Of 240 serologically positive adults, 76 patients received platelet transfusion, out of which 72 received RDP (2- 6 units) with mean of 4 units and 4 received SDP. All were given ABO compatible platelets.

Platelet count	<20000	20- 40000	41-60000
Prophylactic	4	12	3
Therapeutic(in patients with bleeding manifestations)	17	33	7

Out of 19 patients who received prophylactic platelet transfusion, 5 still progressed to bleeding manifestations. Out of 12 patients with platelet count between (10000 - 30000) who didn't receive transfusion because of shortage of platelets, only 3 progressed to bleeding manifestations. Coagulation profile was normal in all patients except 1 patient with CKD who received FFP transfusion.

58 patients received blood transfusion with 38 receiving both blood and platelet transfusion. 3 patients received whole blood transfusion in febrile phase with platelet count >1,00,000 but mild gingival bleed or epistaxis. 10 patients received blood transfusion with platelet count <1,00,000 but minor bleeding. 21 patients received blood transfusion with major bleeding (hematemesis, melena, menorrhagia, and hematuria).14 received blood transfusion with stable vitals but decreased Hct (either because of fluid overload or chronic anemia). 10 received blood transfusion with decreased Hct and unstable vitals. None of the patient received packed cell transfusion despite advising treating physician.

2 patients developed febrile non hemolytic transfusion reaction. 76% patients had leucopenia and 82% had raised liver enzymes (SGPT, SGOT) suggesting liver involvement and bone marrow suppression in dengue.

Post transfusion platelet increment

Calculated count increment= platelet Increment x body surface area/ no of units transfused

Responders: patients with CCI> 5000/ul post 1hr transfusion. Out of 76 patients, 73 were responders with mean CCI of 9800/ul. Of 3 who were non responders, 1 had CLD and was given 12 RDP+1SDP.1 had CKD and was given 20 RDP+1SDP.

Discussion: Dengue virus cause asymptomatic seroconversion or undifferentiated febrile illness esp. in primary infection or classical symptomatic dengue fever. After incubation period of 3- 10 days, illness occur abruptly and in moderate to severe cases followed by 3 phases- febrile, critical and recovery phase. WHO classification-

1. Dengue without warning sign
2. Dengue with warning signs- abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, lethargy, restlessness, liver enlargement>2cm, lab- increased hct with rapid decrease in platelet count
3. Severe dengue- severe plasma leakage leading to dengue shock syndrome or fluid accumulation, severe bleeding, severe organ impairment – liver AST or

ALT> 1000, CNS- impaired consciousness, heart or other organ impairment.

Treatment involves judicious volume replacement with intravenous fluid therapy and proper monitoring of patients. Blood transfusion should be given only in cases with established severe bleeding or suspected severe bleeding in combination with unexplained hypotension. Severe bleeding should be recognized by :- persistent / overt bleeding in presence of unstable hemodynamic state, decreased Hct after fluid resuscitation along with unstable hemodynamic state, refractory shock that fails to respond to consecutive fluid resuscitation of 40- 60ml/kg, hypotensive shock with inappropriately low/ normal Hct, metabolic acidosis in patients with well-maintained systolic B.P esp. with abdominal tenderness or distention(3). 5- 10ml/kg of fresh packed cell or 10-20ml/kg of whole blood should be given.

Interpretation of HCT

- High Hct with stable vitals and adequate urine output don't require extra fluid therapy.
- Decreased Hct with unstable vitals indicate major bleeding and need of blood transfusion.
- Decreased Hct and stable hemodynamic state and adequate urine output indicate hemodilution or reabsorption of ECF (3).

Unnecessary blood transfusion should be avoided as

- It can cause Hct to rise and give false impression of hemoconcentration and plasma leakage.
- Risk of infectious and non-infectious adverse effects (FNHTR, Hemolytic transfusion reaction, TACO, TRALI) associated with blood transfusion.
- Overburdening of transfusion facilities.
- Risk of transmission transmitted dengue because of transfusion from donors with asymptomatic infection or in incubation phase during epidemic.

There are reports of 5 cases of transfusion transmitted dengue. 76 year female in 2002 in Hong-Kong received transfusion for severe anemia developed dengue(4). Cluster of 3 cases received transfusion from same donor, 2 of 3 recipients developed acute dengue infection and all 3 tested positive for dengue, published in 2008(5). During outbreak in Puerto-rico in 2007, of 15350 donation sample tested retrospectively, 29 tested positive. 3 of the recipients of these blood units could be tested, 1 tested positive and developed DHF(6).

Prophylactic platelet transfusion is given because of fear of severe bleeding in patients with acute dengue and thrombocytopenia (7). Bleeding manifestations are highly variable. Factors like mild degree of DIC, hepatic derangements, thrombocytopenia, vasculopathy, platelet dysfunction, coagulopathy act synergistically to cause bleeding (8,9). Causes of thrombocytopenia include both platelet destruction and bone marrow suppression. Immune mediated destruction is probably most important factor. Theoretically, immune mediated destruction may lead to platelet refractoriness or poor response to platelet transfusion(10). In our study, we found 73 of 76 patients were responders with mean CCI of 9800/ul. Out of 3 non- responders, 1 had CKD. Uremia in CKD is independent risk factor for platelet dysfunction or refractoriness. It is due to increase level of metabolites like guanidinosuccinic acid leading to impaired signaling from surface receptors on platelet through cyclo-oxygenase. It also inhibit platelet aggregation by facilitating excess NO production(11). 1 patient had CLD. Thrombopoeitin is released from liver and is important for platelet production and maturation, is impaired in CLD. Increased destruction in CLD is also due to increase shear stress, fibrinolysis, bacterial translocation, immunological destruction and infection causing increased platelet aggregation(12). IPF

(immature platelet fraction) is a measure of reticulated platelet which reflects rate of thrombopoeisis. Increased IPF suggests consumptive or recovering thrombocytopenic disorders while low IPF suggests bone marrow suppression. In a study conducted by DaduT, it was found that 93.75% patients show recovery within 24-48 hours if IPF>10% (13). So, it can be used as important marker to predict platelet recovery in dengue patients and prevent its irrational use.

Conclusion

In our study 27 out of 58 received inappropriate whole blood transfusion and 15 out of 76 received inappropriate platelet transfusion. Platelet transfusion did not prevent development of bleeding. Over judicious transfusion of blood and blood components should be avoided as it can exacerbate the fluid overload in dengue patients and also because of infectious and non-infectious adverse effects associated with blood transfusion. There is a need to prevent inappropriate transfusion by creating awareness among clinicians. Our study also necessitates the need of transfusion committee for proper utilization of blood components on individual basis.

References

1. Davidson's principle and practice of Medicine.
2. Study of effectiveness of transfusion programme in dengue patients receiving platelet transfusion Nagarekha Kulkarni ijbti2012;2:11-15
3. WHO Handbook for clinical management of dengue
4. Chuang V, Wong TY, Leung YH, Ma E , Law YL, Tsang O, Chan K M, Tsang I, Que TL, Yung R, Liu SH. Review of dengue fever cases in Hong Kong during 1998-2005. Hong Kong Med J 2008;14:170-177
5. Tambyah PA, Koay ES, Poon ML Min, Lin RV, Ong BK. Dengue haemorrhagic fever transmitted by blood transfusion. N Eng J Med 2008;359:1526-1527
6. Stramer SL, Linman JM, Zou S, DoddRY, Tirando-MarraroSSS LM, Hunsperger E, Santiago GA, Munoz-Lordan JL, Tomashek KM. Dengue viremia in blood donors identified by RNA and detection of dengue transfusion transmission during 2007 dengue outbreak in Puerto-Rico Transfusion. 2012Aug;52(8)1657-1666 PMID: 22339201
7. David lee, Vernon J Lee, Yan Sun, Yee Sin Leo. Lack of efficacy of prophylactic platelet transfusion for severe thrombocytopenia in adults with acute uncomplicated dengue infection. Clinical infectious disease vol 48, 1 May 2009;1262-1265
8. Hemostatic derangements in dengue hemorrhagic fever. Chuansumrit A, Chaiyaratana W. Throm Res, 133(1),10-16**.**
9. Makroo, RN Raina, V.Kumar, P & Kanth(2007). Role of platelet transfusion in management of dengue patients in a tertiary care hospital. Asian J Transfusion Science, 1(1),4-7**.**
10. Mitrakul C, Poshyachinda M, Sangkawibha N, Ahandrik S. Hemostatic and platelet kinetic studies in dengue hemorrhagic fever. Am J Trop Me Hyg 1977, 26:975-984.
11. Rossi's Principles of Transfusion medicine
12. The pathophysiology of thrombocytopenia in chronic liver disease. Oscar Mitchell, David M Feldman, Marla diakow, Samuel H Sigal. Hepat Med 2016,8:39-50
13. Dadu T, Sehgal K, Joshi M, Khodaiji S. Evaluation of immature platelet fraction as an indicator of platelet recovery in dengue patients. Int J Lab Hematology.2014