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Case Report

IMMUNITY IN DENGUE HEMORRHAGIC FEVER PATIENTS COULD BE SENSITIZED BY FRESH BLOOD TRANSFUSION

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ABSTRACT
Dengue Haemorrhagic Fever is severe clinical stage of infection caused by dengue viruses externalized by thrombocytopenia, extravasation of fluid into interstitial spaces and circulatory collapse. Existing theories state that sequential secondary infection after a time gap with a different serotype than the earlier one predisposes the patient towards DHF. A patient with clinical condition like that in DHF was referred to Medical College hospital, Jodhpur, Rajasthan where he was given freshly supplied blood containing live WBC's. An enhancement in the gamma interferon level was observed leading to subsequent recovery from the severe stage of DHF.

Key Words: *Dengue Hemorrhagic Fever, Immunity, Blood Transfusion, Gamma Interferon*

CASES
DHF, a leading cause of hospitalization and death is known to occur when a patient already immune against one of the dengue strains, gets re-infected by a strain different than the previous strain (Halstead *et al.,* 1967; Guzman *et al.,* 1990). Immunologically, this can be explained as a non response of B and T lymphocytes of the patient's body against the re-infecting dengue strain, resulting into non secretion of anti-viral cytokine, interferon and the continuance of viral multiplication to reach the stage of DHF. We hypothesize that this non response of B and T lymphocytes could be due to the fact that having interacted and produced antibodies against earlier dengue strain, these cells have developed a misnomer and thus if fresh blood (not more than 1-2 days stored) of a healthy person, which contains live WBC's, is transfused, B and T lymphocytes of such blood will be free from misconception and they will respond against current dengue infection by secreting interferon and achieving cell mediated immunity. Herein, we describe immunity enhancement and recovery in a severe DHF patient.
An 18 years old male patient from Jaisalmer, Rajasthan, India with history of high grade fever, severe febrile illness, bleeding gums and sub-cutaneous haemorrhages was referred to Medical College Hospital, Jodhpur, and Rajasthan on June, 2009. The patient's blood was tested positive for anti-dengue IgM and IgG antibodies, and was found to be negative for malaria, typhoid, HBS Ag, HCV and HIV. His haematological profile showed TLC to be 4200/cu mm; DLC (Neutrophils-56%, Lymphocytes-42%, Monocytes-1% & Eosinopils- 1%); Erythrocyte Sedimentation Rate- 148 mm 1st hr and platelet count-2 lacs/mm. Urine examination of blood showed blood sugar - 122 mg/dl, blood urea- 59mg/dl, Serum Creatinine- 1.4mg/dl, SGOT-253 lu/L, SGPT-218 lu/L, Serum Bilirubin total-0.41 mg/dl, S. Albumin- 3.7 gm/dl, serum total protein- 7.4 gm/dl and serum Alkaline Phosphate- 882 IU/L.
Since the patient was severely anaemic (haemoglobin level 4.0 gm%) he was transfused with 6 units of platelets initially. In addition, we advised transfusion of 250 ml fresh blood (twice) from hospital blood bank. The routine treatment of antibiotics was continued.
2 ml of intravenous blood was taken at three different stages, before first blood transfusion (Stage I), 24 hours after blood transfusion (Stage II) and 24 hours after second transfusion (Stage III), for the bio-chemical and virological analysis to be done at our laboratory. Gamma IFN level in the serum was measured using Quantikine Human IFN-γ kit (M/s R & D Systems, Inc, USA) at all the three stages. Presence of virus in the blood sample was confirmed by Indirect Immunofluorescence Antibody Test

(Kuberski & Rosen, 1977), with DEN-1, 2, 3, 4 monoclonal antibodies (MAb's) (M/s Fitzgerald, USA) and Western Blotting, again with four MAb's as well as confirmed with RT-PCR technique (Lanciotti *et al.*, 1992).

On the 3rd day of illness when the patient was again given fresh blood transfusion, there was an immediate improvement in fever and bleeding symptoms. Serum γ-IFN level during Stage I was measured to be 15.6 pg/ml, during Stage II it rose to 31.2 pg/ml and in Stage III it was 250 pg/ml. Virological examination of serum (for Stage I) tested using IFA Test showed Dengue-1 antigen which was also confirmed by the Western Blotting and RT-PCR methods.

DISCUSSION

DHF is an important area of research for its serious clinical consequences. Virgin B cells along with T lymphocytes interact with foreign proteins to produce antibodies. We hypothesized that in case of DHF, these virgin B cells do not recognize re-infecting dengue strain as foreign protein and hence the usual process of secretion of γ-IFN [a cytokine with anti-viral action (Meager, 1996)] is not attained, membrane proliferation does not occur and ultimately sufficient titre of antibodies are not produced. Present investigation reports that very little quantity of IFN-γ was observed in stage I and that enhanced levels of serum IFN-γ were observed in stage II and III (recovery phase). Our observations suggest that low level of IFN- γ, which could be an immunological reason of DHF, can serve as bio-chemical indicator of prospective DHF. Secondly, in addition to recommended practice of transfusion of platelets (Chairufatah *et al.*, 2003), transfusion of fresh blood (containing live WBC) could be an effective clinical management of severe DHF cases.

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REFERENCES

Chairulfatah A, Setia budi D, Agoes R and Colebunders R (2003). Thrombocytopenia and platelet transfusion in DHF and DSS. *Dengue Bulletin* **27** 138-143.

Guzman MG, Gouri GP, Bravo J, Soler M, Vazquez S and Morier L (1990). Dengue Haemorrhagic fever in Cuba: a retrospective seroepidemiological study. *American Journal of Tropical Medicine and Hygiene* **42** 179- 184.

Halstead SB, Nimmannitya S, Yamarat C and Russel PK (1967). Haemorrhagic fever in Thailand: newer knowledge regarding etiology. *Japanese Journal of Medical Science and Biology* **20** (supp 1) 96-103.

Kuberski TT and Rosen LA (1977). A simple technique for the detection of dengue antigen in mosquitoes by immuno-fluorescence. *American Journal of Tropical Medicine and Hygiene* **26**(3) 533-537.

Lanciotti RS, Calisher CH, Gubler DJ, Chang GJ and Vorndam AV (1992). Rapid detection and typing of dengue viruses from clinical samples by using reverse transcriptase-polymerase chain reaction. *Journal of Clinical Microbiology* **30**(3) 545-551.

Meager A (1996). Interferons. In: *Encyclopaedia of Molecular Biology and Molecular Medicine, Vol 3* edited by Meyers RA (VCH, New York) 317-331.