

## Neurological Manifestations in Dengue Hemorrhagic Fever

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Dengue hemorrhagic fever (DHF) is an acute febrile illness caused by four serotypes of Dengue virus and characterized clinically by hemorrhagic diathesis and a tendency to develop a shock syndrome (DSS). In the earlier epidemics(1-3), hemorrhagic manifestations and shock were the main features. In the past two years, we have found that neurological manifestations were prominent in addition to shock and hemorrhage.

We are reporting 25 children who presented at our hospital between September, 1990 to January, 1991 and September, 1991 to February, 1992 with neurological manifestations of DHF/DSS.

### Material and Methods

The children were defined as DHF in the presence of fever, hemorrhagic manifestations, thrombocytopenia (less than  $100,000/\text{mm}^3$ ) rise in packed cell volume by 20% or more of recovery value, or evidence of increased capillary permeability (pleural effusion or ascites). DSS was considered in the presence of above features

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and hypotension and poor peripheral perfusion(7).

Neurological manifestations included seizures, spasticity and altered sensorium of more than eight hours (after correction of shock) or presence of transient paresis(7).

The serological tests consisted of acute and convalescent phase sera for antibody titre against the four serotypes of Dengue virus using hemagglutination inhibition antibody test(4), complement (C3) levels quantitated by SIRD technique(5) and circulating immune complexes by precipitation with polyethylene glycol(6).

### Results

DSS was seen in ten children, seven children had generalized convulsions and four had unilateral weakness of limbs (hemiparesis) (*Table I*). Thrombocytopenia was present in all children, elevated levels of SGOT and SGPT in eighteen patients and elevated levels of urea and creatinine in ten. Twenty children had right sided pleural effusion (*Table I*). Serological tests revealed Dengue type II infection in seventeen and Dengue type III in four children. C3 levels and circulating immune complexes were significantly lowered ( $p < 0.001$ ) during the acute phase (*Table II*). All the children except one recovered completely. One child died of pulmonary edema.

### Discussion

In the primary infection with Dengue virus, the virus either directly affects the capillaries or activates complement C3 with release of C3 active factors causing leakage of fluid into the extravascular compartment. In the secondary infection immune complexes form, which activate the classical complement pathway, releasing

factors such as C3a and C5a which increase vascular permeability(7,8,10). Complement C3 and circulating immune complexes were depressed during the acute phase in our study with significant rise during the convalescent phase.

Recognition of the disease is very important for management. With prompt treatment of hypovolemic shock, and cerebral edema, children recover complete-

ly(1,7). Out of 25 children, one child died of pulmonary edema. This stresses the need for constant monitoring, as after the correction of the hypovolemic shock, there is danger of pulmonary edema which may be due to increased leakage of fluid from the capillaries into the alveoli.

The initial management is that of shock and convulsions. Volume expanders such as crystalloids or fresh blood transfusion in view of bleeds and thrombocytopenia are administered. After stabilizing the patient, when the vital signs such as pulse, blood pressure and perfusion were normal, anti-cerebral edema measures were initiated, e.g., frusemide or mannitol with careful monitoring of vital signs to avoid overload.

In the epidemics of the previous years, Dengue type 111(3) was the predominant serotype and features of DHF/DSS were prominent. In the present epidemic, Dengue type II was found in majority of our cases and neurological manifestations were prominent in addition to DHF/DSS. Viral studies on larger groups of children may indicate if change in the causative virus might be responsible for change in the clinical manifestations.

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**TABLE I—Summary of Clinical and Laboratory Features (n=25)**

Characteristics	No.	%
Fever	24	96
Vomiting	9	36
Abdominal pain	8	32
Altered sensorium	25	100
Convulsions	7	28
Hemiparesis	4	16
Hepatomegaly	19	76
Gastrointestinal bleeds	19	76
Skin bleeds	6	24
Shock	10	40
Thrombocytopenia	25	100
Right pleural effusion	20	80
Elevated SGOT SGPT	18	72
Elevated BUN, creatinine	10	40

**TABLE II—Complement C3 Levels and Circulating Immune Complexes (n=15)**

	Acute (Mean)	Convalescent (Mean)
Complement C3	63.2 IU/ml (21->166 IU/ml)	138.5 IU/ml R (80 ->243 IU/ml)
Circulating Immune complexes	O.D. 817 R (0.357 ->1.20)	O.D. 1.34 R (0.538 ->2.748)

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## Metachromatic Leukodystrophy Presenting with Extrapyramidal Disturbances

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Metachromatic leukodystrophy (MLD) is a dysmyelinating disorder resulting from

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defective myelin synthesis. The basic abnormality localized in chromosome 22(1), is the absence of enzyme aryl sulphatase A, a deficiency which prevents the conversion of sulfatide to cerebroside. As a result sulfated lipids increase and the membranes of the myelin sheath break down in both central and peripheral nervous system.

It is the commonest of all dysmyelinating disorders, with at least 200 case reports(2). In our country the first case of leukodystrophy was reported by Taori *et al.*(3) from Vellore in 1971. Subsequently, there have been sporadic case reports of MLD(4,5). We are reporting a case of MLD with prominent extrapyramidal dysfunction. We believe that ours is the first report of extrapyramidal disturbances occurring with leukodystrophy, in India.

### Case Report

A 6-year-old male child, eldest of 2 sib-