

# Transcranial Doppler (TCD) with Dynamic Vascular Analysis (DVA) Use in Management of Acute Cerebral Malaria

**Scientific Meeting:** American Academy of Neurology

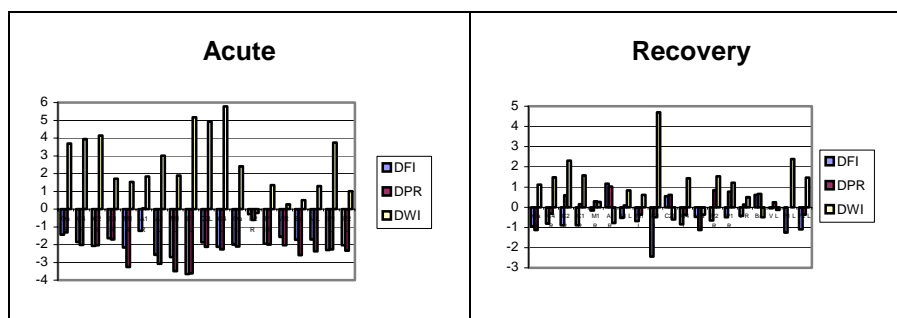
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**Background:** Cerebral malaria common in severe cases of Plasmodium falciparum parasitemia carries a high mortality rate. Conventional management strategies in many cases require use of transfusions to optimize blood flow. Parameters guiding the use of this and other therapies are incompletely established. This report evaluates the use of emerging concepts in transcranial Doppler analysis of cerebral flow and perfusion in the critical care setting of 3 patients with cerebral malaria.

**Methods:** Three patients serving in the armed forces in Eastern Africa developed signs and symptoms of malaria and was transported following initial evaluation to the National Naval Medical Center Bethesda, Md. Two patients develop classic signs and symptoms of cerebral malaria and a third developed mental status changes confounded by pulmonary edema. During the course of management, TCD primary parameters of Mean Flow Velocity (MFV), pulsatility index (PI), and acceleration (SA) were obtained and DVA(6) indices of flow, perfusion and work were calculated. Parameters and indices were followed serially during hospitalization. Correlation of TCD patterns with clinical course in patients were performed, and calculated indices are represented as aggregate mean of standard deviation compared to normative data collected at Wake Forest University in young male athletes of comparable age.

**Results:** All three patients in the acute phase of cerebral malaria demonstrated global decrease of flow and perfusion, as measured by dynamic flow index ( $DFI = MFV/PI$ ) and dynamic pressure ratio ( $DPR = \ln SA / PI$ ) respectively, and a global increase in work required to perfuse brain tissue as measured by dynamic work index ( $DWI = \ln SA / MFV$ ). Indices normalize in the recovery phase.



Pts were treated successfully with pressure management and fluid management without the need for transfusion.

**Conclusion:** The indices revealing low flow, increased impedance of the capacitance vessels with increased work index, and the pattern of segmental involvement strongly suggested that the deficits of acute cerebral malaria in these patients resulted from microvascular occlusive disease and not increased intracranial pressure, and may prove valuable in future strategies of treatment.