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EXPERIENCE OF SUBLINGUAL MICROCIRCULATION EVALUATION IN ADULT WITH SEVERE DENGUE

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1 Introduction

Dengue presents with a broad spectrum of clinical manifestations, ranging from asymptomatic, mild fever, to dengue hemorrhagic fever with or without shock, a life-threatening illness characterized by plasma leakage due to increased vascular permeability. No antiviral modalities are available to treat dengue. Supportive care with close monitoring is the standard management. Severe microcirculatory changes are involved in the mechanisms that lead to dengue shock. We report our experience of the evaluation of sublingual microcirculation in adult patients with severe dengue.

2 Methods

Adult patients with severe dengue were included (WHO classification). Diagnoses was made by serology for IgM/IgG, antigen NS1 or PCR (SD BIOLINE Dengue Duo). Images of sublingual microcirculation were obtained using a Sidestream Dark Field (SDF) (Microscan, Microvision medical, Amsterdam, The Netherlands) with a 5x objective. Microvascular flow index (MFI), proportion of small-perfused vessels (%SVP), heterogeneity index, Hematocrit /Hemoglobin index and Total Vascular Density were calculated. Clinical and laboratory abnormalities were recorded. Pearson and Spearman's correlations were calculated between MFI, %SVP, HI and Total Vascular Density with the Hematocrit /hemoglobin index.

3 Results

Ten patients were studied. Pearson and Spearman Correlation parameters are described in table 1. All patients received Fluids Challenge (FC) with SS 0.9% at admission. After the initial FC, the median %SVP was 94 [IR: 97 – 77], and for the MFI was 2.82 [IR: 2, 85 – 2, 14]. %SVP and MFI among the patients who survived were within normal range values. In the deceased patient, the %SVP was 59%, and the MFI was 1,4; these values were below normal ranges. A significant negative correlation between increased hematocrit and %SVP and MFI was found.

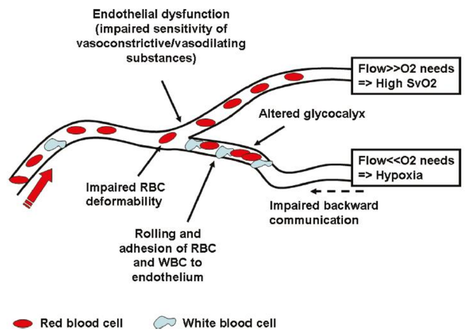

Figure 1. Mechanisms of microcirculatory alterations. Adapted from De Baker et al (4)

Table 1. Pearson and Spearman´s Correlation parameters

		Correlation	p value
Hemoglobin †	%SVP	-0,68	0,028
	MFI	-0,65	0,039
	Functional vessel density	-0,37	0,285
	Total vessel density	0,24	0,493
Hematocrit †	%SVP	-0,73	0,016
	MFI	-0,63	0,048
	Functional vessel density	-0,39	0,260
	Total vessel density	0,19	0,588

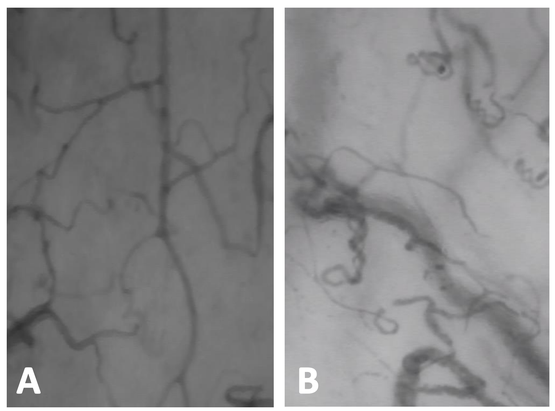

Figure 2. Image taken with SDF. A. Normal microcirculation
B. Abnormal microcirculation with complete absence of vessels flow and microvascular heterogeneity.

4 Conclusions

The initial fluid challenge that identifies and treats volume depletion could correct microcirculation abnormalities evaluated by SDF imaging. However, in the patient who did not respond to this FC, alterations of the MFI and the %SVP were observed.

Persistence of microcirculation abnormalities after fluid challenge, especially a low %SVP and MFI, could be related to mortality. Negative correlations of high Hematocrit with %SVP and MFI were found, suggesting more severe endothelial dysfunction.

Microcirculatory monitoring could help as a prognostic marker or therapeutic target to optimize tissue perfusion and monitoring the progression to multiple organ dysfunctions.

5 References

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