

Non-invasive monitoring of microcirculation in paediatric patients suffering from septic shock

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INTRODUCTION

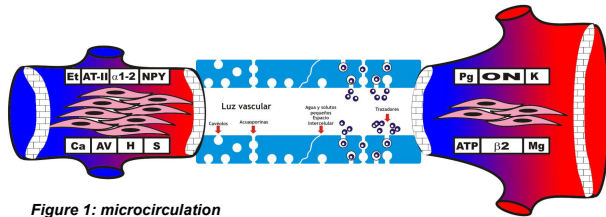


Figure 1: microcirculation

Oxygen related variables and diastolic blood pressure (DBP) allow to estimate the systemic vascular resistance (SVR). Low central venous oxygen saturation (ScvO₂), and an increase in the arterialvenous difference saturation (AV dif sat O₂) as well as in the systemic oxygen extraction index (SO₂ ext index) indicate an increase SVR. An increase in ScvO₂ and a decrease in AV dif sat O₂ and DBP, indicate in decrease SVR.

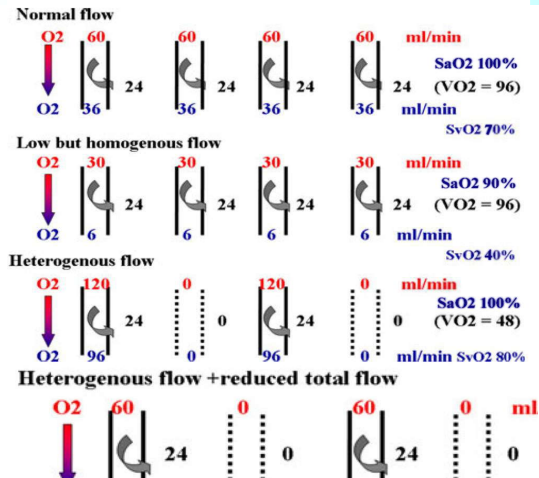


Figure 2: modified of De Backer et al. Int Care Med 2010; 36: 1813-25.

OBJECTIVES

To identify hemodynamic trends and assess pharmacological strategies in pediatric patients with septic shock.

METHODS

Retrospective - descriptive and observational study. Between January 2008 and December 2009, 35 patients (p) were enrolled (p) in the present study with diagnosis of septic shock (23 males), with an average age of 14 months (range: 1 month to a 15 years).

Variable	COOL SHOCK	WARM SHOCK
MAJOR CRITERIA		
ScvO ₂	Low	normal or increased
DavO ₂	Increase	normal or low
IEO ₂	Increase	Decreased
PetCO ₂	Decreased	normal or increased
AV difference CO ₂	Increased	variable
DAP	Increased	Low
Pulse pressure	Convergent	Wide (differential)
RETAIL CRITERIA		
SAP and MAP	normal o low	normal or increased
Diuresis	Dedreasec	Decreased
Capillary refill	Prolonged	Normal or variable
Differential T°	> 3°C	< 3°C or variable
Lactates	Increased	normal or increased

Hemodinamic profile.

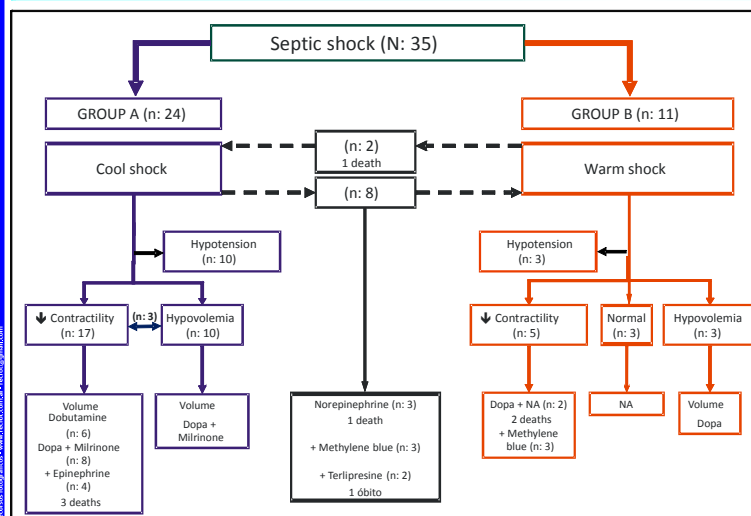
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RESULTS



Group A (non-hyperdynamic shock): 24 p, 17 had myocardial dysfunction and 3 had hypovolemic state. 10 p showed isolated hypovolemia. Systolic blood pressure (SBP) < P5 and DBP > P50. ScvO₂: 53,4%; AV dif sat O₂: 40,9%; SO₂ ext index 0,43, AV dif CO₂: 10,7 mm Hg and increase lactate. Fluid administration (10-60 mL/kg) and vasodilators (dobutamine: 6 p, dopamine + milrinone: 8 p and epinephrine: 4 p) were started. 8 p shifted to group B, 3 p improved with norepinephrine, 3 p with methylene-blue and 2 p with terlipresine.

Group B (hyperdynamic shock): 11 p, 5 p had myocardial dysfunction and 3 p with hypovolemic state. Normal SBP and DBP < P5; ScvO₂: 75,3 %; AV dif sat O₂: 19,9%; SO₂ ext index: 0,21; AV dif CO₂: 9,1 mm Hg and increase lactate. All p received vasopressors (dopamine + norepinephrine). 2 p showed refractory vasoplegic septic improving with methylene-blue. Overall mortality was 8 p (28%).

Variable	Group A	Group B	p value
ScvO ₂	53,4 ± 5,25	75,3 ± 1,25	0,00001
AV dif sat O ₂	40,9 ± 3,02	19,9 ± 1,53	0,00001

CONCLUSIONS

- 1) ScvO₂ and oxygen derives variables allow to assess the microcirculation.
- 2) Detection of hemodynamic trends lead to a rational drug support and fluid administration.
- 3) Methylene-blue administration emerges as an attractive alternative in p with refractory vasoplegic shock.