Foot Pulse Oximeter Perfusion Index Correlates with Calf Muscle Perfusion Measured by Near-Infrared Spectroscopy in Healthy Neonates.

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Objective

In critically ill neonates, peripheral perfusion and oxygenation assessment may provide indirect information on the circulatory failure of vital organs during circulatory shock. The development of pulse oximetry has recently made it possible to calculate the perfusion index (PI), obtained from the ratio between the pulsatile and nonpulsatile signals of absorbed light. The main goals of this study were: (1) to study foot PI; and (2) to evaluate the relationship between foot PI, obtained continuously by pulse oximetry, and a number of variables, i.e. blood flow (BF), oxygen delivery (DO(2)), oxygen consumption (VO(2)), and fractional oxygen extraction (FOE), measured indirectly by near-infrared spectroscopy (NIRS) on the calf in 43 healthy term neonates (weight 3474.6 +/- 466.9 g; gestational age 39.1 +/- 1.4 weeks).

Study design

Calf BF, DO(2) and VO(2) were assessed by NIRS on short-lived venous and arterial occlusion maneuvers. PI was measured on the contralateral foot.

Results

Foot PI was 1.26 +/- 0.39. There was a positive correlation between foot PI and both calf BF ($r = 0.32$, $p = 0.03$) and DO(2) ($r = 0.32$, $p = 0.03$), but no correlation was found between foot PI and calf FOE and between foot PI and VO(2).

Conclusions

In the neonatal intensive care unit, continuously measuring foot PI by pulse oximetry seems clinically more feasible for peripheral perfusion monitoring than spot measurements of the calf BF and/or VO(2) by indirect NIRS.