

Voorstel MDO-opdracht Opleiding Technische Geneeskunde Universiteit Twente

A. Algemeen

1. Titel MDO-opdracht: **Assessment of microcirculation in critically ill newborn infants**

2. Gegevens instelling/indiener:

Naam indiener: W.P. de Boode

Instelling/afdeling: UMC St Radboud Nijmegen, Afdeling Neonatologie

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Medisch begeleider: dr. W.P. de Boode, kinderarts-neonatoloog

Technologisch begeleider (UT):

B. Faciliteiten

1. Welke faciliteiten zijn nodig voor een adequate uitvoering van de vraagstelling?

Alle benodigde faciliteiten zijn aanwezig op de afdeling Neonatologie van het UMC St Radboud, alwaar de werkzaamheden kunnen worden verricht.

2. Wat zijn daarbij mogelijke risico's voor de voortgang van de opdracht?

Geen risico's zover in te schatten op dit moment.

C. Overige opmerkingen

D. Inhoudelijke informatie MDO-opdracht

Introduction

Circulatory failure is a major cause of mortality and morbidity in critically ill newborn infants. The assessment of the hemodynamic status remains rather complex in these patients. Research on the Department of Neonatology of the Radboud University Nijmegen Medical Centre is focused on the development, validation, implementation and evaluation of methods of objective measurement of various neonatal hemodynamic variables.

Measurement of macrocirculatory variables, such as systemic blood flow and mixed venous oxygen saturation, are evolving. However, these parameters reflect global systemic oxygen delivery and do not automatically provide information about the microcirculation.

Adequate microcirculation is essential for gas exchange and metabolic, immunologic, and coagulatory homeostasis. The microcirculation can be analyzed with various technologies (1). With orthogonal polarized spectral imaging and sidestream dark field imaging (MicroScan®, Microvision Medical, Wallingford, Pennsylvania, USA) one can assess microvascular variables, like vessel density and vessel size in the skin on the inner side of the upper arm (2-6) or in the buccal mucosa (7). Other methods that are used to assess microcirculatory parameters are near-

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infrared spectroscopy (NIRS) (8), microvascular laser Doppler (Periflux 5001 Laser Doppler®, Perimed AB, Järfälla, Sweden) (9-11) and near-infrared plethysmography (NIRP) (12).

Study

Determination of an optimal method of non-invasive assessment of various microcirculatory variables in critically ill newborn infants.

Setting

Neonatal intensive care unit of a level III university children's hospital.

Objectives

1. What technique would be most suitable and applicable for the assessment of microcirculatory variables in critically ill newborns?
2. What sites can be used, besides the skin, to assess the microcirculation (for example cheek, tongue, ear lobe et cetera)?
3. Is it possible to measure non-invasively the microcirculation in brain, intestine, lung, and kidney?
4. What is the best indicator of the microcirculation (functional vessel density, vessel diameters, peripheral microvascular blood flow, other)?

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Ondertekening:

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