

Summary

Background and Objective

Paralysis due to spinal cord ischaemia is one of the most feared complications following aortic surgery. Therefore, an adequate haemodynamic management and optimizing blood pressure with the use of vasoactive medication is extremely important to preserve oxygen supply to the spinal cord. Near-infrared spectroscopy (NIRS) has become increasingly popular as a non-invasive monitor to measure the oxygen saturation of the collateral network, an extensive clew of blood vessels taking part in the spinal cord blood supply. It is known that the regional cerebral saturation, measured with NIRS, is influenced by the type of vasoactive medication. In this thesis, we aim to determine if this is also true for the oxygen level of the collateral network, measured with NIRS.

Studies and Results

First, we examined the impact of an endogenous stress response induced by laryngoscopy on the regional, paravertebral measured oxygen saturation (rSpvO₂) of the collateral network (**Chapter 3**). Following laryngoscopy, rSpvO₂ was found to decrease significantly. Then, with the goal of maintaining normal blood pressure, we studied the effect on rSpvO₂ of a bolus administration of

Supervisors

Prof. dr. Anneliese Moerman

Department of Anaesthesia and Perioperative Care Medicine,
Ghent University Hospital, Belgium

Prof. dr. Stefan De Hert

Department of Anaesthesia and Perioperative Care Medicine,
Ghent University Hospital, Belgium

ephedrine or phenylephrine, two vasoactive drugs with different mechanisms of action (**Chapter 4**). Both medications were found to have opposite effects on the paravertebrally measured saturations. In **Chapter 5**, we investigated whether there was a difference in the effect on rSpvO₂ of a continuous administration of phenylephrine and dobutamine, during a steady-state condition. Despite a difference in hemodynamic effect, no clinically relevant effect of either medication was observed on rSpvO₂.

Conclusion

Although NIRS monitoring of the collateral network has already proven its usefulness in a clinical setting, it raises the question whether this technique is sensitive enough to measure the effect of vasoactive medication on rSpvO₂ in a situation where normal blood pressure is maintained.

Exploring the Potential of Near-Infrared Spectroscopy for Spinal Cord Perfusion Monitoring

Onderzoek naar het Potentieel van Nabij-Infrarood
Spectroscopie als Monitor voor de
Ruggenmergdoorbloeding

Caroline Vanpeteghem

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Examination Committee

Internal Jury Members

- Prof. Dr. P. Wouters
Faculty of Medicine and Health Sciences, Ghent University, Belgium
Department of Anaesthesia and Perioperative Care Medicine, Ghent University Hospital, Belgium
- Prof. Dr. F. Vermassen
Faculty of Medicine and Health Sciences, Ghent University, Belgium
Department of Thoracic and Vascular Surgery, Ghent University Hospital, Belgium
- Prof. Dr. K. Colpaert
Faculty of Medicine and Health Sciences, Ghent University, Belgium
Department of Intensive Care, Ghent University Hospital, Belgium

External Jury Members

- Prof. Dr. M. Momeni
Faculty of Medicine and Health Sciences, Université Catholique de Louvain, Belgium
Department of Anaesthesia, Saint Luc University Hospital Brussels, Belgium
- Prof. Dr. D. De Backer
Faculty of Medicine and Health Sciences, Université Libre de Bruxelles, Belgium
Department of Intensive Care, Erasme University Hospital Brussels, Belgium
- Dr. I. Tielliu
Faculty of Medicine and Health Sciences, Groningen University, The Netherlands
Department of Thoracic and Vascular Surgery, University Medical Center Groningen, The Netherlands

Publications

1. **Vanpeteghem CM**, Bruneel BY, Lecoutere IM, et al. Ephedrine and phenylephrine induce opposite changes in cerebral and paraspinal tissue oxygen saturation, measured with near-infrared spectroscopy: a randomized controlled trial. *J Clin Monit Comput* 2020; 34: 253-9.
2. **Vanpeteghem CM**, de Hert SG, Moerman AT. Laryngoscopy mediated stress response induces opposite effects on cerebral and paraspinal oxygen saturation. *Acta Anaesth Bel* 2022; 73:201-5.
3. **Vanpeteghem C**, De Hert S, Moerman A. Blood pressure control with phenylephrine or dobutamine: a randomized controlled trial comparing effects on cerebral and paravertebral tissue oxygen saturation measured with near-infrared spectroscopy. *J Clin Monit Comput*. 2023;37(5):1161-69.
4. Wolfskeil M, Bafort V, Besard M, Moerman A, De Hert S, **Vanpeteghem C**. Continuous non-invasive blood pressure measurement with "ClearSight" compared to standard intermittent blood pressure measurement in patients with peripheral arterial disease. Are potential differences influenced by phenylephrine or dobutamine? *J Cardiothorac Vasc Anesth* 2023; 37: 2470-4.

Short Curriculum Vitae

Caroline Vanpeteghem graduated from Ghent University in 1999. After obtaining her degree in anaesthesia and resuscitation, she joined the department of anaesthesia and perioperative care at the Ghent University Hospital. Her clinical activity consists of anaesthesia for thoracovascular and robotic surgery. In addition, she is also member of international organizations (ESAIC and EACTAIC), where she plays an active role and regularly gives lectures. Her research domain primarily encompasses the monitoring of regional tissue saturations in vascular surgery.



CONTACT

Department of Anaesthesia and
Perioperative Care Medicine, Ghent
University Hospital, Belgium

Department of Basic and Applied Medical
Sciences, Faculty of Medicine and Health
Sciences, Ghent University, Belgium

caroline.vanpeteghem@ugent.be

T +32 9 332 32 81

www.ugent.be