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A mixed methods systems approach to the implementation of new neuromuscular blockade monitoring technology to anesthetic practice during laparoscopic colorectal surgery

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Statement of the problem: Current neuromuscular junction monitoring is notoriously subjective and inaccurate so anaesthetists in Ninewells Hospital, Dundee are trialling TOFcuff technology, a quantitative NMJ monitor, to improve the accuracy of monitoring with the intention to maintain a deep neuromuscular block and facilitate lower intra-abdominal pressure laparoscopic colorectal surgery. Introducing new technology to a complex sociotechnical system brings its challenges and there will be a range of willingness to adopt this change from the users. This pilot study takes a human factors approach, capitalizing on the Systems Engineering Initiative for Patient Safety model and Thematic Hierarchical Network Model of Consequences, looking at the process of introducing TOFcuff to laparoscopic colorectal surgery by identifying the relevant system factors that act as barriers or facilitators to this introduction.

Methodology: A mixed methods design was used, including observations of practice (as well as routine patient outcome data), semi-structured interviews with 2 anaesthetists and questionnaires with 2 surgeons before and after TOFcuff implementation. A deductive thematic analysis was performed.

Findings: TOFcuff provided an easy to use, accurate way of monitoring neuromuscular block. Pain scores were not often recorded and therefore assessing whether lower intra-abdominal pressures reduce post-operative pain are not feasible until a reliable recording method was in place. Anaesthetists reported that the benefits outweighed the drawbacks of TOFcuff, both of which will be discussed. Surgeons found having an accurate indicator of the patient's level of paralysis reassuring and were able to operate at lower laparoscopic pressures without it impairing their field of view.

Conclusions: Incorporating TOFcuff into routine practice would improve confidence in anaesthetists' decisions regarding the reversal of neuromuscular block, allow them to adhere to AAGBI guidelines and improve laparoscopic surgical performance. Following this pilot study, a bigger sample size will be targeted to assess wider TOFcuff.

Biography

Laura Meney is a medical student at University of Dundee undertaking her intercalated BSc degree in Clinical Research with a strong interest in anaesthetics, critical care and pre-hospital medicine. She has taken a year out of her studies to explore the world of human factors through the eyes of the surgical team of Ninewells Hospital, Dundee. She has spent the year combining two well established, complimentary models as described above to create the beginnings of a new, adapted model for a more thorough analysis of qualitative, human factors-related data.

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