Perioperative quality of care and patient safety

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Chapter 1

General introduction and outline of the thesis

“The ABC’s of quality improvement: Audit, Basics and then the Clever stuff”
Richard Lyon, TOPCAT study, London Trauma Conference 2013

How do we improve the care of our patients? How do we make sure that they are safe within the walls of the hospital? These are key questions for all involved in patient care. Since the early 1900s, where treatment possibilities were limited, we’ve come a long way, discovering new diseases, underlying pathophysiology, new drugs and treatment methods. Science and technology have had an incredible impact on medicine. The possibilities now, and the potential for the future seem almost limitless. We can support preterm babies of 24 weeks outside the womb until they are strong enough to do so on their own, we can keep patients alive on ventilators and extracorporeal membrane oxygenators, we can repair hearts with a tiny catheter through the groin vessels, restart hearts and even transplant hearts. But in this ever increasingly complex environment of medicine how do you make sure that what you do is the best for your patient? Which type, out of many drugs do you use? Which type of surgery should they get? And how do you make sure that not only your use of drugs and technology is optimal to support your patients, but also that your whole team is able to provide the best care for that patient? As modern medicine allows for the treatment of very sick and complex patients, the margins of error become smaller and smaller. We know that we are prone to human error. So, how do we develop strategies to deal with the weaknesses and challenges that we face as humans in this environment? Medical personnel forget about 20-50% of critical management steps in high-pressure emergency situations.\textsuperscript{1-5} So how do we improve our performance under stress? And how should we implement these solutions? Top down interventions implemented to improve patient safety will only be effective if the organisational culture embraces patient safety.\textsuperscript{6} For example, checklists, although proven to save lives\textsuperscript{7-9} will not aid in improving patient safety if they are not used correctly. It is therefore pivotal to not only implement safety initiatives, but also to address the safety culture within a healthcare organisation.\textsuperscript{10-12} The research presented in this thesis explores these themes and questions.

Outline of this thesis

This thesis focuses on improving perioperative quality of care and patient safety. It is divided in two parts. Part I focuses on the general aspects of perioperative quality of care and
patient safety. Part II focuses on specific tools and interventions, such as cognitive aids and medication safety.

*Part I: General aspects of safety and quality improvement in perioperative care*

When thinking about safety in the operating theatre a range of important concepts must be considered. For instance, what is safety? How does human error affect perioperative patient safety? How can we identify deficits in our organisation of care? And, how can we improve upon these aspects? These concepts are explored in *chapter 2*. Many of these concepts will feature in more general or specific ways in the other chapters of this thesis. As we will learn from chapter 2, the safety culture within a healthcare organisation greatly affects patient safety. *Chapter 3* describes a way to assess and target the safety culture within a department in order to improve it. As mentioned before, one of the major challenges of modern medicine is complexity. A way of dealing with complexity is standardisation. Guidelines are a way to standardise care, summarising the best available evidence in how to treat patients with specific diseases or undergoing specific treatments. Following guidelines improves adherence to best practice and this improves patient outcome.7-9,13-15 This is why we should follow guidelines. However, knowing this, and after all the hard work that goes into developing guidelines, do we actually use them? Do we know their content? Are they implemented well enough? This is why *Chapter 4* assesses the European implementation of an important perioperative guideline on how to manage patients with cardiovascular comorbidity undergoing non-cardiac surgery. In spite of the fact that it is pivotal to follow guidelines, are they always specific enough to do so? For instance, although all paediatric difficult airway guidelines recommend a surgical airway in the can’t intubate, can’t oxygenate scenario, none them actually recommends a specific technique. *Chapter 5* is therefore a systematic review on the best technique to perform a paediatric surgical airway.

Patient care can furthermore be improved by identifying the strengths and weaknesses in the process of care in a healthcare system. This can be done through an audit of practice, which is described in *chapter 6*, where the safety of modern sedation practice in the Netherlands is audited. The deficiencies of care identified by an audit can subsequently be targeted in order to improve patient outcome. *Chapter 7* shows the impact of such a targeted improvement programme on patient outcomes in haemodynamically unstable patients with a pelvic fracture.

*Part II: Tools and interventions to enhance safety and quality of perioperative care:*

Certain tools can aid in enhancing safety. An example of a tool that targets human error is a cognitive aid. A cognitive aid reminds healthcare practitioners to best practice, as we know that staff consistently forgets a significant amount of essential management steps in the treatment of critically ill patients.15 *Chapter 8* describes the development, implementation
and use of cognitive aids in the operating theatre in order to improve performance under stress. An example of how a cognitive aid is effectively used during an emergency is provided in chapter 9. Cognitive aids have currently found their way into the intraoperative domain of perioperative medicine. However, failure to rescue of deteriorating patients in the surgical ward still contributes significantly to surgical morbidity and mortality. We therefore designed and tested cognitive aids for the management of deteriorating patients in the surgical ward. Chapter 10 shows that these cognitive aids significantly reduce human failure and increase adherence to best practice in the management of deteriorating surgical patients. Medication safety is another important facet of perioperative medicine. Every day frailer patients are undergoing more complex interventions. It is therefore essential to identify the right type of drug for the right patient undergoing a certain procedure. Endoscopic retrograde cholangiopancreatography (ERCP) is one of the most complex endoscopic procedures, often performed in frail patients. As a deep level of sedation is required to perform the procedure in a comfortable way for the patient, this comfort needs to be balanced against the occurrence of sedation-related adverse events. Chapter 11 explores whether the effectiveness and safety of moderate-to-deep sedation for ERCP can be improved by using esketamine (NMDA-receptor antagonist) instead of alfentanil (short-acting opioid) as an adjunct to propofol. Furthermore, perioperative medication errors should be reduced in order to improve patient safety. Medication errors have been reported to occur 1 in every 20 drug administrations in anaesthetic practice. Most of these errors are caused by poor drug labelling. Chapter 12 therefore describes the rationale, creation and implementation of a standardised user-applied drug label for high-risk anaesthetic drugs. The thesis will conclude with a summary and general discussion in Chapters 13 and 14.
References


