

Safe Perioperative Practice, How Can We Further Improve Clinical Every Day Work?

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Abstract

Anaesthesia has become reassuringly safe. All modern anaesthetic agents are effective and associated to only minor side effects, anaesthetic machines and monitors helps delivery and closely in real time observation of vital signs. Anaesthesia practice has expanded and includes today perioperative care, preoperative assessment and optimisation, anaesthesia and postoperative care. Following the postoperative course up to day 30 after surgery is today of increasing interest and importance to document value based perioperative. Interprofessional care where the perioperative nurse has a major commitment will help to further improve the perioperative process.

Keywords: Anaesthesia; Perioperative care; Postoperative recovery; Interprofessional care

Introduction

Anaesthesia has become increasingly safe, adverse effects associated to anaesthetic drugs or directly related to anaesthesia practice are reassuringly low.

Risk assessment and improved scoring system to identify patient as risk is of huge importance [1]. Assessing risk factors is importance especially in the elderly and fragile patients [2]. Thirty day and one year mortality following acute femur neck fracture is high but primarily related to patients' age background medical history [3,4]. The American Society for Anesthesiologists (ASA) class, age and functional dependency are factors of huge importance for a positive outcome [5]. Proper, adequate, preoperative assessment should be made of patients' general health, and function. For patients with compromising disease a more in depth assessment and optimisation may reduce the perioperative risks. Preoperative assessment clinics was suggested already in 1992 by Conway et al. [6] and Reed et al. described the positive experiences with a nurse-led preoperative assessment unit already in 1997 [7]. Collaboration and update of critical information is of importance throughout the perioperative period.

Available anaesthetics inhaled halogenated as well as intravenous are efficacious and safe. The clinical experience of sevoflurane anaesthesia is today enormous and direct toxicity/side effects are most rarely reported [8]. Desflurane with minimal metabolism and low solubility in blood as well as in other body compartments promoting rapid equilibration, rapid wash-in and wash-out is also associated to an extraordinary safety record [9].

Sevoflurane, desflurane, and suxamethonium are known potential triggers of malignant hyperthermia, but cases related to the clinical use are most scares. Dantrium should be readily available wherever anaesthesia is conducted in order to treat patients exhibiting signs and symptoms of malignant hyperthermia [10]. There was also a concern following the introduction of sevoflurane that its reaction in soda creating compound A would cause deleterious effects, toxicity to liver and kidneys. The toxic production is related to the composition of the carbon dioxide absorber and can be reduced by avoiding soda lime and Baralyme[®]. There today a most extensive clinical experience suggesting any explicit organ toxicity being reassuringly low [11].

Anaphylactic reaction may occur. Muscle relaxants [12] rocuronium and also sugammadex for reversal is known to potentially cause and IgE mediated allergic reaction and there is a recent review around mechanism and handling of these reactions [13]. There has also been a discussion whether the commonly use propofol in lipid emulsion could have a cross sensitivity to certain foods. A recent paper however could find no clear relation and downgraded the possible risk, to more or less negligible [14]. Other agents such as contrast media administered intra-operatively for imaging or dextran [15] used as volume replacement are also known to potentially cause allergic reactions. There are most rare case report of reactions also to other agents used perioperatively. There is a recent report e.g. around atropine reaction [16]. Vigilance clinical monitoring and strategy for adequate treatment is essential. Evidence based prevent measures are still lacking. There is a recent review providing up to date evidence around diagnosis management and possibly preventive measures [17].

Increased Monitoring Just for Fun or Clinical Benefits?

Anaesthesia equipment, anaesthesia machines, monitoring equipment as well as disposable have also become more efficient and sophisticated. The vital signs monitoring with continuous online oxygen saturation, ECG, inspired oxygen and end-tidal carbon dioxide, anaesthetic agent concentrations, and non-invasive automatic blood pressure measure are today standard of care. These basic physiological measures provide us in real time with information enabling adjustments in order to minimize the occurrence of deviations from set goals. We have also since several years in the perioperative management of patients had the opportunity to control and monitor

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the brain during anaesthesia using both EEG-based technology e.g. BIS (bi-spectral index), Entropy or Auditory Evoked potentials. During the last couple of years near infra-red cerebral spectroscopy has also been introduced to clinical practice [18]. The EEG-based depth of anaesthesia monitoring has been shown to improve anaesthesia performance reducing the need for volatile anaesthetics, fastened early possibly early recovery, e.g. reduced PONV [19,20]. There are studies suggesting that these additional monitoring instrument/devices can also give the anaesthesiologists information whether a patient at risk for either short or long-term risk of postoperative cognitive impairment [21-23]. Targeted anaesthesia possibly by close-loop automatic control [24] seems also to have potential advantages thus possibly improving both short and long-term outcomes [25]. Goal directed anaesthesia and fluid regime [26,27] seems to have obvious benefits.

Not Only Anaesthesia but Potential Protection?

Direct toxicity or adverse effects associated to anaesthetics are rare. There is an increasing interest whether the anaesthetics possess protecting effects potentially could have beneficial effects on e.g. ischemia reperfusion episodes and postoperative cognitive impairment. Surgical stress and anaesthesia do affect cognition. Cognitive performance is generally rapidly restored and e.g. driving is generally considered safe about 24 hours after surgery. The potential risk for various neurocognitive deviations during the recovery is associated to age and presence of cardiovascular and cerebral disease [28]. The search for brain protective pharmaceuticals is on-going also studies to analyse anaesthetic techniques continuous. Both halogenated inhaled anaesthetics and propofol possess [29] in experimental settings potential cerebral ischemia/reperfusion protecting properties, the explicit effects in clinical practice is however still not there. Present evidence around brain and cardio protection of clinical dignity from the use of sole agents is not conclusive [30,31]. There are studies suggesting protective effects, reduced risk for neurocognitive impairment during recovery from EEG-targeted anaesthesia [32]. Further studies addressing whether targeted anaesthesia with the use of a depth-of-anaesthesia monitoring system as the BIS is underway [33]. The potential effects from surgery, anaesthesia and perioperative stress on the risk for dementia requires also further studies. Current knowledge is insufficient to state whether there is any increased risk or possibly a protective effect [34]. There are two recent reviews around protection commenting that much of preclinical work is yet not confirmed in the clinical setting, it seems however reassuring to continue beta-blocking as well as statin therapy, possibly also to use halogenated inhaled anaesthetics although their animal effects has still not been conformed [35,36]. For non-cardiac surgery the choice of main anaesthetic halogenated inhaled agent or propofol seems not to have major impact [37].

Quality and Speed of Recovery

Day, ambulatory surgery, and enhanced recovery pathways is becoming increasingly popular. Minimising the perioperative stress, avoiding prolonged fasting and supporting and empowering early postoperative directives are basic components. Adequate pain management and minimising the occurrence of PONV is also essential [38]. Multi-modal analgesia [39] and PONV prophylaxis has become standard of care [40]. Follow-up and assessing up to 30-day patient outcomes is increasingly requested. Tele-medicine and modern communication tools smart phone apps do provide new opportunity to follow-up after discharge. The perioperative nurse has an obvious place in preparation, as well as for follow-up [41].

Follow Up

There is an increasing interest in making health care more efficacious and patient centred. Shortening hospital care has been widely accepted and is one way of reducing hospital cost.

Also increasing numbers of surgical procedures are performed on a fast track basis.

Value-Based Health Care Delivery is suggested as a tool to further improve patient focus, provide health care aiming for patients' satisfaction with care and outcome. This calls for better and more patient focused tools to assess postoperative recovery. These tools should provide objectively the recovery process and be used both in order to assess the individual patient outcome but also centred performance quality of care. A recent mini review identified ten multidimensional postoperative assessment tools. Must being multi-dimensional with domains with focus on; pain, physiological function, activities of daily living (ADL), emotions, nausea/vomiting and nutrition/elimination. Objective and patient-subjective reported outcomes were commonly addressed by visual analogue scale (VAS) or pre-graded scales [42]. The Postoperative Quality of Recovery scale (PostopQRS) was the instrument covering most of domains including cognition [43]. Residual impairment in cognition, failure of complete cognitive recovery, is not uncommonly seen during the three first days after surgery, and may of course interfere with activities of daily living [44]. The PostopQRS is validated and used in seven countries and in five languages. An assessment modification of cognitive domain of the original PostopQRS tool including a tolerance factor to account for performance variability has been incorporated; "returned to baseline values or better" was modified not exactly to be back at baseline values but just nearby [45]. Lindqvist et al. compared anaesthesia based on desflurane or propofol in a randomized study during ambulatory breast surgery using the Cognitive Failure Questionnaire (CFQ) and a modified version of the PostopQRS. They found that the cognitive recovery was still not complete 1 week after surgery in any of the groups. No difference was however found in the cognitive recovery comparing middle-aged patients receiving desflurane or propofol anaesthesia during ambulatory breast surgery [46]. The PostopQRS has also been tested for investigate the impact of the stress associated waiting for cancer surgery showing a "overall low performance" but no major variability [47]. Bowyer et al. found when analysing the quality of recovery tools that they has progressed from the assessment of merely early and immediate recovery to on-going assessment of broader postoperative ability up to 30 days after surgery/anaesthesia. They comment however that "no single recovery tool" is perfect. They concluded that the assessment tool must be multidimensional, address recovery over time and be complementary to current clinical databases [48]. It is of importance also to assess overall benefit, to consider aspects such as measurement of disability-free survival after surgery e.g. with the World Health Organization Disability Assessment Schedule 2.0 that has been found clinically acceptable, valid, reliable, and to be a responsive instrument for measuring postoperative disability [49].

Anaesthesia is safe and effective, but we should without aim for further refinements and improvements focusing on rapid and complete recovery and patients' satisfaction. The perioperative handling is a team work and we must further improve interprofessional collaboration and together compile and analyse data around our performance. The perioperative nurse is an important part. Working together in a lean perioperative process is most certainly the road to better and safer perioperative patient care.

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