



## Review Article

# Postoperative recovery: the importance of the team

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## Summary

An ageing population and rising healthcare costs are challenging cost-efficient hospital systems wanting to adapt, employing novel organisational structures designed to merge diverse skill sets. This needs not only physician and nursing leadership but also new models of care. Anaesthetists have expanded their role into the broader multidisciplinary field of peri-operative medicine, emphasising collaboration and safety in health teams. A greater focus on patient-centred care and shared decision making, along with validated metrics to quantify quality improvement activities, have emphasised the importance of comfort, patient satisfaction and quality of life after surgery. Shared decision-making is more likely to be manifest in a flat hierarchy in which each member of the team brings their own experience and skills to optimise patient care. Successful surgery is best achieved by a coordinated, multidisciplinary team, embedded in a culture of collaboration and safety.

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## Introduction

More than 320 million people undergo major surgery each year globally [1], and a growing proportion of these are elderly or have comorbidities that increase the need for comprehensive peri-operative care. There is no doubt that advances in anaesthesia, antisepsis, technology and training have dramatically improved outcomes for people with conditions amenable to surgery but modern surgery has become highly complex. Patients are older and frailer, and present to hospital with a range of medical conditions that may or may not be well managed. Healthcare costs continue to rise. These and other drivers of care are challenging cost-efficient hospital systems wanting to adapt, employing novel organisational structures designed to merge diverse skill sets. This needs not only physician and nursing leadership but also new models of care [2–4].

In 1954, Beecher and Todd highlighted the *"inseparability of anaesthesia from the total care of the surgical patient"* and *"the compelling reason why surgeon and anaesthetist, engaged as they are in a common task, cannot with profit pursue separate goals"* [5]. Anaesthetists have expanded their role into the broader multidisciplinary field of peri-operative medicine [6], along with geriatric medicine services for older surgical patients [7] and other interested groups [8, 9]. The enhanced recovery after surgery (ERAS) movement has emphasised a multimodal, multidisciplinary approach involving a team of surgeons, anaesthetists and an ERAS coordinator to minimise complications and shorten hospital stay [10]. Teamwork is key and has been shown to lead to better outcomes [11]. Modern surgery and peri-operative care has become embedded in a culture of collaboration and safety in health teams [11, 12].

Surgeons are growing increasingly aware of the importance of non-technical skills [13], and nurses have always practiced patient-centred care [14], but non-clinical aspects often get missed by all who care for patients in the peri-operative period [15]. A renewed focus on patient-centred care [16], along with validated metrics to quantify quality improvement activities, have emphasised the importance of patient satisfaction [17–19], comfort [20] and quality of life [21]. An often underappreciated component of ERAS is the provision of patient information. Once considered a passive recipient of information and decisions, the patient is now considered an active participant in the clinical decision-making process. This requires consideration of patient age and sex [22, 23], functional status [24], mental health [25, 26] and health literacy [27, 28]. Access to appropriate pre- and postoperative information, respect and dignity are key to patients' satisfaction with care [29].

Shared decision-making is an ideal [30], but not often achieved [31]. It is more likely to be manifest in a flat hierarchy in which each member of the team brings their own experience and skills to optimise patient care [32].

## Recovery after surgery

Postoperative recovery starts when surgery and delivery of anaesthesia stops, most often followed by transfer to a recovery suite or critical care environment. Full patient recovery takes much longer, perhaps best defined by the patient perceiving a complete return to their usual self or to their pre-operative health status (or better). It can be a complex and fragile process, with physical, emotional, social and habitual characteristics [33].

Recovery from surgery can be divided into five phases:

- 1** Pre-recovery, starting before surgery and includes the patient's emotional, physical and practical preparations for the surgery and postoperative recovery [34, 35].
- 2** Early recovery, starting when the patient leaves the operating room and begins to emerge from anaesthesia, recovering protective reflexes and motor activity.
- 3** Intermediate recovery, when the patient is still cared for at the hospital but is not monitored as closely as in phase II. Phase III is the period during which coordination and physiological function normalise and the patient may be considered in a state of 'home-readiness' and is able to return home.
- 4** Later recovery, when the patient is discharged from the hospital and care continues until they have regained their usual function and activity. This phase can be from hours to days and is the period after which the patient

has fully recovered and is capable of returning to work or usual home activities [33, 36].

- 5** Long-term recovery, most often taking 3–6 months for restoration of functional and cognitive abilities, although persistent postsurgical pain can occur in up to 10% of patients [14].

It is crucial to measuring and follow-up quality of postoperative recovery, symptoms and discomfort [20], well-being [37] and fatigue [38] to assess how changes in healthcare delivery impact the quality of care [39].

## The surgeon's perspective

Surgery at its core is a technical undertaking in which focus and attention to detail are paramount. The incisions, the planes of dissection and the placement of every suture all matter. Just as cure from some afflictions may be achieved with an appropriate operation, inadequate resection margins, leaking anastomoses, thrombosed grafts and wound complications are all regarded as technical failures, things that could have been avoided. Functional and aesthetic outcomes are usually attributed to the surgeon when he or she faces patients and families in the recovery room and in the clinic. A surgeon's performance is publicly appraised in audit meetings and league tables. When things go well, patients are often profuse in their praise, crediting the surgeon with the entire surgical episode, but when complications occur there is nowhere to hide. Of course, surgery is not really a solo enterprise. The surgical episode depends critically on patient selection, and on multidisciplinary pre-operative, peri-operative and postoperative care. But surgeons will almost always feel a special relationship with their patients, who face an ordeal to be endured, who have a need for rescue from something so serious as to warrant an operation, who perceive the surgeon having a sense of proximity to his or her body and privileged access to parts to which even the patients themselves do not have access, and who have to endure the physical and emotional aftermath. Little described this as an 'ethics of surgery', adding the special importance the patient places on the surgeon's continued presence on postoperative rounds, at clinic visits or by making telephone calls [40]. In addition to mastering the performance of operations, the surgeon's role in patient selection and non-technical skills required to be safe and effective have been thoroughly scrutinised. Much has been written about situational awareness, judgement, peri-operative and intra-operative decision-making, slowing down when you should and communication and teamwork in the operating room [41–43]. Even surgeons' role in advocacy and improving

health systems has been articulated as aspects of professionalism [44]. Such technical and non-technical skills are now defined, taught and assessed during surgical training, and are actively promoted by most professional bodies throughout surgeons' careers [45]. Although these developments are far reaching and have greatly extended surgeons' own views of what constitutes good practice, they do not necessarily encompass surgeons' roles within broader interdisciplinary teams. Of course, practice characteristics are critical determinants of whether this matters – a surgeon doing mostly office-based procedures may be able to practice brilliantly with a very small team. However, this is clearly not the case in hospital-based practice, with sicker patients, more complex procedures and greater dependence on expert nursing, allied health, non-surgical specialists, community-based teams and non-medical professionals. How does a surgeon work effectively with the other team members upon whom patients also depend?

It has been argued that a sense of equal status among healthcare team members is a pre-requisite for truly collaborative practice [46]. There are two problems with this notion from a surgeon's perspective. The first is procedural and relates to a general lack of exposure to interprofessional training. Although the intrinsic value of interdisciplinary collaboration is implicit within competency-based frameworks, an explicit discourse of interprofessional learning is still lacking in most surgical training programmes. The second problem is normative, and relates to the notion of equality. Collaboration and teamwork are typically highly valued in surgical training and practice, but the surgeon primarily retains leadership at the centre of any given healthcare team [47]. This could be understood to be a direct outcome of the professional culture that is reinforced on a daily basis by the experiences described earlier. Many argue that it is in patients' best interests to have a hierarchical structure in the operating room.

For both cultural and clinical reasons, therefore, it appears the dominant model in surgery is a hierarchical form of leadership and management role, rather than a team member and collaborator role that some argue is necessary for successful interprofessional practice. Of course this is not necessarily problematic, and best done with grace [48]. Largely gone are the days when all staff would jump to attention, dropping what they are doing to fall into line behind the surgeon as he or she appears, unannounced, for an impromptu ward-round, barking instructions as the convoy breezes past each patient. However, to be otherwise would take substantial further adjustment to formal training, including rapprochement between the competing discourses of professionalism in

surgery and interprofessionalism outside of surgery [49], as well as a different style of role modelling by the most respected consultants that probably only comes with generational change.

## The anaesthetist's perspective

As with most things in life, preparation is key. This applies to the patient (evaluation, optimisation, prehabilitation) and the surgical team. The importance of a thorough pre-operative evaluation became apparent in the mid-20th century [50], but anaesthetic involvement in the pre-admission evaluation of elective surgical patients did not become established until the 1970s [51]. A particular focus on coronary artery disease followed, aiming to quantify peri-operative risk and inform rational selection of additional investigations [52, 53]. In the 1990s, pre-admission clinics were being established [51, 54]. These clinics could be led by surgeons, anaesthetists or nurses [55–58], but, ideally, they function best as a multidisciplinary peri-operative system to also include physiotherapy, pharmacy and other allied health personnel. That is, a comprehensive peri-operative service [32, 55, 59, 60].

The benefits of a pre-admission review process are many: comprehensive evaluation and risk stratification; optimisation of medical conditions; referral for additional investigations and specialist review; patient education; day of surgery admission; reduced cancellations; discharge planning; and opportunities for end-of-life care. Experience has shown that this offers ideal opportunities for better team-based care. Hence, there are not only improvements in quality and safety of healthcare but also improved job satisfaction [55, 61].

Optimising medical conditions before surgery is most important in those with chronic medical conditions such as diabetes [14], heart failure [62] and frailty [37]. Prehabilitation refers to efforts to improve the nutritional status, fitness, well-being and medical conditions of patients awaiting surgery [63–66]. Although the full value of prehabilitation pathways is yet to be determined, there is growing evidence to support such efforts [67, 68].

The specialty of anaesthesia has evolved to incorporate peri-operative medicine [4, 69]. As surgical outcomes continue to improve, more extensive surgery is being offered to older patients, often with concurrent medical diseases and drug treatments [70]. Optimal peri-operative care requires a seamless transition of an informed, medically optimised patient before surgery, through the operation, to a recovery period with minimal discomfort and free of complications, to optimal health [70]. The traditional model of medical specialty 'silos' opens up gaps in

knowledge and care. A complication-free recovery requires trained, multidisciplinary, team-based care and this should be embedded in a clinical care pathway focused on enhancing patient recovery. The ERAS pathways also identify audit of outcomes and process in a multidisciplinary environment to ensure reduced risk of postoperative complications and shorter hospital stays [10, 71].

The introduction of surgical safety checklists into the operating suite has been rapid and effective [72]. Despite some problems with compliance [73, 74], successful widespread implementation has mostly been achieved [72, 75]. This not only improves patient safety and outcomes after surgery but it also clearly improves teamwork and communication in the operating room [76].

The value of an acute pain service, staffed by an anaesthetist and a specialised pain nurse (or nurse practitioner), and sometimes including a pharmacist, is well established [66, 67]. An acute pain service is often confronted with unstable postoperative patients in which pain is but one symptom. The acute pain service staff are often the first to identify the deteriorating patient [77]. Access to intensive care is often limited [78] and so hybrid models have been developed that include ward-based critical care and extended recovery areas [79, 80]. Ward nurses play an important role [81, 82]. This has entailed changes in work practices for many clinicians, who have moved outside their traditional scopes of practice to engage in novel solutions to limited resources.

## The nurse's perspective

As with surgery and anaesthesia, the basis for creating a safe and successful postoperative recovery begins with pre-operative assessment and planning. Once the details of the operation are known, the nurse assesses the patient's personal, social and clinical status, with an emphasis on their fears, stresses and vulnerability. Each individual patient's resources and needs must be taken into account as well as the specific circumstances of the surgery and anaesthesia [83].

Patient-centred care implies a recognition of the patient as a unique entity, being addressed by name and treated with dignity and respect. The nurse should connect with the patient and explain what is going to happen, providing support and reassurance as well as acting faithfully by keeping given promises [84]. Thus, feelings of trust can influence emotional balance and having faith in the support of healthcare staff reduces anxiety both before and after surgery [85]. These attributes, along with ensuring patient comfort result in better patient satisfaction [29, 86].

Operating room nurses have their own responsibilities in patient identification and participation in the surgical safety checklist, patient positioning, maintenance of body temperature and infection control [76, 83, 87, 88]. Nurses contribute to patient monitoring and require situational awareness, to be responsive, as well as maintaining ethical responsibility, concern and respect for patient dignity – central tenets for all team members [83, 87, 89]. These and other shared goals are essential for teamwork and shared mental models crucial for patient safety [90]. Teamwork is also an essential component of handover from the operating room to the recovery area or intensive care unit [90]. The handover should be structured and both written and verbal [91].

The major nursing activity in the recovery area is direct clinical care, including connecting patients to monitors, delivery of oxygen therapy, preparation and administration of drugs, blood products and fluids, monitoring of drains and urine output, provision of patient comfort and assessment of pain [92]. It is of great importance that the assessments are performed systematically and with validated scales. In a technical, procedure-orientated area, such as the recovery area, errors of judgement and faulty techniques are common. Of note is the recurring problem of failure of communication [93]. Improvements in written, verbal and electronic transmission of information are, therefore, of great importance. Using tools to assess readiness for discharge can limit adverse events [94]. Nurses working in the recovery area should have the requisite skills to care for a diverse postoperative patient types as well as the critically ill surgical cohort. The recovery area nurse must make decisions on a minute-to-minute basis and use their knowledge and experience for problem-solving and effective patient care [84, 95]. Postoperative adverse events can also occur in patients with little or no co-existing disease and, in some cases, this can lead to serious sequelae, including cardiac arrest [93]. Thus, the nurse needs to be competent in handling airway management, advanced cardiac life support and other serious complications [92]. The risk for mortality decreases in units with high patient-to-nurse ratios [96]. Although it is difficult to predict recovery area staffing needs due to the marked variation in patient number and acuity over several hours [97], the ratio of nurses to patients should be flexible so as to provide no less than one nurse to three patients, and one nurse to each patient who has not recovered protective reflexes or consciousness.

The early recovery period is followed by a handover and transfer to a surgical ward. Surgical ward nursing staff have their own specific responsibilities. The emphasis on

patient comfort and monitoring is maintained, with additional encouragement of early feeding and ambulation. Patient satisfaction is enhanced by having nurses easily accessible [98] and personalised electronic health programmes aimed at managing recovery expectations and guidance tailored to the patient [99], including post-discharge digital follow-ups [34, 86, 100], are examples of care that increase quality of recovery.

In conclusion, good recovery and successful surgery should be defined by the patient and is best achieved by a co-ordinated, multidisciplinary team, embedded in a culture of collaboration and safety [12]. The ageing population is also placing added pressure on the health system, with new models of care of the elderly being successfully introduced [7]. Once again, a multidisciplinary shared care model, consisting of surgeons, geriatricians, anaesthetists, nurses, allied health and other clinicians integrating as a comprehensive geriatric assessment team is ideal to optimise care through to full recovery [101, 102]. Some centres have extended this model to create 'post-operative care' or 'outreach teams', linking surgery, anaesthesia, geriatrics, nursing and other specialty input [64–66]. Improvements in capacity and delivery of surgical services are crucial ingredients of a high-quality healthcare system [1].

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