Coordinated perioperative care—a high value proposition?

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The merits of a coordinated consistent approach to the perioperative journey appear obvious, but only relatively recently has there been a substantial focus on this area through initiatives such as the ASA’s Perioperative Surgical Home (POSH)1 and the Royal College of Anaesthetists Perioperative Medicine Programme.2 These approaches include consistent structured elements in the patient pathway, such as preoperative assessment and management, triage, high quality intraoperative care, and postoperative management matched to a patient’s needs. A large survey of perioperative activity in the UK in 2011,3 and recent coronial findings and recommendations in Australia,4 both indicate an unmet need in this area. This is especially concerning when the increasing numbers of high-risk cases associated with changing population characteristics are considered.

Evidence of high value care, using Porter’s definition of outcome and cost,5 is highly relevant to all aspects of healthcare, including the systems, structures and processes which combine to create a POSH. In this edition of BJA, a report by Swart and colleagues6 examines patient outcomes and health care costs associated with triage by a preoperative clinic to either high acuity or ward-based postoperative care after bowel surgery, and provides important insights into what perioperative elements can be effective, and how these should be evaluated. It is acknowledged that there are limitations in these data, as this was a single-centre observational study from one time period, in one field of surgery, and with triage in part dependent on availability of high acuity beds. However, the findings that intermediate-risk patients sent to high acuity beds had better outcomes at a lesser overall nominal cost than those initially sent to the ward, provide important lessons for future work in this area.

The elements in a system for preoperative assessment and management come in many forms, ranging from highly structured multidisciplinary clinics7 to assessment at the door of the operating theatre.3 From this manuscript by Swart and colleagues, we do know that consultant anaesthetists were involved in risk assessment, and that detailed data was required for risk calculations. Separate to specific interventions, such as correction of anaemia or cessation of smoking, a major challenge into the future is to identify what structural and process elements of the system provide value. For example, a recent large retrospective analysis of patients who had attended a structured anaesthesia-led preoperative clinic, staffed by both anaesthetists and nursing staff, found lower overall mortality than when preoperative workup was managed by surgery. The authors specifically comment that it is unknown what elements of the clinic contributed to the observed association, although patient engagement and team communication are two suggestions. Detailed analysis is possible when determining the value of preoperative assessment and clinics. There are published data associating preoperative clinics with efficiency outcomes such as cancellations.8,9 Further, there are studies revealing potentially value-adding (or value-removing) preoperative practice changes, such as task delegation,10 computer-assisted pre-screening,11 structured questionnaires,12 or video conferenced assessment with and without remote physical examination,13 although these are often small or qualitative studies in single sites. Larger scale studies of these types of processes and pathways seems a logical direction in order to identify those with genuine high value.

Inclusion of a risk prediction tool was an important part of the triage decisions in Swart and colleagues.6 Whilst its effectiveness in other healthcare jurisdictions is unknown, at a minimum its components provide insight into what data are relevant, at least for prediction of 30-day mortality. Many other perioperative risk identification tools exist, although some were not originally intended for prospective clinical decision-making, and they vary greatly in their evidence base, predictors, weightings, sophistication and performance.14–17 The sensitivity and specificity of these tools (often measured using ROC curves) are low compared with diagnostic tools in medicine, nevertheless they appear to have a place in the context of an appropriately structured and staffed preoperative setting. These tools often focus on readily collected endpoints such as 30-day mortality and, in this study by Swart and colleagues,6 this was adequate to predict those who would benefit from early high acuity care. It is plausible, but not proved, that preoperative prediction of shorter-term endpoints, such as postoperative complications,18,19 may provide additional information to better guide decisions, such as early referral to high acuity postoperative units. Also relevant to the value proposition are the resource requirements of such tools, which may necessitate objective data from specialised testing, such as CPEX,6 or experienced specialist opinion. Considering the potential benefit from these types of tools, and the increasing data on co-morbidities and postoperative events available from international multi-centre clinical trials and outcomes registers,17 there is an opportunity to systematically expand the evidence base for risk predictions tools, and to prospectively examine their value as part of perioperative systems.

The capacity provided in standard postoperative wards, and high dependency or intensive care units, is also relevant to
providing patient benefit. The study of Swart and colleagues\(^6\) does not provide us insight into what specific aspects of high dependency care were effective, nor what capacity was available on general wards. For example, by what mechanism was delayed anastomotic leak prevented by early high dependency unit care? Individual interventions such as optimising cardiovascular parameters and fluid balance\(^5\) are plausible contributors, but improved insight into the specific mechanisms and capacity requirements may better inform the composition of the ideal postoperative care unit for these patients. This may guide the development of newer concepts, such as the extended recovery room,\(^2\) with capacity (and cost) potentially somewhere between a ward and a separate high dependency unit.

Lastly, Swart and colleagues\(^6\) have provided some basic data on comparative bed day costs of different care pathways, suggesting that an investment in high dependency care provided an overall cost reduction. Especially in resource-challenged healthcare environments, early and careful cost and outcome analysis is increasingly important, and should not be an afterthought allowing innovations to be entrenched before full evaluation. Recent publications suggesting low value from both robotic prostatectomy\(^2\) and one model of a physician-led high risk preoperative clinic,\(^2\) highlight the need for robust and early analysis of the overall value proposition, before innovation has become embedded care. It is acknowledged that productivity gains, such as those suggested here, often do not result in reduction in total costs in the short term; but for example might enable more services to be provided for the same cost. This is due, in part, to the fixed nature of healthcare assets and scale of provision (such as wards, theatres, clinics and so on) where the impact of each change is not sufficient, in itself, to enable resources to be reduced or redeployed at sufficient scale. In consequence both the short and long-term benefits on outcomes and costs must be considered. Relevant and detailed financial analysis is not always a simple task and these skills are not, currently, widely available to support research and translation. Additionally, as in this case, where the cost savings will be released elsewhere, there is an added burden on financial planning and management accounting systems for ensuring that the appropriate budgetary response is delivered.

Health services research, to provide a strong basis for identifying optimal structures and processes for concepts such as the perioperative surgical home, has not always been well funded historically by large grant funding bodies. However, there are signs, at least in Australia through the National Health and Medical Research Council, of a change in thinking. The potential positive impact on outcome and cost demonstrated by Swart and colleagues\(^6\) emphasises the need for this to be a priority. It may not have the glamour or industry-based funding of innovations with high-tech devices or medicines, but the potential impact on sustainable healthcare is too important for this not to be a priority for major grant funding bodies and research teams. We should not hesitate to introduce health services change, but should demand an evidence base for existing and proposed services, just as we do for therapeutic goods – our patients should expect no less.

## Declaration of interest

G.L. is the director of a clinical trials unit, PARC Clinical Trials, and current Chair of Medical Device Advisory Committees of the Therapeutic Goods Administration, Australia.

A.G. is a strategic consultant to the SE London Sustainability and Transformation Programme. The University of Adelaide holds the rights to an electronic preoperative questionnaire, CHAT.

## References


The egg-and-chicken situation in postoperative enhanced recovery programmes

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Nowadays, enhanced recovery programmes (ERPs) are well established and used in the daily practice for different surgeries in many specialties. They involve pre-, intra-, and postoperative measures or elements. Among the postoperative measures, early mobilization and early oral intake are commonly cited. Accordingly, these two postoperative elements are included in all published ERPs and were shown to be the most used and reported interventions in ERPs in a recent systematic review (including 50 trials).\(^7\) Some authors, however, considered that these postoperative elements are markers of both protocol compliance and recovery.\(^7\) In our daily practice of ERP, every patient is taught (using oral or written information, or both) about the importance of postoperative early eating and mobilization. But it is difficult to figure out (considering only the postoperative period) whether a given patient had better recovery because he was eating and ambulating early or whether he tolerated early eating and walked early thanks to rapid recovery without complication. A similar reasoning can be applied to early termination of i.v. fluid infusion; is it a key element for enhanced recovery or is it a marker of early recovery facilitated by optimal preoperative and intraoperative strategies? These aspects of ERP evoke the egg-and-chicken situation and highlight the need for further well-conducted studies to improve our knowledge of the physiopathology of ERPs.

We think that early mobilization and early (liquid or solid) oral intake, generally considered as components of ERPs, should be also considered as outcomes of ERP, in the same manner as the length of stay or the overall morbidity. A fully informed patient who is free of pain and nausea, without drains and tubes, is probably willing to eat and ambulate early. In a recent survey by Hughes and colleagues,\(^8\) the patients rated some elements of ERPs as important and relevant outcomes; notably, to be able to eat and drink as soon as possible and to be independently mobile in hospital as soon as possible.

Some authors reported that enforced mobilization is an independent factor for duration of hospital stay.\(^4\)\(^5\) But this statistical correlation does not explain whether it is a cause or consequence. Indeed, mobilization, even enforced, cannot be achieved if the other postoperative elements of the ERP are not fulfilled (i.e. adequate analgesia, prevention of nausea and vomiting, avoidance of tubes, etc.). In an appropriately informed patient, early mobilization and eating are simply the results (and the markers) of the adherence to the other ERP elements or the efficiency of the ERP, or both. Accordingly, a recent systematic review failed to show an impact of early mobilization on outcomes after abdominal and thoracic surgery,\(^5\) probably because it is itself an outcome.

If we consider those ‘elements’ as ‘outcomes’ of ERP, the inability to eat or walk early, despite adherence to the other protocol elements, should therefore be considered as a failure of the ERP or the result of medical or surgical complications.\(^7\) Indeed, postoperative pain and opiate tolerance can vary widely among patients despite adequate perioperative pain management.\(^8\) Likewise, postoperative nausea and vomiting can still occur despite multimodal prophylaxis and independent of ileus.\(^7\) These side-effects will therefore affect the adherence to early feeding and mobilization. In contrast, surgical and medical complications can also result in severe pain and ileus, precluding success of the ERP.

This thinking highlights the importance of pre- and intraoperative elements, which become the true determinants of the success of the ERP. These intraoperative elements include the invasiveness of the surgery,\(^10\) maintenance of homeostasis, fluid balance, and anaesthetic and analgesic techniques.\(^11\) Accordingly, a study assessing the relationship between the adherence to protocol and the duration of hospital stay\(^12\) reported that the lower the adherence to pre- and intraoperative measures (carbohydrate loading, antiemetics, magnesium, and non-opioid analgesics), the longer the duration of stay.

In conclusion, we propose a paradigm shift regarding some postoperative elements of ERPs. Providing there is good patient counselling and information, the early tolerance of oral intake