Towards a learning system for Enhanced Recovery After Surgery

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Contemporary colorectal surgery was often associated with long length of stay (eight days for open surgery and five days for laparoscopic surgery), high costs, and rates of surgical site infection approaching 20-30 per cent. During the hospital stay for elective colorectal surgery, the incidence of perioperative nausea and vomiting (PONV) may be as high as 80 per cent in patients with certain risk factors. After discharge from colorectal surgery, readmission rates have been noted as high as 35.4 per cent.

The concept of Enhanced Recovery After Surgery (ERAS) was initially proposed by Kehlet who explored the possible determinants of post-operative morbidity in the late 1990s. He identified potential risk factors that need to be recognised and treated perioperatively to minimise the effects of surgical stress on the patient. Kehlet also championed the idea of working within a multidisciplinary team framework. Together these have led to a series of interventions, which have been formulated into standardised mutli-disciplinary integrated protocols to span a patient's entire journey through the surgical process with distinct elements in the pre-operative, intra-operative and post-operative phase.

The outcomes of interest to patients and providers include freedom from nausea, freedom from pain at rest, early return of bowel function, improved wound healing, and early hospital discharge. The basic premise is that the impact of surgery on the metabolic and endocrine response is reduced leading to earlier recovery. Successful implementation of ERAS leads to reduced length of hospital stay and earlier return to productivity. Systematic reviews of ERAS for various types of surgery have shown that the intervention has the potential to enhance patient outcomes, but that consistent implementation is required. In this paper, we describe how the concepts drawn from the field of implementation science can be used to improve consistency and quality of ERAS implementation.

Management of surgical risk and quality improvement

It is widely understood today that the first step towards implementing ERAS is to assure patient safety and quality of care and addressing several factors that are external to the surgical process itself. Scaling up in new hospitals and countries requires attention to much more than the surgery and requires an appreciation for introducing standardised processes in complex systems, and appreciation of the implementation contexts. These steps involve: (a) developing a standard set of activities that are needed to deliver ERAS within a health system (over and above the clinical steps themselves); (b) identifying the operational factors (e.g. political will, resources, schedules, supplies, equipment, etc.) that affect the implementation of ERAS within the system; (c) identifying the organisational factors (e.g. staff motivation, organisational culture, climate for innovation) that affect the implementation of ERAS, and (d) developing tailored, locally appropriate strategies to address the organisational and operational factors based on systematic local experiments. In essence, effective hazard reduction and risk management requires a reframing of care from one that is task-oriented at the level of the practitioner, to a systems-based, patient-centred one that looks to the actual relationships within the socio-technical microsystems, and the operational and organisational characteristics of the meso- (and possibly macro-) system in which care is conceived and delivered.

At the most basic, this involves a re-conceptualisation of the patient from the passive object of medical intervention to an active 'consumer' or 'user' of health services who co-produces and "owns" their own health. Standardisation can lead to more seamless

process, which the patient and family experience as high quality service. The risks and hazards of healthcare are known to frequently be the result of an ineffective systems design rather than poor performance by surgeons and other individual providers. Preventable errors occur in healthcare because of the interaction between "latent" organisational system failures and "active" errors by frontline actors, possibly in ignoring or responding inappropriately to those system failures. Multiple latent conditions, or "organisational pathogens", may be designed into the processes and structures of care thereby increasing the likelihood/risk of failure/error at the patient-provider interface, sometimes because of unforeseen interactions between pathogens.

Continuous learning and systems improvement

It should be clear by now that successful implementation of an ERAS programme requires not just the clinical studies showing that the intervention works in controlled study settings, and supportive culture but is also supported by a continuous organisational learning platform to understand what actually works in practice. Evaluation methods for assessing the effectiveness of ERAS therefore need to not only determine whether patient outcomes have been achieved, but also under what mechanism(s) were they achieved, for whom and in what context. This requires the creation of an internal learning system that can document the results of the Plan-Do-Study-Act (PDSA) cycles (15), harvest learning and share with other facilities and systems so that knowledge about implementation becomes as pervasive as the knowledge about the intervention itself.
Learning is the acquired, relatively permanent or persistent change of behaviour or behaviour potential resulting from instruction, training,

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and practice (intentional learning) or experience (incidental learning). In 1984, Kolb described an experiential learning model, which argued that learning occurs through a cycle of reflective observations of concrete individual or team experiences in order to gain an understanding of what can be learned from each specific experience. This adaptive learning approach supports new ideas, which are applied to future experiences, renewing the cycle and supporting the professional joy and practice of the clinicians.

What is next for ERAS?

Effective implementation processes are essential in achieving desired outcomes of health system initiatives. Whereas many approaches to Enhanced Recovery After Surgery (ERAS) implementation may seem straightforward, careful advanced planning, mapping out multiple stakeholder involvement, and addressing other contextual constraints needed for programme scale up and sustainability are complex. Interventions tend to have components beyond just clinical care, implementation activities are diverse, and contexts dynamic and complicated.

Diffusion of ERAS into mainstream surgical practice has been hindered due to minimal evidence of successful ERAS under routine conditions for management and resourcing ERAS. This makes meaningful ERAS improvement initiatives challenging to describe and evaluate as matching evaluation and programme designs can be difficult, requiring collaboration, trust and transparency. If this does not take place, results may be highly variable and lack credibility because the association between interventions implemented and outcomes achieved is obscure and attribution uncertain. Aligning the interests of all specialty stakeholders is the largest organisational challenge in implementing successful ERAS.

The lack of clarity and descriptions of the implementation strategies, report on implementation variables, and the context under which the implementation occurs hinder successful spread. Without the detailed context in which it was implemented one is often led to disappointment or outright failure of spread and scale-up efforts. The input of imbedded researchers into the design and conduct of ERAS improvement initiatives is essential in mitigating these potential problems.

Meaningful application of mixed health

services research methods can serve as powerful tools for studying the impact of ERAS in diverse clinical settings, both for prospective studies about implementation and the analyses of retrospectively collected data. This can provide the means for transforming ERAS practice into evidence, and practice within uncertainty into deep knowledge. The process of learning is iterative and typically incremental, constantly being infused by everyday work experience and hard-earned lessons by clinicians providing clinical care.

The real challenge remains how to translate these findings into new settings. Introducing and implementing ERAS practice is a complex challenge requiring what Deming calls the "profound knowledge" of improvement. This involves four key components: (a) deep knowledge of the system through which ERAS is delivered; (b) understanding variation, and the aspects of variation that can be tolerated or even required (as in adaptations) and those that need to be eliminated; (c) willingness to experiment to continually improve and be bold in advancing testable theories of improvement and (d) engaging in the improvement process with transparency, truth telling and trust building.

While, emerging data is showing that thoughtful implementation of ERAS improves the opportunity for rapid, uncomplicated recovery after surgery with both short-and long-term benefits for patients, decrease patient readmission rates and leads to significant cost savings, the benefits can never be realised at scale without a rapid diffusion of ERAS into mainstream using timely and robust methods for systems improvement and clinician engagement.

The nature of complex systems such as ERAS is that small changes to inputs may produce large changes in results across the system. Thoughtful implementation with an eye on key system leverage points reinforced by engaged learning communities may result in rapid acceleration of ERAS uptake once a "tipping point" is reached. By the same token, negative feedback loops may result in rapid deterioration of uptake from which systems may find it difficult to recover. The ERAS implementation tools require thoughtful application, preferably bottom up, led by front line clinicians: they are not a hammer that can be universally employed in all circumstances. They are not an end in themselves. Instead they provide a starting place for systematic reflection, staff engagement, deepening trust and staff support, and supporting a culture of continuous improvement. The process of implementing ERAS should promote team engagement among clinicians, staff, administration, and patients. It is must be systematic and based upon measurement and consultation with all stakeholders involved in the process.

Even if initial outcomes are achieved, the practice could determine how to produce an even better outcome or achieve it more efficiently and with less cost.

Lasting surgical quality improvement is necessary and requires significant change in how surgical care is delivered. It explicitly seeks to be not only better, but the best that the team can deliver under these care circumstances. The staff ownership of the ERAS improvement process and adaptability of the intervention to address future quality outcomes are considered strengths.

Key messages

1. The standardisation and integration of the multidisciplinary protocols should be based upon evidence-based medicine, quality enhancement, service improvement, simplification of processes and cost-efficacy.

2. Implementation of ERAS is difficult and requires a mental mindset change and respectful cooperation of many involved specialties, who all have their own needs and personal goals.

3. It is important to assign champions from each involved speciality who are charged by that specialty to make decisions on the multidisciplinary protocol on behalf of their specialty.

4. Compliance to the protocol is the best way to measure successful implementation of ERAS. Compliance on the postoperative protocol has proven to be the most difficult part.

5. Initiating ERAS works best by bottom-up initiatives of a few champions followed by top-down support to speed-up and strengthen implementation and to support uptake by other services.

6. Good preparation (assigning champions, making protocols and patient info materials, visiting ERAS team courses, and training teams) and adopting a an implementation process, preferably with ERAS-teacher is crucial to success.

References available on request.

Dr. Barach will be speaking on 'Towards a learning system for Enhanced Recovery After Surgery (ERAS): Embedding Implementation and Learning Evaluation' on January 29, as part of the Anaesthesia and Pain Management conference at Arab Health Congress.

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