# Enhanced Recovery after Surgery Controversy Symposium University of Pretoria

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# Layout

- Introduction.
- What is enhanced recovery after surgery (ERAS).
- Principles of ERAS.
- Examples of successes of ERAS.
- How to implement ERAS.
- Take home message.

# Common challenges

- Escalating health care costs.
- Shortage of beds especially ICU.
- Waiting time for operation.
- Pressure from medical schemes to discharge patients early.
- Rising levels of litigation.

# Attempts to address the challenges

- Day/ambulatory procedures.
- Modification of anaesthetic approach.
- Sub-specialization leading to high volume units.
- Minimal access surgery.

# Weaknesses

- Fragmented attempts: anaesthetists, surgeons, nurses and physiotherapists.
- Often generic and limited to minor procedures.
- Superiority of MAS is sometimes exaggerated despite similar neuro-hormonal responses after some open procedures.
- And, in certain cases similar magnitude of stress and therefore inflammatory response (open versus laparoscopic cholecystectomy, groin hernia repair, appendicectomy, colectomy, etc.).
- Purported advantages of MAS due to maintenance of rigid surgical culture after open surgery.

# Amazing: Less than 24 hour post-operative stay

- Bariatric  procedure.
- Hip replacement.
- Cholecystectomy.
- Adrenelectomy.
- Groin hernia repair.
- Parathyroidectomy.
- Thyroidectomy.

***Kehlet and Wilmore, 2008. Annals of Surgery; 248 (2)***

# No collateral damage

- Increased analgesic cost.
- Increased morbidity.
- Increased mortality.
- Increased costs.
- Increased re-admission rate.
- Delayed return to work.

# The answer

- Enhanced recovery after surgery (ERAS)/Fast track surgery (FTS)

# What is ERAS?

- Multidisciplinary.
- Multimodal.
- Procedure specific.
- Deliberate peri-operative preparation.
- Aim: to expedite normal post operative recovery.

# Multimodal strategies to enhance recovery after surgery

- Practiced since the 1990s and popularized in the 21st century by Henrik Kehlet for non-cardiac elective surgery.
- **Summative practices aimed at reducing stress and therefore SIRS associated with elective operations to enable:**
  - Less pain.
  - Early post operative recovery.
  - Reduction of morbidity and mortality.
  - Shortened hospital stay and early return to normal activities.
- **Without associated increase in re-admission rate.**

# The role players

- Patients.
- Anaesthetists.
- Surgeons.
- Trained/dedicated nurses.
- Physiotherapists.
- Hospital managers and administrators.

# The anaesthetist's role

- A perioperative care physician ***(White et al, 2007. Anesthesia and Analgesia 104: 1380-1396)*** who decides.

- Preoperative medication.
- Choice of anaesthetic drugs.
- Prophylactic drugs (e.g. post operative nausea).
- Adjuvant drugs to enhance recovery.
- Post operative pain, nausea and vomiting management.

# The surgeon's role

- To become a team player.
- Selection of appropriate patients.
- Selection of appropriate surgical option.
- Selection of appropriate incision.
- Adjust care according to available scientific evidence.

# Three Phases

- Pre-operative.
- Intra-operative.
- Post-operative.


**Fig. 1.** Main perioperative components typically included in ERAS programs. Adapted from Varadhan et al. [6].

***Dorcaratto et al, 2013. Digestive Surgery 30: 70-78***

- An ERAS patient will refuse to go to ICU and ask to go home immediately following an operation.

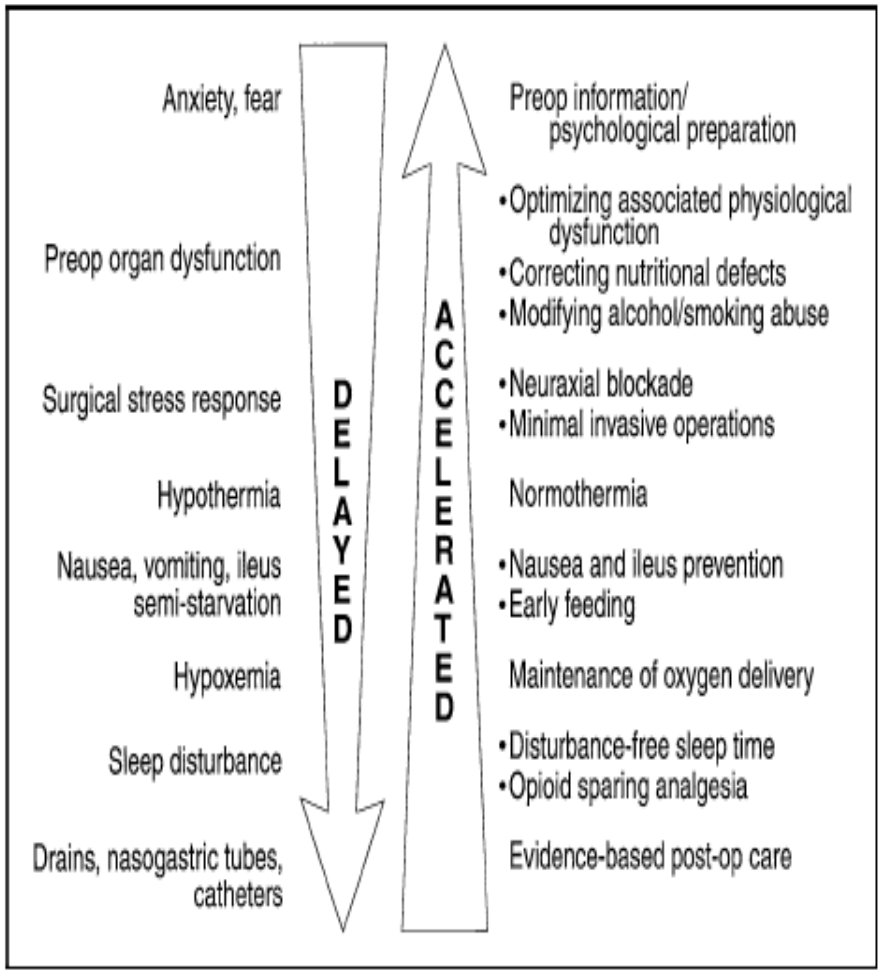


Fig. 2. Factors that contribute to delayed or accelerated recovery after elective operations.

nutritional therapy has no major benefit except in depleted patients.

*Postoperative hypoxemia*

Postoperative hypoxemia may occur in the early recovery period as a consequence of anesthesia-related effects, and as a late event during the days when the patient is receiving less acute care [105]. The late postoperative hypoxemia may occur as a persistent phenomenon or as episodic desaturations, usually occurring at night [106]

The constant hypoxemic response is closely related to the conventional impairment in pulmonary function and supine position [107] while episodic desaturations are predominantly related to postoperative sleep disturbances with rebound of REM-sleep during the second to fourth postoperative night [105,106]. Late postoperative hypoxemia has been identified as an important contributing factor to post-

***Kehlet et al, 2002. The American Journal of Surgery 183: 630-641***

**Table 2** Characteristics of randomized controlled trials comparing fast-track surgery with conventional care

| Reference | Year | Surgery | n FT/CC | Major findings | No. of FT items | Jada score |
|---|---|---|---|---|---|---|
| Anderson et al. [33] | 2003 | Hemicolectomy | 14/11 | PHS↓ Ileus↓ Pain↓ Fatigue↓ | 12 | III |
| Delaney et al. [34] | 2003 | Intestinal and rectal resection | 31/33 | THS↓ | 5 | II |
| Gatt et al. [35] | 2005 | Colorectal resection | 19/20 | PHS↓ Ileus↓ | 11 | III |
| Khoo et al. [36] | 2007 | Colorectal resection | 35/35 | PHS↓ THS↓ | 10 | III |
| Ionescu et al. [38] | 2009 | Colorectal resection | 48/48 | PHS↓ Ileus↓ | 10 | III |
| Muller et al. [39] | 2009 | Colonic resection | 76/75 | PHS↓ Complication rate↓ | 12 | III |
| Serclova et al. [40] | 2009 | Colorectal resection | 51/52 | PHS↓ Complication rate↓ Ileus↓ Pain↓ | 8 | III |
| Wang et al. [41] | 2011 | Colorectal resection | 106/104 | PHS↓ Complication rate↓ Ileus↓ | 12 | II |
| Vlug et al. [20] | 2011 | Colonic resection | Lap-FT 100<br>Open-FT 93<br>Lap-standard 109<br>Open-standard 98 | PHS↓ THS↓ in lap-FT | 16 | V |
| Kuzma et al. [37] | 2008 | Appendectomy | 32/25 | PHS↓ | 7 | III |
| Petersen et al. [3] | 2006 | Hip replacement | 27/30 | PHS↓ | 5 | III |
| Larsen et al. [44] | 2008 | Hip and knee replacement | 45/42 | PHS↓ QoL↑ | 9 | III |
| Keulemans et al. [49] | 1998 | Lap cholecystectomy | 40/40 | PHS↓ Costs↓ | 7 | III |
| Johansson et al. [50] | 2006 | Lap cholecystectomy | 52/48 | PHS↓ Costs↓ | 7 | III |
| Recart et al. [60] | 2005 | Lap nephrectomy | 13/12 | PHS↓ Pain↓ | 6 | III |
| Gralla et al. [59] | 2007 | Lap prostatectomy | 25/25 | PHS↓ Complication rate↓ | 10 | I |
| Liu et al. [64] | 2010 | Gastric resection | 33/30 | PHS↓ Ileus↓ IL-6↓ Glucose↓ Loss of body composition↓ | 10 | III |
| Wang et al. [65] | 2010 | Gastric resection | 45/47 | PHS↓ Costs↓ Ileus↓ Pain↓ QoL↑ TNF-α, IL-6, and CRP↓ | 11 | II |
| Muehling et al. [74] | 2008 | Lung resection | 30/28 | Pulmonary complications↓ | 8 | III |

TABLE 1. Results From Selected Fast-Track Surgical Programs

| Procedure | Postoperative LOS | Comments |
|---|---|---|
| Groin hernia repair | 1.5–6 h | Large consecutive series (n = 1000–3000) using local infiltration anesthesia[134,135] |
| Cholecystectomy | Same day discharge >80% | Large consecutive series and randomized trials. Further improvement with antiemetics/multimodal nonopioid analgesia[136–140] |
| Bariatric surgery | ~80%, <23 h | n = 2000 consecutive laparoscopic Roux-Y gastric bypass[141]; gastric banding[142] |
| Colonic resection | 2–4 d | Documentation of benefits on recovery of all organ functions and reduced morbidity from multi-center series and randomized trials. Only minor differences between open and laparoscopic fast-track surgery[96–102,143–148] |
| Complex colorectal procedures | 3–5 d | Single-institution series, laparoscopic and open approach[149–154] |
| Pulmonary resection | 1–4 d | Single-institution series, open, and thoracoscopic[155–157] |
| Reflux surgery | 98%, <23 h | Large (n = 557) consecutive, single-institution series, laparoscopy[158] |
| Esophageal resection | 7–8 d | Small single-institution series[159–161] |
| Pancreatic resection | 7 d | Consecutive series before vs. after pathway, cost reduction[162] |
| Radical prostatectomy | ~75%, 1 d | Large consecutive series[163] |
| Nephrectomy (donor) | 1–2 d | Shortest (23 h) with laparoscopic approach, 2 d with open surgery[164,165] |
| Nephrectomy (other) | 2–4 d | Consecutive patient series, shortest with laparoscopic approach[166–168] |
| Adrenalectomy | <1 d in 80% | Laparoscopic approach, small, single-institution series[169,170] |
| Abdominal aortic aneurysmectomy | ~3 d | Consecutive series, revised criteria for intensive care stay, fluid-restriction[171–174] |
| Mastectomy | <1 d in 90% | Large consecutive series[175–177] |
| Parathyroid and thyroid surgery | 80%–90% ambulatory | Single-institution consecutive series[178–180] |
| Hip, knee, and elbow arthroplasty | ≤1 d | Small, single-institution series with or without minimal access operation[181–184] |
| | ~3–4 d | Well-designed pathways, cost-reduction[185,186] |
| Ovarian cancer surgery | 5 d | Single-institution, consecutive series[187] |

***Kehlet et al. 2002. The American Journal of Surgery***

# Suggestion on initiation and implementation of ERAS program

## Planning

- Develop interest.
- Information gathering.
- **Organize a team.**
- Training.
- **Writing of specific protocols and care pathways/plans.**

## Implementation

- **Initiate procedure specific program.**
- Patient evaluation, optimization and education.
- Stress reducing peri-operative care.
- Nutrition, physiotherapy, etc.
- **Discharge (instruction)** and follow-up.
- Evaluation of the program.

Kehlet et al,2008. Annals of Surgery 248: 189-198

# Summary

- ERAS is feasible.
- Please lets embrace ERAS.
- Lots of MMeds could be based on randomized trials on ERAS.

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- Thank you