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- 
- An invasion of armies can be resisted, but not an idea whose time has come.

VICTOR HUGO

Enhanced Recovery After Surgery



Enhanced Recovery After Surgery (ERAS) protocols, are combinations of evidence based peri-operative strategies which work synergistically to markedly speed recovery after surgery ^[1, 2].

Enhanced Recovery After Surgery

Developed by H. Kehlet in Denmark in colonic surgery, Gradually has gained world-wide acceptance.

Originally described in open surgery but its advantages definitely extended to laparoscopic surgery, and many other types of surgery.

Enhanced Recovery After Surgery



Although each of these individual strategies is beneficial, to some extent, on its own, to achieve maximum benefit they have to be used together in the form of a package.

Using ERAS protocols, post-operative stays following colorectal resection can be safely reduced to around two to four days.

Enhanced Recovery After Surgery

This much earlier discharge is not achieved by lowering the prerequisites for release from hospital, but rather by achieving the standard discharge criteria a lot quicker due to an accelerated post-operative phase.

The advantages of ERAS have been repeatedly proven in a number of randomised clinical trials and meta-analyses.

The underlying mechanism of ERAS protocols is thought to be an attenuation of the peri-operative stress response ^[3-5], also there is increasing evidence to suggest that the benefits of ERAS are can be mediated by the early return of organ function^[6].

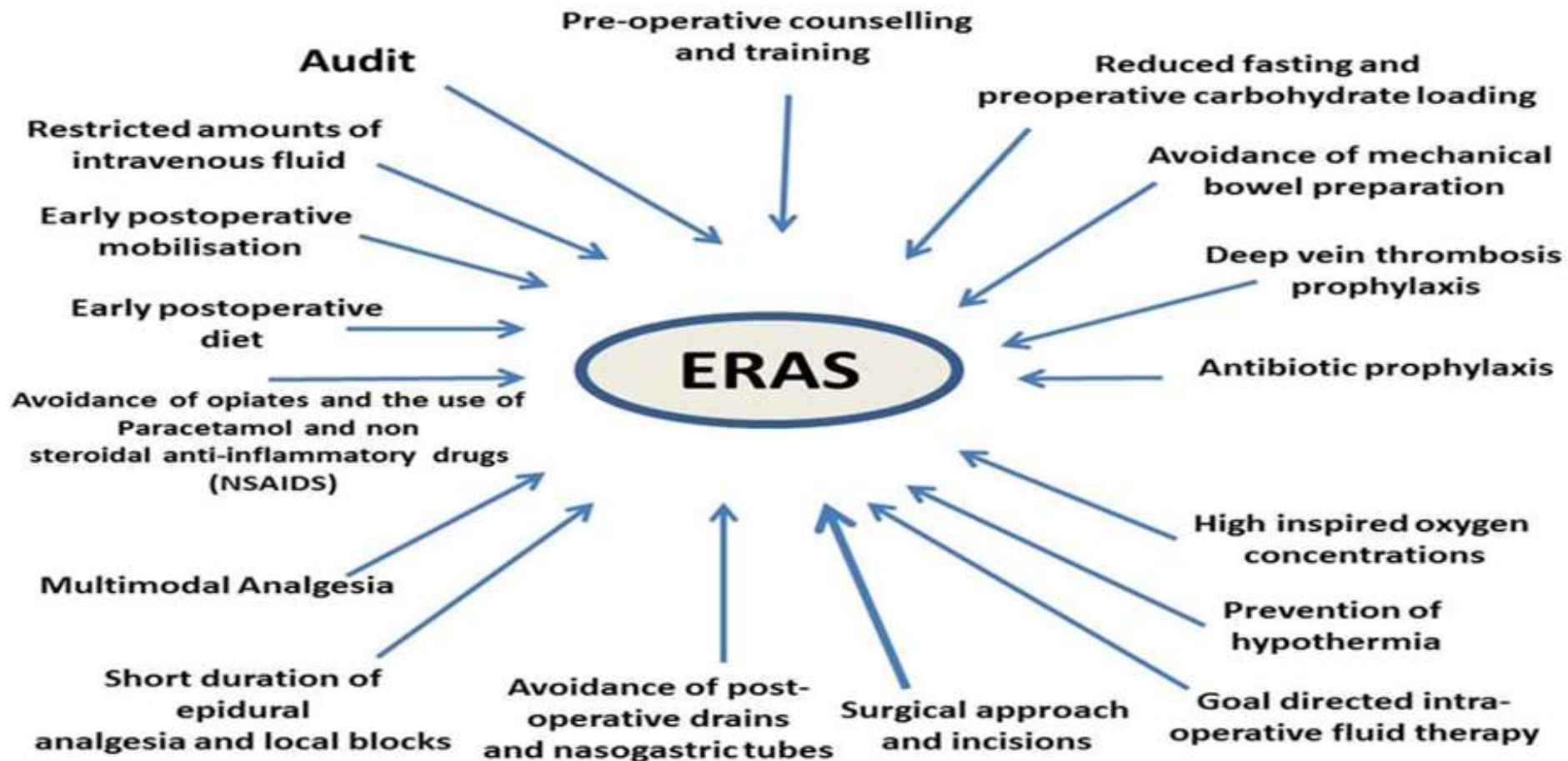
Enhanced Recovery After Surgery

ERAS[®] Society

The logo for the ERAS Society features the text "ERAS[®] Society" in a blue, sans-serif font. Below the text is a stylized graphic consisting of two blue lines that curve upwards and then downwards, resembling a wave or a path.

P A M E
ERAS
SOCIETY

The logo for PAME ERAS Society features a stylized graphic at the top consisting of two lines, one green and one blue, that curve upwards and then downwards. Below the graphic, the text "P A M E" is written in a small, green, sans-serif font, followed by "ERAS" in a larger, blue, sans-serif font, and "SOCIETY" in a smaller, blue, sans-serif font.



ERAS - *Components*

- Preoperative Preparation
 - ▣ *Prehabilitation*
 - ▣ *-Patient Education.*
- Intraoperative Management
 - ▣ *Standardization / reduce inter-practitioner variability*
- Enhanced Postoperative Recovery
 - ▣ *Educated pathways*



Pre-operative Counselling & Patient Involvement.

Recommendation:

All patients undergoing elective surgery should be counselled.

Patients should be provided with both verbal as well as written information.

Pre-Optimisation of patients who have co-morbidities.

Shared Decision Making (SDM)

Reduced Fasting and Preoperative Carbohydrate Loading

Recommendation:

6 hours to solids but patients should be allowed clear fluids for up to 2 hours before induction of general anesthesia. In addition, a clear carbohydrate rich drink should be administered orally the night before surgery and 3 hours prior to induction of anesthesia.

Avoidance of Mechanical Bowel Preparation

Recommendation:

Oral mechanical bowel preparation should not be used routinely in patients undergoing colonic resection. If clearance of the rectum is required for a left sided anastomosis, a single phosphate enema on the morning of the surgery may be used to evacuate the rectum.

Deep Vein Thrombosis Prophylaxis

Recommendation:

All patients undergoing surgery should be started on a once daily low molecular weight heparin the night before surgery and continued for the entire length of the patient's hospital stay. In addition, graduated compression thromboembolic deterrent stockings (TEDs) should be used during the procedure, pneumatic mechanical compression stockings should be used. Prophylaxis should be considered for up to one month after discharge, especially in those at a higher risk of thromboembolic complications, such as those with residual malignancy or previous episodes of thrombosis.

Antibiotic Prophylaxis

Recommendation:

Should be administered 15- 60 min. prior to incising the skin. In prolonged procedures (more than 4 hours) or if there is major blood loss (greater than 1500 mls) a second dose may be administered.

Prevention of Un-intentional Hypothermia

Recommendation:

Hypothermia (core temperature less than 36°C) should be actively prevented using warm-air blankets.

Warming should be continued for as long as the patient is in recovery. If the procedure is expected to last for more than an hour, then warmed intravenous fluids should be used. An oesophageal probe should be used during the procedure for measurement of core body temperature.

Goal Directed Intra-Operative Fluid Therapy

Recommendation:

An esophageal Doppler probe (or other minimally invasive methods of stroke volume measurement such as FloTrac, ClearSight EV1000, LiDCO plus™ and LiDCO rapid™) should be used to continuously measure the cardiac output, and fluid administration should be titrated according to variations in the cardiac output.



Goal Directed Intra-Operative Fluid Therapy

- Pearse. JAMA 2014
- 38 RCT
 - ▣ 17-29% reduction in Morbidity.
 - ▣ 0.8 days reduction in HLOS

Effect of a Perioperative, Cardiac Output-Guided Hemodynamic Therapy Algorithm on Outcomes Following Major Gastrointestinal Surgery
A Randomized Clinical Trial and Systematic Review

Rupert M. Pearse, MD; David A. Harrison, PhD; Neil MacDonald, FRCA; Michael A. Gillies, FRCA; Mark Blunt, FRCA; Gareth Ackland, PhD; Michael P. W. Grocott, MD; Aoife Ahern, BSc; Kathryn Griggs, MSc; Rachael Scott, PhD; Charles Hinds, FRCA; Kathryn Rowan, PhD; for the OPTIMISE Study Group

Benes et al. *Critical Care* 2014, 18:584
<http://ccforum.com/content/18/6/584>



Open Access

Goal directed fluid therapy based on
post-surgical outcome:
a randomized controlled trial

Cardiac complications associated with goal-directed therapy
in high-risk surgical patients: a meta-analysis

N. Arulkumaran, C. Corredor, M. A. Hamilton, J. Ball, R. M. Grounds, A. Rhodes and M. Cecconi*

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Surgical Approach and Incisions

Recommendation:

Laparoscopic approach should be used, depending on local expertise and available resources. For open surgery, a lower transverse incision should be used whenever possible.

If a transverse incision is not possible, then a selectively lower or upper midline incision is recommended. The length of the incision should be kept as short as possible.

Avoidance of Post-operative Drains & Nasogastric Tubes

Recommendation:

Routine abdominal drains and nasogastric tubes should be avoided.

If gastric decompression is required during surgery, a nasogastric tube may be inserted temporarily and removed at the end of the procedure.

Short Duration of Epidural Analgesia and Local Blocks

Recommendation:

Colorectal surgery should receive epidural analgesia. It should be initiated at the beginning of the procedure and continued for a maximum of 48 hours. Weaning from epidural analgesia should start 12 hours postoperatively. Care should be taken that the equipment does not interfere with mobilization. Patients undergoing laparoscopic resection may or may not be administered epidural analgesia depending upon the preference of the operating surgeon and anesthesiologist.

Avoidance of Opiates and The use of Multimodal Analgesia

Recommendation:

Patients should be prescribed regular Paracetamol and NSAIDS / COX2I such as Ibuprofen if there are no contraindications to their use.

Opiates, including Codeine preparations and Tramadol, should only be reserved for breakthrough pain. Whenever opiates are used, attention should be paid to prevent nausea and vomiting and regular antiemetic prescribed.

Early Postoperative Diet

Recommendation:

Patients should be allowed oral fluids as tolerated on the day of the surgery and built up to an oral diet over the next 24 hours.

Patients who are not meeting their nutritional requirements by 72 hours after surgery should be assessed by a dietician.

Early Postoperative Mobilisation

Recommendation:

A structured mobilisation plan should be in place.

Patients should be helped to sit out in a chair on the evening of surgery and definitely by the first post-operative day. This should be followed by gentle assisted mobilisation either the same day or the next day.

Patients should be seen by a named physiotherapist pre-operatively with the aim of explaining the mobilisation plan.

This physiotherapist should then help enforce this plan throughout the post-operative period.

Restricted Amounts of Intravenous Fluid

Recommendation:

It is not possible to recommend a single point in time by which all intravenous fluid administration should be stopped.

However, in the majority of patients, this should be possible by the second post-operative day, by which time adequate oral fluids should be tolerated and indwelling epidural catheters removed.

Audit

Recommendation:

Clinical outcomes, including readmission rates and compliance to the various ERAS strategies, should be regularly audited. Readmission rates after ERAS implementation should not exceed 10%.

Audit findings should be discussed in regular audit meetings attended by medical, nursing, and other ancillary staff.

Results should also be disseminated using the local IT systems such as the intranet and e-mail.

Recommendations for opioid use:

From OSAS

1. Minimize or avoid respiratory depressant (opioid) peri operative in OSAS to limit obstructive breathing

From ERAS


2. Avoid opioid to improve bowel function and enhance recovery after surgery

From ASA taskforce on pain :

3. Reduce opioids by using multimodal analgesia
4. Avoid induction of hyperalgesic syndrome by reducing the opioid use and by adding NMDA receptors antagonists

Standardization :

- Standardization of surgery
- Standardization of anesthesia
- Standardization of interaction between both



Anesthesia should not only be safe with rapid recovery ,but should improve the surgical outcome and reduce surgical complications





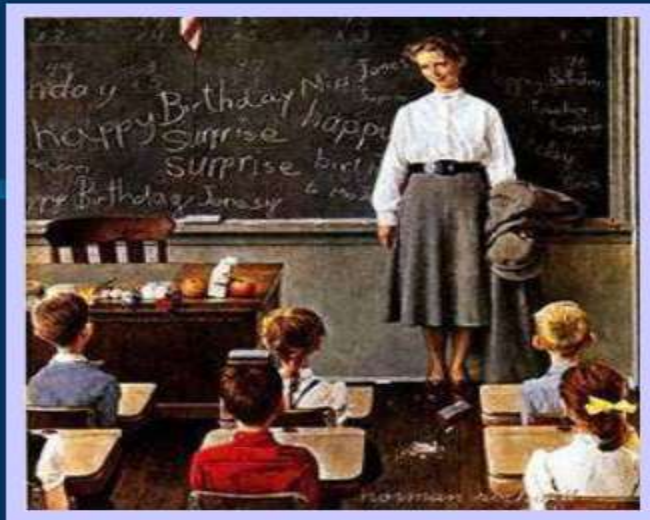
Benefits Realised

Government Vision



The core principles of enhanced recovery are aligned to the Health White Paper:

- ***Putting patient first***
- ***Improving healthcare outcomes***
- ***Autonomy and accountability***
- ***Cutting bureaucracy and improving efficiency***



“..., one of the greatest opportunities to improve patient outcomes will probably come not from discovering new treatments but from more effective delivery of existing therapies.”

Pronovost PJ et al., Lancet 2004; 363:1061-7