A Comparative Study between Traditional Care Program and Enhanced Recovery after Surgery (ERAS) Program in General Surgery

Thesis

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By

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Abb.	Full term
ACE I	*Angiotensin Converting Enzyme Inhibitor*
ACE	*Angiotensin Converting Enzyme*
ASA	*American Society of Anesthesiologists*
AT	*Anaerobic threshold*
ATII	*Angiotensin II*
BMI	*Body Mass Index*
CHD	*Coronary heart disease*
COPD	*Chronic obstructive pulmonary disease*
COX	*Cyclo-oxygenase*
CPEX/CPET	*Cardiopulmonary exercise testing*
CT	*Computed Tomography*
CWI	*Continuous Wound Infusion*
DM	*Diabetes Mellitus*
DSE	*Dobutamine stress echocardiograpy*
DVT	*Deep Venous Thrombosis*
ECG	*Electrocardiogram*
ERAS	*Enhanced Recovery After Surgery*
FBC	*Full blood count*
FDA	*Food and Drug Administration*
FFP	*Fresh Frozen Plasma*
FTS	*Fast Track Surgery*
GDT	*Goal directed fluid therapy*
GIT	*Gastro-intestinal tract*
Hb	*Haemoglobin*
HbA1c	*Glycosylated haemoglobin*
ICU	*Intnsive Care Unit*
IPLA	*Intraperitoneal Local Anesthetic*
IV	*Intravenous*
IVL	*Intravenous Lidocaine*
LMWH	*Low Molecular Weight Heparin*
LOS	*Length of stay*
LV	*Left Ventricle*
MI	*Miocardial Infarction*

List of Abbreviations **cont...**

Abb.	Full term
NCEPOD	*National Confidential Enquiry into Patient Outcome and Death*
NGT	*Nasogastric tube*
NICE	*National Institute for Health and Care Excellence*
NMDA	*N-methyl-D-aspartate*
NRS	*Nutrition Risk Score*
NSAIDS	*Nonsteroidal Anti-inflammatory Drugs*
OR	*Operation Room*
PCA	*Patient – controlled analgesia*
PI3K	*Phosphatidyl-inositol 3-kinase*
POD	*Postoperative day*
POI	*Postoperative ileus*
PONV	*Postoperative nausea and vomiting*
RNA	*Ribonucleic acid*
SD	*Standard Deviation*
SGA	*Subjective global assessment*
SIRS	*Systemic inflammatory response syndrome*
SSI	*Surgical Site Infction*
TAP	*Transversus-Abdominis Plane*
TEA	*Thoracic Epidural Analgesia*
TIA	*Transient Ischaemic Attack*
TID	*Ter in die (Three Times Daily)*
TOD	*Transesophageal Doppler*
VTE	*Venous thromboembolism*

INTRODUCTION

Enhanced Recovery after Surgery (ERAS) programs have been very important to surgeons who are keen to decrease postoperative morbidity, reducing variability in postoperative care and minimizing hospital costs ***(Carli et al., 2016)***.

The delay in full recovery after major surgery has been improved significantly by introducing a series of modifications throughout the whole perioperative period and summarizing these modifications in a program called the enhanced recovery after surgery (ERAS) program or the Fast Track Surgery (FTS) ***(Gustafsson et al., 2013)***.

ERAS Program is an evidence-based program structured to optimize perioperative care. It also helps to decrease stress of surgery, maintain normal physiological status and minimize complications thus speeding up postoperative recovery ***(Jaber et al., 2010)***.

ERAS program consists of multiple interventions to speed up recovery of patients by decreasing the effect of surgery on endocrinal and metabolic stress responses. Effective modulations of these responses lead to a reduction in complications rate, length of hospital stay and need for analgesia ***(Parrish et al., 2016)***.

ERAS also addresses early mobilization and early oral feeding which means early return to normal life style after

major surgery thus early discharge with less morbidity. This is achieved by normalizing the patient's physiologic state preoperatively to decrease the impact of surgery which helps early returning to the normal state ***(Parrish et al., 2016)***.

The ERAS pathway has been first introduced in colorectal surgery then developed to involve other subspecialties as urology, cardio-thoracic, orthopedic and vascular surgery ***(Melloul et al., 2016)***.

With traditional perioperative care, patients undergoing elective colorectal resection can have a complication rate of 20% to 30% and a postoperative hospital stay of 6 to 12 days. The use of health care resources and costs are related to the length of hospital stay and the extent of postoperative morbidity ***(Cheng-le Zhuang et al., 2013)***.

ERAS program has been shown to decrease complications and shorten the length of hospital stay. Later this program changed into multi-disciplinary interventions including multiple perioperative interventions which are now recognized as the ERAS protocol ***(Malczak et al., 2016)***.

ERAS and related programs increase the efficiency of care, resulting in a reduction of length of hospital stay. Good results of the application of ERAS programs in other fields as colorectal surgery encouraged application of ERAS protocols to patients undergoing pancreatic surgery ***(Kagedan et al., 2014)***.

Bariatric surgery is the most efficient treatment for morbid obesity, ensuring steady loss of weight and improving co-morbidities due to obesity. The application of ERAS improved outcome in bariatric surgery ***(Thorell et al., 2016)***.

Liver surgery is a major and stressful procedure for surgeons and patients. Major complications can reach 27 % in malignant disease with a 5% mortality rate. Stress response is increased after major hepatic surgery. Directed programs as ERAS reduce metabolic response to stress therefore decrease complications ***(Melloul et al., 2016)***.

AIM OF THE WORK

This study aims to assess the safety and efficacy of enhanced recovery after surgery programs in general surgery in comparison with traditional care.

PREOPERATIVE

ERAS pathway starts from the preoperative period throughout the whole perioperative hospital stay. Preoperatively it aims to prepare the patient for the upcoming surgical stress in order to decrease the impact of metabolic response ***(Steenhagen, 2016).***

Key elements of the preoperative care in the ERAS program include patient education, patient optimization, minimizing fasting, prevention of surgical site infection and thromboprophylaxis ***(Nelson et al., 2017).***

Patient Education

A successful ERAS program begins with an engaged, participating patient. It is important to emphasize the active role patients will play in their own recovery and empower patients to "speak up" and ask questions. Daily milestones are specified regarding goals for nutrition, exercise, pain management, and drains. The discharge criteria are explicit for patients and caregivers ***(Feldman, 2017).***

Preadmission information, education and counseling about surgical and anesthetic procedures reduce fear and anxiety and enhance postoperative recovery and discharge. The information includes the role of perioperative feeding, early postoperative mobilization, pain control, and respiratory physiotherapy to reduce the prevalence of complications ***(Segelman and Nygren, 2017).***

Explicit preoperative patient information can facilitate postoperative recovery. Importantly, at this first encounter the patient should also be given a clear role with specific tasks to perform, including targets for food intake and oral nutritional supplements and targets for mobilization, during the postoperative period ***(Halaszynski et al., 2015).***

The enhanced recovery consensus is that preoperative information is beneficial and patient education should describe the patient's journey and condition expectations for the period of hospitalization. Intensive preoperative patient information facilitates postoperative recovery, reduces anxiety and pain, and improves postoperative self-care and symptom management, particularly in patients who exhibit the most denial and the highest levels of anxiety ***(Kiecolt et al., 2016).***

Delivering information during pre-assessment appears to be more effective than in the immediate preoperative period. Patient education includes emphasizing the importance of a patient's role in his or her own recovery and a clear explanation of what is to happen encourages adherence to the ERAS care pathway as compliance is currently believed to be central to a successful program ***(Shuldman, 2016).***

Setting realistic goals and discussing potential morbidity is also important and has a positive impact upon recovery. 'Informative preparations' can be both 'procedural' and 'sensory information' indicating what the patient will see, hear,

feel and taste. Post-discharge expectations should be clarified to patients within an enhanced recovery program ***(King et al., 2017).***

Preparing patients for surgery by education and conditioning of expectations may therefore induce physical changes that will improve outcome. The patient's attitude towards surgery significantly influence emotional status during the decision-making process. In turn, emotions have a direct effect on 'stress' hormones and these modulate immune function ***(Sharma et al., 2016).***

Personality type has been found to influence hospital stay and it is likely to exert an effect upon pain threshold. Postoperative anxiety and depression are closely linked to preoperative levels using validated psychological questionnaires and are related to postoperative quality of life ***(Sharma et al., 2017).***

Preoperative health behavior can also influence outcome, including immune and endocrine function, wound healing and overall postoperative rehabilitation. When patients are under stress, they may increase negative short-term destructive coping behaviors including smoking, alcohol and caloric intake and these can have a deleterious effect on not only immune and neuro-endocrine function, but also on postoperative physical recovery ***(Eremin et al., 2017).***

Patient Optimization

A well-functioning multidisciplinary preoperative clinic is a key component of an ERAS program. The goal of preoperative medical optimization should go beyond risk stratification and aim to improve surgical outcomes by increasing physiologic reserve, where it is compromised by pre-existing co-morbidities. This includes preoperative smoking cessation, glucose control, and correction of anemia ***(Feldman, 2017).***

Outcomes are improved by preoperative identification of risk factors and evaluation and optimization of co-morbidity, such as anemia, diabetes mellitus and hypertension. Malnourished patients benefit from preoperative nutritional supplementation with fewer infectious complications and anastomotic leaks. Patients should stop smoking or drinking excessive amounts of alcohol ***(Nygren, 2015).***

Pre-assessment Clinics

The pre-assessment, pre-admission or preoperative assessment clinic is the vehicle by which the early components of the enhanced recovery process are delivered and it allows for risk assessment and adjustment. The key elements of the pre-assessment clinic are:

- *Full* assessment and clinical examination with anaesthetic consultation shortly after a decision to operate has been made.