

Preoperative Optimization of High Risk Surgical Patients

Essay

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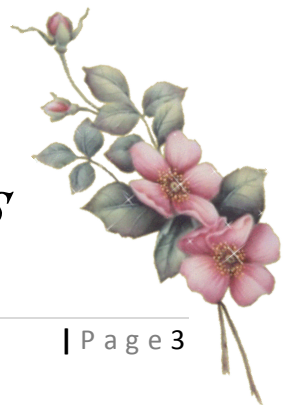
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Contents

Subject	Page
List of tables	I
List of abbreviations	III
Introduction	1
Aim of the work	3
 Definition of high risk surgical patients	4
 Preoperative assessment of high risk surgical patient	10
 Preoperative optimization of high risk surgical patients	49
Summary	114
References	117

List of Tables

<i>No</i>	<i>Table</i>	<i>Page</i>
1	Risk factors for perioperative morbidity and mortality	10
2	ASA physical status classifications	12
3	Goldman Cardiac Risk Index	13
4	Detsky's Cardiac Risk Index	19
5	The Canadian Cardiovascular Society (CCS) grading of angina pectoris	20
6	Revised (Lee's) Cardiac Risk Index	21
7	Clinical predictors of increased preoperative cardiovascular risk	22
8	Postoperative Pneumonia Risk Index	24
9	Distribution of postoperative pneumonia risk index scores	26
10	Risk factor Odds ratio for developing a respiratory complication	28
11	Typical Preoperative Diagnostic Testing in Patients with Chronic Kidney Disease	32
12	Risk Factors in Patients with Cirrhosis Who Undergo Surgery	33
13	Risk Factors for Operative Mortality in Patients With Obstructive Jaundice	34
14	Childs Classification for chronic hepatic patients	35
15	Calculation of stroke risk index (SRI)	40
16	Glasgow coma scale	40
17	Modified pediatric GCS	41
18	The "Hunt and Hess" and "Hunt and Kosnik"	42

	Scales	
19	World Federation of Neurological Surgeons Clinical Grading Scale	43
20	The Fisher Scale for Grading SAH on Admission CT scan	44
21	METs for different activities	50
22	The Duke activity index	50
23	New York Heart Association (NYHA) classification	51
24	Management approach to patients with previous PCI who are due to undergo noncardiac surgery	61
25	Contraindications to Elective Surgery in Patients with Liver Disease	80
26	Preoperative management of neurological and psychiatric medications	96

List of Abbreviations

ACC/AHA	American College of Cardiologists and the American Heart Association
ACE	Angiotensin Converting Enzyme
AKI	Acute Kidney Injury
ALS	amyotrophic lateral sclerosis
APO-E	apolipoprotein E
ARB	Angiotensin Receptor blocker
ASA	American Society of Anesthesiologists
BUN	Blood urea nitrogen
CABG	coronary artery bypass graft
CaCB	Calcium channel blockers
CAD	coronary artery disease
CCS	The Canadian Cardiovascular Society
CHF	congestive heart failure
COPD	chronic obstructive airway disease
COX	cyclooxygenase enzyme
CPX	cardiopulmonary exercise testing
CRI	Cardiac Risk Index
DVT	Deep Venous Thrombosis
ECG	Electrocardiogram
FEV1	forced expiratory volume in 1 sec
FVC	forced-vital capacity
GCOS	Glasgow coma outcome scale

GCS	Glasgow coma scale
HMG CoA	(3-hydroxy-3-methylglutaryl-coenzyme A
LAD	Left Anterior Descending artery
LV	left ventricle
LVEF	Left Ventricular Ejection Fraction
MELD	Model for End-Stage Liver Disease
MEP	maximal inspiratory and expiratory pressures
MET	metabolic equivalents
NGT	Nasogastric tube
NSAIDs	non steroidal anti-inflammatory drugs
NYHA	New York Heart Association
OSA	obstructive sleep apnea
PACU	postanesthetic care unit
PCF	peak cough flow
<i>PCI</i>	Percutaneous coronary intervention
PFT	Pulmonary function test
PMNL	polymorphonuclear leukocyte
PORIF	perioperative renal insufficiency
POSSUM	Physiological and Operative Score for the enumeration of morbidity and mortality
PPC	I. perioperative pulmonary complications
PVCs	premature ventricular contractions
SAH	sub arachnoid hemorrhage
SIADH	inappropriate antidiuretic hormone secretion
TIA	transient ischemic attacks
TIA	transient ischemic attacks
TIPS	Transjugular intrahepatic portosystemic shunt
WFNS	World Federation of Neurological Surgeons

Introduction

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 (**John et al., 2012**).

Pre-assessment requires liaison between primary and secondary care such that patient evaluation can identify medical and social factors that can be modified preoperatively, not only to reduce the effects of surgery upon the patient, but also ensure an efficient enhanced recovery process (**Kheterpal et al., 2009**).

Detecting and modifying co-morbidities before an operation are central to the early stage of enhanced recovery and allow for a reduction in morbidity and in the need for more complex supportive care, such as intensive care. Preoperative assessment allows realistic evaluation of the risk of surgical intervention and gives an opportunity to manage the risk to an individual patient by making modifications to improve the patient's general condition and organ function (**Kheterpal et al., 2009**).

Guidelines and Expert Consensus Documents aim to present management and recommendations based on the relevant evidence on a particular subject in order to help physicians to select the best possible management strategies for the individual patient suffering from a specific condition, taking into account not only the impact on outcome, but also the risk–benefit ratio of particular diagnostic or therapeutic interventions **(Halaszynski et al., 2004)**.

Studies that have investigated optimization of surgical patients have varied in their approaches to both the timing of interventions, and the goals they have aimed to achieve. For enhanced recovery to be successful it is essential that patients be adequately prepared for surgery and preoperative preparation is the first stage in this process. It sets the expectations of the patient and their family for planned surgery and emphasizes how this can affect the patient **(Kehlet , 2009)**.

Aim of the work

To gain recent knowledge about full optimization of preoperative medical conditions in the high risk surgical patients to improve performance and decrease morbidity and mortality.

Definition of high risk surgical patients

Risk

The dictionary meaning of “RISK” is hazard, danger, exposure to mischance or peril. Risk is a measure of probability (statistical chance) of future occurrence (usually undesirable). Nobody is with ‘no risk’ as a very small but possible chance of untoward outcome exists even for those who do not show presence of a factor known to be associated with undesired outcome. We can grade risk as:

- 1: Very low risk
- 2: Low risk
- 3: Moderate risk
- 4: High risk
- 5: Very high risk

(Chabra et al., 2002)

Risk factors

A risk factor is a detectable characteristic or circumstance of individuals or groups which is associated with an increased chance (risk) of experiencing an unwanted outcome. Risk factors can be ‘causes’ or ‘signals’ of untoward outcome. They are observable or identifiable before the occurrence of the undesirable event they predict. General risk factors for perioperative morbidity and mortality are shown in (table 1) (Chabra et al., 2002).

Table 1: Risk factors for perioperative morbidity and mortality:

- 1: Cardiac index > 12 as regard to goldman CRI
- 2: Previous severe cardiac illness (e.g., acute myocardial infarction, heart failure , stroke)
- 3: Age > 70 years with limited physiological reserve in one or more vital organs (NYHA classification II, III or IV)
- 4: sepsis/shock
- 5: Acute renal failure defined as an abrupt decrease of clearance of nitrogenous waste by the kidneys resulting from a variety of processes. This is accompanied by acute rise > 30 % of serum creatinine within 24 h
- 6: Hepatic failure

(Massie et al., 1993)

Definition of high risk surgical patient

The high-risk surgical patient is defined as a patient, undergoing surgery, who is at a high risk for morbidity and mortality due to the coexistent diseases and/or the severity of surgery. A large population of high-risk surgical patients exists, accounting for approximately 13% of all surgical admissions but more than 80% of postoperative deaths **(Gribes et al., 2000)**.

Classification of high risk surgical patients:

Several classifications have been described to stratify the risk of surgery.

1: In 1977, Goldman and his colleagues described the Cardiac Risk Index (CRI) based on his analysis of 1001 patients. Patients were given points according to the findings before surgery. However, this classification like the others mainly focused on the cardiac morbidity.

2: Another score, the POSSUM score (Physiological and Operative Score for the enumeration of morbidity and mortality), has been developed, originally for surgical audit, but it can also be used to estimate the risk of patients. Two-part scoring system including:

A: Physiological assessment

Provides exponential score on 12 variables:

- Age
- Cardiac signs
- Respiratory signs
- Systolic blood pressure
- Pulse
- Coma score
- Serum urea
- Serum sodium
- Serum potassium
- Hemoglobin
- White cell count
- ECG

B: Operative severity

Provides exponential score on 6 variables:

- Operative magnitude
- Number of operations within 30 days
- Blood loss
- Peritoneal contamination
- Presence of malignancy
- Timing of operation

(Mark et al., 2007)

3: The ASA (American Society of Anesthesiologists) classification of physical status was originally introduced in 1941 as a tool for statistical analysis. A high ASA score (table 2) is predictive of both increased postoperative complications and mortality after non-cardiac surgery **(Mark et al., 2007)**.

Table 2: ASA physical status classifications:

Class	Original
1	No organic pathology or patients in whom the pathological process is localized and does not cause any systemic disturbance or abnormality.
2	A moderate but definite systemic disturbance caused either by the condition that is to be treated or surgical intervention or which is caused by other existing