Enhanced Recovery After BariatricSurgery

Essay

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List of Abbreviations

ADH	Antidiuretic hormone		
AHA	American heart association		
AHI	Apnea hypopnea index		
APAP	Auto adjusting positive airway pressure		
ASA	American society of anesthesiologists		
BEE	Basal energy expenditure		
BiPAP	Bilevel positive airway pressure		
BIS	Bispectral index		
BMI	Body mass index		
CC	Closing capacity		
CO	Cardiac output		
CAD	Coronary heart disease		
CHD	Congestive heart disease		
CI	Cardiac index		
CO_2	Carbon dioxide		
CPAP	Continuous positive airway pressure		
CPEX	Cardiopulmonary exercise testing		
DM	Diabetes mellitus		
DVT	Deep venous thrombosis		
ECG	Electrocardiography		
EI	Energy intake		
ERABS	Enhanced recovery after bariatric surgery		

🕏 List of Abbreviations 🗷

ERAS	Enhanced recovery often anneaux	
	Enhanced recovery after surgery	
FRC	Functional residual capacity	
GERD	Gastro esophageal reflux disease	
HELP	Head elevated laryngoscopy position	
IAP	Intra-abdominal pressure	
IBW	Ideal body weight	
ICU	Intensive care unit	
IDDM	Insulin dependent diabetes mellitus	
IHD	Ischemic heart disease	
IVC	Inferior vena cava	
JVP	Jugular venous pressure	
LAGB	Laparoscopic adjustable gastric banding	
LBM	Lean body mass	
LMWH	Low molecular weight heparin	
LOS	Length of hospital stay	
LVH	Left ventricular hypertrophy	
MAC	Minimal alveolar concentration	
MAP	Mean arterial blood pressure	
N ₂ O	Nitrous oxide	
OHS	Obesity hypoventilation syndrome	
OSA	Obstructive sleep apnea	
PAP	Positive airway pressure	

PACU	Postoperative anesthesia care unit		
P _a CO ₂	Arterial carbon dioxide tension		
PEEP	Positive end expiratory pressure		
PE	Pulmonary embolism		
PFTs	Pulmonary function tests		
PONV	Postoperative nausea and vomiting		
REM	Rapid eye movement		
RSI	Rapid sequence induction		
RV	Residual volume		
RYGB	Roux-en-Y gastric bypass		
TBW	Total body weight		
TEE	Trans esophageal echocardiography		
TIVA	Total intravenous anesthesia		
TLC	Total lung capacity		
VC	Vital capacity		
VD	Volume of distribution		
V/Q	Ventilation/perfusion ratio		
VTE	Venous thromboembolism		
WHO	World health organization		

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Introduction

According to the National Institute of Health, Obesity is a major health problem with clearly established health implications, including an increased risk for coronary artery disease, hypertension, dyslipidemia, diabetes mellitus, gall bladder disease, degenerative joint disease, obstructive sleep apnea and socioeconomic and psychological impairment (*Babatunde et al.*, 2002).

Bariatric surgery provides significant and sustained weight loss option for morbidly obese patients. Implications for anesthetic and perioperative care of severely obese patients are various. Induction of anesthesia is associated with potential risks of difficult airway and pulmonary aspiration of gastric contents. Periods of hypoxemia and hypercarpia perioperatively may increase pulmonary vascular resistance and precipitate right heart failure particularly in patients with pre-existing cardiac disease. The limited information available concerning pharmacodynamics and pharmacokinetics perioperatively administered medications in severe obesity poses a challenge to proper drug dosing in these patients (Cook et al., 2011).

Advances in surgery and anesthesia make bariatric surgery as a short stay procedure. In the last 15 years many innovations have been introduced either to the surgical technique or to the anesthesia management to enhance the recovery and improve the outcome of bariatric surgery, without compromising patient safety. Because of these improvements and an increased need for bariatric surgery, a prolonged stay in the hospital is no longer justified (*Raeder*, 2007).

Enhanced recovery after bariatric surgery or Ultra Fast Track pathway indicates a multidisciplinary strategy to enhance postoperative recovery and decrease morbidity by reducing surgical stress and its consequences. The length of stay in the hospital is significantly reduced in comparison to traditional management strategies. The effectiveness and implementation of this pathway is based on the following the features of the surgery, the three elements: particularities of patients, and the optimization of all aspects of perioperative care .Examples of ultra fast track components are detailed patient information, adequate specific dietary preparation, anesthetic protocols, minimally invasive surgery, and early mobilization. Collaboration between surgeons, anesthesiologists, nurses, and physiotherapists is essential to properly achieve enhanced recovery after surgery (Elliott et al., 2013).

Aim of the work

The aim of this work is to study the significance of enhanced recovery after bariatric surgery by proper perioperative anesthetic management.

Pathophysiological changes in morbidly obese patient

Definition:

As defined by the WHO, overweight and obesity are characterized by an abnormal or excessive fat accumulation that presents a risk to health (*Huschak et al.*, 2013).

Usually the BMI is used for classification. A person with a BMI of 25 kg/m² or more is classified as overweighed, whereas a BMI of 30kg/m²ormore defines obesity. The sole use of BMI for definition of obesity is controversial. Ina large cohort of patients it has recently been demonstrated that mortality in older patients increases with increased waist circumference, midpoint between floating ribs and iliac crest, despite normal BMI values (*Jacobs et al.*, 2010).

Waist circumference better quantifies fat distribution pattern and therefore offers a further risk stratification. Circumferences of >90–94 cm in men, and >75–80 cm in women increase the perioperative risk of metabolic and cardiovascular complications. Waist circumferences >120 cm (men) and >110 cm (women), respectively, increase mortality risk in patients 50 years and older (*Jacobs et al.*, 2010).

<u>Table (1):</u> Classification of body weight according to the WHO.

Category	BMI class (kg/m ²)	Risk of comorbidities
Underweight	<18.5	Low (relevant risk of other clinical problems
Normal weight	18.5-24.9	Standard
Overweight	25.0-29.9	Increased
Obese class I	30.0-34.9	Moderate
Obese class II	35.0-39.9	Severe
Obese class III	≥ 40.0	Highest

The etiopathogenesis of obesity

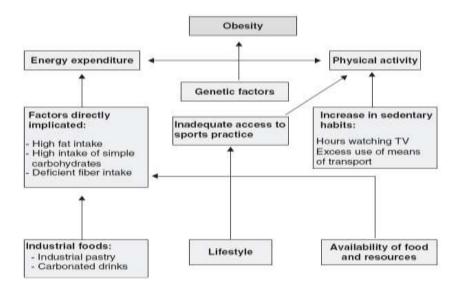
The current understanding of genetics and molecular biology allows considering the pathogenesis of obesity as a complex phenomenon. In this regard, the theory of a sustained increase in intake associated with deficient energy expenditure is excessively simplistic, because obesity has a very heterogeneous origin, and a variety of both genetic and nutritional factors are involved in its development (*Hurt et al.*, 2011).

A- Genetic factors

Recent studies suggest that the development of obesity may have its origin during the fetal period. According to this, a programming mechanism would activate during the fetal period many nutritional, hormonal, physical, and psychological processes which would act in critical periods of life to shape certain physiological functions (*Tounian*, 2011).

B- Changes in dietary and physical activity patterns

Daily physical activity is the predominant factor in the maintenance of body weight and that it is therefore important for weight loss. However, any activities considered to involve low energy expenditure deserve special consideration because in a wide majority of cases it is due to such activities that body weight regulation will be achieved and maintained. (fig. 1) (*Jeffcoale*, 1998).



<u>Figure (1):</u> Factors involved in the development of obesity (*González*, 2010).

C- Other causes:

1 - Endocrine disease:

Previously undiagnosed endocrine disease is almost never the cause of obesity. Hypothyroidism is rare as a cause, and thyroxin replacement produces dramatic weight loss. Hyperphagia and weight gain are sometimes seen in thyrotoxicosis. Cushing's syndrome is a rare cause of obesity, but it is important to consider this possibility when assessing obese patients. Adults with growth hormone deficiency exhibit increased body fat and reduced lean body mass, which can be corrected with growth hormone replacement. Obesity is often a feature of polycystic ovary syndrome, but the primary cause of this remains unknown (*Wilding*, 2002).

2 - Hypothalamic obesity:

Tumors in the hypothalamic region often damage the ventromedial hypothalamic regions that regulate energy intake and expenditure. Such patients often exhibit marked hyperphagia, but also have autonomic imbalance leading to hyperinsulinemia, which can exacerbate weight gain by promoting fat deposition. Physical activity may be reduced as a result of somnolence or associated visual loss (*Wilding*, 2002).

3 - Drugs

Many drugs promote weight gain. The mechanisms are not well understood, but may involve both central effects on appetite and peripheral metabolic effects (*Wilding*, 2002).