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Contents

Aim of the Work

The aim of the work is to review obesity not only as a risk factor for chronic diseases but also as a risk factor for more post operative complications.

List Of Abbreviations

Abbrev.	Full term
ABP	Arterial blood pressure
ACTH	Adrenocorticotropic hormone
AGB	Adjustable gastric banding (open)
ASBS	American Society of Bariatric Surgeons
BMI	Body mass index
BPD	Bilio-pancreatic diversion
BPPDS	Bilio-pancreatic diversion with duodenal switch
CDC	Centers for Disease Control and Prevention
CPAP	Continuous positive airway pressure
CVP	Central venous pressure
EWL	Excess weight loss
FBS	Fasting blood sugar
FDA	Food and Drug Administration
GB	Gastric banding
GE	Gastroesophageal
GEJ	Gastroesophageal junction
GERD	Gastroesophageal reflux disease
GI	Gastrointestinal
HPA	Hypothalamic-pituitary-adrenal axis
IGT	Impaired glucose tolerance
IV	Intravenous
LAGB	Laparoscopic adjustable gastric banding

LASGB	Laparoscopic adjustable silicone gastric banding
LMW	Low molecular weight
LRYGB	Laparoscopic Roux-En-Y gastric bypass
LVBG	Laparoscopic vertical-banded gastroplasty
NAFLD	Non alcoholic fatty liver disease
NIDDM	Non-insulin dependent diabetes mellitus
NIH	National Institutes of Health (United States)
NPY	Neuropeptide Y
NSAIDs	Non-steroidal anti-inflammatory drugs
PCA	Patient-controlled analgesia
RCT	Randomised controlled trial
RY	Roux-en-Y
RYGB	Roux-en-Y gastric bypass
RYGB-E	Extended (Distal) Roux-en-Y gastric bypass
T2DM	Type 2 diabetes mellitus
UGI	Upper gastrointestinal
UK	United Kingdom
US	United States
VBG	Vertical-banded gastroplasty
VSRG	Vertical silastic ring gastroplasty
WHO	World Health Organization

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Introduction

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health leading to reduced life expectancy and/or increased health problems. People are considered obese when their body mass index (BMI) exceeds 30 kg/m2 and they are considered morbid Obese when their (BMI) are greater than 40 kg/m2 (**Haslam and James, 2005**) .

$$\mathbf{BMI} = \frac{\mathbf{mass(kg)}}{\mathbf{(height(m))^2}}$$

There are many possible pathophysiological mechanisms involved in the development and maintenance of obesity. This field of research had been almost unapproached until leptin was discovered in 1994. Since this discovery, many other hormonal mechanisms have been elucidated that participate in the regulation of appetite and food intake, storage patterns of adipose tissue, and development of insulin resistance **(Flier, 2004**).

Excessive weight can result in many serious potentially life-threatening health problems including hypertension, Type II diabetes mellitus (non-insulin dependent diabetes), increased risk for coronary disease, increased unexplained heart attack, hyperlipidemia, infertility, and a higher prevalence of colon, prostate, endometrial, and possibly breast cancer. Approximately 300,000 deaths a year are attributed to obesity (**El-Sohl et al., 2001**).

Obesity can also give rise to several secondary conditions including arthritis, hernias, adult-onset asthma, gallstone, sleep apnea and skin disorders (**Beers et al, 2004)**

Obese patients may present for an elective procedure, for bariatric surgery, for emergency surgery or for obstetric anaesthesia or analgesia. Obese patients have a significantly higher risk of complications following surgery, thrombophlebitis, deep venous thrombosis (DVT), pulmonary embolism (PE), atelectasis, obesity hypoventilation syndrome, heart attack, wound infection, nerve injury and urinary tract infection. Also it was found that morbidly obese patients had a death rate nearly twice as high as that of all other patients, as well as a higher rate of cardiac arrest.(**Bamgbade et al., 2007).**

Caring for critically ill severely obese patients is a challenge for the entire ICU staff. These patients are often difficult to intubate and gaining vascular access can become a major source of frustration. Even routine aspects of care, such as monitoring blood pressure and moving the patient, are complicated. Furthermore, many diagnostic studies are impossible to obtain and/or of limited quality so severe obesity is independently associated with increased mortality in the ICU. (**El-Sohl et al., 2001**).

Chapter I

Phathophysiology of Morbid Obesity

Obesity is considered epidemic in the world in general, and it is an increasingly major health hazard in many developing nations, Obesity is clearly associated with the development of some common chronic conditions, and obese individuals have between 50% and 100% increase in the chance of early death when compared with people of normal weight.

Body Mass Index (BMI) describes relative weight for height and is significantly correlated with total body fat content. The BMI should be used to assess overweight and obesity and to monitor changes in body weight. BMI is calculated as weight (kg)/height squared (m2). To estimate BMI using pounds and inches, use: [weight (pounds)/height (inches) 2] x 703. **(Flegal et al, 2002)**

Table 1: Classification of people according to BMI. (Flegal et al, 2002)

BMI <18.5 = underweight
BMI 18.5–24.9 = normal weight
BMI 25–29.9 = over weight
BMI >30 =obese
BMI >40 (or >35 kg/m2 1 co-morbidity) = morbid (‘‘clinically severe’’) obesity
BMI >50 = ‘‘super-obesity

Clinical obesity is a syndrome involving both weight and metabolic changes, and is influenced by both genetic and environmental factors. Both aspects can participate in the pathology associated with obesity. (**Price et al, 2006)**

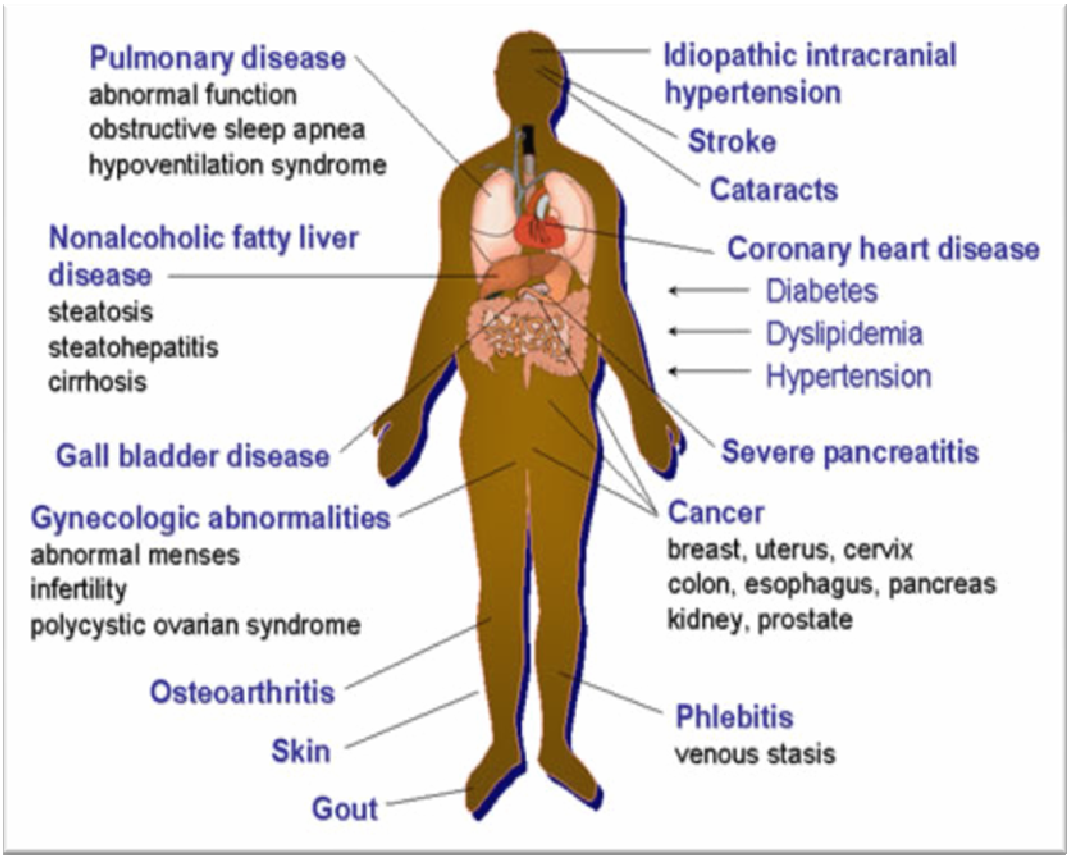

Figure 1: The pathological effects of morbid obesity on body systems. From (Price et al, 2006)

Table 2: Overview of pathophysiologic effects of obesity. (Faroogi et al, 2003)

A- Weight-Related Changes :
Degenerative joint disease
Dermal pressure changes
Restrictive pulmonary physiology
Increased intra-abdominal pressure effects
Mobility limitations
B- Physiologic Changes :
Hyperkinetic systemic circulation
Myocardial hypertrophy
Elevated systemic pressure
Diastolic dysfunction
Increased circulating blood volume
Metabolic syndrome
C- Pro-inflammatory Phenotypic Changes :
Vascular intimal atherosclerotic changes
Prothrombotic state with: Increased fibrinogen Decreased fibrinolysis Increased antithrombin-III levels Increased plasmin activator inhibitor levels Increased blood viscosity

Effects of morbid obesity on body systems:

Cardiovascular system:

Obesity can affect: circulatory volumes, electrocardiographic findings, cardiac structure and function, besides changes at the cellular level.

The relationship between obesity and stroke volume has been well elucidated, as weight increases beyond ideal body weight, there is a linear increase in total blood volume resulting in a direct increase in cardiac output which almost exclusively dependent on increased stroke volume with resting heart rate remaining unchanged. **(Alpert et al, 2001)**

In resting normo-tensive obese patients, systemic vascular resistance has been noted to be normal or reduced. It is suggested that the increase in cardiac excessive adiposity. **(Collis et al, 2001)**

Obese patients, however, are at increased risk for systemic hypertension, and concentric hypertrophy remains common. With increasing left ventricular (LV) mass, there is decreased compliance; several echocardiographic studies implicate obesity as an independent risk factor for left atrial enlargement and (LV) diastolic dysfunction. **(Rider et al, 2009)**

(obesity cardiomyopathy) may be identified when the (LV) dilation exceeds the compensatory effects of the left ventricular hypertrophy.

The increased cardiac output also may result in right ventricular (RV) hypertrophy/enlargement. **(Alpert et al, 2001)**