Obesity: the ICU Paradox

Rates of obesity are increasing and obesity is associated with comorbidities in all organ systems. Cardiovascular complications include diabetes, hypertension, heart failure and stroke. Additional effects include sleep apnoea, non-alcoholic fatty liver disease, arthritis and several cancers. It is estimated ~ 60% of Australian population is overweight. It has been postulated obesity is a higher risk than smoking for adverse effects on quality adjusted life years at a population health level. The subset of obese patients that has had the greatest increase in prevalence in the general community are those with a body mass index (BMI) >40 kg/m2 (WHO Class III). In overweight patients (BMI 25-29.9 kg/m2) anthropomorphic measures such as waist circumference may provide additional cardiovascular risk stratification.

Bariatric patients present specific challenges in minimising complications and ensuring safe perioperative care. The care of the bariatric patient requires a multidisciplinary and organisation wide approach with respect to equipment, manual handling, staff training, psychological factors, nutrition, transport, mobility and the involvement of multiple teams.

Lifestyle and pharmacological interventions have had limited success in the treatment of obese patients particularly those with a BMI > 40kg/m2. The most effective therapy for obesity is bariatric surgery with maintained lifestyle changes. Rates of surgery are rising rapidly. The 3 widely performed operations in Australia are laparoscopic adjustable gastric band, Roux-en Y gastric bypass and gastric resection (sleeve). Patients undergoing surgery typically have a BMI >35 kg/m2 with evidence of obesity related complications or a BMI > 40 kg/m2.

In hospital mortality for elective bariatric surgery is low although large observational studies report higher mortality than randomised trials. The nature and type of complications vary with the surgery performed. Causes of significant early morbidity include anastomotic leak, thromboembolic complications and decompensation of cardiac disease. In addition to first time surgery, revision surgery rates are rising rapidly as well with increased risk of complications. Significant healthcare disparities exist in access to bariatric surgery.

Because of its well described cardiovascular and inflammatory associations, obesity has been studied in patients undergoing coronary bypass surgery but to a lesser extent in valve or other cardiac surgery. Recent studies have questioned the increased risk of obesity in cardiac surgery. Previous work by Yap et al showed increased incidence of renal failure and deep sternal wound infection in obese patients but no increase in mortality; however, the underweight group were excluded from the outcome analysis.

The intensive care literature suggests worse outcomes in obese patients with sepsis. In surgical patients a U shaped risk of mortality was found. Cardiac surgical patients usually have their weight and height measured pre operatively as opposed to self-reported values which are used in large population studies. Self-reported weight may be an underestimate of true weight. Also much data is collected and risk stratification is possible to adjust for potential confounding factors. A summary of current literature suggests highly selected extreme obesity patients (BMI >40 kg/m2) can safely undergo cardiac surgery.
A paradox is a statement or proposition that seems self-contradictory or absurd but in reality expresses a possible truth. The obesity paradox has also been described where obese patients have better outcomes in chronic dialysis, acute myocardial infarction, congestive heart failure and obese patients with hypertensive heart disease have improved survival compared to normal weight patients. Nutrition and low BMI are well studied in general surgical and cancer surgery patients and low BMI is associated with poor outcomes. “U” or “J” shaped relationships have been described between BMI and survival in several large population groups. Lower short and long term mortality associated with overweight and obesity has been described in a large cohort of intensive patients however cardiac surgical patients were excluded.

The obesity paradox in the general population is to a large extent determined by the way BMI is categorised and confounding factors such as smoking, ethnic background, socioeconomic status, cardiovascular fitness and particularly the presence, type and severity of a disease process.

References