

# Metabolic Effects of Bariatric Surgery

Honorary Section Editor - Francesco Rubino

A significant body of evidence has accumulated demonstrating that bariatric/metabolic surgery can achieve sustained weight loss, excellent metabolic control and reduction of cardiometabolic risk. Randomized clinical trials also show that surgery is more effective than conventional medical therapies in the treatment of obese patients with Type 2 Diabetes Mellitus (T2DM). In this section, leading international experts discuss clinical and mechanistic aspects of bariatric/metabolic surgery and provide the reader with a state-of-the art review of the latest research in this field.

Research on the mechanisms of action of these surgical procedures have revealed a critical role of the gastrointestinal (GI) tract in the regulation of glucose metabolism, satiety/hunger and lipid metabolism, providing a biological rationale for the use of GI-based interventions as a treatment for metabolic syndrome. Metabolic surgery has been one of the fastest growing fields of medical research in the last decade. In their chapter, Drs Neff and le Roux discuss mechanisms of weight loss and glucose homeostasis after the most commonly performed bariatric operations.

Lifestyle interventions and drugs have relatively little impact on CVD risk in patients with fully blown diabetes. In contrast, long-term case-controlled studies document a significant reduction of cardiovascular disease (CVD) and mortality after bariatric/metabolic surgery. Drs Elliott and le Roux have reviewed the effects of various bariatric procedures on CVD risk factors.

Drs Olbers and Johannson reviewed the effect of bariatric/metabolic surgery on various metabolic conditions, including T2DM, hypertension, sleep apnea and metabolic syndrome; emphasizing how the health benefits of these GI operations go well beyond weight loss.

Although the indications for bariatric/metabolic surgery are still based on body mass index (BMI)-centric criteria, studies in animals and humans show that many of the metabolic effects of GI surgery are independent of weight loss. Such evidence has led to the hypothesis that surgical treatment for T2DM could be offered to less obese and non-obese patients. Dr Cohen and co-workers discuss the results of metabolic surgery for the treatment of type 2 diabetes in patients with BMI below 35 kg/m<sup>2</sup>.

The recognition that alteration of GI anatomy can exert weight-independent effects on metabolism and that different anatomical manipulations can exert distinct physiologic effects has fueled interest toward the development of new surgical procedures and endoluminal devices specifically designed for the treatment of metabolic disease. Such novel approaches have the intent to mimic at least some of the metabolic effects and possibly reduce the nutritional side effects of conventional bariatric surgery. Dr Ugale presents the results of laparoscopic ileal interposition with sleeve gastrectomy, an experimental procedure for T2DM and other metabolic conditions.

The reader will find the chapters that follow both informative and stimulating as they provide a critical appraisal of the available evidence, including current gaps in knowledge and a view of how research in metabolic surgery may shape the future care of obesity and diabetes.