

# THE GP AND BARIATRIC SURGERY: PART 1

Bariatric surgery is increasingly recognised as a viable approach to effective weight-loss management. In part one of a new series the authors discuss the different types of bariatric surgery.

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The World Health Organisation defines overweight and obesity as an abnormal or disproportionate accumulation of body fat which may be harmful to health.<sup>1</sup> The incidence of overweight or obese adults in England in 2013 was 62.1% (67.1% of men and 57.2% of women).<sup>2</sup> This presents a significant public health challenge. Those classified as overweight or obese are at risk of developing major health problems associated with a reduction in life expectancy. A BMI of 30-35 carries with it a 2-4 years reduction in life expectancy, a BMI >40 is associated with an 8-10 year reduction.<sup>3</sup> Significant morbidity in combination with substantial social consequences of obesity such as discrimination, social isolation and potential reduction or loss of earnings negatively impacts on the wider UK economy.<sup>4</sup> NHS costs attributable to overweight or obese patients are estimated to be £4.2 billion and indirect costs to the wider economy of £15.8 billion, with this set to rise with the increasing rates of overweight and obese adults and children in the UK.<sup>5</sup> Worldwide, bariatric surgery is being increasingly utilised to treat obesity and its complications as studies have shown it to be the only method for achieving long term weight loss in the morbidly obese.<sup>6</sup> In the UK, more than 18,283 bariatric operations have been carried out between 2010 and 2013.<sup>7</sup>

## Classification and prevalence

Obesity is most commonly classified using BMI which is calculated by the weight in kilograms divided by height in metres squared ( $\text{kg}/\text{m}^2$ ). Although BMI does not directly measure adiposity and must be interpreted with caution in certain populations (for example pregnancy and children), a BMI of over 30  $\text{kg}/\text{m}^2$  is classified as obesity.<sup>8</sup>

The prevalence of obesity (BMI >30  $\text{kg}/\text{m}^2$ ) in England is calculated to be 24.4% in men and 25.1% in women with similar figures throughout the UK.<sup>2,9-11</sup> The highest prevalence of obesity worldwide occurs in the United States of America. If current trends continue it is estimated that by 2025 UK obesity could have increased to 47% and 36% in men and women respectively.<sup>5</sup>

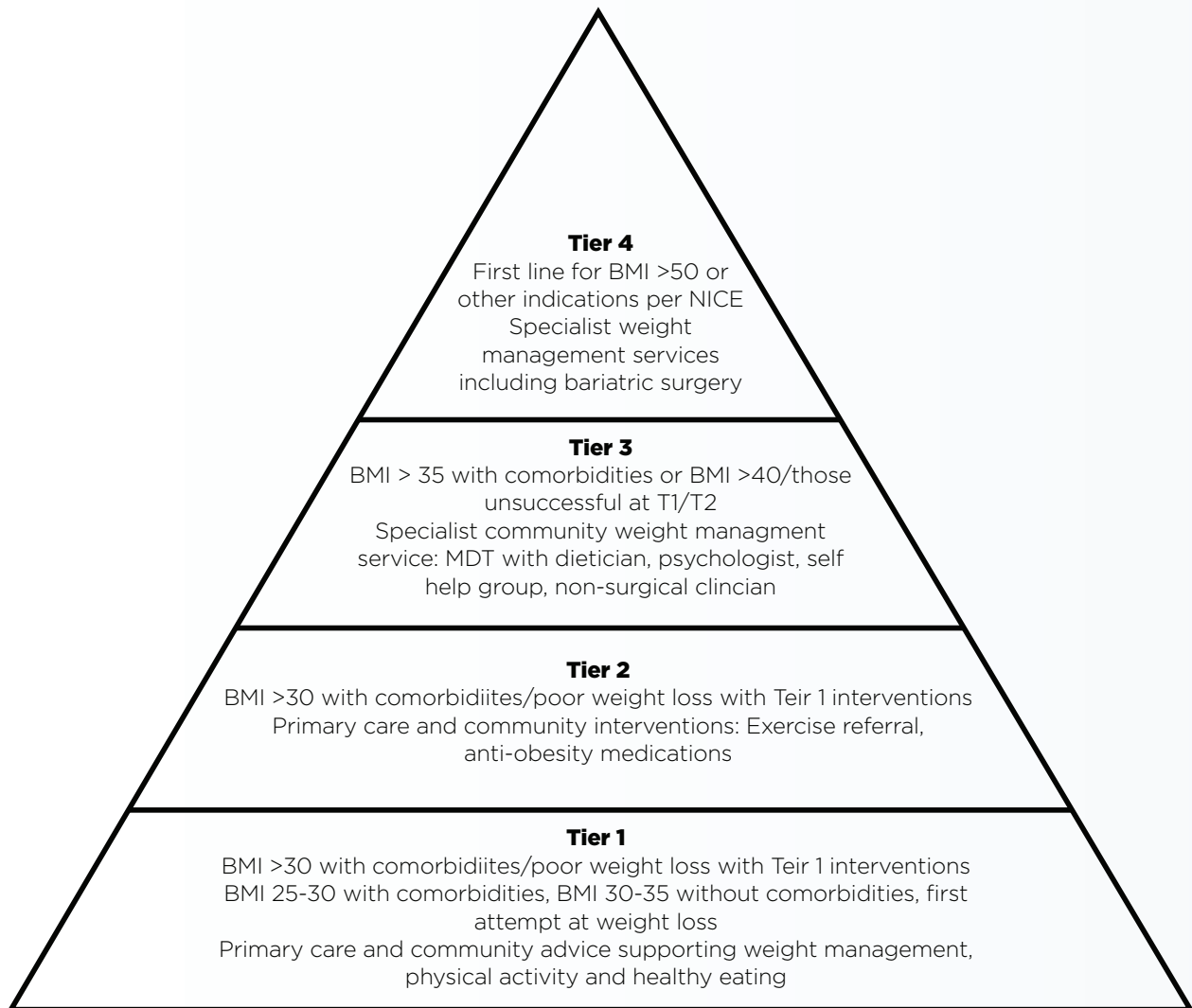
## Sequelae of obesity

Overweight and obese patients are at increased risk of developing a number of medical conditions including type 2 diabetes mellitus, hypertension, dyslipidaemia, cardiovascular disease, sleep apnoea, osteoarthritis and certain cancers, mainly oesophageal, endometrial, colorectal and breast (in post-menopausal women).<sup>12</sup> With the development of these serious health conditions comes a reduction in life expectancy and the WHO estimate 3.4 million adults die each year as a result of being overweight or obese.<sup>1</sup> Obesity also impacts upon reproductive health and fertility,<sup>13,14</sup> psychological health and has wider social and economic implications.<sup>4</sup> Obesity is now recognised as a disease by the WHO and has been incorporated into the 'Global Action Plan for the prevention and control of non-communicable diseases 2013-2020' with the aim of stopping the growth of global obesity and therefore reduce its impact on mortality worldwide.<sup>1</sup>

## Current treatment modalities

The management of obesity is multifactorial and National Institute for Health and Care Excellence (NICE) recommend a tier based approach (Figure 1).<sup>15</sup> The starting tier is dependent on increasing BMI with or without associated obesity related comorbidities or unsuccessful progress at lower tiers. Tier 1 approach focuses on primary care and community advice to support weight management with guidance on reduction in calorie intake, healthy eating and physical exercise. The second tier of obesity management focuses on community interventions managed by the general practitioner and the community team including exercise prescription. Pharmacotherapy (Table 1) is a further treatment modality which may be considered when patients have not achieved their target weight with the help of diet, exercise and behavioural alterations or are struggling to maintain their weight loss. Tier 3 involves referral to a multi-disciplinary specialist weight management service in the community and progression to Tier 4 signifies involvement of secondary care and bariatric surgeons.

**FIGURE 1: TIER BASED APPROACH TO MANAGEMENT OF OVERWEIGHT AND OBESE ADULTS**



**Orlistat**

Orlistat, a selective lipase inhibitor, is currently the only anti-obesity medication approved in the UK by NICE. Orlistat selectively binds to gastric and pancreatic lipase in the gastrointestinal tract. This partially inhibits the hydrolysis of dietary triglycerides to their substrates, thereby limiting their absorption. The fat which is not absorbed (approximately 30% of intake) is excreted, which can make stools pale and loose.<sup>16</sup> NICE guidelines suggest it may be prescribed in patients of BMI >30kg/m<sup>2</sup> or BMI >28kg/m<sup>2</sup> with associated risk factors when diet and exercise is failing. Orlistat may be continued after three months if the patient loses at least 5% of their body weight. Cases should be reviewed on an individual bases after a year.<sup>8</sup>

**Bariatric surgery**

Bariatric surgery aims to achieve sustained reduction in body weight with reduction/prevention of associated co-morbidities. Bariatric surgery acts by either

**TABLE 1: ANTI-OBESITY PHARMACOTHERAPY<sup>17</sup>**

Drug	Approved for use in UK	Mechanism of action
Orlistat	Yes	Selective inhibitor of lipase
Lorcaserin	No, FDA approved	Serotonin 2C receptor agonist
Combination of phentermine and topiramate extended release	No, FDA approved	Phentermine reduces appetite by increasing norepinephrine in the hypothalamus and topiramate may reduce appetite through its effect on GABA receptors

restriction: reduction in the capacity of the stomach limiting the amount of food intake; malabsorption: impaired absorption of nutrients by “bypassing” a proportion of the stomach and small bowel; or a combination of both restriction and malabsorption. Hormonal mechanisms are also thought to play a role in weight loss following bariatric surgery, although

the exact nature of their effect is still debated. Ghrelin is a hormone secreted in the gastric fundus which plays an important role in the physiology of appetite and stimulation of growth hormone. Due to resection or bypassing of the portion of the stomach which is responsible for ghrelin production, levels have been shown to decrease significantly post-operatively. This is in comparison to diet induced weight loss, where levels of ghrelin are higher than normal. It is theorised this could be the reason for sustained weight loss following bariatric surgery.<sup>18,19</sup>

The most commonly performed bariatric procedures worldwide are Roux en y gastric bypass, sleeve gastrectomy, adjustable gastric banding and biliary pancreatic diversion/duodenal switch.<sup>20</sup> Each procedure is associated with impressive long term weight loss and this is measured as percentage of excess weight loss (%EWL) which allows a comparison of the degree of weight loss between patients of varying initial weights<sup>7</sup> (Table 2). Prior to surgery patients are counselled intensively regarding the risks of each procedure and encouraged to continue their weight loss. In the immediate preoperative weeks patients are given a low calorie diet (also known as the liver shrinkage diet) to follow which encourages reduction in liver glycogen storage and therefore liver size. The resulting reduction in size and increased suppleness of the liver makes it easier to retract. This is necessary to allow access to the stomach so the procedure can be carried out laparoscopically.<sup>21</sup>

### Intragastric balloon

Intragastric balloon insertion is usually carried out as a bridge to bariatric surgery.<sup>22</sup> A collapsed balloon attached to a filling tube are placed endoscopically into the stomach. The balloon is inflated with blue dye and the filling tube subsequently detached under direct vision. The presence of the balloon induces early satiety and restriction of food intake. The balloon typically requires removal after six months.<sup>23</sup>



### Adjustable gastric band

An adjustable silicone band is placed laparoscopically around the upper stomach to induce early satiety and restrict food intake.<sup>24</sup> The band is connected via tubing to a subcutaneous port which is easily accessed



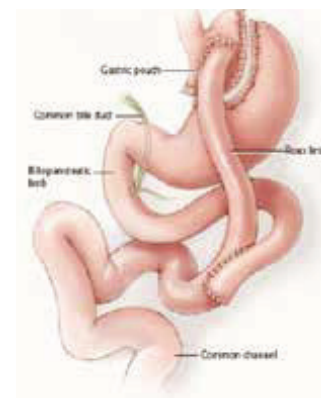
**TABLE 2: COMPARISON OF %EWL BETWEEN BARIATRIC PROCEDURES<sup>7</sup>**

Bariatric procedure	%EWL at 3 years
Gastric band	45 - 55%
Sleeve gastrectomy	55 - 60%
Roux en y gastric bypass	55 - 70%

to allow alteration of fluid within the balloon which lines the band.<sup>25</sup> Gastric bands are associated with good short term weight loss, however over the years of their usage, a large number have to be removed due to weight regain or other band related complications such as reflux or band slippage (Table 3). In a large UK case series of 665 patients, 21% of bands were removed and over half (58%) of these patients went on to have further bariatric surgery.<sup>26</sup>

### Gastric bypass

The Roux en y gastric bypass is currently the most frequently performed bariatric operation worldwide.<sup>20</sup> Gastric bypass works by a combination of restriction and malabsorption. The restrictive element is achieved by dividing the stomach into two sections, a proximal segment which becomes a small gastric pouch and a distal stomach segment which remains continuous with the biliary pancreatic system (BP limb). When a patient has a meal the food passes from the stomach pouch into the jejunum and remains there without any absorption. After 1-1.5 metres another anastomosis from the small bowel to the bowel of the BP limb is made. Only when diet passes through this anastomosis does absorption begin.<sup>27</sup>



### Sleeve gastrectomy

Sleeve gastrectomy is carried out by dividing and removing a portion of the stomach (the greater curvature) leaving a reduced size "sleeve" like stomach thereby restricting food intake.<sup>28,29</sup>



### Biliary pancreatic diversion (BPD) (+/- duodenal switch)

BPD is most commonly carried out in patients with BMI >50; the procedure combines a distal

gastrectomy with a long roux en y anastomosis to limit the length of the nutrient absorbing limb. Only a few centres in the UK routinely perform this procedure.<sup>30</sup>

## Bariatric surgery and diabetes

Our understanding of the role of bariatric surgery in the management of obese patients with type 2 diabetes mellitus is continuously developing. Studies have previously demonstrated improvement in glycaemic control associated with reduction in required medical therapy and cardiovascular risk factors in obese subjects with type 2 diabetes mellitus.<sup>31–33</sup>

We have the advantage of high quality evidence in bariatric surgery with a substantial follow up period, in particular the Swedish Obese Subjects group has reported follow up 20 years following obesity surgery.<sup>34</sup> Bariatric surgery (roux en y gastric bypass and sleeve gastrectomy) in combination with best medical management has been demonstrated to be superior to intensive medical management alone in the management of obese patients with poorly controlled type 2 diabetes mellitus. In a randomized control trial of 150 type 2 diabetic patients, significantly more patients achieved a target glycated haemoglobin level of <6.0% in the bariatric surgery group compared to medical management. This improvement in diabetes control continued long term (three years of follow up) and surgery was also associated with significant weight loss and improvement in quality of life within this diabetic group.<sup>33</sup>

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## NEXT ISSUE

**Part 2 will look at the management post surgery and the role of the GP.**