

## Early Effect of Bariatric Surgery on Urogenital Function in Morbidly Obese Men

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### ABSTRACT

**Introduction:** Obesity is an independent risk factor for erectile dysfunction (ED) and lower urinary tract symptoms (LUTS). Bariatric surgery has been shown to improve erectile function and urinary symptoms in medium- to long-term studies (3- to 12-month postoperative follow-up).

**Aim:** To investigate the early effect (1 month postoperatively) of bariatric surgery on ED and LUTS, which has not previously been investigated.

**Methods:** Morbidly obese men (body mass index  $> 35 \text{ kg/m}^2$ ) undergoing bariatric surgery were asked to complete the International Index of Erectile Function (IIEF) and International Prostate Symptom Score (IPSS) questionnaires before surgery and 1, 3, and 6 months after surgery.

**Main Outcome Measure:** The influence of bariatric surgery on urogenital function, body mass index, fasting blood glucose, and glycated hemoglobin were analyzed using parametric and non-parametric tests for paired samples.

**Results:** Of 30 patients who completed the study, 18 reported ED (IIEF score  $< 25$ ) and 14 reported moderate or severe LUTS (IPSS  $\geq 8$ ) before the operation. Twelve patients had ED and moderate or severe LUTS. IIEF score, IPSS, body mass index, percentage of weight loss, fasting blood glucose, and glycated hemoglobin showed significant and rapid improvement after bariatric surgery starting at the 1-month postoperative time point and improvement continued throughout the study in all patients with ED or moderate to severe LUTS.

**Conclusion:** This is the first study showing improvement in erectile and urinary function within 1 month after bariatric surgery, an effect that was parallel to glycemic improvement and weight loss.

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**Key Words:** Bariatric Surgery; Weight Loss; Erectile Dysfunction; Lower Urinary Tract Symptoms; Body Mass Index

### INTRODUCTION

According to the World Health Organization definition, overweight (body mass index [BMI]  $\geq 25 \text{ kg/m}^2$ ) and obesity (BMI  $\geq 30 \text{ kg/m}^2$ ) are abnormal and excessive fat accumulation,

respectively, that can impair overall health.<sup>1,2</sup> With an increasing number of overweight or obese people globally, obesity has been recognized as an epidemic affecting the health of populations mainly through obesity-related diseases such as type 2 diabetes, cardiovascular diseases, and stroke.<sup>1,3</sup> Therefore, it is not surprising that obesity has been identified as an independent risk factor for erectile dysfunction (ED) and lower urinary tract symptoms (LUTS).<sup>4–8</sup>

Corona et al<sup>9</sup> suggested that obesity is directly related to lower androgen levels in men who have ED, and that obesity-related comorbidities, particularly hypertension, are considered significant causes of arteriogenic obesity-related ED. The association between obesity and ED can be explained in part through increased levels of various proinflammatory cytokines in obese people.<sup>10</sup> These signs of inflammation have a strong connection with endothelial dysfunction, which is directly related to ED

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**Table 1.** Baseline characteristics of patients before bariatric surgery

	ED group (n = 18)	No ED group (n = 12)	Statistical difference ( <i>P</i> value)
Age (y)	48.9 ± 7.0	44.1 ± 6.9	.12
Height (m)	1.8 (1.7–2.0)	1.8 (1.6–1.9)	.94
Weight (kg)	147.1 (94.8–232.5)	143.9 (107.9–230.1)	.71
BMI (kg/m <sup>2</sup> )	46.8 (37.9–61.9)	47.8 (37.1–69.5)	.09
FBG (mmol/L)	5.3 (4.6–8.3)	5.4 (4.4–14.9)	.07
HbA1c (mmol/mol)	43.5 (37.0–58.0)	44.0 (32.0–95.0)	.09
IIEF total score	35.0 (13.0–64.0)	68.5 (51.0–74.0)	.03
IIEF EF domain	13.0 (2.0–25.0)	29.0 (27.0–30.0)	.02
IIEF OF domain	8.0 (1.0–10.0)	10.0 (6.0–10.0)	.02
IIEF SD domain	6.0 (2.0–8.0)	8.5 (4.0–10.0)	.004
IIEF IS domain	6.0 (0.0–13.0)	12.5 (6.0–15.0)	.002
IIEF OS domain	5.5 (2.0–10.0)	9.0 (4.0–10.0)	.001
IPSS total score	12.5 (0.0–28.0)	4.5 (1.0–14.0)	.01
IPSS IE	1.5 (0.0–5.0)	0.0 (0.0–2.0)	.02
IPSS frequency	2.0 (0.0–5.0)	0.5 (0.0–5.0)	.08
IPSS intermittency	1.5 (0.0–5.0)	0.0 (0.0–4.0)	.09
IPSS urgency	2.0 (0.0–5.0)	0.0 (0.0–3.0)	.01
IPSS weak stream	1.0 (0.0–2.0)	0.0 (0.0–2.0)	.01
IPSS straining	0.0 (0.0–2.0)	0.0 (0.0–1.0)	.98
IPSS nocturia	1.0 (0.0–5.0)	1.0 (0.0–3.0)	.92
IPSS QoL	12.5 (0.0–28.0)	4.5 (1.0–14.0)	.002

BMI = body mass index; ED = erectile dysfunction; EF = erectile function; FBG = fasting blood glucose; HbA1c = glycated hemoglobin; IE = incomplete emptying; IIEF = International Index of Erectile Function; IPSS = International Prostate Symptom Score; IS = intercourse satisfaction; OF = orgasmic function; OS = overall satisfaction; QoL = quality of life; SD = sexual desire.

through the nitric oxide pathway.<sup>11</sup> Similarly, LUTS has been suggested to be caused by microvascular dysfunction,<sup>12</sup> which can be observed in obese men.<sup>13</sup> Other hypotheses for LUTS in obesity are an increased ratio of estrogen to testosterone,<sup>4</sup> which could play a role in benign prostatic hyperplasia, increased prostate volumes,<sup>14</sup> and increased sympathetic nervous system activity.<sup>15</sup>

Weight loss through non-surgical methods (ie, diet, medication, or exercise) or surgical methods (ie, bariatric surgery) has been shown to improve erectile<sup>16,17</sup> and urinary<sup>16,18</sup> function. The improvement after bariatric surgery has been more effective and longer lasting than the non-surgical approaches.<sup>17</sup> Previous studies on the effect of bariatric surgery on ED and LUTS have investigated time points of at least 3 to 12 months after the surgery. Although all these studies reported significant improvement in erectile<sup>16,19–22</sup> and urinary<sup>19,22</sup> function, the improvement was parallel to the weight loss. The patients had achieved significant weight loss and their urogenital function improved.

Bariatric surgery can have an acute glycemic effect: as soon as 48 hours after the operation, patients can have improved blood glucose levels.<sup>3,23–25</sup> Hence, bariatric surgery has been coined the “surgical treatment for diabetes.”<sup>26</sup> Although the exact mechanism of this phenomenon is currently unknown, this suggests that glycemic improvement could precede weight loss after bariatric surgery in the early postoperative phase.

Therefore, we assessed the urogenital function of morbidly obese men (BMI > 35 kg/m<sup>2</sup> with obesity-related comorbidity) preoperatively and at 1, 3, and 6 months after bariatric surgery.

## METHODS

### Patient Selection

Men listed for bariatric surgery who had a BMI higher than 35 kg/m<sup>2</sup> with obesity-related comorbidity or a BMI higher than 40 kg/m<sup>2</sup>,<sup>2</sup> age older than 30 years (47.2 ± 8.1), and could read and understand the questionnaires were included in the study from February 2013 to July 2015. Patients were excluded if they were not sexually active or were younger than 30 or older than 75 years. None of the patients were treated or had received prior treatment for ED or LUTS.

### Data Collection

Patients were given the International Index of Erectile Function (IIEF)<sup>27</sup> and the International Prostate Symptom Score (IPSS)<sup>28</sup> questionnaires to complete, their weight and height were measured, and venous blood was drawn from the study participants according to University College London Hospital guidelines to measure fasting blood glucose (FBG) and glycated hemoglobin (HbA1c) concentrations, which were measured using the hexokinase method and cation exchange

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