Review

Obesity and urinary incontinence

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Abstract
Obesity is growing at an alarming rate worldwide. It poses a major health problem that in turn places a huge financial burden on health services. Medical conditions such as diabetes mellitus and ischaemic heart disease are commonly associated with obesity, but less well documented is the association between obesity and urinary incontinence. This article reviews the current literature to see whether: (1) obesity predisposes to urinary incontinence; (2) weight loss improves urinary incontinence and (3) obesity affects the surgical outcome. It also covers the surgical and anaesthetic implications of obesity. New minimally invasive surgical techniques make surgical risks acceptable for the obese patient but the anaesthetic risks remain high. Obese patients should not be denied surgery but be made aware of the higher risks. Future research should focus on the impact of obesity on surgical outcomes for continence surgery, particularly on intraoperative and postoperative complication rates as well as long-term cure rates.

Keywords: Continence surgery, obesity, overweight, urinary incontinence, weight loss

Introduction
Obesity is a chronic condition with an excess storage of body fat. Various definitions exist for obesity, the one most widely used is a body mass index (BMI) of more than or equal to 30 kg/m².1 The incidence of obesity is growing at an alarming rate worldwide. World Health Organization projects that by 2015, approximately 2.3 billion adults will be overweight (BMI equal to or more than 25 but <30) and more than 700 million will be obese.2 In the UK, nearly 25% of the adult population are obese. The Health Survey for England documented a progressive rise of obesity from about 8% in 1980 to 24% in 2004.3 This epidemic poses a major health problem and a huge financial burden to health services. Obesity is associated with a 2 to 12-fold increase in mortality with its increased incidence of co-morbidities such as diabetes mellitus, hypertension, ischaemic heart and cerebrovascular diseases. The aim of this review is to focus on the impact of obesity on urinary incontinence as well as the difficulties faced by health professionals when caring for an obese patient.

Does obesity predispose to incontinence?
Urinary incontinence is defined by the International Continence Society as ‘the complaint of any involuntary leakage of urine’. It is a very common problem, affecting up to one in three women in Europe.4 Urinary incontinence poses a significant negative impact on social functioning and quality of life to many individuals.

It is a condition that affects women of all body sizes and is certainly not confined to those who are obese.

Nonetheless, some studies have shown that obese women are more prone to urinary incontinence,5–12 although many do not differentiate between stress (involuntary urine leakage on effort or exertion or on sneezing or coughing) and urge incontinence (involuntary urine leakage accompanied or immediately preceded by urgency). In the morbidly obese women where BMI ranged from 40 to 80 (mean 49.5), the prevalence of urinary incontinence was quoted to be as high as 67%.12 There is currently no evidence that detrusor function is affected in obese women. However, significant correlations between BMI and intra-abdominal pressure have been demonstrated. This suggests that obesity may stress the pelvic floor secondary to a chronic state of increased pressure, resulting in development and recurrence of stress urinary incontinence.13,14 Therefore, it is assumed that obesity affects stress and not urge incontinence. Urodynamics parameters, however, have not been shown to be influenced by obesity.11

Does weight loss improve incontinence symptoms?
The guidelines published in 2006 by the National Institute for Health and Clinical Excellence in the UK on the management of urinary incontinence in women advises ‘women to lose weight in the treatment of all types of incontinence’.15 However, there is little evidence in the literature to prove that weight loss improves or cures urinary incontinence. There is only one published randomized controlled study of 40 patients that showed...
Management problems with obesity

Prior to performing surgery for urinary incontinence, most clinicians, in agreement with the Royal College of Obstetricians and Gynaecologists’ guideline, would perform urodynamics to confirm the diagnosis of stress incontinence and to exclude the detrusor overactivity and voiding dysfunction. Limited mobility secondary to obesity can certainly make procedures such as urodynamic studies technically difficult. Insertion of urethral and rectal pressure lines may be challenging because of limited access from increased surrounding adipose tissue. Performing urodynamics may be impossible if the patient exceeds the weight limit of the equipment such as the examining couch on which to catheterize the patient and using the uroflowmetry chair.

Non-surgical management for urinary incontinence

Conservative management in the form of lifestyle interventions (caffeine reduction, stopping smoking, regulating fluid intake, treating constipation), pelvic floor muscle exercise and bladder retraining should always be the first-line treatment for women with urinary incontinence. This is particularly important in the management of obese patients. Success with conservative measures in treating their urinary symptoms would mean that they can avoid surgery with its inherent risks. For patients with stress incontinence where conservative measures have failed and surgery or anaesthesia deemed to be contraindicated, drug therapy in the form of duloxetine can be considered. This is a combined noradrenaline and serotonin reuptake inhibitor that is believed to act by increasing the urethral sphincter activity in the storage phase of the micturition cycle. The efficacy of duloxetine does not seem to be affected by obesity but the evidence for this is scarce.

Anaesthetic implications

Obese patients should be considered as high-risk cases when undergoing any anaesthesia, requiring the involvement of an experienced anaesthetist in their care. The high incidence of medical conditions, such as hypertension, diabetes mellitus, cerebrovascular and coronary artery diseases among obese patients necessitate an early, detailed preoperative assessment prior to any surgery. In addition, changes in body physiology associated with obesity further increases the risks to the patient. These include:

(1) pulmonary – excess weight impairs pulmonary mechanics (decreased efficiency of respiratory muscles and lung compliance due to increased weight of chest wall and splitting of the diaphragm), impairs gas exchange, increases oxygen consumption and reduces lung volume that impairs oxygenation, especially in the supine or Trendelenburg position. The incidence of lung atelectasis was found to be significantly higher in obese (9.7%) compared with non-obese (1.9%) patients 24 h after anaesthesia.

(2) cardiac – obesity increases blood volume and cardiac output, which increases the strain on the heart and systemic hypertension

(3) gastrointestinal – higher incidence of hiatus hernia with acidic gastric contents volumes increases the risk of pulmonary aspiration

(4) endocrine – insulin resistance increases the incidence of diabetes mellitus

(5) coagulation – increased risk of deep vein thrombosis and pulmonary embolism

Venous access for cannulation and blood tests, intubation for general anaesthesia or insertion of regional anaesthesia may be challenging. Extra anaesthetic equipment such as large cuff sphygmomanometer, extra long epidural or spinal needles or fibreoptic laryngoscopy may be required.

Obesity alters the distribution and the response to anaesthetic drugs. Fat-soluble drugs, administered either as an inhalational or intravenous agent, have increased volume of distribution. This prolongs the elimination of fat-soluble drugs, resulting in prolonged anaesthesia and delay in returning to consciousness postoperatively.

Surgical implications

There are practical implications when operating on an obese patient. Bariatric beds and operating theatre tables designed to accommodate heavy and ‘wide’ patients will be required. Theatre and nursing staff must be trained in manual handling as safety of staff and patients is paramount. Special surgical equipment such as long needle holders and deep retractors for laparotomies and long trocars and Veres needles for laparoscopic surgery are essential to enable surgery to be performed safely.

Currently, the most common surgical procedure for the treatment of urinary stress incontinence in women is the insertion of tension-free vaginal tape (TVT). It is minimally invasive through the vaginal route and would be the ideal surgical treatment modality for obese women. Patients can be admitted as day cases, which would mean early mobilization, reducing thromboembolic and infection risks. Furthermore, the efficacy of the TVT has been shown to be comparable with laparoscopic Burch colposuspension after one year. There are, however, some potential problems with TVT tape insertion in the obese patient. The introducer needles, which are manufactured in one standard size, may not be long enough to reach their exit points due to the increased adipose tissue deposition over the mons pubis. An alternative would be...
the transobturator tape that involves inserting the introducers through a 1 cm mid-urethral incision of the anterior vaginal wall and exiting through small incisions in the thighs. The transobturator route can overcome the problem of TVT needles being ‘too short’ but hyperflexing the hips of an obese woman to perform the procedure may be impossible due to increased adipose tissue deposition on the thighs.

In recent times, there has been a gradual move away from performing abdominal surgery. Advantages of laparoscopic and vaginal surgery include less postoperative pain, shorter hospital stay and convalescence as well as less intraoperative and postoperative complications. This is particularly beneficial for the obese patient, especially when surgical access through the abdominal route is likely to be more difficult than through the vaginal or laparoscopic approach. However, these advantages could be negated by the longer time it takes to perform laparoscopic compared with abdominal surgery. The COLPO trial demonstrated that laparoscopic colposuspension performed by experienced surgeons took 15 min longer that open colposuspension. Having to place an obese patient in a head down tilt to displace bowel during laparoscopic surgery could also result in difficulty ventilating the patient.

Surprisingly, there is so far no compelling evidence that obesity increases the complication rates for incontinence surgery. This may be because of a gradual move away from abdominal surgery to performing more vaginal (such as TVT insertion) and laparoscopic surgery. From personal experience, obesity certainly increases the surgical risks. However, we should not stigmatize obese patients and deny them surgery as the major perioperative and postoperative complications have so far been found to be acceptable.

### Does obesity affect surgical outcomes?

In the authors’ opinion, obesity does increase the failure rate of incontinence surgery even though there is conflicting evidence from the available literature. Some studies found that preoperative obesity reduced the long-term cure rate of TVT (from 81.2% to 52.1%, and 83.3% to 68.3%), Burch colposuspension and slastic sling insertion. Others have shown that preoperative morbid obesity did not seem to be a risk factor for failure of surgical procedures. The complication rates between the obese and non-obese groups post-TVT insertion were not significantly different, with the cure rate (90%) maintained at 18 months follow-up. However, there was a significantly higher incidence of postoperative urge urinary incontinence in the obese group (17.9 versus 3.4%).

### Reducing risk to the obese patient

Morbidity and mortality rise sharply when the BMI exceeds 30 kg/m². Associated co-morbidities and changes to the body physiology increase the anaesthetic and surgical risks to the obese patient. Measures have to be taken to reduce these risks and to optimize the surgical outcomes.

Preoperative counselling regarding smoking cessation and dietary advice is useful. Steady weight loss via a healthy diet and supervised exercise regime can reduce the risks for an obese patient. However, weight loss over a short period of time prior to surgery may not be possible and has not been shown to reduce perioperative morbidity and mortality.

Preoperative assessment is a key component in the assessment and management of risk to the obese patient. The process should identify any health problems so that appropriate investigations can be performed and medications adjusted to optimize the patient’s health preoperatively.

National guidelines have been published stating that every hospital should have its own protocol for the management of the obese patient with a named anaesthetist and a named theatre team member who will ensure that appropriate equipment and processes are in place for the perioperative management of morbidly obese patients.

Complications such as thromboembolism can be reduced by the administration of subcutaneous heparin and the use of compression boots during the operation as well as large thromboembolic deterrent stockings postoperatively. Early mobilization and if necessary, chest physiotherapy should be encouraged to further reduce the postoperative complications such as thromboembolism and lung atelectasis.

Alternative surgical techniques could be employed to reduce the risk to the obese patient. For example, insertion of the Veres needle through left upper quadrant (Palmer’s point entry) to create a pneumoperitoneum in an obese patient for laparoscopic procedures has been shown to be safe and effective. Performing less invasive continence surgery such as TVT insertion could further reduce the complication risks.

### Conclusion

As the incidence of obesity rises, urinary incontinence is expected to become more problematic within the general population. The demand for continence surgery is likely to rise, putting more pressure on the health-care system to deliver a good quality of care to this group of high-risk patients. While obesity tends to increase the surgical and anaesthetic risks, patients should not be denied surgery solely due to their weight. Recent surgical advances have made the level of these risks acceptable. Nevertheless, conservative and medical measures should always be the first-line management of urinary stress incontinence.

So far, little is known regarding the impact of obesity on the surgical outcome of continence procedures. Future research should be focused in this area.

### Key points

- Obesity is increasing in incidence and seems to predispose women to urinary stress incontinence, not urge incontinence.
- Conservative measures should be first-line therapy to treat stress incontinence.
- New minimally invasive surgical techniques make surgical risks acceptable for the obese patient but anaesthetic risks remain high.
- Obese patients should not be denied surgery but be made aware of the higher risks associated with obesity.
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