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Obesity and pelvic floor dysfunction

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Obesity is associated with a high prevalence of pelvic floor disorders. Patients with obesity present with a range of urinary, bowel and sexual dysfunction problems as well as uterovaginal prolapse. Urinary incontinence, faecal incontinence and sexual dysfunction are more prevalent in patients with obesity. Uterovaginal prolapse is also more common than in the non-obese population. Weight loss by surgical and non-surgical methods plays a major role in the improvement of these symptoms in such patients. The treatment of symptoms leads to an improvement in their quality of life. However, surgical treatment of these symptoms may be accompanied by an increased risk of complications in obese patients. A better understanding of the mechanism of obesity-associated pelvic floor dysfunction is essential.

Obesity and pelvic floor disorders

Obesity is a modern epidemic. The worldwide prevalence of obesity has doubled from 1980 to 2008. The current prevalence of obesity is 14% among women and 10% in men [1]. Obesity presents not only with well-described major medical conditions but also a number of quality-of-life issues. Pelvic floor dysfunction is more common in the overweight and obese group of patients. Obesity may impair pelvic floor function due to many reasons. These include a chronic increase in intra-abdominal pressure,

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damage to pelvic musculature, nerve damage and associated conduction abnormalities and obesity-related co-morbidities including diabetic neuropathy and intervertebral disc herniation [2]. Increasing body mass index (BMI) seems to directly increase the distressing nature of symptoms of pelvic floor dysfunction. It is highest in morbidly obese (57%) and severely obese (53%) women when compared with obese (44%) women [3]. The severity of obesity has an increasing adverse effect on pelvic floor function. This has been a recurrent theme in studies that have reported pelvic floor function in patients awaiting bariatric surgery. Pelvic floor dysfunction has been reported to be as high as 87% in some studies before bariatric surgery [4]. The impact of obesity on pelvic floor function cannot be underestimated. This is of particular relevance in current times with an increasing prevalence of obesity throughout the world.

Obesity and urinary incontinence

Association and mechanism

Obesity is considered a strong independent risk factor for both pre-existent and new-onset urinary incontinence in some research studies [5]. The odds ratio attributable to obesity in urinary incontinence varies between 4 and 5. Each five-unit increase in BMI increases the risk of urinary incontinence by 20–70% as reported in a systematic review by Subak et al. [6] The mechanism of stress incontinence is more quickly precipitated by obesity due to the increased intra-abdominal pressure associated with the condition. The increased intra-abdominal pressure leads to an increase in vesical pressure and urethral mobility. The prolonged weakness of the pelvic musculature, nerve supply and supporting structures due to the strain may cause pelvic floor weakness and ineffective function. Overactive bladder symptoms are also reported to be higher in patients with obesity, particularly in the pre-menopausal age group [7]. The aetiology and pathophysiology of idiopathic overactive bladder is poorly understood even in the general population; hence, no clear mechanism of the association between an overactive bladder and obesity is available.

Obesity and urinary stress incontinence

Stress incontinence has been established to be more common in women with obesity indisputably in many different studies. The dependency of the distressing nature and severity of stress incontinence on increasing BMI is of particular interest [8]. It is then to be expected that weight loss will have a favourable response on the continence mechanism in obese individuals. The effect of non-surgical weight loss has been reported in a health economic analysis [9]. A 5% decrease in weight loss led to a 50% reduction in urinary incontinence episodes. A cost-effectiveness analysis of weight loss and urinary incontinence found a reduction of cost by 21% for a reduction of weight loss by 5% [10].

Weight loss, by both surgical and non-surgical means, alleviates stress incontinence to a great extent, and it should be considered before any other form of treatment in obese patients reporting distressing urinary stress incontinence. A 40–50% reduction in stress incontinence episodes has been reported after non-surgical weight loss using diet, exercise and medication in some studies [9,11]. Conservative treatment of stress incontinence comprises pelvic floor exercises, supervised pelvic floor physiotherapy, electrical stimulation of pelvic floor muscles and use of duloxetine. Duloxetine was reported to be a useful alternative in obese patients with a good response in initial studies [12]. More recently, Duloxetine has been described to have anti-obesity and anti-binge eating properties along with its known antidepressant effect in animal studies. The dual effect of this drug may have a favourable impact on stress urinary incontinence in these patients by a variety of mechanisms including facilitation of weight loss [13].

Stress incontinence is surgically treated by insertion of a tension-free vaginal tape, transobturator tape (TOT), colposuspension, urethral bulking or more recently the single-incision sling insertion without an exit incision. The use of colposuspension has been decreasing since the introduction of the transvaginal tape and TOT. Surgery for stress incontinence is as successful in the obese group of patients as in the general population. A systematic review explored the effectiveness of stress incontinence surgery in obese patients and found it to be equally successful in obese patients as well as patients with normal BMI [2]. Greer et al. obtained similar results in their meta-analysis where an 81% cure rate was quoted in the obese population compared to 85% in the non-obese group [14]. However,

specific product studies have observed that obesity is more common in patients with failures after tension-free vaginal tape but not in those with a TOT [15,16]. A more recent study reported both subjective and objective outcomes after insertion of TOT after a median of 21 months. The results were categorized by BMI. Both subjective and objective results were found to be similar across the various BMI groups [17,32]. A 1-year follow-up study on 206 patients after insertion of single-incision sling reported its outcomes by BMI groups. A subjective improvement was noted among all the BMI groups, but a lesser objective efficacy was noted with an increasing BMI [18,33].

It has also been observed in a case–control study that, compared with the non-obese population, the operating time was more prolonged with a slightly higher estimated blood loss in obese patients undergoing tape procedures for urinary incontinence [19,31]. It is useful to counsel the patients prior to the procedure with the available evidence and local data on outcomes after incontinence surgery before making an informed decision about surgical treatment among the other options available.

Overactive bladder and obesity

Overactive bladder may be neurological or idiopathic in nature. The management of overactive bladder comprises bladder training, use of anticholinergics or more recently antimuscarinics, B-3 agonists, neuromodulation and cystoscopic injection of botulinum toxin.

Overactive bladder symptoms and their resulting distress are more common in obese patients compared to the general population. Handa et al. described the longitudinal changes in urinary function in parous women and described that overactive bladder symptoms are more common in obese patients similar to stress incontinence [20]. McGrowther et al. described obesity and poor lifestyle factors to be markedly associated with incident or new-onset overactive bladder in a large database of >3000 patients [21]. Such studies demonstrate a strong link with obesity and overactive bladder. In a case–control study from a registry, Melin et al. also observed that the distress caused by overactive bladder symptoms was considerably more in the obese group of patients [22]. This may be due to coexisting mobility issues that prevent such patients from getting to the toilet in time when suffering urge incontinence and urgency.

The treatment of overactive bladder in this group of patients also comprises lifestyle changes and the use of medications. The use of different antimuscarinics has been shown to be as efficacious among obese patients as in the general population [23,24]. Darifenacin and trospium chloride have been shown to improve their urinary incontinence scores with once-daily administration in respective studies.

Weight loss and overactive bladder

Whitcomb et al. reported a 73% reduction in overactive bladder symptoms in patients after surgically induced weight loss compared to their baseline symptoms [25]. A similar reduction in distressing overactive bladder symptoms has been described in studies with non-surgical weight loss [26].

Obesity and mixed urinary incontinence

Mixed urinary incontinence has a strong association with obesity amongst all urinary symptoms [27]. This was found to be the case in both men and women. This complicates the relationship between obesity and urinary incontinence and it cannot be explained by the mechanical factors due to weight-related changes in obesity alone. The treatment of mixed urinary incontinence in this group comprises primarily weight loss, lifestyle changes with dietary modification, bladder training and use of antimuscarinics before embarking on any form of surgery. The success rate of onabotulinum toxin injections is not affected by obesity, but sacral neuromodulation is more difficult to perform in obese patients.

Obesity and pelvic organ prolapse

Myers' study on prolapse symptoms in obese and overweight women showed that 37% of patients admitted to prolapse symptoms in the obese group [28]. Intensive non-surgical weight loss did not lead

to any improvement in prolapse symptoms in this study. Machin's review on aetiological factors in pelvic organ prolapse also indicates a consistent association of obesity with pelvic organ prolapse [29]. Hendrix described that all the different types of prolapse were associated with obesity. Morbid obesity was shown to be associated with a significant increase in the occurrence of uterine prolapse (40%), rectocele (75%) and cystocele (57%) [30]. Kuldish et al. studied the relationship between change in weight and pelvic organ prolapse progression/regression in women during a 5-year period. A large number of postmenopausal women with an intact uterus ($n = 16{,}698$) were included in this study. The risk of prolapse progression in overweight and obese women compared with women with a normal BMI was increased by 32% and 48% for cystocele, by 37% and 58% for rectocele and by 43% and 69% for uterine prolapse, respectively [31].

Weight loss and uterovaginal prolapse

Pelvic organ prolapse seems to be the result of damage to the pelvic floor by different mechanisms of injury such as obesity, childbirth and menopause. Weight loss has not been shown to reverse the distressing nature or severity of symptoms due to pelvic organ prolapse. This has been observed with both non-surgical [21] and surgical methods of weight loss [32]. Weight loss in these patients will help to stop the progression and worsening of symptoms of prolapse but not an improvement in the distress caused. Weight loss may also help in reducing the post-surgical morbidity associated with obesity and prolapse surgery.

Pelvic organ prolapse surgery and obesity

Obesity is known to be associated with more complications in the post-surgical period due to restricted mobility and resumption of activities of daily living. Obesity is associated with more thromboembolic events compared to the non-obese group. The discussion of route of surgery becomes more relevant in this patient group as resorting to earlier mobility with the laparoscopic or vaginal route may reduce the incidence of thromboembolic events associated with obesity. The vaginal route has been observed to be associated with lesser febrile morbidity, post-operative ileus and urinary infection in a study. Shorter surgical time and hospital stay have been shown to be additional favourable outcomes in this study [33].

Obesity and defaecatory disorders

Defaecatory disorders, particularly faecal incontinence, are distressing symptoms that impair social mobility in an individual. Sileri observed that 59% of patients undergoing bariatric surgery reported defaecatory disorder symptoms before undergoing surgery. This was a range of constipation, faecal incontinence or a combination of the two. Sileri also observed that, after bariatric surgery, there was an improvement in both the constipation and faecal incontinence severity scores with decreasing BMI [34]. Poylin conducted a systematic review on obesity surgery and defaecatory dysfunction [35]. This review of 20 studies on the subject found that the relationship between obesity and defaecatory disorders is not well defined. This review suggested that the rates of constipation are not particularly higher in the obese population. However, faecal incontinence and diarrhoea were particularly higher in patients presenting for obesity surgery. Faecal incontinence improved after weight loss with bariatric surgery as noted in the follow-up studies that reported outcomes after bariatric surgery, particularly the Roux-en-Y gastric bypass procedure.

It is not inconceivable that there will be some mechanical and neurological dysfunction associated with obesity due to the excessive weight on the pelvic floor. This is likely to lead to defaecatory disorders as part of the global pelvic floor dysfunction known to be associated with obesity.

However, bariatric surgery by virtue of its mechanism of action is likely to cause gastrointestinal symptoms due to shortening of the bowel segment as well as the new onset of malabsorption disorders. Few studies have also highlighted that there may be an increasing incidence of bowel dysfunction after bariatric surgery due to this reason [36].

Obesity and sexual dysfunction

Sexual function is affected by several factors including body image, body confidence, low mood, depressive symptoms, coexistent pelvic floor dysfunction such as urinary incontinence, prolapse or faecal incontinence that may cause embarrassment during sexual intercourse.

Sexual dysfunction is difficult to report due to under-reporting of the nature of symptoms. Sexual dysfunction has been reported to be as high as 51% in women presenting for bariatric surgery and 41% in women presenting for non-surgical methods of weight loss [37]. A follow-up study of 106 women undergoing bariatric surgery found that sexual function improved significantly after surgically induced weight loss. This was found to improve across all the domains of the Female Sexual Function Index (FSFI), namely, arousal, lubrication, desire and satisfaction, as reported on the FSFI questionnaire, a common tool used to report sexual function in females [38]. A similar study demonstrated an improvement in sexual function scores in 28% of women after bariatric surgery. The improvement was significantly higher in the desire and arousal domains of the FSFI scores [39].

Conclusion

Obesity is well known to be associated with medical disorders. More recently, the associations between obesity and quality-of-life issues have also been widely researched. The relationship between pelvic floor function and obesity has been described thoroughly in recent studies. The associations between urinary function, bowel function, sexual function and prolapse have been described in various studies. Weight loss by surgical and other non-surgical methods seems to help with the improvement in pelvic floor function.

Surgery for urinary stress incontinence is successful in obese patients even when it remains a common associated factor with failed incontinence surgery. Duloxetine may be more useful as an option in this group of patients. Overactive bladder and mixed incontinence treatment remains similar to that in the non-obese group. Prolapse continues to have a strong association with obesity. Vaginal and laparoscopic methods of treatment may be more favourable to such patients. Defaecatory disorders are reported to be more common with obesity. Some improvement of pre-existing symptoms and new onset of defaecatory function may also arise. Sexual dysfunction improves across all domains of sexual function with weight loss in obese patients.

Practice points

- Weight loss by surgical and non-surgical methods greatly reduces the incidence of stress urinary incontinence. Weight loss must be the first step in managing obese patients with complaints of stress incontinence.
- Duloxetine is more useful for stress urinary incontinence in obese patients due to its anti-obesity and anti-binge eating properties.
- Surgery for stress incontinence is equally successful in obese patients. However, a more prolonged operating time and slightly higher blood loss have been reported in obese patients.
- The distress caused by overactive bladder may be more in obese patients due to co-morbid issues and restricted mobility.
- Weight loss helps to improve overactive bladder symptoms.
- Antimuscarinics are equally effective in obese patients.
- Sacral neuromodulation may be more difficult to perform in obese patients.
- Weight loss does not improve prolapse symptoms.
- Post-operative morbidity after prolapse surgery is more in obese patients. The route of surgery is important in reducing these problems.
- Sexual function improves after surgery for obesity

Research agenda

- Effect of obesity and weight loss on urinary stress incontinence
- Effect of weight loss on overactive bladder treatment modalities
- Effect of obesity on recurrent prolapse
- Change of bowel function after weight-loss surgery
- Effect of weight-loss surgery on sexual function

Conflict of interest

None.

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