

DOES BODY MASS INDEX IMPACT SUCCESSFUL VOIDING FOLLOWING MIDURETHRAL SLING PROCEDURES FOR STRESS URINARY INCONTINENCE?

Hypothesis / aims of study

Midurethral slings are commonly used to treat stress urinary incontinence. The tension-free vaginal tape (TVT) and transobturator tape (TOT) are effective for many patients and have demonstrated efficacy in patients with a wide range of body mass index. In women in the United States, the prevalence of obesity, defined as body mass index (BMI) above 30 kg/m², was 35.3% in 2005-2006. Obesity has been described as a risk factor for stress incontinence. Mid-urethral slings have become widely popular operations because of high success rates, low incidence of complications, and technical ease. Urinary retention requiring catheterization occurs in 2-20% of patients, although its duration is generally limited. Levin et al. reported a 2.5% rate of urinary retention requiring catheterization for a period of longer than 7 days; only one patient failed to void spontaneously by 1 month after surgery. Previous studies have evaluated the efficacy of midurethral slings in obese women and indicated high success rates. The aim of our study was to test the hypothesis that obesity is a factor associated with a successful voiding trial following mid-urethral sling procedures for stress urinary incontinence (SUI).

Study design, materials and methods

A retrospective cohort of patients undergoing TVT or TOT was identified using the hospital electronic surgical database for the period from September 1, 2007 to August 31, 2008. Review of the electronic medical records resulted in 147 cases involving TVT or TOT and no other concurrent surgical procedure. Information gathered from the electronic medical record included the following: the patients' age, BMI at time of surgery, type of midurethral sling (TVT or TOT), timing of discontinuation of Foley catheter following the procedure, and the time of day recorded as the anesthesia stop time of the procedure. The TVT procedures (Gynecare, Ethicon, Inc., Somerville, NJ) and TOT procedures (Caldera Medical, Inc, Agoura Hills, CA) were performed according to manufacturer specifications, and as previously described by others.

Successful voiding was defined as the ability of a patient to pass a postoperative voiding trial. Patients who did not void successfully were discharged from day surgery with an indwelling Foley catheter. Voiding trials were completed according to instructions given by the primary surgeon, typically by instilling 200cc to 400cc of saline into the patient's bladder and then measuring the volume of the spontaneous void or a post-void residual volume. Those patients who voided at least half of the instilled volume or had a post-void residual of 100 mL or less were deemed to successfully pass their voiding trial. Patients who underwent concurrent vaginal prolapse procedures were excluded. Six cases (all TVT procedures) were excluded because an intraoperative cystotomy was recognized. This resulted in 141 midurethral slings (70 TOT + 71 TVT) that were used for data analysis. Patients were divided into two groups based on whether or not they passed a voiding trial on the day of surgery. The data set was examined using Student's t test, Pearson's Chi square test, and multivariate regression analysis to assess factors including BMI, age, time of day that surgery was complete, and type of sling procedure performed as variables contributing to a delay in successful voiding trial. For variables contributing to a delay, receiver-operator curve (ROC) analysis was performed to test for a threshold point in the relationship with voiding during the immediate post-operative interval.

Results

Of the 141 subjects, 72% had a positive voiding trial on the day of surgery prior to release. The remaining 29% of subjects left with a urinary catheter in place and returned for additional trials. The interval to first successful voiding trial in this series of subjects ranged from 0 to 11 days after surgery. Of 71 patients undergoing TVT, 41 patients (57%) successfully passed a voiding trial immediately post-procedure. Of 70 patients undergoing TOT, 59 patients (85%) successfully passed post-procedure voiding trials. Therefore, patients undergoing TVT were significantly more likely to be discharged home with a Foley catheter (Odds Ratio of 2.8). The difference in postoperative successful voiding in relation to procedure type (TVT versus TOT) was significant ($p = 0.0003$ using Pearson's Chi Square test).

The mean BMI (29.8, 95% CI 28.9-31.1) of the 100 patients who successfully passed a post-procedure voiding trial was significantly greater than mean BMI (27.5 kg/m², 95% CI 25.7-29.4) of the 41 patients who did not pass a post-procedure voiding trial using multivariate analysis. A ROC analysis was then performed, indicating that patients with BMI greater than 27.4 kg/m² were more likely to pass their post-procedure voiding trial (sensitivity = 59%, specificity = 69%).

Of the 41 patients who did not pass a voiding trial on the day of the procedure, 33 (80%) passed on postoperative day 1, and the remaining 8 patients passed voiding trials on postoperative days 2 to 11. The time of day that the procedure was completed was not related to successful voiding following TVT placement. Using univariate analysis, age appeared to be related to passing the post procedure voiding trial. However, when taking into account the difference related to the procedure, age was not a significant ($p = 0.20$) component.

Cases were also analyzed by primary surgeon. This analysis showed there were statistically significant differences among individual surgeons ($p = 0.026$).

Interpretation of results

Obesity has become an increasingly prevalent social and medical problem in the United States. Obese women are frequently denied treatment due to surgical difficulty and excess risk associated with their condition. Previous investigators have demonstrated the efficacy of treatment of SUI with midurethral slings in obese patients. Previously, others have noted increased intraabdominal pressure and increased intravesical pressure in obese women with SUI. Urodynamic data from Bai et al indicated that mean flow rate was significantly lower in obese patients than in non-obese patients. Tunn et al found an association where increased urethral resistance pressure correlated with increased body mass index. Our data indicates that obese women may have a higher likelihood of successful voiding immediately following midurethral sling placement. However, the physiological differences in continence

mechanisms of obese women and non-obese women have not been specifically described. Additionally, women undergoing TOT placement were more successful in passing postoperative voiding trials than were patients undergoing TVT. There are multiple possibilities why this difference was present in our study. There are inherent differences in the procedures in the anatomical locations of the sling and the method that the sling reproduces and reinforces the natural connective tissue suspension of the urethra. There are also procedural differences between surgeons and potential variations in patient populations.

The aim of our retrospective study was not to investigate the efficacy or long term outcome of the midurethral slings placed. Therefore, any association with our results is unknown. One weakness of our study is that there were no standardized voiding trial instructions.

Concluding message

Our study indicated that there is a wide variation in patients' ability to successfully pass a postoperative voiding trial, and that ability is affected by BMI, the type of midurethral sling being placed, and also by the surgeon placing the sling.

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<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	Yes
<i>Specify Name of Ethics Committee</i>	Scott & White Institutional Review Board
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	No