Objective and subjective outcome 3 years after synthetic transobturator nonabsorbable anterior mesh use in symptomatic advanced pelvic organ prolapse surgery

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Abstract

Background: The management of using a mesh graft in the anterior compartment is reported to lead to a higher rate of recurrent prolapse after anterior colporrhaphy than after mesh repair. Several randomized controlled trials (RCTs) have shown no significantly superior subjective cure rates or reoperation rates, despite better anatomical cure rates with synthetic mesh compared with traditional anterior colporrhaphy for anterior compartment defects, however, the follow-up period in most RTCs was only 1 year.

Objective: To evaluate the objective and subjective outcome in women with symptomatic advanced pelvic organ prolapse (POP) who underwent sacrospinous fixation (SSF) with anterior vaginal mesh (AVM). We postulated that in the hands of well-trained surgeons, AVM plus SSF yields better long-term success rates with a low rate of mesh-related complications. We studied the long-term postoperative outcomes of SSF with AVM.

Study design: This was a retrospective study of 114 patients who underwent surgery for POP between January 2006 and March 2010. Patient assessment at baseline and 3-year postoperative follow-up was analyzed. SSF plus AVM was performed for apical and anterior compartment repair. Primary outcome was objective cure (POP Quantiﬁcation Stage ≤ 1) and subjective cure deﬁned as a negative response to Questions 2 and 3 on the POP Distress Inventory 6. Secondary outcomes were complications, symptoms severity, and quality of life as measured using validated questionnaires.

Results: Postoperative data for 114 patients were analyzed. Median follow up was 59.6 months. All patients completed a minimum of 3 years follow up. The objective cure rate was 100% for anterior and apical compartments and 90.4% for posterior compartment. Regarding the individual compartment, the cure rate was significantly high (p < 0.001 for all compartments).

There were four cases (3.5%) of mesh exposure in which all patients were treated under local anesthetic with excision of the exposed mesh without additional suturing of vaginal tissue at the outpatient office. Topical estrogen therapy was prescribed to facilitate re-epithelialization of vaginal wounds. There were no cases of mesh erosion into the bladder or other organs, and no patient needed mesh removal due to chronic pain or infection.

There was no recurrence in the anterior and apical compartment. Eleven patients (9.6%) had recurrence of the posterior compartment during postoperative follow up.

There was a significant improvements in all questionnaires with p < 0.001 for POP Distress Inventory 6, Urogenital Distress Inventory, and Incontinence Impact Questionnaire, and p = 0.001 for Prolapse/Urinary Incontinence Sexual Function Questionnaire. There was no signiﬁcant difference for preoperative and 1-year postoperative urodynamic diagnosis. There were seven cases of occult urodynamic stress incontinence.

Conclusion: The Perigee System gave a favorable result in both anatomical and subjective success rates with a low rate of mesh-related morbidities. The strength of the study reported here is its long-term follow up of a relatively large number of patients and the use of validated questionnaires. Limitations are that it is not a RCT; hence, selection and indication bias is unavoidable. The favorable outcome and
Introduction
Pelvic organ prolapse (POP) may occur in up to 50% of parous women. The lifetime risk of undergoing surgery for POP in the general female population aged ≤85 years has recently been reported to be as high as 19–20%. This high likelihood of undergoing surgery for POP combined with the knowledge of anatomic failure rates for native tissue repairs, that range between 30% and 70% for the anterior vaginal wall and approximately 20% for the posterior vaginal wall, has led to the increased use of prosthetic mesh in vaginal prolapse surgery with the main aim to reduce anatomic failure rates and increase the durability of repairs. The management of using a mesh graft in the anterior compartment is supported by a recent Cochrane review which reported a higher rate of recurrent prolapse after anterior colporrhaphy than after mesh repair. Several randomized controlled trials (RCTs) showed no significantly superior subjective cure rates or reoperation rates despite better anatomical cure rates with synthetic mesh compared with traditional anterior colporrhaphy for anterior compartment defects, however, the follow-up period in most of these RCTs was only 1 year. Therefore, the conclusion made by the Food and Drug Administration based on these findings stated that there is no conclusive evidence that using transvaginally placed mesh in POP repair is an improvement over traditional POP repair without mesh and that it may expose patients to greater risks.

Materials and methods
Medical records of 198 patients who underwent primary POP surgery without concomitant anti-incontinence surgery performed between January 2006 and March 2010 were retrospectively reviewed. In total 114 patients who had transvaginal anterior mesh (AVM) plus sacrospinous fixation (SSF) were evaluated. Inclusion criteria comprised patients with POP stages 3 and 4 who underwent primary POP repair. Patients who needed concomitant anti-incontinence surgery, who had previous POP repair, or who were unfit for surgeries were excluded. All patients had preoperative evaluations, including detailed medical history, physical examination, and pelvic examination. Vaginal examinations were done with patients in the semisupine lithotomy position. A split-speculum technique was used to evaluate descent of the vaginal vault, anterior and posterior vaginal walls, and uterine prolapse with maximum Valsalva maneuver. Prolapse staging was recorded according to the POP Quantification (POP-Q) system.

Investigations included urinalysis, 1-hour pad test, cough stress test, and multichannel urodynamic evaluation. All patients were required to complete a 72-hour voiding diary, the Incontinence Impact Questionnaire (IIQ-7),11 the Urogenital Distress Inventory (UDI-6),12 the POP Distress Inventory 6 (POPDI-6),13 and the Pelvic Organ Prolapse/Urinary Incontinence Sexual Function Questionnaire (PISQ-12).14 at baseline and during follow-up at 12 months and 36 months. Validated Chinese versions were used for all questionnaires. All conditions were defined according to the standards of the International Continence Society. Patients with poorly controlled medical conditions were optimized before surgery. All patients were counseled on the surgical procedures and informed of the potential benefits and possible complications during and following surgery. Risk of mesh-related complications, e.g., mesh erosion, chronic pelvic pain, dyspareunia, infection, and the possibility of needing additional procedures for mesh removal or trimming in case of mesh complications, were included in the counseling. Patients made an informed decision as to whether to have AVM surgery or not. Postmenopausal patients received preoperative and postoperative topical estrogen treatment unless contraindicated.

Operative procedure
All surgeries were performed by the senior author (T.S.L.), who is experienced in native tissue pelvic reconstructive surgery and trained in vaginal mesh insertion. Surgeries performed include vaginal hysterectomy, anterior vaginal mesh procedure (Perigee System; AMS, Minnetonka, MN, USA) and, if indicated, a posterior colporrhaphy. Right unilateral SSF via a posterior approach, as described by Miyazaki, was adopted for all patients. Details of the surgical procedure for AVM (Perigee) were described previously.

Cystoscopy to evaluate the integrity of the lower urinary tract was performed. All patients were given a prophylactic antibiotic of 500 mg cefazolin prior to surgery that continued every 6 hours postsurgery for 1 day. A Foley catheter and a vaginal pack (gauze soaked with povidone iodine) were placed for 72 hours. Catheterization was stopped once the amount of postvoid residual was consistently <20% of that from self-voiding. Patients with a residual urine volume persistently >150 mL for >5 days were taught to use clean intermittent self-catheterization.

Follow-up visits were scheduled at 1 week, 1 month, 3 months, 6 months, 1 year, and annually thereafter. The outcome measure was the objective cure rate at 3 years’ follow-up, defined as POP-Q ≤1 at the anterior vaginal wall and all compartments. Patient feedback on POPDI-6 with no or mild sensation of protruding abdominal organ (Question 3) and no or mild heaviness (Question 2) were considered subjective success.

Descriptive statistics were used for demographics and perioperative data. Paired-sample t-test, and either Chi-square or Fisher exact test were applied for comparison of pre- and postoperative continuous and categorical data, respectively. A repeated measures analysis of variance (ANOVA) was used to determine whether a difference in continuous follow-up existed between groups in order to decrease the chance of type 1 error. A value of p < 0.05 was considered statistically significant for all comparisons. All statistical methods used the commercial software SPSS, version 17 (SPSS, Chicago, IL, USA). The institutional review board of Chang-Gung Memorial Hospital approved the chart evaluation of this study.

Results
Median follow up was 59.6 months. All patients completed a minimum of 3 years follow up. Preoperative demographics are as shown in Table 1. The objective cure rate was 100% for the anterior and apical compartment and 90.4% for the posterior compartment.
(Table 2). As for the individual compartment, the cure rate was significantly high ($p < 0.001$ for all compartments; Table 3).

There were four cases (3.5%) of mesh exposure in which all were treated under local anesthetic with excision of the exposed mesh without additional suturing of vaginal tissue at the outpatient office. Topical estrogen therapy was prescribed to facilitate re-epithelialization of vaginal wounds. There were no cases of mesh erosion into the bladder or other organs, and no patient needed mesh removal due to chronic pain or infection.

There was no recurrence in the anterior and apical compartment; 11/114 (9.6%) patients had recurrence of the posterior compartment during postoperative follow up. There was a significant improvement in all questionnaires with $p < 0.001$ for POPDI-6, UDI-6, and IIQ-7 and $p = 0.001$ for PISQ-12 (Table 4); however, there were only 67 patients (58.7%) available for PISQ-12 analysis. There was no significant difference for preoperative and 1-year postoperative urodynamic diagnosis. There were seven cases of occult urodynamic stress incontinence.

**Discussion**

Demographics in this study showed the mean age was 64.1 years and median parity was 4.2. Another large population study showed that those who underwent vaginal mesh surgery (median 59 years, interquartile range 52–67) were older than those who underwent native tissue repair; (median 55 years, interquartile range 47–63; $p < 0.001$). Age and sexual activity were the significant independent predictors of late mesh exposure in previous studies. The objective success rate was high: 90.4% for the posterior compartment and 100% for both the anterior and apical compartment. This is comparable with other studies; which reported an overall success rate of 93.5% at 3 years in a retrospective study utilizing Prolift T, Perigee, and Apogee and 97.1% across all 68 women who were followed up for at least 2 years. None of the recurrence of posterior compartment in our study was reoperated because most had no bothersome symptoms and were asymptomatic. Despite that, they did not report a worsening of prolapse-related symptoms (POPDI-6). The higher success rate of anterior repair in our study is possibly because we combined anterior repair with SSF. Ideal repair of the anterior compartment should include a concomitant apical support procedure because the magnitude of anterior vaginal wall prolapse is a combined function of impairment of the pubovisceral muscle and the urogenital and cardinal ligaments (apical support). The vaginal apex is often involved in large cystoceles; therefore, concomitant apical support is necessary with anterior compartment repair. The significant individual compartment cure rate in all compartments may be explained by ensuring better support for anterior prolapse with the use of synthetic mesh, with less burden being exerted on the apical compartment, together with the performance of SSF leading to a better cure rate and lower recurrence of vault prolapse.

Many previous studies suggested no difference between transvaginal mesh and native tissue repair in term of subjective cure rate and quality of life despite superior objective cure rates in mesh-augmented repair. Our study showed a significant improvement of quality of life as shown by the improvement in POPDI-6, PISQ-12, UDI-6, and IIQ-7. The improved postoperative UDI-6 and IIQ-7 scores may imply that the Perigee procedure improves lower urinary tract symptoms. The most frequently observed complication was de novo stress urinary incontinence defined as the subjective complaint of stress incontinence after surgery in previously continent women, and this subject matter is currently being analyzed in our ongoing study. Mesh-related vaginal erosion is one of the major drawbacks of this type of surgery, with an average incidence of 10%. Notably our mesh exposure rate was 3.5%, which is comparable with the rate reported by Ca et al (3.6%), but much lower than the average reported rate of approximately 10%. The low rate shown in our study is probably because we excluded the first 20 cases during the learning curve and patients with previous prolapse surgery. Long et al suggested that vaginal erosion is less likely to occur beyond the learning curve. In addition, using the hydrodissection technique to ensure inclusion of the full thickness of the vagina epithelium and endopelvic fascia, together with not trimming redundant vaginal tissue was adopted in order to minimize the risk of mesh exposure. Some authors suggested...
higher mesh exposure with concomitant hysterectomy.\textsuperscript{12} however, our findings did not support this association, as we only had 3.5% mesh exposure despite 91.3% (95/114 patients, 83.3%) concomitant vaginal hysterectomy. The other rare complication reported by Long and Wu\textsuperscript{13} is the vaginal adhesion band following a transvaginal mesh repair, which needs to be addressed as part of counseling preoperatively.

Conclusion

Transobturator nonabsorbable AVM combined with SSF yielded a favorable and sustainable result over 3 years in anatomical and subjective success rates. The rate of mesh-related morbidities was low and acceptable.

References