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ORIGINAL ARTICLE

Perioperative Complications in Vaginal Mesh Procedures Using Trocar in Pelvic Organ Prolapse Repair

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Abstract
Introduction and Hypothesis This study aimed to document intraoperative and early postoperative complications associated with the use of vaginal mesh with trocar in pelvic organ prolapse (POP) repair.
Methods This is a retrospective review of 120 cases of vaginal repair of POP using vaginal mesh. Of the 120 patients, 31 underwent anterior mesh repair (Light mesh 10, Avaulta 1, Perigee 1, and Prolift 19); 35 underwent posterior mesh repair (Light mesh 2, Posterior IVS 17, and Prolift 16); and 54 underwent anterior and posterior mesh (total) repair (Light mesh 8, Prolift 32, and Prolift M 14).
Results Three bladder injuries (2.5%) and one distal rectal injury (0.8%) occurred during dissection. Three of four organ injuries (75%) had previous prolapse repair. Overall four patients (3%) required transfusion. Urinary retention exceeding 5 days occurred in four patients. Three of them (60%) also underwent TVT-O. Groin pain occurred in two patients one of whom underwent TVT-O. Gluteal pain occurred in one patient. Early mesh exposure occurred in the vaginal cuff of a patient who underwent hysterectomy.
Conclusions The vaginal mesh procedures may be done with relatively few perioperative complications. However, there is a need for more randomized controlled trials with long-term follow-up to clarify its postoperative long-term complications and morbidities.

Keywords Perioperative complications · Vaginal mesh procedures · Pelvic organ prolapse

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Introduction

Pelvic organ prolapse is a common condition and a major reason for urogynecologic surgery. A variety of operations, including both vaginal and abdominal approaches, have been described for the treatment of pelvic organ prolapse. Abdominal sacrocolpopexy, vaginal sacrospinous ligament fixation, anterior repair, and posterior repair are widely accepted procedures. Recently, synthetic materials are increasingly used in urogynecologic surgery. Suburethral slings like tension-free vaginal tapes have become a popular treatment of choice for stress urinary incontinence, owing to high success rates and few side effects [1]. Mesh patches have also been introduced in prolapse surgery as an effective method in dealing with the high recurrence rates of traditional surgeries. However, there were some

problems with mesh patch, such as suturing, dissection, and exposure. Vaginal mesh kits using trocar have specially designed equipments and techniques that are easy to perform and do not require anchoring sutures.

Although the use of synthetic material in prolapse surgery seems to be very effective, as supported by high cure rates, short operating and recovery time, and low recurrence rates [2–8], clinical experience has shown that implantation of meshes may be associated with side effects, such as pain, mesh exposures and infection, vaginal bleeding, vaginal discharge, fistulas, and dyspareunia [9–14].

The purpose of this study was to determine the incidence and type of perioperative complications associated with mesh applications using trocars in prolapse surgery.

Materials and Methods

This retrospective study was based on a review of the medical records of 120 patients with anterior and/or posterior and/or apical prolapse, who underwent vaginal mesh surgery with trocars, which was performed by a single experienced pelvic floor surgeon (F.D). The study was performed during the period from May 2006 to June 2011. Written informed consent was obtained from all the patients. The ethical committee of the hospitals approved the study.

The pre- and postoperative protocol included an urogynecologic history, a physical examination, a voiding diary, a 1-h pad test, a cough stress test, and perineal ultrasonography. Pelvic organ prolapse was staged using the POP-Q system. The main indications for surgery for anterior, posterior, and uterine or vaginal vault prolapse were stage 2 prolapse in the POP-Q system. Multichannel urodynamic studies were performed in selected patients. Stress test and urodynamic studies were performed in patients in whom the cervix was reduced to identify occult urodynamic stress incontinence (USI). The methods, definitions, and descriptions used conformed to the standards recommended by the International Continence Society.

At the beginning of the study, we used self-tailored polypropylene mesh (Parietene: Sofradim, Trevoux, France or Gynemesh: Ethicon, Somerville, NJ, USA) with trocars. After commercially vaginal kits [Prolift (Gynecare/Ethicon, Somerville, NJ, USA), Avaulta (Bard Urologic Division, Covington, GA, USA), Perigee (American Medical Systems, Minnetonka, USA), Posterior IVS (Tyco Healthcare, United States Surgical, Norwalk, USA)] were available in our country, we used them with their special equipment as described by the producer. All patients were placed in the lithotomy position with thighs flexed at approximately 90°, saline with a vasoconstructive solution was infiltrated to ease dissection and reduce bleeding, a midline incision was made, which included full thickness of the fibromuscular wall of the vagina. The vagina was closed without any resection of vaginal tissue. If hysterectomy was needed, then it was performed first. No T incisions were allowed to reduce the chance of mesh exposure in the patients with cuff prolapse. After closing the incisions, a lubricated vaginal packing was inserted into the vagina for a day. Anal sphincteroplasty was performed after the main operations when indicated. The surgical procedures performed in the groups are shown in Table 1. Patients at risk received antithrombotic prophylaxis consisting of low-molecular-weight heparin. Antibiotic prophylaxis was administrated in all patients. All postmenopausal women were treated with vaginal estrogen before the surgery. Foley catheter was removed on the first postoperative day.

A perioperative complication was defined as any complication that occurred during surgery or within 6 weeks postoperatively.

Student's t test and the Chi-squared test were used for statistical analysis (SPSS software, version 11.0, SPSS, Chicago, IL, USA). A p value ≤ 0.05 was considered significant.

Results

Of the 120 patients, 31 underwent anterior mesh repair (Light mesh 10, Avaulta 1, Perigee 1, Prolift 19), 35 underwent posterior mesh repair (Light mesh 2, Posterior IVS 17, Prolift 16), 54 anterior and posterior mesh repair (total) (Light mesh 8, Prolift 32, Prolift M 14) were performed. General anesthesia was utilized in 96 of cases, regional anesthesia in 14 and sedation with local anesthesia in 9. Previous pelvic organ prolapse surgery had been performed on 50 (42 %) patients. Concomitant surgical procedures were performed in 53 patients (44.2 %).

Operating time, hemoglobin loss and hospital stay were only compared in 67 patients who did not undergo a concomitant procedure. Patient characteristics and surgical data are presented in Table 1.

Intraoperative hemorrhage requiring transfusion occurred in three patients (2.5 %). In postoperative period, large perineal ecchymosis extending to inner thigh occurred in 5 patients that one of them required transfusion. Overall four patients (3 %) required transfusion. Three bladder injuries (2.5 %) and one distal rectal injury (0.8 %) occurred during dissection. They were all detected intraoperatively and repaired immediately. Three of the four patients with organ injuries (75 %) had previous prolapse repair. Urinary retention exceeding 5 days occurred in four patients (6, 7, 9, and 12 days). Three of them (60 %) had undergone

Table 1 Patients characteristics

Procedure	Anterior ($n = 31$)	Posterior ($n = 35$)	Total mesh ($n = 54$)
Age (range)	48 (28–72)	49 (35–66)	46.5 (32–68)
Parity (range)	3.2 (1–7)	4.1 (1–6)	4.3 (0–9)
BMI (range)	28 (25–38)	29 (24–40)	29.7 (26–44)
Postmenopausal patients, *n* (%)	14 (45.2)	16 (45.7)	21 (38.9)
Previous pelvic surgery, *n* (%)	13 (41.9)	11 (31.4)	26 (48.1)
Operating time (min) (range)[a]	40 (33–70)	42 (30–73)	68 (50–90)
Concomitant surgery			
Anterior colporrhaphy	1	–	3
Posterior colporrhaphy	–	4	3
TVT-O sling	16	5	19
TVT-Secur sling	1	–	3
Cervical amputation	–	–	3
Anal sphincteroplasty	–	3	3
Vaginal hysterectomy	–	–	17
Hospital stay (days) (range)[a]	1.3 (1–4)	0.9 (0–5)	1.8 (1–7)
Hemoglobin lose mg/dl[a]	1.2	0.9	1.6

[a] Without concomitant procedures

TVT-O. Groin pain occurred in two patients one of whom underwent TVT-O. Gluteal pain occurred in one patient. Early mesh exposure occurred in the vaginal cuff of a patient underwent hysterectomy. Detailed complication rates and perioperative morbidity for the various surgical procedures are shown in Table 2.

Discussion

In the present study, the mean age of patients with prolapse is younger and their parity is higher than published studies. Main reasons of pelvic organ prolapse in young women in our country are generally high birth rate, prolonged labor, poor prenatal care, and incidences of giving birth at home without medical help. Therefore, we commonly used the abdominal sacrohysteropexy procedure that preserved the uterus for young patients with total prolapse in the past [15].

Table 2 Perioperative complications

	Anterior ($n = 31$)	Posterior ($n = 35$)	Total mesh ($n = 54$)	Total
Bladder injury, *n* (%)	2 (6.4)	–	1 (1.8)	3 (2.5)
Rectal injury, *n* (%)	–	1 (2.8)	–	1 (0.8)
Hemorrhage, *n* (%)	1 (3.2)	1 (2.8)	2 (4.6)	4 (3.3)
Urinary retention (>5 days), *n* (%)	2 (6.4))	–	2 (3.7)	4 (3.3)
Urinary infection, *n* (%)	1 (3.2)	2 (5.7)	2 (3.7)	5 (4.2)
Febrile morbidity, *n* (%)	1 (3.2)	2 (5.7)	2 (3.7)	5 (4.2)
Perineal ecchymosis	1 (3.2)	1 (2.8)	3 (5.6)	5 (4.2)
Gluteal pain	–	1 (2.8)	–	1 (0.8)
Groin pain		–	–	2 (1.7)
Early mesh exposure	–	–	1 (1.8)	1 (1.8)

Diwadkar et al. [13] in a meta-analysis of 24 studies including 3,425 patients and Gomelsky et al. [16] in a review of 16 studies including 1,552 patients reported bladder injury as 0.7, 2.6 % and bowel injury as 0.3, 0.3 %, respectively. In the clinical studies, Kato et al. [17] in 300 Patients and Caquant et al. [18] in 684 patients reported bladder injury as 3.7, 0.7 % and rectal injury as 0.3, 0.3 % respectively. In the present study, the rates of bladder injury and rectal injury were 2.5 and 0.8 %, respectively, and were comparable with these studies. Cautious dissection and needle insertion are mandatory to prevent injury, and it is important to detect the injury during procedure if it occurs. In addition paying attention to finger feeling, water leakage, and macro hematuria are important in detection. Some investigators have also recommended blue methylene test and cystoscopy [7, 19]. Digital rectal examination should be routinely done in posterior mesh repair to check rectal injury and the absence of mesh tension [17]. We placed the posterior mesh, after repairing distal rectal injury, at a position which was a safe area out of peritoneal cavity. The preoperative bowel preparation has to be a mandatory rule in vaginal mesh kit procedures for probable injury and easing rectal palpation. Of our patients with organ injuries, 75 % had also undergone previous pelvic surgeries that increase the risk of hemorrhage and organ injuries [18].

In the present study, hemorrhage requiring transfusion occurred in 3.3 % of the patients. Hemorrhage in vaginal mesh kits were reported between 0, 0.3, 1, 2.8 % in the literature [5, 17, 18, 20]. It may be hard to control hemorrhage during vaginal mesh procedures. Tampons and vaginal packing can stop hemorrhage. Large perineal ecchymosis always indicates hemorrhage into tissue, and it should be dealt immediately.

The rate of mesh exposure in our study was 0.8 %, lower than those in published studies that reported a rate between 5.8 and 19 % [13, 16, 21]. The lower rate in the present study may be associated with short follow-up period and surgeon's experience on mesh application. Dwyer and O'Reilly [21] showed the importance of the learning curve when it comes to preventing prosthetic exposure (19 % in the first year compared with 4 % in the third).

In conclusion, vaginal mesh procedures may be done with relatively fewer perioperative complications. However, there is a need for more randomized controlled trials with long-term follow-up to clarify its postoperative long-term complications and morbidities.

Conflict of interest None

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