De novo symptoms and their impact on life quality in patients following transvaginal reconstructive pelvic surgery with polypropylene mesh

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Summary

Objective: To study the de novo symptoms and their impact on life quality in patients that underwent transvaginal reconstructive pelvic surgery (RPS) with polypropylene mesh. *Materials and Methods:* From May 2004 to March 2011, 114 severe pelvic organ prolapse (POP) patients with Stage III-IV by POP-Q system underwent RPS with polypropylene mesh. Patients completed pelvic floor distress inventory short form (PFDI-20) and pelvic floor impact questionnaire short form (PFIQ-7) preoperatively and repeated them at two and six months, and one year postoperatively. *Results:* Ninety-six (84%, 96/114), 85 (75%, 85/114), and 77 (68%, 77/114) patients, respectively, completed the questionnaires at two months, six months, and one year postoperatively. All patients had POP-Q staging scoring ≤ I at one year after surgery. Nineteen (19.8%, 19/96) patients had mesh exposure at two and six months (7.8%, 6/77) at one year follow-up. Most vaginal and pelvic symptoms, urinary and obstructive defecation bothersome symptoms improved significantly at two months postoperatively and this improvement was maintained at the one year follow-up. Mean score of PFDI-20 and PFIQ-7 all improved significantly postoperatively at two and six months and at one year follow-up ($p < 0.01$). Fifty percent (48/96) of patients had postoperative de novo symptoms at the two months follow-up predominantly presented with bothersome vaginal discharge (35.4%, 34/96) and pelvic muscle symptoms (20.8%, 20/96). Patients with de novo symptoms had higher postoperative mean POPDI-6 and POPIQ-7 scores ($p < 0.05$) than those without at the two month follow-up, but no significant difference was seen at the six month and at one year follow-ups. Patients with bothersome vaginal discharge had higher vaginal mesh exposure rate (41.2%, 14/34) than patients without (8.1%, 5/62) ($p = 0.0003$). One year after operation, 77 (68%) patients completed the non-validated satisfaction questionnaire. Seventy-four (96%, 74/77) patients said that they were either 'very satisfied' or 'satisfied' with the outcome of their surgery, while three (4%, 3/77) reported unsatisfactory results. *Conclusions:* De novo symptoms were common after transvaginal RPS with polypropylene mesh, but most of them were moderate and resolved within six months postoperatively and seldomly had a long-term negative impact on their quality of life. The impact of dyspareunia on patients' sexual function requires further research.

Key words: New symptoms; Polypropylene mesh; Reconstructive pelvic surgery; Pelvic floor dysfunction; Life quality.

Introduction

Vaginal reconstructive pelvic surgery (RPS) is a major surgical procedure for treating severe pelvic organ prolapse (POP), which aims to not only recover the function of pelvic organs but also obtain long-lasting reconstructive effects with the premise of minimising surgical trauma. Traditional RPS can strengthen the reconstructive effect by adopting autologous tissue to strengthen the pelvic floor, but unfortunately the recurrence rate after POP is high, with about one-third of patients requiring reoperation [1]. It has become an urgent clinical need to replace autologous tissue with newly developed synthetic materials. Until recently, French surgeons have taken the lead in adopting synthetic mesh for reinforcement after vaginal RPS surgery [2]. Such surgery usually requires a pre-selected piece of synthetic mesh to retain the pelvic wall to support prolapsed organs using puncture needle in casing. Although the application of synthetic mesh in RPS usually occurs after hernia repair surgery, the performance demands on the material are harsh. There must be sufficient support strength, good compliance, and flexibility to avoid discomfort in patients with appropriate extension of the vagina; this also requires good compatibility, permanence, and low pathogenicity of material tissues. The present, more consistent views show a low pathopoiesis rate with polypropylene material woven with a low weight, large holes, and single-stranded fibres at a flexible range of 20% to 35% [3]. Polypropylene mesh has become the most common synthetic material for transvaginal RPS. However, not all the studies have reported encouraging transvaginal polypropylene mesh RPS results, so the efficacy and safety for polypropylene mesh in vaginal applications of RPS still need adequate randomised controlled trials [4]. Studies on the complications caused by mesh, including mesh exposure, infection, painful sexual intercourse, organ perforation, and vascular nerve injury have been reported, which will affect the life quality of patients, and can even be life-threatening [5]. This is also a common cause of new-onset symptoms after surgery. Since 2005, the U.S. Food and Drug Administration (FDA) has received over 1,000 related reports of serious complications caused by synthetic mesh for POP and incontinence [5], and has issued a warning [6].

Most transvaginal polypropylene mesh RPS-related re-

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ports have been related to the surgical failure rate and a reduction in mesh exposure [2,7,8]. In recent years, studies on the effect of implanted network chips on the function of the vagina and adjacent pelvic floor muscle began to appear [9,10], but little research has focused on new postoperative symptoms. It is well-known that many patients with severe POP have pelvic floor dysfunction (PFD) symptoms to varying degrees, which can seriously affect the quality of life of patients. Relief of PFD symptoms and improvements in life quality are important criteria to weigh whether the clinical operation was successful. Clinicians have emphasized the improvement of surgery on PFD symptoms in patients with severe preoperative POP, but often overlooked the distresses caused by common new-onset postoperative symptoms. Serious new-onset symptoms still have a negative impact on the quality of life of patients and degree of satisfaction with the treatment, and is worthy of further attention.

Therefore, this study was designed to investigate PFD symptoms and quality of life in patients who underwent RPS using vaginal polypropylene mesh because of severe POP, but also addressed new-onset postoperative symptoms and the effects of these on patient quality of life.

Materials and Methods

Study design

From May 2004 to March 2011, 114 patients with severe POP were treated with polypropylene mesh RPS. The average age of 114 patients was 64 ± 8 years, the mean body mass index (BMI) was 24.6 ± 2.7 kg/m^2, the average parity was 2.8 ± 1.5, and the average menopause was 14 ± 8 years. The patients had no history of hormone treatment. Of the 114 patients, 65 patients (57%) had more than one kind of medical complication, including 47 cases of hypertension, 11 cases of coronary heart disease and heart surgery, 17 cases of diabetes, four cases of cerebrovascular disease, nine cases of chronic bronchitis, two cases of chronic obstructive pulmonary disease, and one case of non-Hodgkin's lymphoma combined with systemic lupus erythematous. The 114 patients were staged as Stage III-IV according to the degree of POP quantification (POP-Q) method, with 84 cases of Stage III (74%) and 30 cases of Stage IV (26%). The recurrence of simple repair of the vaginal anterior and posterior wall occurred in six cases, and vault prolapse after hysterectomy in five cases. Preoperative symptoms associated with PFD are shown in Table 1. New-onset symptoms were defined as PFD symptoms in postoperative patients which troubled the daily life of patients.

Investigation methods: questionnaire

The classic questionnaire used in international women's PFD research was adopted to evaluate PFD symptoms and their impact on life quality: the pelvic floor distress scale summary table, pelvic floor distress inventory-20 (PFDI-20), and the impact questionnaire summary of the pelvic floor impact questionnaire-7 (PFIQ-7) [11]. PFDI-20 was composed of 20 POP symptom questions, and included three subscales: POP distress inventory (POPDI-6), colorectal-anal distress inventory (CARDI-8), and urinary distress inventory (UDI-6). The PFDI-20 scoring criteria were: 0, asymptomatic; 1, symptomatic but had no effect on life quality; 2, mild impact; 3, moderate impact; and 4, severe impact.

Table 1. — *PFD symptoms distribution in patients before and after RPS with polypropylene mesh (n, %).*

PFD	Before operation (n = 114)	Two months after operation (n = 96)	Six months after operation (n = 85)	12 months after operation (n = 77)
Vagina or cavitas pelvis syndrome hypogastralgia	17 (14.9)	10 (10.4)	5 (5.9)	0 (0)*
Heavy feeling of cavitas pelvis	57 (50)	16 (16.7)*	3 (3.5)*	1 (1.3)*
Walk friction feeling	44 (38.6)	0 (0)*	0 (0)*	0 (0)*
Tumor prolapse sense	107 (93.9)	0 (0)*	0 (0)*	0 (0)*
Urinary distress symptoms				
Dysuria	51 (44.7)	8 (8.3)*	5 (5.9)*	4 (5.2)*
Incomplete voiding	57 (50)	11 (11.5)*	12 (12.5)*	8 (10.4)*
Stress urinary incontinence	46 (40.4)	17 (17.7)*	12 (12.5)*	10 (13)*
Urge incontinence	26 (22.8)	7 (7.3)*	7 (8.3)*	7 (9.1)**
Hand-assisted voiding	23 (20.2)	0 (0)*	0 (0)*	0 (0)*
Urinary frequency	37 (32.5)	10 (10.4)*	6 (7.1)*	6 (7.8)*
Urgency	29 (25.4)	9 (9.4)*	7 (8.2)*	6 (7.8)*
Defecation distress				
Acute defecation	6 (5.3)	1 (1)	1 (1.2)	3 (3.9)
Dry fecal incontinence	2 (1.8)	1 (1)	1 (1.2)	1 (1.3)
Loose stools incontinence	6 (5.3)	2 (2.1)	1 (1.2)	1 (1.3)
Gas incontinence	7 (6.1)	1 (1)	0 (0)	1 (1.3)
Difficult defecation	36 (31.6)	14 (14.6)*	5 (5.9)*	8 (10.4)*
Incomplete voiding	27 (23.7)	7 (7.3)*	5 (5.9)*	5 (6.5)*
Hand-assisted voiding	11 (9.6)	0 (0)*	0 (0)**	0 (0)*

Compared with that before operation: *$p < 0.01$; **$p < 0.05$.

Table 2. — *PFDI-20,PFIQ-7,and subscale score before and after RPS with polypropylene mesh ($x \pm s$).*

Questionnaire	Before operation (n = 114)	Two months after operation (n = 96)	Six months after operation (n = 85)	12 months after operation (n = 77)
PFDI-20	62.40 ± 43.70	13.70 ± 7.95*	9.76 ± 14.81*	5.89 ± 12.13*
POPDI-6	29.58 ± 18.37	2.86 ± 5.62*	1.84 ± 4.17*	0.81 ± 2.24*
UDI-6	24.92 ± 21.76	8.21 ± 13.39*	6.85 ± 11.12*	3.41 ± 7.02*
CARDI-8	8.27 ± 12.49	2.54 ± 6.94*	1.10 ± 3.76*	1.66 ± 6.05*
PFIQ-7	79.90 ± 55.81	14.65 ± 5.84*	9.45 ± 21.23*	6.35 ± 18.04*
POPIQ-7	39.81 ± 24.95	3.82 ± 6.83*	3.47 ± 11.88*	1.11 ± 3.70*
UIQ-7	32.01 ± 28.93	8.23 ± 19.15*	5.43 ± 12.65*	3.46 ± 10.41*
CARIQ-7	8.04 ± 20.64	3.08 ± 13.07**	0.55 ± 3.28*	1.72 ± 7.35*

Compared with that before surgery: *$p < 0.01$; **$p < 0.05$.

The subscale scores were the sum of the subscale scores of each question/the number of questions × 25. Score range was from 0 to 100. The total scale score for the three subscale scores were added together, with a range of 0 to 300 points. A higher score indicates more severe symptoms of PFD. The PFIQ-7 also included three scales: the pelvic organ prolapse impact questionnaire-7 (POPIQ-7), colorectal-anal impact questionnaire-7 (CARIQ-7), and urinary impact questionnaire (UIQ-7). Each scale consisted of seven daily life questions to evaluate the impact of PFD symptoms on life quality. The rating criteria were: 0, no effect on life quality; 1, mild effect; 2, moderate impact; 3, severe impact. The subscale scores were the sum of the subscale score of each question/the number of questions × 100 ÷ 3; scores range from 0 to 300. A higher score indicates more severe symptoms of PFD.

Questionnaire methods

The questionnaire was performed together by non-surgical personnel and patients. The preoperative questionnaire was completed before surgery but after admission. The patient follow-up questionnaires were completed after two and six months and at one year. All patients who completed questionnaires were conscious and answered questions independently.

Table 3. — *New symptoms after polypropylene mesh RPS (n, %).*

Syndrome after	Two months after operation (n = 96)	Six months after operation (n = 85)	12 months after operation (n = 77)
Abnormal excretion in vagina	34 (35.4)	29 (34.1)	19 (24.7)
Musclar syndrome in cavitas pelvis	20 (20.8)	6 (7.1)	2 (2.6)
Hypogastralgia	7 (7.3)	2 (2.4)	1 (1.3)
Fall and expand from cavitas pelvis	5 (5.2)	2 (2.4)	0 (0)
Perineal body pain	6 (6.3)	1 (1.2)	0 (0)
Vaginal pain	1 (1.0)	1 (1.2)	1 (1.3)
Vaginal shrinkage	1 (1.0)	0 (0)	0 (0)
Urgency	2 (2.1)	0 (0)	0 (0)
Urgent incontinence	1 (1.0)	0 (0)	0 (0)
Urge incontinence	4 (4.2)	1 (1.2)	2 (2.6)
Dysuresia	1 (1.0)	0 (0)	1 (1.3)
Incomplete urination	1 (1.0)	1 (1.2)	1 (1.3)
Urgent defecation	0 (0)	0 (0)	1 (1.3)
Constipation	2 (2.1)	0 (0)	2 (2.6)

Table 4. — *PFDI-20, PFIQ-7 and subscale score in group with and witout new symptoms two months after polypropylene mesh RPS (x ± s).*

Questionnaire	Group with new symptoms (n = 48)	Group without new symptoms (n = 48)	*p* value
PFDI-20	16.55 ± 18.45	10.86 ± 17.15	0.12
POPDI-6	4.51 ± 7.08	1.20 ± 2.83*	0.003*
UDI-6	9.13 ± 11.86	7.29 ± 14.83	0.50
CARDI-8	2.93 ± 7.96	2.15 ± 5.81	0.58
PFIQ-7	19.29 ± 28.75	10.02 ± 21.88	0.08
POPIQ-7	7.24 ± 8.10	0.40 ± 2.16*	0.000*
UIQ-7	8.73 ± 19.41	7.74 ± 19.09	0.80
CARIQ-7	3.73 ± 15.28	2.78 ± 10.57	0.72

*$p < 0.05$.

Statistical methods

SPSS 10.0 software was adopted for statistical analysis; t-tests or rank tests were used for quantitative data and the Pearson χ^2 test was used for classification data. A $p < 0.05$ was considered statistically significant.

Results

RPS with polypropylene mesh

Of the 114 patients treated with polypropylene mesh RPS, front pelvic polypropylene mesh RPS was performed in 97 cases (85.1%), whole pelvic polypropylene mesh RPS was performed in 17 cases (14.9%), vaginal hysterectomy was performed in 102 cases (89.5%), high sacral ligament vaginal suspension surgery was performed in 95 cases (83.3%), tension-free urethral sling suspension surgery was performed in 44 cases (38.6%), perineorrhaphy and levator myorrhaphy was performed in 95 cases (83.3%), cystoscopy was performed in 95 cases (83.3%), external anal sphincter repair was performed in one case, and line abdominal wall hernia repair was performed in one case. The mean operative time was 180 ± 52 min (90 - 405 min) and the mean hemorrhage volume was 248 ± 142 ml (50 - 800 ml). The guide pin pricking technique caused bladder damage in two patients, and the damage naturally healed one week after indwelling catheter. A six-cm hematoma was detected on the left side of the bladder of one patient with persistent postoperative pain. The patient's bleeding stopped and improved after local therapy, two months after surgery, and ultrasound results showed the hematoma had disappeared. Routine cystoscopic examination of one patient showed right ureteral obstruction. The urine spray of the bilateral ureter was normal, confirmed by cystoscopy after removing and replacing the right sacral ligament sutures. In three cases urinary tract infection had occurred within one week, one case had type II pulmonary infection combined with type II respiratory failure, and one case had an infection of the perineal body, followed by anti-infective therapy. The postoperative morbidity was 4.4% (5/114).

Table 5. — *PFDI-20, PFIQ-7, and subscale score in groups with and witout new symptoms six months after polypropylene mesh RPS (x ± s).*

Questionnaire	Group with new symptoms (n = 44)	Group without new symptoms (n = 41)	*p* value
PFDI-20	9.56 ± 14.15	9.97 ± 15.66	0.899
POPDI-6	1.99 ± 3.76	1.68 ± 4.61	0.734
UDI-6	6.16 ± 9.19	7.60 ± 12.95	0.554
CARDI-8	1.42 ± 4.64	0.76 ± 2.50	0.422
PFIQ-7	10.17 ± 24.42	8.68 ± 17.43	0.749
POPIQ-7	4.76 ± 15.41	2.09 ± 6.12	0.303
UIQ-7	4.65 ± 10.50	6.27 ± 14.70	0.558
CARIQ-7	0.76 ± 4.35	0.32 ± 1.48	0.540

Table 6. — *PFDI-20, PFIQ-7, and subscale score in groups with and witout new symptoms one year after polypropylene mesh RPS (x ± s).*

Questionnaire	Group with new symptoms (n = 39)	Group without new symptoms (n = 38)	*p* value
PFDI-20	6.09 ± 11.36	5.67 ± 13.02	0.880
POPDI-6	0.86 ± 2.18	0.77 ± 2.34	0.862
UDI-6	3.63 ± 6.70	3.18 ± 7.41	0.781
CARDI-8	1.60 ± 5.16	1.73 ± 6.92	0.926
PFIQ-7	7.57 ± 19.63	5.11 ± 16.43	0.553
POPIQ-7	0.86 ± 2.18	0.25 ± 1.08	0.126
UIQ-7	3.54 ± 10.58	3.38 ± 10.38	0.947
CARIQ-7	1.95 ± 7.70	1.47 ± 7.07	0.777

Postoperative follow-up of patients treated with polypropylene mesh RPS

Follow-up was carried out at two, six months, and at one year after surgery and was 84% (96/114), 75% (85/114) and 68% (77/114), respectively. All the POP-Q stages of the follow-up patients after one year were ≤ Stage I, and the surgical objective success rate was 100%. Nineteen patients showed vaginal mesh exposure two months after surgery (19.8%, 19/96), with an average diameter of 0.64 ± 0.55 cm (0.1-2 cm). Mesh exposure was detected in 13 patients six months after surgery (15.3%, 13/85), with an average diameter of 0.40 ± 0.30 cm (0.1-1 cm). Mesh exposure was detected in six patients one year after surgery (7.8%, 6/77), with an average diameter of 0.43 ± 0.26 cm (0.1 - 1 cm).

Mesh exposed reference was according to treatment methods recommended by Muffly and Barber, including regular observation, topical estrogen cream, and metronidazole suppository, cutting off the exposed mesh in the clinic or hospital, etc. [12]. Most exposure gradually improved based on this method after treatment and recovery, but there were still six cases of patients with exposed mesh one year later. No progress was found in any patient. One patient underwent mesh exposition excision 11 months after surgery because she could not tolerate long-term abnormal vaginal discharge; healing of the exposed parts was found two months later. The preoperative PFD symptoms of the patients were significantly relieved two months after surgery and maintained until one year after surgery (Table 1). Corresponding to this, the PFDI-20 and PFIQ-7 scores and their subscales for the patients after surgery decreased significantly compared to the preoperative scores (Table 2). 50% (48/96) of patients encountered new symptoms two months after surgery (Table 3), but to a lesser extent, the majority of new-onset symptoms were relieved and disappeared six months after conservative treatment. There was no statistically significant difference between the PFDI-20 and PFIQ-7 scores of the patients in the new-onset symptomatic group and those patients with no new symptoms two months later, but the scores of the subscale POPDI-6 and POPIQ-7 were significant ($p < 0.05$) (Table 4). There was no statistically significant difference between the subscale scores of PFDI-20 and PFIQ-7 in the patients of the two groups six months after surgery ($p > 0.05$) (Tables 5 and 6).

Abnormal vaginal discharge (35.4%, 34/96), and pelvic muscle symptoms (20.8%, 20/96) were the most common new-onset symptoms of the patients in this group. The results at two months follow-up showed that in 34 cases in the abnormal vaginal discharge group, mesh exposure was found in 14 cases (41.2%), line knots on the vaginal stump in four cases, and granulation in one case. Five patients were found with mesh exposure in 62 cases with no abnormal vaginal discharge (8.1%), a vaginal stump knot in six cases, and granulation in one case. The rates of mesh exposure of the patients in the abnormal vaginal secretion group were significantly higher than those of the patients in the no abnormal vaginal secretion group ($p = 0.0003$).

A total of three patients were dissatisfied one year after surgery; one patient was dissatisfied with new-onset postoperative pain in the vagina, one patient found no improvement in preoperative urinary frequency and urge incontinence and new-onset stress incontinence, and one patient found no improvement in fecal and urge incontinences. The overall satisfaction rate was 96% (74/77) one year after surgery.

Discussion

The recurrence rate of traditional surgical treatment on POP was high. The anterior vaginal wall is the most common site of recurrence, as 60% of prolapses recurred at the initial site of the vagina, and about one-third of patients required reoperation. Most current domestic and international literature shows that transvaginal polypropylene mesh RPS cannot only improve the effect of surgical repair, but also relieve the symptoms of PFD and improve life quality of patients [13-16], which is consistent with the results in this study. The efficacy of clinical research findings usually depends on whether the changes are statistically significant, but statistically significant differences do not have clinical meaning. The minimal clinically important difference (MCID) is the minimum threshold used to determine whether the change of therapeutic effect has clinical significance. Data that attain or exceed the MCID and has statistically significant changes can be considered clinically significant [17]. Barber's research has shown that PFDI-20 and PFIQ-7 of the MCID was 45 score and 36 score, respectively [11]. In this study, the changes in PFDI-20 and PFIQ-7 before and after surgery were 48.7 points and 62.3 points, respectively, which were higher than the MCID. It also suggests that polypropylene mesh RPS can really relieve PFD symptoms and improves the life quality of patients and have clinical practice significance.

Polypropylene mesh is currently the most commonly used synthetic material in transvaginal pelvic reconstructive surgery. Although surgery can improve the effect of repair, it can also result in mesh exposure, infection, shrinkage, organ damage, and other complications, and induce new clinical symptoms. Currently, less attention has been paid to these effects in the clinic. Pham *et al.* have reported postoperative new-onset symptoms of RPS, such as urinary incontinence (27%), urgency (25%), urinary frequency (23%), constipation (22%), and dysuria (10%). The total new-onset symptoms rate of the patients was 42%, but the related surgery methods were non-surgical vaginal polypropylene mesh RPS [18]. Aungst *et al.* more systematically investigated the new-onset postoperative symptoms in patients after treatment with transvaginal polypropylene mesh RPS. The postoperative new-onset of stress urinary incontinence was 24.3%, and the rate of new-onset symptoms of pelvic muscles including sexual intercourse pain, vaginal pain, groin pain, sitting pain, and walking pain, etc. was 18.3% [19]. In this study, the occurrence rate of new-onset pelvic muscle symptoms (20.8%) was similar, but abnormal vaginal discharge (35.4%) was more common, which may be related to the higher mesh exposure rate (19.8%) in this study. Further statistical analysis also confirmed that mesh exposure was the main reason leading to abnormal vaginal discharge. Although most scholars have taken a series of measures, such as preoperative vaginal mucosa fully-treated with estrogen, preventing inverted "T"-shaped incisions, placing the mesh in vaginal muscle without tension, and fully covering with the vaginal mucosa, etc., mesh exposure still occurs at a reported exposure rate of about 4.6% to 15.6% [12, 20, 21]. In this study, the slightly higher rate of mesh exposure may be related to the following factors: 1) the average age of patients was high, the average menopause was longer, and the level of estrogen in vaginal mucosa was relatively poor; 2) with more surgery, operative time was rather long; 3) the proportion of hysterectomy was

high (89.5%) [22]; 4) a more stringent standard was adopted and touched mesh fibres were included in the statistics on mesh exposure [3]. The causes inducing new-onset postoperative pelvic muscles symptoms were related to pelvic organ injury induced by surgery, pelvic tissue growth into the mesh film, mesh shrinkage, incorrect positioning of the mesh, high-mesh tension, and mesh arm tension with higher traction [19]. The improvement of mesh placement techniques may help reduce the occurrence of such new-onset symptoms.

Although most studies confirmed the exact effect of polypropylene mesh RPS on PFD, little attention was paid to the effect of new-onset symptoms on life quality and satisfaction of patients regarding surgery. Some studies have shown that postoperative new-onset symptoms in RPS of patients have a direct impact on achieving the desired objectives and the satisfaction of the patients, and can even affect the quality of life of patients [18, 23]. This study showed that although there was no statistically significant difference between the total PFDI-20 and PFIQ-7 scores of the patients in the new-onset symptom group and those of the patients in the no new-onset symptom group, the scores of the POPDI-6 and POPIQ-7 subscale of the patients in the new-onset symptom group were significantly higher compared with those of the patients in the no new-onset symptom group (PPOPDI-6 = 0.003, PPOPIQ-7 = 0.000). This suggests that new-onset postoperative vaginal or pelvic symptoms still have a negative impact on the life quality of patients, but there were no statistically significant differences in the scores of the patients on the two groups six months after surgery. This suggests that new-onset symptoms were transient, the degree of the majority of new-onset symptoms was lower and could be eased or even disappear over time. This corresponds with the viewpoint of August et al. in that most new-onset symptoms after RPS are mild, and can be improved by conservative treatment six months after surgery [19]. In this study, the incidence of new-onset symptoms was higher and may be related to the following factors: 1) some preoperative symptoms existed before surgery and were masked by severe PFD symptoms. When surgery effectively relieved the severe PFD symptoms, the original mild symptoms reemerged and were perceived by patients; 2) after the severe PFD symptoms were resolved, slighter PFD symptoms needed to be resolved. A study by Lowenstein *et al.* also reported a similar phenomenon [23]. The improvement of the original preoperative symptoms of patients was poor and new symptoms will affect the achievement of the prospective target of patients, and thus affect the satisfaction of patients. Hullfish *et al.* mentioned the significance of the achievement of self-objectives of patients in assessing the therapeutic effect of RPS for the first time [24]. A study by Elkadry *et al.* also found that the satisfaction of patients with surgery was poorly correlated to traditional objective measurement results, and was related to the level of achieving self-goals [25]. According to the postoperative satisfaction survey, it is not difficult to find that new-onset symptoms of patients was one of the main causes resulting in the dissatisfaction of patients.

Dyspareunia is a common new-onset symptom after transvaginal polypropylene mesh RPS, but unfortunately the patients in this group were not sexually active, and the authors failed to obtain sufficient data for analysis. It was reported that the incidence of painful sexual acts in females with POP was quite different (8%-43%), which makes postoperative clinical evaluation of new-onset dyspareunia more difficult [26]. Lowman performed the POP survey in women after polypropylene mesh RPS, and postoperative new-onset dyspareunia occurred in 16.7% (21/57) of patients, but mild to moderate dyspareunia occurred in 75% of patients; 83% of patients with new-onset sexual intercourse pain were willing to choose this procedure again, which was similar to the previous studies. This suggests that such operations did not affect the patient's overall sexual health [26]. However, for patients to retain vaginal function and choose transvaginal RPS with polypropylene mesh, the impact of this kind of surgery on sexual function is still worthy of addressing.

In summary, common postoperative new-onset symptoms were induced by polypropylene mesh RPS, but the general extent was low, and most symptoms could be eased or even eliminated by conservative treatment within six months. Few long-term negative effects on the life quality of patients were found. The effect of postoperative dyspareunia on sexual function needs to be further investigated.

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