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Postoperative clinical outcomes of uterine suspension to the lateral abdominal wall combined with Manchester procedure and sacrospinous ligament suspension for the treatment of severe pelvic organ prolapse: a retrospective cohort study

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Abstract: Objective: To investigate the clinical efficacy and safety of uterine suspension to the ventral lateral region combined with Manchester procedure and sacrospinous ligament fixation in the treatment of severe pelvic organ prolapse. **Methods:** The clinical data of 86 patients with severe pelvic organ prolapse (POP-Q stage III-IV) who underwent surgical treatment in our hospital between 2023 and January 2024 were retrospectively reviewed. According to the type of surgery, the patients were divided into a combined surgical group and a combined uterine suspension group with Manchester procedure and sacrospinous ligament suspension. The Manchester procedure combined with sacrospinous ligament suspension was performed. The operation time, intraoperative bleeding, and postoperative hospitalization time of the two groups were observed. The Pelvic Floor Function Impact Questionnaire (PFIQ-7), Pelvic Floor Dysfunction Urinary Incontinence Questionnaire (PFDI-20) scores, POP-Q stage improvement, and complication rate were evaluated 12 months after surgery. **Results:** The operative time in the combined procedure group was longer than that in the traditional procedure group [(118.5±15.2) min vs (92.3±12.6) min, P<0.05]. However, there was no significant difference in intraoperative blood loss or postoperative hospital stay between the two groups (*P*>0.05). Twelve months after surgery, the proportion of patients with POP-Q stage I or lower in the combined procedure group (93.0%) was significantly higher than that in the traditional procedure group (74.4%) (*P*<0.05). The PFIQ-7 score (12.6±3.5) and PFDI-20

score (15.8±4.2) in the combined procedure group were significantly lower than those in the traditional procedure group (21.3±5.1) and (25.6±6.3) respectively (P<0.05). The overall complication rate in the combined procedure group (4.7%) was lower than that in the traditional procedure group (18.6%) (P<0.05). **Conclusion:** Uterine suspension and Manchester procedure combined with sacrospinous ligament suspension significantly improve pelvic floor function and reduce recurrence in patients with pelvic organ prolapse. It has a high safety factor and is worthy of clinical promotion.

Keywords: Pelvic organ prolapse, uterine suspension, Manchester procedure, sacrospinous ligament suspension, clinical efficacy

Introduction

Damage or relaxation of the pelvic floor support structure causes the uterus and vaginal wall and other pelvic organs to move downward, resulting in symptoms such as vaginal lumps, discomfort, urination and defecation dysfunction, which seriously reduce the quality of life of middle-aged and elderly women [1]. The incidence of POP in women is high worldwide, and some patients are in the stage of severe prolapse of stage III-IV. Surgery is the first choice for treatment [2]. In clinical treatment, the commonly used surgical techniques include Manchester operation (shortening the main ligament and partial removal of the cervix to enhance pelvic floor support) and sacrospinous ligament suspension technology (fixing the top of the vagina to the sacrospinous ligament to restore its anatomical position). For severe POP, the long-term treatment effect of a single surgical strategy is limited.

Combined surgical techniques have become the research focus for improving the treatment effect of severe POP. The uterus is fixed at a high position, with the specific fixation points being the abdominal wall and sacrum, which significantly enhances the support force of the top of the pelvic floor. There is no unified standard for combining it with traditional surgery. A literature review shows that uterine suspension combined with sacrospinous ligament suspension can improve the support strength of the vaginal apex. This only involves cases of severe pelvic organ prolapse with uterine preservation, and the balance between anatomical reduction and functional recovery remains to be determined [3]. This study suspended the uterus in the lateral area of the abdominal wall, integrated the Manchester operation with sacrospinous ligament suspension measures, and strengthened pelvic floor support in multiple dimensions, striving to significantly optimize the treatment effect of severe pelvic organ prolapse. A retrospective clinical data analysis was conducted on the two surgical methods for

treating severe pelvic organ prolapse, comparing the clinical efficacy and safety of uterine suspension and abdominal wall lateral fixation, providing empirical support for the formulation of surgical strategies for severe pelvic organ prolapse (POP), and striving to reduce the risk of postoperative recurrence and improve the quality of life of patients.

1 Subjects and Methods

1.1 Subjects

A total of 86 cases of severe pelvic organ prolapse who underwent surgical treatment in the Department of Gynecology of our hospital between January 2023 and January 2024 were selected for study. Inclusion criteria: ① Patients who meet the POP-Q stage III-IV (the lowest point of uterine or vaginal prolapse ≥ 1 cm below the hymen margin). ② The age limit of the study subjects was set at 45 to 70 years old. ③ Patients who took surgical measures on their own and signed informed consent. ④ Patients with complete clinical data. Exclusion criteria: ① Patients with significantly impaired function of core organs such as the heart, liver and kidneys, and who present with combined disorders. ② Patients with coexisting pelvic malignant tumors and acute inflammation. ③ Patients with a history of previous pelvic floor surgery. ④ Pregnant women and people preparing for pregnancy.

A combined surgery group was formed based on surgical type. No statistically significant differences were observed in baseline data, including age, disease duration, and POP-Q stage, between the two groups (P>0.05). The comparison of baseline data was not statistically significant (Table 1).

Table 1 Comparison of baseline data between the two groups of patients (x±s /n)

index	Combined procedure group (n=43)	Traditional surgery group (n=43)	Statistics	P-value
Age (years)	58.6±7.2	57.8±6.9	t=0.52	0.604
Disease duration (years)	6.2±2.1	5.9±1.8	t=0.73	0.468
POP-Q stage [n (%)]			χ^2=0.12	0.729
Stage III	28 (65.1)	26 (60.5)		
Stage IV	15 (34.9)	17 (39.5)		

Comorbidities [n (%)]				
hypertension	12 (27.9)	10 (23.3)	χ^2=0.26	0.610
diabetes	5 (11.6)	6 (14.0)	χ^2=0.11	0.741
Mainly uterine prolapse [n (%)]	30 (69.8)	28 (65.1)	χ^2=0.23	0.631

1.2 Operation Method

The same team of chief physicians performed the operations on both groups of patients, and the surgery was completed successfully using combined spinal-epidural anesthesia.

1.2. Conventional Surgery

① Manchester Procedure: After exposing the cervix, a partial cervical resection is performed, leaving the cervix at a length of 2 to 3 cm. The cervical stump is sutured. The cardinal and uterosacral ligaments on both sides of the uterus are shortened to strengthen fixation and optimize uterine support.

② Sacrospinous Ligament Suspension: The posterior vaginal wall is dissected to reveal the right sacrospinous ligament interface. The vaginal apex is sutured to the sacrospinous ligament with non-absorbable sutures. Tension is adjusted to elevate the vaginal apex above the level of the ischial spine.

1.2. Hybrid Surgical Model

The Manchester procedure and sacrospinous ligament suspension were performed in parallel with the traditional surgical model.

Uterine suspension to the lateral abdominal wall: A 3 cm skin incision was made 2 mm to the right of the midline of the lower abdomen, and the abdominal wall muscle layer and peritoneum were dissected. The uterine fundus was pulled upward, and a non-absorbable suture was passed through the uterine seromuscular layer. The other end of the suture was attached to the anterior rectus abdominis muscle of the abdominal wall. Tension was adjusted to maintain

the uterus in an anteversion position, approximately 3 to 4 cm from the upper edge of the pubic symphysis.

1.3 Observational Outcomes

Surgical outcomes included operative time, intraoperative blood loss (measured by weight and suction), and postoperative hospital stay. ① Pelvic floor function assessment: 12 months before and after surgery, the PFIQ-7 questionnaire was used to numerically analyze the impact of pelvic organ prolapse on daily life. The score range was set from 0 to 100, and the degree of interference with daily life was also increased. The PFDI-20 questionnaire tests the severity of symptoms such as urinary incontinence and pelvic compression. The scoring range is set from 0 to 300 points. The more severe the symptoms, the better. ② Anatomical reduction effect: 12 months after surgery, the improvement of prolapse is evaluated by POP-Q staging, and the proportion of patients who are cured (stage I and below), improved (stage II), and relapsed (stage III-IV) is analyzed. ③ Complications: Complications within 12 months after surgery are systematically registered. The complications include vaginal bleeding, infection, urinary dysfunction, and loosening of the uterine suspension line, which are not within the scope of the investigation.。

1.4 Statistic Analysis

Data were analyzed using SPSS 26.0 software. Continuous data were expressed as ($x \pm s$), and intergroup comparisons were performed using the independent sample *t*-test. Enumeration data were expressed as [n (%)], and intergroup comparisons were performed using the χ^2 test. $P<0.05$ was considered statistically significant.

2 Results

2.1 Comparison of surgery-related indicators between the two groups

operation time of the combined procedure group was significantly longer than that of the traditional procedure group ($P<0.05$); there was no statistically significant difference in intraoperative blood loss and postoperative hospitalization time between the two groups ($P>0.05$) (Table 2).

Table 2 Comparison of surgery-related indicators between the two groups ($x \pm s$)

index	Combined procedure group (n=43)	Traditional surgery group (n=43)	t-value	P-value

Operation time (min)	118.5±15.2	92.3±12.6	8.67	<0.001
Intraoperative blood loss (ml)	85.6±18.3	79.8±16.5	1.57	0.121
Postoperative hospital stay (d)	5.2±1.1	4.9±1.0	1.36	0.178

2.2 Comparison of pelvic floor function scores between the two groups before and 12 months after surgery

There was no statistically significant difference in PFIQ-7 and PFDI-20 scores between the two groups before surgery (P>0.05); 12 months after surgery, the scores of both groups were significantly lower than those before surgery (P<0.05), and the score of the combined surgery group was significantly lower than that of the traditional surgery group (P<0.05) (Table 3).

Table 3 Comparison of pelvic floor function scores between the two groups before and 12 months after surgery (x±s , points)

index	Time point	Combined procedure group (n=43)	Traditional surgery group (n=43)	T-value between groups	P value between groups
PFIQ-7	Before surgery	48.5±9.2	47.9±8.8	0.31	0.756
	12 months after surgery	12.6±3.5	21.3±5.1	9.24	<0.001
PFDI-20	Before surgery	165.8±25.6	162.3±24.9	0.68	0.498
	12 months after surgery	15.8±4.2	25.6±6.3	8.76	<0.001

2.3 Comparison of POP-Q stage improvement between the two groups 12 months after surgery

The proportion of POP-Q stage I and below in the combined surgery group (93.0%) was significantly higher than that in the traditional surgery group (74.4%), and the recurrence rate

(2.3%) was significantly lower than that in the traditional surgery group (16.3%) ($P < 0.05$) (Table 4).

Table 4 Comparison of POP-Q stage improvement between the two groups 12 months after surgery [n (%)]

POP-Q staging	Combined procedure group (n=43)	Traditional surgery group (n=43)	χ^2 value	P-value
Stage I and below (cured)	40 (93.0)	32 (74.4)	5.47	0.019
Stage II (improvement)	2 (4.7)	6 (14.0)	1.72	0.190
Stage III-IV (recurrence)	1 (2.3)	5 (11.6)	3.04	0.081

2.4 Comparison of postoperative complications between the two groups

Within 12 months after surgery, the total incidence of complications in the combined procedure group was significantly lower than that in the traditional procedure group ($P < 0.05$) (Table 5).

Table 5 Comparison of postoperative complications between the two groups [n (%)]

complication	Combined procedure group (n=43)	Traditional surgery group (n=43)	χ^2 value	P-value
vaginal bleeding	1 (2.3)	5 (11.6)	2.87	0.090
difficulty urinating	0 (0.0)	2 (4.7)	2.05	0.152
pelvic infection	0 (0.0)	1 (2.3)	1.01	0.314
Loose uterine suspension wire	1 (2.3)	0 (0.0)	1.01	0.314
Overall incidence	2 (4.7)	8 (18.6)	4.07	0.044

3 Discussion

3.1 Advantages of anatomical reduction in combined surgery

The pathological basis of severe POP is the multi-plane damage of the pelvic floor support structure (cardinal ligament, uterosacral ligament, levator ani muscle, etc.). It is difficult for a single surgery to fully repair the damaged pelvic floor structure [4]. The combined surgery relies on triple reinforcement technology to achieve the optimization of multi-dimensional support. In the Manchester operation, the cardinal ligament is shortened to stabilize the cervix, the sacrospinous ligament suspension fixes the vaginal apex, and the uterus is suspended to the outside of the abdominal wall, thereby effectively improving its overall position and constructing a three-dimensional support structure of "apex-cervix-uterine body". Twelve months after surgery, the proportion of patients in the combined surgery group with POP-Q Ⅰ and below was as high as 93.0%, which was 74.4% higher than that in the traditional surgery group, and the recurrence rate was as low as 2.3%. This surgery successfully achieved the reduction and maintenance of the anatomical structure and significantly reduced the recurrence of pelvic floor prolapse. The reason for this is that the uterus is suspended on the outside of the abdominal wall, eliminating the continuous pulling effect of the uterine gravity on the pelvic floor. This method is particularly effective in cases with a large uterus or extremely loose pelvic floor tissue.

3.2 The effect of combined surgery on the improvement of pelvic floor function

PFIQ-7 and PFDI-20 scores constitute the key scales for assessing the quality of life of POP patients. Empirical analysis shows that 12 months after surgery, the scores of the combined surgery group were significantly lower than those of the traditional surgery group, and the patients' symptoms were significantly improved. This may be related to the following factors: First, the stable improvement of the uterine position reduces the pressure on the bladder and rectum, and enhances the ability to urinate and defecate. Second, the three-dimensional support system reduces the friction between the vaginal wall and the surrounding tissues, significantly reducing swelling and pain. The combined surgery preserves the physiological structure of the uterus, which is conducive to maintaining the integrity of the pelvic floor nerves and blood vessels, and may be another boost to the excellent functional recovery effect.

3.3 Safety analysis of the combined surgery

The combined surgery also prolonged the operation time, but there was no significant change in intraoperative bleeding and hospitalization time in the two groups, indicating that the surgical method did not significantly increase the level of trauma [5]. After the combined

surgery, the complication rate was 4.7%, which was significantly reduced compared with 18.6% in the traditional surgery group, and there were no cases of serious complications. It is worth noting that the uterus was fixed using non-absorbable suture technology. There was only one case of loosening of the suspension line, which was recovered after secondary calibration. This fixation method showed the advantage of stability. In the traditional surgical group, the frequency of dysuria was 4.7%, which was a relatively high level. It may be related to the excessive tension of the vaginal apex suspension. Using the combined surgical technique, the overall uterus was lifted to achieve effective dispersion of tension, which greatly reduced the risk level of such complications.

4 Conclusion

The combined treatment of severe pelvic organ prolapse with an external abdominal wall uterine suspension, Manchester procedure, and sacrospinous ligament suspension can comprehensively strengthen the pelvic floor support structure and significantly improve the pelvic floor anatomical reduction and functional level. This procedure reduces the postoperative recurrence rate and has a high safety factor. This procedure introduces an innovative treatment plan for patients with severe POP. It has outstanding performance and strong clinical application and promotion for patients with extremely lax pelvic floor tissue who seek uterine preservation.

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