

Evaluation of the Clinical Advantages of Laparoscopic Transverse Abdominal Wall Suspension in the Treatment of Pelvic Organ Prolapse

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Abstract: *Objective:* To evaluate the clinical advantages of laparoscopic transverse abdominal wall suspension in treating pelvic organ prolapse. *Methods:* Sixty patients diagnosed with moderate to severe pelvic organ prolapse and underwent surgical treatment in our hospital between January 2022 and December 2023 were selected. According to different surgical methods, they were divided into an observation group (given laparoscopic transverse abdominal wall suspension) and a control group (given transvaginal mesh implantation), with 30 subjects/group. The data on perioperative-related indicators, quality of life scores, postoperative recurrence, and complications of the two groups of patients were collected. *Results:* The postoperative hospitalization days and intraoperative bleeding volume of the observation group were significantly lower than those of the control group, but had longer operation time than that of the control group ($P < 0.05$). The differences between the two groups were statistically significant 6 months after surgery, and the Pelvic Floor Disease Quality of Life Impact Questionnaire (PFIQ-7) score of the observation group was significantly higher than the control group ($P < 0.05$). Both groups of patients completed 12 months of follow-up without any postoperative recurrence. The number of complications in the observation group was slightly lower than that of the control group ($P > 0.05$). *Conclusion:* Laparoscopic transverse abdominal wall suspension was more effective in treating pelvic organ prolapse and is an ideal surgical procedure.

Keywords: Pelvic organ prolapse; Laparoscopic transverse abdominal wall suspension; Clinical advantages

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1. Introduction

Pelvic organ prolapse mainly refers to a type of disease in which the pelvic organs are displaced and prolapsed into or outside the vagina due to the weakness of the female pelvic floor support system, thereby causing pelvic organ dysfunction. The main clinical symptoms include varying degrees of lumbosacral vaginal soreness, a sinking feeling, or a prolapsed mass that increases vaginal secretions, abnormal bowel and bladder symptoms,

sexual life disorders, etc. It is more common in middle-aged and older women and adversely affects the health and life quality of middle-aged and older women globally ^[1]. As women pursue a higher quality of life, the effective handling and treatment of pelvic floor organ prolapse has become an important issue faced by obstetricians and gynecologists. From the perspective of clinical practice, asymptomatic pelvic organ prolapse generally does not require any treatment. Most patients who seek medical treatment for pelvic organ prolapse experience severe symptoms and surgery is often the first choice of treatment ^[2]. Nowadays, reconstructive surgery is mostly used in clinical practice to treat pelvic organ prolapse, mainly to restore the organ's anatomical position and function. With the continuous advancement of laparoscopic technology, laparoscopic transverse abdominal wall suspension has been widely used in the treatment of pelvic organ prolapse. This study further analyzed the clinical advantages of laparoscopic transverse abdominal wall suspension in the treatment of pelvic organ prolapse.

2. Materials and methods

2.1. Information

Sixty patients who were diagnosed with moderate to severe pelvic organ prolapse and underwent surgical treatment in our hospital from January 2022 to December 2023 were selected for retrospective analysis. The patients were randomly grouped into an observation group and a control group, with 30 subjects each. The control group consisted of patients aged from 52–74 with a mean age of 65.56 ± 5.21 years. The parity ranged from 1–4 times with an average of 2.15 ± 1.11 times; Regarding the prolapse grade (based on the pelvic floor organ prolapse evaluation system POP-Q), 8, 16, and 6 patients had degree 2, degree 3, and degree 4, respectively. The observation group consisted of patients aged 53–75 with a mean age of 65.53 ± 5.13 years. The parity ranged from 1–5 times with an average of 2.18 ± 1.08 times; Regarding the prolapse grade, 7, 14, and 9 patients had degree 2, degree 3, and degree 4, respectively. When comparing the data between the two groups, the differences were not statistically significant ($P > 0.05$).

2.2. Screening criteria

Inclusion criteria: (1) Patients with clinically diagnosed pelvic organ prolapse, prolapse grade 2 or above, and obvious clinical symptoms that adversely affect their daily life; (2) no previous history of pelvic and abdominal surgery or pelvic floor repair surgery; (3) patients with complete clinical information; (4) consented. Exclusion criteria: (1) patients undergoing other surgeries during the operation; (2) patients with malignant tumors of the pelvic organs; (3) patients with other organic lesions of the pelvic organs; (4) patients with mental illnesses or psychological problems; (5) patients that refuse to follow up after surgery.

2.3. Methods

Both groups of patients completed relevant examinations before surgery, such as eliminating surgical contraindications, vaginal preparation 3 days before surgery, and intestinal preparation 1 day before surgery. They were forbidden to eat or drink before surgery. Both groups were followed up every 3 months after the surgery.

The control group was treated with transvaginal mesh implantation for pelvic floor reconstruction. The patient was guided into a cystolithotomy position. Toothless oval forceps were used to pull out the cervix and diluted norepinephrine saline was injected under the vaginal wall mucosa to form a water cushion. A midline longitudinal incision was made through the anterior vaginal wall mucosa (from the urethral opening to the cervix) to the anterior lip of the cervix and then separated laterally to the lower part of the descending pubic

branch to establish communication with the vesicovaginal space. Two longitudinal incisions were made at the level of the urethra orifice and the junction of the thigh and labia majora. A special puncture needle was used to penetrate the skin wound on the outside of the labia majora and then out of the vagina through the obturator. This process facilitated the guidance of the pre-cut T-shaped mesh. The thread was then led out from the lateral wound, and the opposite side was treated similarly. The lower edge of the mesh was fixed to the bladder fascia and cervical cardinal ligament, respectively. After the mesh was completely flattened, tension-free sutures were performed. Finally, the mucosa of the anterior vaginal wall was sutured.

The observation group received laparoscopic transverse abdominal wall suspension surgery. The patient was guided into a cystolithotomy position. Puncture procedures were performed to establish the pneumoperitoneum. Operating instruments were inserted and the presence of adhesions in the abdominal cavity was noted. The condition of the uterus and appendages was carefully observed. The depth of the uterine cavity was further explored and the uterine cup was inserted and fixed into the vagina. The uterus was then lifted to reveal the surgical area. The bladder was pushed down to fully expose the cervix and part of the anterior vaginal wall. The pre-cut T-shaped mesh was laid flat and fixed with sutures on the cervix and anterior vaginal wall. The two side arms of the mesh were arranged and an incision 3 cm away from the anterior superior iliac spine on both sides of the abdominal wall was made, about 4 cm above the anterior superior iliac spine. Endoscopic dissection forceps were used to enter the extraperitoneal space to the round ligament of the uterus and establish extraperitoneal tunnels on both sides. By passing through the extraperitoneal space, the side arm of the mesh was positioned in the pelvic cavity and pulled out through the puncture port. The mesh was adjusted to make it tension-free. Lastly, the peritoneum was sutured continuously and the skin incision was sutured conventionally.

2.4. Observation indicators

Statistics regarding the perioperative-related index data (operative time, postoperative hospitalization days, and intraoperative bleeding volume) of the two groups of patients were collected, and the perioperative conditions were observed and compared. The Pelvic Floor Disease Quality of Life Impact Questionnaire (PFIQ-7) was applied 6 months after surgery. The total score was calculated as the average value of each column $\times 100/3$. Finally, the scores of each column were added up to give a total score range. The total score ranged from 0–300. The lower the score, the higher the quality of life. The postoperative recurrence (prolapse grade ≥ 2 nd degree) and complications (mesh exposure, abnormal defecation, abnormal urination, abdominal distension, traction discomfort, etc.) of the two groups of patients were measured 12 months after surgery to evaluate the clinical efficacy and safety.

2.5. Statistical methods

The collected data were analyzed using the SPSS 22.0 statistical software. Count data were expressed as % and the differences were analyzed using the chi-squared (χ^2) test. Measurement data were expressed as mean \pm standard deviation and the differences between the two groups were compared using the *t*-test. Results were considered statistically significant at $P < 0.05$.

3. Results

3.1. Comparison of perioperative conditions between the two groups

The *t*-test was used to conduct a statistical analysis of perioperative-related indicators between the two groups. As shown in **Table 1**, the observation group's postoperative hospitalization days and intraoperative bleeding volume were significantly lower than that of the control group. However, the operation time for the observation

group was longer than that of the control group ($P < 0.05$).

Table 1. Comparison of perioperative conditions between the two groups (mean \pm standard deviation)

Group	Cases, <i>n</i>	Operation time (min)	Postoperative hospital stays (d)	Intraoperative blood loss (mL)
Control group	30	95.43 \pm 18.78	4.98 \pm 0.87	66.46 \pm 22.33
Observation group	30	115.46 \pm 20.58	2.67 \pm 0.53	36.76 \pm 17.34
<i>t</i>	-	3.938	12.420	5.754
<i>P</i>	-	0.000	0.000	0.000

3.2. Comparison of quality of life scores between the two groups

The *t*-test was used to analyze the quality of life scores of the two groups. As shown in **Table 2**, there were no statistically significant differences in the quality of life scores between the two groups before surgery ($P > 0.05$); the differences between the two groups were statistically significant 6 months after surgery, and the observation group had significantly higher quality of life scores than the control group ($P < 0.05$).

Table 2. Comparison of quality of life scores between the two groups (mean \pm standard deviation, points)

Group	Cases, <i>n</i>	Before surgery	6 months after surgery
Control group	30	168.89 \pm 33.10	45.38 \pm 16.57
Observation group	30	175.26 \pm 30.18	32.16 \pm 10.33
<i>t</i>	-	0.779	3.708
<i>P</i>	-	0.439	0.000

3.3. Comparison of the clinical efficacy and safety between the two groups

Both groups of patients completed 12 months of follow-up. No patient had a postoperative recurrence and no mesh was exposed. In the control group, 3 cases of urinary discomfort, 1 case of defecation discomfort, 1 case of abdominal distension, and 1 case of stretching discomfort occurred. In the observation group, 1 case of urinary discomfort and 2 cases of defecation discomfort occurred. The number of complications in the observation group was slightly lower than that of the control group, but the difference was insignificant ($P > 0.05$).

4. Discussion

At present, the clinical treatment of pelvic organ prolapse in China is divided into surgical and non-surgical. For patients with a prolapse degree of 2 degrees and above, surgery has gradually become the preferred treatment method. However, clinical surgical methods are complex and diverse, and the advantages and disadvantages of various procedures using this method require further study.

As compared with other traditional pelvic organ prolapse surgeries, transvaginal mesh pelvic floor reconstruction can reduce the risk of anatomical recurrence, alleviate clinical symptoms, and correct multi-chamber prolapse simultaneously. However, transvaginal mesh implantation for pelvic floor reconstruction is a blind puncture with a large puncture depth and a limited surgical field, which requires high technical proficiency from the surgeon. Laparoscopic transverse abdominal wall suspension retains the minimally invasive advantages of laparoscopy, with rapid postoperative recovery, with the entire process performed under

direct vision under laparoscopy, providing a clear vision of the surgical area and is simple to operate [3,4]. At the same time, laparoscopic transverse abdominal wall suspension has altered the surgical approach for pelvic organ prolapse. Due to a greater distance from the sacral promontory, laparoscopic transverse abdominal wall suspension not only significantly reduces the difficulty of the operation but also significantly reduces the risk of intraoperative vascular damage and nerve damage. In addition, it does not require extensive peritoneal incision and tissue separation. The mesh side arms only pass through the peritoneum and do not require additional fixation, which helps to achieve improved tension-free suspension, thus reducing the risk of postoperative discomfort and dyspareunia in the surgical area [5]. The results of this study showed that the postoperative hospitalization days and intraoperative bleeding volume of the observation group were significantly lower than those of the control group, but the operation time was longer than that of the control group ($P < 0.05$); the PFIQ-7 score of the observation group, 6 months after surgery, was significantly higher than that of the control group ($P < 0.05$). Both transvaginal mesh pelvic floor reconstruction and laparoscopic transverse abdominal wall suspension have good perioperative outcomes. Although laparoscopic transverse abdominal wall suspension has the disadvantage of a longer operation time, it has obvious advantages in reducing intraoperative bleeding, accelerating postoperative recovery, and improving the patient's quality of life. Regarding recurrence and complications, there was no recurrence in both groups. The number of complications in the observation group was slightly lower than that of the control group, but the difference was insignificant ($P > 0.05$).

5. Conclusion

Laparoscopic transverse abdominal wall suspension was effective in treating pelvic organ prolapse, has good outcomes and efficacy, and is worthy of clinical promotion and widespread application.

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Disclosure statement

The authors declare no conflict of interest.

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