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Clinical Comparative Study of Modified Laparoscopic Cervical Cerclage and Transvaginal Cervical Cerclage in the Treatment of Cervical Insufficiency

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Abstract: *Objective:* To observe the clinical effects of modified laparoscopic cervical cerclage and transvaginal cervical cerclage in the treatment of cervical insufficiency. *Methods:* 74 patients with cervical insufficiency in our hospital (from June 2024 to September 2025) were selected and randomly divided into a control group (37 cases) undergoing transvaginal cervical cerclage and an observation group (37 cases) undergoing modified laparoscopic cervical cerclage. The patients' surgical conditions, hospitalization time, pregnancy outcomes, complication rates, neonatal outcomes and quality of life were observed. *Results:* The operation time, intraoperative blood loss, and hospitalization time of the observation group were shorter than those of the control group ($P < 0.05$); the pregnancy outcome of the observation group was better than that of the control group ($P < 0.05$); the incidence of complications in the observation group was lower than that of the control group ($P < 0.05$); the neonatal outcome of the observation group was better than that of the control group ($P < 0.05$); and the quality of life score of the observation group was higher than that of the control group ($P < 0.05$). *Conclusion:* The modified laparoscopic cervical cerclage surgery for patients with cervical insufficiency has good results. It can promote postoperative recovery, improve pregnancy outcomes and neonatal outcomes, reduce the incidence of complications, and improve the quality of life. It is better than transvaginal cervical cerclage treatment and is worth learning from.

Keywords: Modified laparoscopic cervical cerclage; Transvaginal cervical cerclage; Cervical insufficiency

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1. Introduction

Cervical insufficiency is mainly the gradual dilation of the cervix without uterine contractions or pain, which in turn causes the fetal membranes and placenta to protrude into the vagina, easily causing the delivery of immature fetuses and premature rupture of membranes. This disease is an important cause of miscarriage or premature birth in preterm pregnancies [1]. At this stage, the main treatment for this disease is cervical cerclage. Mechanical reinforcement of the internal cervical is beneficial for prolonging gestational age and improving pregnancy outcomes. Transvaginal cervical cerclage has been the clinical treatment of choice for a long time and has many features, such as ease of operation. However, for some patients with abnormal anatomy or failed transvaginal surgery, open abdominal surgery is often performed. This surgical method has a greater adverse impact on patients, such as obvious trauma and slow recovery. With the continuous development of minimally invasive technology, improved laparoscopic cervical cerclage has attracted

widespread attention. It can avoid vaginal operations and further irritate the cervix, and can seal the cervical canal more firmly. It is an effective treatment measure, and its clinical application effect needs to be studied in depth [2].

2. Materials and methods

2.1. General information

A total of 74 patients with cervical insufficiency in our hospital from June 2024 to September 2025 were selected and randomly divided into 2 groups. There were 37 patients in the control group, aged 21 to 36 (28.37 ± 2.81) years old, cervical length 21 to 27 (24.38 ± 2.81) cm, and cervical internal os width 3 to 8 (5.47 ± 1.19) mm. There were 37 patients in the observation group, aged 22 to 37 (28.54 ± 2.67) years old, cervical length 22 to 28 (24.54 ± 2.67) cm, and cervical internal os width 3 to 7 (5.54 ± 1.23) mm. Comparison of general data, $P > 0.05$.

Inclusion criteria: (1) Singleton pregnancy or non-pregnant state; (2) Cervical conditions suitable for cerclage; (3) No history of pelvic surgery; (4) No reproductive tract infection.

Exclusion criteria: (1) severe fetal malformations or genetic diseases; (2) complications during pregnancy; (3) mental illness.

2.2. Method

Control group: The patients were given general spinal anesthesia, kept in the lithotomy position, and their buttocks were appropriately elevated. Do a good job of disinfecting the vulva and vagina, empty the bladder, completely expose the cervix and fornix, and carry out secondary disinfection. The anterior lip of the cervix is gently lifted using oval forceps, and 0.9% saline is injected into the reflexed part of the bladder and cervix to form a water cushion. The vaginal mucosa is transversely incised 0.5 cm below the reflected peritoneum, and the bladder is pushed upward to ensure full exposure of the cervix. Purse-bag suture is used. The needle is inserted at the 1 o'clock position to penetrate the mucosa and reach two-thirds of the cervical myometrium. The needle is inserted at the 5 o'clock position, the needle is inserted at the 11 o'clock position, and the needle is withdrawn at the 7 o'clock position. Finally, a knot is tied at the posterior fornix. During the operation, in order to reduce the postoperative foreign body irritation of the patient, continuous absorbable sutures are usually used when suturing the fornix mucosa, and cerclage wires are embedded in the submucosa.

Observation group: Patients were placed in a supine position with tracheal intubation and intravenous inhalation combined anesthesia, with their legs separated and a urinary catheter indwelling. Make an incision on the upper edge of the umbilicus with a length of 1 cm. At the same time, the Trocar and laparoscope are inserted to establish pneumoperitoneum and ensure that the pressure is maintained at 10 to 13 mmHg. For non-pregnant patients, during the surgical treatment, the uterus is pushed up with a uterine lift to fully expose the field of view, and 5 mm puncture holes are established at the McBurney's point in the right lower abdomen, the corresponding part on the contralateral side, and the lateral side of the left umbilical ligament. The bladder is folded and the peritoneum is opened, and the bladder is pushed down at the same time to fully separate the tissues around the uterine isthmus and clearly display the parametrial blood vessels. Then use the Mersilene band to puncture the inner side of the paracervical blood vessels and the superficial myometrium of the cervical isthmus. Pay attention to going from front to back and bypass the back of the uterine isthmus. Then, puncture the needle inside the contralateral uterine blood vessels from back to front. The final knotting position is in front of the uterine isthmus. The cervical tightness is tested, and the standard is that the No. 6 dilation rod passes without resistance, and the cerclage is repeated according to this standard. The wound was sutured laparoscopically, and a cerclage band was embedded at the same time. For patients with early pregnancy, it is necessary to use a lifting cup to hold the cervix during the uterine lifting process, and the integrity of the round ligament of the uterus is preserved during the operation. In order to create a good operating space, the tip of the forceps needs to be used to push up the rear of the broad ligament. The operator makes a hole at the lifting site, and at the same time penetrates the peritoneum of the front and rear leaves of the broad ligament. The needle insertion and needle removal operations are performed in the hole, and the rest of the steps are the same.

2.3. Observation indicators

(1) Statistics of operation time, intraoperative blood loss, and hospitalization time; (2) Pregnancy outcomes: miscarriage, premature birth, term delivery; (3) Complication rate: vascular injury, cerclage detachment, cervical tear, postoperative infection; (4) Neonatal outcomes: macrosomia, neonatal morbidity; (5) Quality of life: Brief Health Scale (SF-36), the higher the score, the better.

2.4. Statistical methods

SPSS 26.0 software processes data. Measurement data is expressed as mean ± standard deviation (SD), t test is used. Count data is expressed as: n, %. χ^2 test is used. $P < 0.05$ means the difference is statistically significant.

3. Results

3.1. Comparison of patients' surgical conditions and hospitalization time

The observation group was less than the control group, $P < 0.05$, **Table 1**.

Table 1. Comparison of patients' surgical conditions and hospital stay

Group	Operation time (min)	Intraoperative blood loss (mL)	length of stay (d)
Control group (n = 37)	68.37 ± 2.84	36.95 ± 2.83	7.18 ± 1.38
Observation group (n = 37)	61.28 ± 2.86	20.19 ± 3.28	5.96 ± 1.23
t	10.700	23.533	4.014
P	0.000	0.000	0.000

3.2. Comparison of pregnancy outcomes

The observation group was better than the control group, $P < 0.05$, **Table 2**.

Table 2. Comparison of pregnancy outcomes (n%)

Group	Miscarriage	Premature Birth	Term birth
Control group (n = 37)	2 (5.41)	10 (27.03)	25 (67.57)
Observation group (n = 37)	1 (2.70)	2 (5.41)	34 (91.89)
χ^2		7.040	
P		0.030	

3.3. Comparison of complication rates

The observation group was lower than the control group, $P < 0.05$, **Table 3**.

Table 3. Comparison of complication rates (n%)

Group	Blood vessel damage	The cerclage band fell off	Cervical tear	Postoperative infection	Always happens
Control group (n = 37)	2 (5.41)	3 (8.11)	1 (2.70)	1 (2.70)	7 (18.92)
Observation group (n = 37)	0 (0.00)	0 (0.00)	0 (0.00)	1 (2.70)	1 (2.70)
χ^2	-	-	-	-	5.046
P	-	-	-	-	0.025

3.4. Comparison of neonatal outcomes

The observation group was lower than the control group, $P < 0.05$, **Table 4**.

Table 4. Comparison of neonatal outcomes (n%)

Group	Macrosomia	Neonatal morbidity
Control group (n = 37)	4 (10.81)	6 (16.22)
Observation group (n = 37)	0 (0.00)	1 (2.70)
χ^2	4.229	3.945
P	0.040	0.047

3.5. Quality of life comparison

The observation group was higher than the control group, $P < 0.05$, **Table 5**.

Table 5. Comparison of quality of life (points)

Group	Energy	Emotional function	Somatic pain	Social function	General health	Physiological functions	Mental health	Physiological function
Control group	71.57 ± 2.69	73.74 ± 2.95	73.72 ± 3.94	71.34 ± 2.38	73.84 ± 2.23	71.72 ± 2.94	72.72 ± 2.94	72.34 ± 2.71
Observation group	76.74± 3.55	77.94 ± 2.64	75.57 ± 3.83	75.49 ± 2.62	77.40 ± 2.62	76.73 ± 2.93	78.55 ± 2.34	77.82 ± 2.39
t	7.061	6.453	2.053	7.132	6.294	7.342	9.438	9.225
P	0.000	0.000	0.044	0.000	0.000	0.000	0.000	0.000

4. Discussions

Cervical insufficiency is relatively common clinically. The most obvious manifestation after the disease occurs is the painless shortening and opening of the cervix after the second trimester of pregnancy, preventing the pregnancy from being maintained to term. Through analysis of the cause of the disease, it is believed that it is related to many factors, such as congenital cervical dysplasia, hormone level imbalance, etc. Acquired injury is also a very important factor, such as surgery, infection, childbirth, etc. [3] In the treatment of diseases, surgery is a common treatment method. However, in clinical practice, it is found that there are many surgical methods that can be used, but there are certain differences in the final effects of different surgical methods. At the same time, due to the continuous development of medical technology, various high-quality surgical treatment methods are constantly emerging [4]. Therefore, further research is needed to select more effective and safe surgical methods for patients with cervical insufficiency.

In the results of this study, the operation time, intraoperative blood loss, and hospitalization time of the observation group were shorter than those of the control group ($P < 0.05$). Improved laparoscopic cervical cerclage can perform more precise operations under laparoscopy, further enlarging the pelvic structure, locating the internal cervical os and parametrial blood vessels in a short time, further reducing the time for repeated exploration, and thus shortening the operation time. During transvaginal surgical treatment, the bladder and cervix are separated manually, and the operating space is limited, which easily increases the risk of tissue damage and leads to an increase in intraoperative bleeding [5]. Laparoscopy can further refine blood vessels, thereby reducing intraoperative blood loss. The field of view of transvaginal surgery is limited, which can easily cause accidental injury to blood vessels, increase bleeding, and prolong the operation time. Laparoscopic surgery further reduces trauma to patients and reduces postoperative pain, which is beneficial to speeding up postoperative physical recovery and shortening hospitalization time [6]. The pregnancy outcome of the observation group was better than that of the control group ($P < 0.05$). The sutures are fixed to the cervical isthmus during modified laparoscopic cervical

cerclage treatment, which in this case can provide stronger mechanical support and better resist the uterine cavity pressure during pregnancy. The transvaginal cerclage thread is mainly located in the cervix and vagina. Its position is low, and it is easy for the cerclage thread to fall off due to cervical shortening or uterine contractions. Moreover, laparoscopic surgery can avoid stimulation of the cervix caused by vaginal surgery, reduce the risk of premature rupture of membranes, increase the full-term birth rate, and reduce the miscarriage and premature birth rates [7]. The incidence of complications in the observation group was lower than that in the control group ($P < 0.05$). During transvaginal surgery, it is easy to damage the blood vessels of the bladder or cervix, increasing the risk of postoperative infection or cervical tear. Laparoscopic treatment is performed through the extraperitoneal route without entering the vagina, reducing the risk of complications. Laparoscopic suturing is stronger and the sutures are buried under the peritoneum, thereby reducing the risk of cerclage detachment. The neonatal outcomes of the observation group were better than those of the control group ($P < 0.05$). Modified laparoscopic cervical cerclage treatment is beneficial for increasing the full-term birth rate. In this case, it can improve neonatal lung maturity and reduce the incidence of neonatal diseases. However, transvaginal cervical cerclage has a higher rate of premature birth, which requires more intervention for newborns and increases their prevalence [8]. The quality of life score of the observation group was higher than that of the control group ($P < 0.05$). Laparoscopic cervical cerclage has less trauma and less pain, which helps patients to move around as soon as possible after surgery, achieve better postoperative recovery, avoid adverse effects on their daily activities and emotional state, and thus improve their quality of life [9].

Therefore, after treatment of patients with cervical insufficiency, compared with transvaginal cervical cerclage treatment, modified laparoscopic cervical cerclage has better surgical effects, promotes postoperative recovery, improves pregnancy outcomes and neonatal outcomes, reduces the incidence of complications, and improves quality of life, which has promotional value.

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Disclosure statement

The author declares no conflict of interest.

References

[1] Yan HH, Wu SW, Liu XW, 2022, Analysis of Related Factors Affecting Pregnancy Outcomes During Mid-Trimester Emergency Transvaginal Cervical Cerclage Treatment of Cervical Insufficiency. Journal of Practical Obstetrics and Gynecology, 38(7): 540–543.

[2] Xiang CR, Zhu JJ, 2022, Study on the Efficacy and Related Influencing Factors of Transvaginal Cervical Cerclage in the Treatment of Cervical Insufficiency in Mid-Pregnancy. Chinese Sexual Science, 31(2): 99–102.

[3] Sun RR, Zhang WM, Li D, 2025, Analysis of the Therapeutic Effect of Transvaginal Cervical Cerclage on Cervical Insufficiency in Twin Pregnancy. Chinese Maternal and Child Health Care, 40(3): 423–426.

[4] Gao Y, Zhang YX, 2023, Application and Timing of Laparoscopic Cervical Cerclage in the Treatment of Cervical Insufficiency. Journal of Practical Clinical Medicine, 27(16): 127–130.

[5] Zhang Y, He YM, Ying XY, 2024, Comparison of the Clinical Effects of Laparoscopic Cervical Cerclage in the Treatment

of Cervical Insufficiency During Pregnancy and Before Pregnancy. Chinese Family Planning and Obstetrics and Gynecology, 16(7): 94–98.

[6] Cao J, Ying XY, 2023, Observation on the Clinical Effect of Laparoscopic Cervical Cerclage in the Treatment of Cervical Insufficiency Between 16 and 21 Weeks of Pregnancy. Chinese Journal of Practical Gynecology and Obstetrics, 39(1): 111–114.

[7] Shen QL, Wu WT, Shen JY, et al., 2023, Clinical Effect of Emergency Cervical Cerclage in the Treatment of Cervical Insufficiency and Its Impact on Patient Prognosis. Chinese Maternal and Child Health Care, 38(20): 3922–3925.

[8] Li YJ, Wang Y, Tang C, et al., 2024, Comparative Analysis of the Efficacy of Modified Transvaginal Cervical Cerclage and Classic Cerclage. Journal of Practical Obstetrics and Gynecology, 40(8): 651–656.

[9] Cao J, Liang SL, Xu YX, et al., 2024, Analysis of Pregnancy Outcomes of Laparoscopic Cervical Cerclage in the Treatment of Cervical Insufficiency in Pregnant Women of Different Gestational Ages and Different Pregnancy Types. Chinese Journal of Practical Gynecology and Obstetrics, 40(11): 1135–1137.