



# Clinical value of traditional laparotomy, extensive vaginal hysterectomy, and laparoscope-assisted vaginal hysterectomy in the treatment of patients with cervical intraepithelial neoplasia III

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**Background:** Cervical cancer is a common malignant tumor in women. This study aims to explore the clinical effects of traditional laparotomy, extensive vaginal hysterectomy and laparoscope-assisted vaginal hysterectomy in the treatment of patients with cervical intraepithelial neoplasia III (CIN III).

**Methods:** A total of 79 cases with CIN III *in situ* who were treated in our hospital from July 2015 to February 2017 were selected as the study participants. According to the different surgical methods employed, patients were divided into a laparotomy group (n=21), a vaginal group (n=26), and a laparoscope-assisted vaginal group (n=32). The operative indicators in the three groups were compared, as well as the operative complications, quality of life, and female sexual function.

**Results:** The operation time, intraoperative blood loss, and hospitalization time in the laparotomy group were all significantly greater than those in the vaginal and laparoscope-assisted vaginal groups ( $P < 0.05$ ), and the operative time was the shortest in the vaginal group. There was no significant difference in postoperative recovery time, drainage tube removal time, and time to out-of-bed activation between the vaginal group and the laparoscope-assisted vaginal group ( $P > 0.05$ ). After surgery, the main complications were poor wound healing, infection, vaginal discharge, and neoplasms of the vagina, and the total incidence of complications in the laparotomy group was 19.04%, which was significantly higher than that in the vaginal group (3.84%) and the laparoscope-assisted vaginal group (3.12%) ( $P < 0.05$ ). Three months after surgery, the physical and emotional function scores of patients in the laparoscope-assisted vaginal group were significantly higher than those in the laparotomy and vaginal groups ( $P < 0.05$ ). Six months after surgery, there were no significant differences among the three groups in scores of libido, sexual intercourse pain, orgasm, or difficulty in sexual intercourse ( $P > 0.05$ ).

**Conclusions:** Laparoscope-assisted vaginal hysterectomy has a short recovery time and a low incidence of complications in patients with early cervical cancer *in situ*. Compared with laparotomy and vaginal hysterectomy, laparoscope-assisted vaginal hysterectomy is more conducive to improving the postoperative quality of life of patients.

**Keywords:** Laparotomy; vaginal; laparoscope-assisted; vaginal hysterectomy; cervical intraepithelial neoplasia III (CIN III); clinical value

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## Introduction

Cervical cancer is one of the common gynecological malignancies in clinical practice. In recent years, the incidence of cervical cancer in China has shown a trend towards a gradually younger age, so timely treatment is of great importance to protect the health of patients (1). The onset of cervical cancer is closely related to factors such as continuous high-risk HPV infection, sexual activity, and premature birth. Currently, there are various clinical treatment of cervical cancer surgical operation, the main research in a previous study of traditional laparotomy and vaginal hysterectomy. However, with the development of minimally invasive surgery, laparoscopic has been widely used in various kinds of gynecological diseases treatment and, in fact, the author based on vaginal hysterectomy surgery assisted laparoscopic operation can make up for the lack of a single operation line more. But there are a few literatures on the evaluation of the clinical effect of mainstream operation (2-4). Therefore, this study used three different surgical methods to carry out relevant clinical observation on 79 patients with early cervical cancer, aiming to explore the clinical effect of different surgical methods in the treatment of cervical cancer patients, so as to provide relevant information for the clinical selection of appropriate treatment plans. We present the following article in accordance with the STROBE reporting checklist (available at <http://dx.doi.org/10.21037/tcr-21-679>).

## Methods

### General information

A total of 79 patients with CIN III admitted to our hospital from July 2015 to February 2017 were selected as the research participants. The inclusion criteria were as follows: Patients who had a confirmed diagnosis of CIN III by pathological biopsy or surgery (5) and who were >18 years old. Patients were excluded based on the following criteria: (I) patients with other malignant tumors; (II) patients with severe heart, liver, or other organ diseases; (III) patients with incomplete clinical data; and (IV) patients undergoing fertility treatment. According to the surgical method used, patients were divided into three groups: a laparotomy group (n=21), a vaginal group (n=26) and a laparoscope-assisted vaginal group (n=32). Patients in the laparotomy group were 40–69 years old, with an average age of 46.69±6.62 years; Their International Federation of Gynecology and Obstetrics (FIGO) staging was as follows: five cases in stage

Ia1, eight cases in stage Ia2, three cases in stage Ib1, two cases in stage Ib, and three cases in stage IIa. Patients in the vaginal group were 40–70 years old, with an average age of 47.63±6.51 years; Their FIGO staging was as follows: six cases in stage Ia1, nine cases in stage Ia2, five cases in stage Ib1, three cases in stage Ib, and three cases in stage IIa. Patients in the laparoscope-assisted vaginal group were 40–71 years old, with an average age of 45.49±6.39 years; Their FIGO staging was as follows: seven cases in stage Ia1, 12 cases in stage Ia2, six cases in Ib1, five cases in stage Ib, and two cases in stage IIa. There were no significant differences between the three groups in general data such as age and FIGO staging, which were comparable ( $P>0.05$ ). All procedures performed in this study involving human participants were in accordance with the Declaration of Helsinki (as revised in 2013). The informed consent was taken from all the patients. The study was approved by the Research Ethics Committee of the First Affiliated Hospital of Chengdu Medical College (2018CY1208).

### Surgical methods

Patients in the laparotomy group underwent traditional total hysterectomy with open laparotomy.

The procedure for laparoscopic surgery was as follows: (I) the status of the pelvic and abdominal cavity was fully explored; (II) high ligation was performed to cut off the pelvic funnel ligament; (III) the uterine tissues were swept in sequence and collected into specimen bags; (IV) the uterine artery was cut off at the branch of the main uterine artery of the internal iliac artery; (V) the bilateral round ligaments were cut off 3 cm from the uterus, then the uterine bladder peritoneum was opened, with the reflexed peritoneum of the uterus and rectum. Finally, parts of the bladder-cervix space, rectal side space, and bladder side space were separated to expose and open the inner and outer lobes of the bladder-cervix ligament, followed by the exposure of the ureter and the opening of the ureteral tunnel.

The procedure for vaginal surgery was as follows: (I) formation of vaginal cuffs: a water pad was formed 3–4 cm away from the tumor with an injection of adrenaline solution (1:200), or normal saline for those with hypertension; then the vaginal wall was circularly incised, and related tissues were separated to form a vaginal cuff; silk was used to suture and close the vaginal cuffs and wrap the cervix, retaining the sutures to facilitate traction. (II) The lateral space of the rectum was separated to fully expose the uterosacral and main ligaments, which were cut off 3 cm from the cervix.

**Table 1** Comparison of operative time, intraoperative blood loss, and length of stay among the three groups

Group	Case	Operation time (min)	Intraoperative blood loss (mL)	Length of stay (d)
Laparotomy group	21	180.65±61.69	569.14±98.21	9.65±3.32
Vaginal group	26	109.56±28.05*	106.36±26.26*	8.31±1.21*
Laparoscope-assisted vaginal group	32	139.56±37.28**	119.61±34.45*	8.26±1.04*
F		16.08	492.59	3.78
P		<0.001	<0.001	0.027

\*P<0.05, compared with the laparotomy group; \*\*P<0.05, compared with the vaginal group.

(III) The uterus, double appendages, and pelvic lymph nodes were cut off and removed. (IV) The pelvic peritoneum and vaginal stump were closed, an indwelling T-drainage tube was inserted, and a final check was made with the laparoscope for bleeding on the stump before finishing the surgery.

### Observation indicators

Indexes of patients in the three groups were compared, including the operation time, intraoperative blood loss, postoperative recovery time, drainage tube removal time, time to out-of-bed activation, and length of stay. In addition, surgical complications were recorded and compared amongst the three groups, such as poor vaginal healing, infection, vaginal fluid, and other conditions. When patients returned to hospital for their 3-month review after surgery, their quality of life was assessed using the QLQ-C30 quality of life scale. There are 30 items in the QLQ-C30 quality of life scale, and items 1 to 28 are scored on a 1–4 scale. The 29th and 30th items are scored on a 1–7 scale. The higher the total score, the higher the reported quality of life.

Six months after surgery, the Brief Index of Sexual Function for Women (BISF-W) was administered to assess the postoperative sexual functioning of patients. The BISF-W scale includes items relating to libido, orgasm, sexual psychology, and dyspareunia. The higher the score, the worse the quality of sexual functioning. At the same time, cytology was reviewed and the recurrence rate was recorded 6 months after surgery.

### Statistical methods

All data in this study were statistically analyzed using the SPSS 18.0 (IBM, New York, USA) statistical package. The

measurement data were described by the mean ± standard deviation and analyzed using variance and t tests. The count data were expressed as the pass rate or composition ratio and analyzed by the chi-squared ( $\chi^2$ ) test. A P value <0.05 was considered to be statistically significant.

## Results

### Comparison of operation time, intraoperative blood loss, and hospital stay in the three groups

The comparison of operation time, intraoperative blood loss, and length of stay in the three groups of patients is shown in *Table 1*. Results showed that operation time, intraoperative blood loss, and length of stay of the three groups were significantly different (P<0.001). Specifically, the operation time, intraoperative blood loss, and hospital stay in the laparotomy group were significantly greater than those in the vaginal group or the laparoscope-assisted vaginal group. Of the three groups, the vaginal group had the shortest operation time (P<0.05).

### Comparison of postoperative recovery time, drainage tube removal time, and time to out-of-bed activation in the three groups of patients

The comparison of postoperative recovery time, drainage tube removal time, and time to out-of-bed activation of patients in the three groups is shown in *Table 2*. There were statistically significant differences among the three groups of patients (P<0.001). The postoperative recovery time, drainage tube removal time, and time to out-of-bed activation in the laparotomy group were significantly longer than that in the other two groups (P<0.05), and the laparoscope-assisted vaginal group times were significantly longer than those of the vaginal group (P>0.05).

**Table 2** Comparison of the postoperative recovery time, drainage tube removal time, and time to out-of-bed activation in the three groups of patients

Group	Case	Postoperative recovery time (h)	Drainage tube removal time (d)	Time to out-of-bed activation (h)
Laparotomy group	21	46.97±4.69	4.63±2.15	37.16±10.21
Vaginal group	26	32.36±6.94*	3.06±1.34*	12.69±6.79*
Laparoscope-assisted vaginal group	32	34.16±5.26*	3.15±1.26*	13.16±6.52*
F		44.13	7.28	77.23
P		<0.001	0.001	<0.001

\*P&lt;0.05, compared with the open group.

**Table 3** Comparison of complications among the three groups

Group	Case	Poor vaginal healing	Infection	Vaginal discharge	Neoplasms of the vagina	Total incidence (%)
Laparotomy group	21	2	2	0	0	19.04
Vaginal group	26	0	0	0	1	3.84
Laparoscope-assisted vaginal group	32	0	1	0	0	3.12
$\chi^2$						7.924
P						0.019

**Table 4** Comparison of QLQ-C30 quality of life scores in the three groups after surgery

Group	Case	Physical function	Role function	Emotional function	Cognitive function	Social function
Laparotomy group	21	76.27±11.23	74.03±11.21	72.14±13.41	74.35±14.64	71.28±13.77
Vaginal group	26	79.61±9.63	76.54±11.63	74.16±10.25	76.98±8.97	73.05±9.14
Laparoscope-assisted Vaginal group	32	85.94±10.85*#	80.41±16.66	86.18±11.45*#	81.32±17.62	77.59±16.27
F		5.79	1.43	11.92	1.57	1.24
P		0.004	0.244	<0.001	0.213	0.294

\*P&lt;0.05, compared with the laparotomy group; #P&lt;0.05, compared with the vaginal group.

### Comparison of complications and recurrence rate in the three groups

The comparison of complications in the three groups is shown in *Table 3*. After surgery, the main complications of the three groups were poor vaginal healing, infection, vaginal discharge, and neoplasms of the vagina. The total incidence of complications in the laparotomy group was 19.04%, which was significantly higher than those in either the vaginal group (3.84%) or laparoscope-assisted vaginal group (3.12%), and the difference was statistically

significant (P<0.05). The incidence of complications in the laparoscope-assisted vaginal group was lower than that in the vaginal group, but with no statistical difference (P>0.05). Six months after surgery, there were no recurrent cases in the three groups.

### Comparison of QLQ-C30 quality of life scores after surgery in the three groups

The comparison of QLQ-C30 quality of life scores after surgery in the three groups is shown in *Table 4*. The

**Table 5** Comparison of Brief Index of Sexual Function for Women (BISF-W) scores after surgery in the three groups

Group	Case	Libido	Coital pain	Orgasm	Dyspareunia
Laparotomy group	21	111.24±16.39	101.94±10.39	101.48±16.63	114.18±13.52
Vaginal group	26	109.75±15.92	104.25±13.26	103.81±15.28	109.36±16.32
Laparoscope-assisted vaginal group	32	106.94±12.74	96.58±12.57	98.45±14.36	103.25±17.58
F		0.58	2.99	0.89	3.00
P		0.562	0.056	0.413	0.055

results showed that there were no significant differences in the role functioning, cognitive functioning, and social functioning of patients in the three groups 3 months after operation ( $P>0.05$ ). The scores on physical functioning and emotional functioning of patients in the laparoscope-assisted vaginal group were significantly higher than those in the laparotomy group and the vaginal group ( $P<0.05$ ).

#### ***Comparison of female sexual function scores in the three groups after surgery***

At 6 months after surgery, the BISF-W scores showed no significant differences in the scores of libido, coital pain, orgasm, and dyspareunia ( $P>0.05$ , Table 5).

## **Discussion**

### ***The pathogenesis of cervical cancer and common clinical treatments***

Cervical cancer is a common malignant tumor in clinical practice, and it has been reported in the literature that the onset of cervical cancer *in situ* is closely related to persistent high-risk HPV infection (6). More recently, with the continuing change in people's living standards and sexual concepts, the prevalence of cervical cancer in China has been increasing yearly, even though the intensity of cervical cancer screening has improved clinically (7). Statistics shows that there are more than 130,000 new cervical cancer cases every year in China, with an annual increase of 2% to 3%, and the age of the onset of cervical cancer tends to be younger. Planned treatment in clinical need to evaluate the prognosis of cervical cancer risk. The first category is based on a single risk factor, including TNM staging, age, or incidence area; and the second category should be established on the basis of multiple factors to predict. So far, considering the fact that the clinical stage of early cervical cancer *in situ* is low, surgical excision of

the uterus is mainly used to prevent the spread of cancer cells. If necessary, relevant radiotherapy and chemotherapy can be assisted before and after surgery to consolidate the treatment effect and improve the prognosis of survival time (8-10). At present, clinical studies have not yet clarified the specific pathology of cervical cancer. Therefore, the conventional treatment for cervical cancer mainly involves surgery to remove the uterus to prevent the spread of cancer cells, in cases where the clinical stage is low for early cervical cancer *in situ*. If necessary, adjuvant radiotherapy and chemotherapy are used to consolidate the efficacy of surgery and improve the prognostic survival time (8-10).

### ***Advantages and disadvantages of the different surgical methods***

In this study, three different surgical methods were compared and analyzed in the treatment efficacy of patients with CIN III. Patients in the vaginal group showed the shortest operation time. The operation time, intraoperative blood loss, and duration of hospital stay of patients in the laparotomy group were significantly greater than those of the vaginal group or the laparoscope-assisted vaginal group. After surgery, the postoperative recovery time, drainage tube removal time, and time to out-of-bed activation of patients in the laparotomy group were also significantly longer than those in the other two groups, suggesting that compared with the vaginal group and the laparoscope-assisted vaginal group, there is no obvious advantage of laparotomy as a surgical method. Traditional laparotomy has a good surgical field of vision, but it causes greater trauma to the patient and the abdominal wall scars affect the patient's appearance. Also, traditional laparotomy surgery to remove the uterus requires a high rate of analgesic drug administration after surgery. In this study, poor vaginal healing and infection were the main complications after surgery in the laparotomy group, which is consistent with the conclusions of previous

studies and is one of the main factors affecting the recovery of patients (11-14). However, there were no significant differences in BISF-W scores between the three groups at 6 months after surgery. Patients with vaginal surgery have lower pain and fewer postoperative complications. In this study, only 3.84% of patients with vaginal surgery had complications after surgery. However, although vaginal surgery has an advantage in shortening the recovery time of patients, there is a limitation in the visual field for vaginal surgery insofar as the pelvic cavity is not directly visible. If the patient has anterior pelvic adhesions or other diseases, it is difficult to address these with vaginal surgery (15). Laparoscope-assisted vaginal surgery combines the advantages of both laparoscopic and vaginal surgery. The direct vision of the laparoscope increases the successful rate of vaginal surgery. Even if the patient has other pelvic diseases, laparoscope-assisted vaginal surgery can easily handle the round ligament and ovarian ligament, and cut away the ligament and fallopian tube. Additionally, the surgical field of view is enlarged to avoid damage to the ureter and bladder during the operation, thereby ensuring the quality of life of patients after surgery (16-18).

#### ***Precautions for laparoscope-assisted vaginal surgery***

Due to the functional limitations of the equipment, it is difficult for the operator to suture under laparoscopic surgery, so there are certain stringent training requirements for the laparoscope operator. In addition, compared with vaginal surgery alone, laparoscope-assisted vaginal surgery takes a little longer, because it is difficult to stop the bleeding under the endoscopic glands. Therefore, in order to avoid bleeding, it is necessary to pay attention to the replacement and adjustment of instruments during the operation (19,20).

#### **Conclusions**

Among the three surgical methods, CIN III patients recovered more quickly and had a lower complication rate after laparoscope-assisted vaginal surgery. The biggest advantage of vaginal hysterectomy is the short operation time. Compared with traditional laparotomy and vaginal hysterectomy, laparoscope-assisted vaginal hysterectomy has a wider operating field of vision, a wider range of applications, and is more conducive to improving the quality of life of patients after surgery. For these reasons,

laparoscope-assisted vaginal surgery is worthy of clinical application. The shortcomings of this study are that the sample size is relatively small and long-term follow-up is not conducted on patients, so the long-term effects of various surgical schemes cannot be compared. Therefore, the conclusion of this study needs to be confirmed by expanding the sample size and extending the follow-up time for further in-depth investigation.

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#### **Footnote**

*Reporting Checklist:* The authors have completed the STROBE reporting checklist. Available at <http://dx.doi.org/10.21037/tcr-21-679>

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