Oncology Treatment Discovery, 2023, Volume 1, Issue 1
http://ojs.bbwpublisher.com/index.php/OTD

Efficacy Analysis of Laparoscopic Myomectomy and Open Myomectomy in the Treatment of Uterine Fibroids

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Abstract: *Objective:* To compare and analyze the effects of myomectomy by laparotomy and laparoscopy for uterine fibroids. *Methods:* 60 patients with uterine fibroids treated in the past 3 years (January 2020 to December 2022) were randomly divided into two groups according to the surgical plans, with 30 cases in each group. Patients in the control group underwent laparotomy, whereas those in the observation group underwent laparoscopic surgery. The effects were compared and analyzed. *Results:* Compared with the control group, the observation group had shorter surgery, time to first passage of flatus, and hospital stay; less intraoperative blood loss; lower complication rate; and higher postoperative quality-of-life score ($P < 0.05$). Although there was no significant difference between the two groups in terms of substance P (SP), interleukin 6 (IL-6), and prostaglandin E2 (PGE2) before surgery ($P > 0.05$), there was an increase in each index after surgery, but the increase in the observation group was less, as compared to the control group; the observation group had significantly lower levels of each index ($P < 0.05$). *Conclusion:* There are two common surgical approaches for myomectomy, laparotomy and laparoscopy. In comparison, the laparoscopic approach, a minimally invasive procedure, can optimize surgery-related indicators, reduce surgical trauma response, and reduce complications. It benefits patients by delivering favorable surgical outcomes and improving postoperative quality of life.

Keywords: Myomectomy; Laparotomy; Laparoscopic surgery; Complications; Trauma response

Online publication: June 26, 2023

1. Introduction

Most patients with clinically diagnosed uterine fibroids have no obvious symptoms. Only a small number of patients may present with vaginal bleeding, pain, or a palpable mass over the abdomen [1,2]. Uterine fibroids are benign tumors of the reproductive system that are common in clinical practice. The pathogenesis of the disease is not fully understood, but it has been speculated that the disease is related to high estrogen levels. Although uterine fibroids are benign lesions, their health hazards cannot be underestimated when enlarge. Active treatment is the key to preventing cancer. The clinical treatment of this disease is mainly surgery, and with today's technology, complete resection of uterine fibroids is feasible. The majority of traditional uterine fibroid removal procedures involve open surgery, which inevitably causes significant trauma and increases the risks for complications. Therefore, after the procedure, most patients will take a long time to recover, and the prognosis may be poor due to complications [3,4].

Laparoscopy is a minimally invasive technique, and its value has attracted much clinical attention. In the ever-advancing medical field, this technique has been applied in various surgeries. Practice has proven that laparoscopic surgery is less invasive, and patients tend to recover faster after surgery [5,6]. Hence, we conducted a study on patients with uterine fibroids with the aim of exploring the difference between laparoscopic surgery and laparotomy in the treatment of uterine fibroids.

2. Materials and methods

2.1. Baseline data

Sixty patients with uterine fibroids treated in the past 3 years (January 2020 to December 2022) were randomly divided into two groups according to the surgical plans, with 30 cases in each group. Patients in the control group underwent laparotomy, whereas patients in the observation group underwent laparoscopic surgery. The mean age of the patients in the two groups was 42.16 ± 2.75 (observation group) and 42.35 ± 2.86 (control group), respectively; the tumor diameters were 7.09 ± 0.56 cm (observation group) and 7.07 ± 0.49 cm (control group), respectively; and the disease duration was 8.99 ± 1.25 months (observation group) and 8.76 ± 1.19 months (control group), respectively. There were no differences between the two groups of patients in terms of baseline data ($P > 0.05$).

Inclusion criteria: (1) uterine fibroids confirmed by magnetic resonance imaging (MRI) or other imaging methods, which were consistent with postoperative pathological results; (2) complete diagnosis and treatment data; (3) patients and their families were informed and provided informed consent.

Exclusion criteria: (1) co-existence of malignant tumor; (2) mental disorder or language dysfunction; (3) contraindications to myomectomy; (4) dropped out of the study or poor compliance.

2.2. Surgical approach

2.2.1. Abdominal/Open myomectomy

Surgery was arranged within 1 week after the end of menstruation. Sterilized drapes were used, and the surgery was carried out with general anesthesia and the patient in supine position. An incision of about 8 cm in length was made 2 transverse fingers above the pubic symphysis; the abdomen was opened layer by layer. The abdominal cavity was opened to expose the uterus, and the location, size, shape, and other information of the fibroids were verified. After injecting 10 U of oxytocin, the fibroid tissue was removed by blunt dissection, and the abdominal cavity and pelvic cavity were washed. The residual cavity was sutured, bleeding was stopped, and the incision was closed. Antibiotic prophylaxis was initiated.

2.2.2. Laparoscopic myomectomy

The procedure was performed with general anesthesia and the patient kept in lithotomy position. Sterilized drapes were used. An incision of about 1 cm was made below the navel, and carbon dioxide (CO_2) was used to create a CO_2 pneumoperitoneum with a pressure of 15 mmHg. The pneumoperitoneum needle handle was taken out, and a laparoscope was used to observe the conditions in the pelvic cavity. After verifying the specific information of the fibroid tissue, the operating instrument was inserted through the hole. Vasopressin was applied locally, the capsule was cut with the help of an ultrasonic knife, and the fibroid tissue was grasped. After pulling the fibroid tissue with forceps, blunt separation and electrocoagulation were performed to stop the bleeding. The residual cavity was sutured with absorbable sutures. After the incision was closed, prophylaxis antibiotic was initiated.

2.3. Evaluation indicators

(1) Surgery-related indicators: operation time, intraoperative blood loss, time to first passage of flatus, and length of hospital stay.

(2) Incidence of complications: intestinal obstruction, emphysema, incision bleeding, and surgical site infection.
(3) Trauma response before and after surgery: substance P (SP), interleukin 6 (IL-6), and prostaglandin E_2 (PGE_2).
(4) Quality of life: SF-36 was used to evaluate quality of life; a higher score indicates better quality of life.

2.4. Statistical analysis

Data were processed using SPSS 20.0. Measurement data were represented by mean ± standard deviation, and *t*-test was used. Enumeration data were expressed in percentage (%), and χ^2 test was used. $P < 0.05$ indicates a statistically significant difference.

3. Results

3.1. Surgery-related indicators

Compared with the control group, the observation group had shorter surgery, intraoperative blood loss, time to first passage of flatus, and hospital stay ($P < 0.05$). See **Table 1** for details.

Table 1. Comparison of surgery-related indicators between the two groups

Group	Number of cases	Operation time (min)	Intraoperative blood loss (mL)	Time to first passage of flatus (h)	Length of hospital stay (d)
Observation group	30	49.28 ± 8.56	60.58 ± 11.25	18.02 ± 3.25	5.54 ± 0.98
Control group	30	65.78 ± 8.49	91.36 ± 11.75	26.98 ± 4.31	8.02 ± 1.04
t		7.496	10.364	9.092	9.506
P		0.000	0.000	0.000	0.000

Data are given as mean ± standard deviation.

3.2. Incidence of complications

The incidence of complications in the observation group was lower than that in the control group ($P < 0.05$). See **Table 2** for details.

Table 2. Comparing the incidence of complications between the two groups

Group	Number of cases	Intestinal obstruction	Emphysema	Incision bleeding	Surgical site infection	Incidence rate
Observation group	30	1 (3.33)	1 (3.33)	0 (0.00)	0 (0.00)	2 (6.67)
Control group	30	2 (6.67)	0 (0.00)	3 (10.00)	3 (10.00)	8 (26.67)
x^2		0.351	1.017	3.158	3.158	4.320
P		0.554	0.313	0.076	0.076	0.038

Data are given as n (%).

3.3. Trauma response before and after surgery

There was no significant difference in SP, IL-6, and PGE_2 between the two groups before surgery ($P > 0.05$). However, after surgery, each index increased, but the increase in the observation group was lesser than that in the control group; the levels of each index in the observation group were lower than those in the control group ($P < 0.05$). See **Table 3** for details.

Table 3. Comparison of trauma response between the two groups before and after surgery

Group	Number of cases	SP (μg/mL)		IL-6 (pg/mL)		PGE_2 (μg/mL)	
		Before surgery	After surgery	Before surgery	After surgery	Before surgery	After surgery
Observation group	30	3.99 ± 0.58	4.42 ± 0.36	5.42 ± 0.36	6.20 ± 0.71	102.36 ± 10.25	117.25 ± 11.54
Control group	30	3.98 ± 0.62	6.75 ± 0.41	5.43 ± 0.29	7.98 ± 0.85	102.45 ± 10.16	147.69 ± 11.39
t		0.065	23.390	0.119	8.803	0.034	10.283
P		0.949	0.000	0.906	0.000	0.973	0.000

Data are given as mean ± standard deviation.

3.4. Quality of life

The postoperative quality of life scores of the observation group were higher, as compared to the control group ($P < 0.05$). See **Table 4** for details.

Table 4. Comparison of quality-of-life scores between the two groups

Group	Number of cases	Quality-of-life score (points)			
		Social function	Mental health	Emotional function	Physiological function
Observation group	30	90.34 ± 4.15	92.33 ± 3.62	94.87 ± 12.18	96.15 ± 10.88
Control group	30	80.24 ± 6.45	86.35 ± 2.35	80.54 ± 11.04	82.14 ± 8.64
t		5.100	7.589	4.775	5.523
P		0.000	0.000	0.000	0.000
Group	**Number of cases**	**Quality-of-life score (points)**			
		Physical pain	**Physiological function**	**Vitality**	**General health**
Observation group	30	89.88 ± 5.41	92.32 ± 2.43	90.78 ± 3.74	91.48 ± 3.29
Control group	30	78.25 ± 5.37	87.52 ± 2.01	81.25 ± 4.36	83.66 ± 3.01
t		8.357	8.377	6.425	9.605
P		0.000	0.000	0.000	0.000

Data are given as mean ± standard deviation.

4. Discussion

In the past, open surgery was mainly used for patients with uterine fibroids. This surgical approach is also the earliest surgical plan in clinical practice, aiming at patients with tumor enlargement, large number of tumors, or tumors in special locations. This approach allows the removal of lesions to be more thorough and has a more significant effect. However, it has been found, through clinical practice, that open surgery causes considerable trauma and there are many postoperative complications that hinder the prognosis. In modern medicine, minimally invasive techniques have been popularized in the surgical field, and patients have higher requirements for surgical comfort and safety. Minimally invasive procedures have been generally recognized to have more advantage over conventional surgery and are more in line with the treatment needs of patients [7-10]. In particular, since many patients with uterine fibroids have fertility needs, they prefer minimally invasive surgery over conventional open surgery to reduce damage to the uterus and strive for faster recovery [11,12]. At present, the advantage of laparoscopic surgery has been widely recognized. The advantage of laparoscopic myomectomy includes less trauma, smaller incision, faster recovery, less risk of infection, smaller postoperative scar, and better aesthetics; the field of view can be expanded for surgical exploration during surgery, and the relationship between the tumor tissue and adjacent tissues can be better distinguished under the visualization system, thus preventing unnecessary damage to adjacent tissues when the tumor tissue is removed; in addition, organs are less disturbed by the operations during surgery, resulting in not only less bleeding, but also unlikely postoperative pelvic adhesions [13-16].

In this study, the two approaches of myomectomy were compared, and the results showed that the observation group had shorter surgery, time to first passage of flatus, hospital stay, and intraoperative blood loss, as compared to the control group ($P < 0.05$). From the perspective of surgery-related indicators, the use of laparoscopic technology can further optimize indicators, such as intraoperative blood loss and speed of surgery; moreover, patients may recover faster after the procedure. Compared with the control group, the observation group had significantly lower incidence of complications ($P < 0.05$). With the assistance of laparoscopic technology, only a small operation hole is needed to complete the procedure, the environment in the abdomen and pelvis is less affected, the risk of infection is lower, and a wider field of view can be achieved, which is helpful to preventing unnecessary tissue injuries; in that way, the overall rate of complication is lower. Our study also found that although there were no significant differences between the two groups in terms of SP, IL-6, and PGE_2 before surgery ($P > 0.05$), both groups showed an increase in each index after surgery, but the increase was lower in the observation group, as compared to the control group and the levels of each index in the former group were lower than those in the control group ($P > 0.05$). Trauma response refers to the systemic reaction involving humoral, endocrine, nervous, and other systems when the body is damaged or dysfunctional. Since laparoscopic surgery is less invasive, the trauma response is less. Compared with the control group, the observation group had significantly higher postoperative quality-of-life scores ($P < 0.05$). Quality of life is an important indicator for prognosis; thus, the results confirmed that the prognosis of patients who undergo laparoscopic surgery would be more satisfactory.

In conclusion, myomectomy can be achieved by both laparotomy and laparoscopy, although the latter, as a minimally invasive procedure, can optimize surgical-related indicators, reduce the risk of complications, and lead to less traumatic response and better prognosis. Its value in surgery is high; thus, it is worth popularizing in clinical practice.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Mu H, 2022, Comparison of Clinical Effects Between Laparoscopic Myomectomy and Traditional Open Myomectomy in the Treatment of Patients with Uterine Fibroids. Medical Equipment, 35(8): 88–90.

[2] Li Q, 2021, Comparison of Clinical Effects of Laparoscopic Myomectomy and Open Myomectomy in the Treatment of Uterine Fibroids. Chinese Medicine Guide, 19(17): 79–80.

[3] Li D, Chen C, Wang Y, 2021, Comparison of Clinical Effects Between Laparoscopic Myomectomy and Laparoscopic Myomectomy in the Treatment of Uterine Fibroids. Frontiers of Medicine, 11(6): 57–58.

[4] Qu J, Huang W, Lei X, 2020, Comparison of Clinical Effects of Laparoscopic In Situ Rotary Excision

and Laparotomy in the Treatment of Giant Uterine Fibroids. Frontiers of Medicine, 10(34): 134–135.

[5] Lu Y, 2021, Comparison of the Clinical Effect of Laparoscopic Myomectomy and Traditional Open Myomectomy in the Treatment of Giant Uterine Fibroids. Clinical Research, 29(2): 97–98.

[6] Huang J, 2021, Comparison of Clinical Effects of Laparoscopic Myomectomy and Laparotomy in the Treatment of Uterine Fibroids. World Compound Medicine, 7(2): 115–117.

[7] Guan X, Hua C, Wang S, et al., 2020, Comparison of Curative Effect Between Laparoscopic Myomectomy and Traditional Open Myomectomy in the Treatment of Giant Uterine Fibroids. Journal of Xinxiang Medical College, 37(3): 243–245 + 250.

[8] Zou Q, 2020, Analysis of Clinical Effect and Prognosis Quality of Minimally Invasive Laparoscopic Myomectomy for Patients with Uterine Fibroids. Chinese Medicine Innovation, 17(11): 126–129.

[9] Wang X, Xu L, Sun M, et al., 2021, Effects of Laparotomy and Laparoscopic Myomectomy on Myoma Recurrence, Oxidative Stress and Serological Trauma Indexes in Patients. Chinese Journal of Endoscopy, 27(4): 26–30.

[10] Shen Y, Shen B, 2021, Clinical Efficacy of Laparoscopic Uterine Artery Occlusion Combined with Myomectomy in the Treatment of Uterine Fibroids. Laboratory Medicine and Clinic, 18(19): 2830–2833.

[11] Xu Y, Zhang F, Meng H, et al., 2022, Observation on the Curative Effect of Laparoscopic Myomectomy and Traditional Laparotomy in the Treatment of Uterine Fibroids. Chinese Cancer Clinic and Rehabilitation, 29(5): 537–540.

[12] Tang Y, Wang X, Zhou X, 2021, Clinical Curative Effect of Laparoscopic Myomectomy and Its Influence on Hormone Indexes and Inflammatory Factor Levels of Patients. Journal of Bengbu Medical College, 46(1): 58–61.

[13] Liang L, Sun L, Yang B, et al., 2022, Efficacy of Laparoscopic Myomectomy in the Treatment of Uterine Fibroids and Its Impact on Postoperative Pregnancy. Chinese Maternal and Child Health, 37(1): 165–167.

[14] Tang K, Ma H, Liu P, 2022, Comparison of Efficacy and Safety of Transumbilical Single-Port Laparoscopy and Traditional Open Myomectomy. Anhui Medicine, 43(9): 1038–1041.

[15] Wang R, Wu W, Xu F, et al., 2020, Effects of Laparoscopic Myomectomy and Laparotomy on Endocrine Status, Immune Function and Prognosis of Patients with Uterine Fibroids. Advances in Modern Biomedicine, 20(16): 3160–3163.

[16] Cao X, Du L, Wang Q, et al., 2022, The Effect of Laparoscopic Myomectomy and Transabdominal Myomectomy in the Treatment of Uterine Fibroids. Jilin Medicine, 43(7): 1954–1956.