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Laparoscopy and Laparotomy for Endometrioid Adenocarcinoma: Short- and Long-Term Outcomes' Comparison

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Abstract— *Aims*. In order to compare the advantages of laparoscopy with those of laparotomy for the treatment of endometrioid adenocarcinoma and to draw conclusions about the relative merits of the two procedures, both in the short and long term. Methods. Six hundred ninety-three patients with endometrioid adenocarcinoma who had laparoscopy instead of laparotomy between 2012 and 2020 were included in the research. The therapeutic impact of these two treatments for endometrioid cancer was evaluated by reviewing basic patient information, their perioperative indicators, and recurrence rates. Final product. Laparoscopy was performed on 365 endometrioid adenocarcinoma patients, whereas laparotomy was performed on 328 individuals. Longer operating durations, less intraoperative haemorrhage, and shorter postoperative hospital admissions were seen in the laparoscopic group compared to the laparotomic group. The laparotomic group had a much higher incidence of radical hysterectomy and less-radical hysterectomy (59/365, 16.16%) than the laparoscopic group (162/328, 49.39%). While the two groups did not vary substantially in terms of local recurrence, the laparotomic group had a much higher distant recurrence rate (15/308, 4.87%) compared to the laparoscopic group (3/351, 0.85%). There was a larger survival benefit in the laparoscopic group compared to the laparotomic group in both the I/II and III/IV patient subgroups (314/314, 100% vs. 7/242, 28.93%) and 35/37, 94.59% vs. 51/66, 77.27%). Final thoughts. Compared to patients who had laparotomic surgery, those who underwent laparoscopic surgery recovered more quickly and experienced a reduced risk of postoperative recurrence in the immediate aftermath of the procedure. The endometrioid adenocarcinoma therapy option is laparoscopic surgery, which is both safe and successful.

1. Introduction

Adenocarcinoma of the endometrium is one of the most common cancers seen in women's germ lines [1, 2]. It constitutes 75–80% of all uterine malignancies and has the second-highest death rate worldwide [3]. The prevalence of obesity and subfertility also contribute to the increased illness load [4, 5]. Endometrioid adenocarcinoma is best treated surgically [6, 7]. A regional lymphatic basin resection may be done depending on the surgical result. Traditional laparotomy for endometrioid adenocarcinoma is efficient, however it comes with some serious drawbacks such increased intraoperative bleeding and extended operation times.

eight to ten. A growing body of research suggests that endometrioid adenocarcinoma patients may benefit from laparoscopic surgery rather than open surgery due to its reduced invasiveness [11–13]. Endometrioid adenocarcinoma patients are advised to have laparoscopic surgery as their primary treatment option according to the 2020 NCCN Guidelines [14]. Laparoscopy had superior results when compared to the least invasive technique in a retrospective study of clinical and oncological outcomes for ovarian and cervical cancer therapy. The oncologic outcomes of 60 ovarian cancer patients who received laparoscopic staging were similar to those of 120 patients who underwent open surgery, according to a study by Gallotta et al. [15]. The patients in the laparoscopy group had similar outcomes as those in the open surgery group.

publication in the field of clinical practice method [15]. Furthermore, no statistically significant change in staging was seen when comparing robotic staging with traditional laparoscopic staging in patients with early-stage ovarian cancer [16]. Both laparoscopy and laparotomy resulted in comparable 5-year recurrence-free and overall survival rates for women, according to a prior research [17]. In a study

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of early-stage endometrial cancer, Ruan et al. [18] found that lap-aroscopy was just as effective as laparotomy in terms of oncological results and surgical outcomes. Concerning the consequences, both immediate and long-term, of laparoscopic and open surgery on endometrioid adenocarcinoma patients, there is still a great deal of unanswered questions.

Here, we conducted a review of past work that examined the risks and benefits of laparoscopy and lap-arotomy during surgery and contrasted the results for individuals who had these procedures.

2. Patients and Methods

Chapter 2.1: People Under Treatment. The 693 participants in this retrospective research were recruited from the patient records of women who had endometrial cancer treatment at the Hainan Provincial People's Hospital in China between 2012 and 2020. Laparoscopy was used to treat 365 patients, whereas laparotomy was used to treat 328 patients. Prior to surgery, every patient received a diagnostic curettage and hys-teroscopy. Postoperatively, any further pathological diagnoses were solidified. In order to participate in the research, every single individual gave their written permission.

Part 2.2: The Plan for Care
A.2.2.1. Laparoscopic Operations. Each patient was put into the lithotomy position and an indwelling urine catheter was implanted after they had received general anaesthesia. The patient had an incision around 1 cm long made 3 cm above their navel. After the puncture was successfully made, the laparoscopes were inserted and pneumoperitoneum was established by means of carbon dioxide insufficiency. For the first and second incisions, a 5 mm incision was performed at the umbilicus level. Perforations were made at the right appendiceal maiotic point during parietal aortic lymph node dissection, and a third incision was made above the left anterior superior iliac spine for the surgery. In addition to the standard pelvic and abdominal exams, a cytological blood test used washing fluid collected from the peritoneal cavity.

Methods Employed in a Total Hysterectomy (2.2.2). Bipolar electrocoagulation and an ultrasound knife were used to co-agulate and cut the uterine arterio-vein and infun- dibulopelvic ligaments. Simultaneously, extensive removal of the uterosacral ligaments around the uterus was carried out. A horizontal incision was made in the vaginal vault to facilitate the excising of the vaginal wall using monopolar electrocoagulation. What was the uterus taken out of the body for the purpose of a quick pathology analysis. Based on the extent of myometrial invasion and grade of tumour differentiation, lymph node dissection was usually conducted.

Procedure for Dissecting Pelvic Lymph Nodes (2.2.3). A pelvic lymph node dissection was carried out, beginning at the medial aspect of the psoas major muscle and continuing to the medial aspect of the intrailiac lymph nodes, obturator lymph nodes, 2 cm above the common iliac artery, and finally, the level of the deep iliac vein on the foot side.

Laparoscopic para-aortic lymphaticectomy procedure (2.2.4). Beginning at the inferior mesenteric artery and continuing all the way to the renal vein, lymphadenectomy and dissection were performed up to 2 cm above the bifurcation of the abdominal aorta. One kind of abdominal aortic lymph node has to be removed for four specific pathological reasons: (1) poorly differentiated type; (2) deep muscle layer infiltration; (3) imaging lymph node hypertrophy; and (4) other particular pathological type.

2.2.5. Endovascular Both radical and less radical hysterectomy options are available. A less-or radical-radical hysterectomy may be performed if the tumour has spread to the cervical stroma. Coagulation of the uterine artery was initiated at the point where the internal iliac artery and major sacral ligament met after the ureter had been fully exposed. The vaginal resection was around 2-3 cm long. Transvaginal retrieval of the specimen was performed. The cervix is preserved with a less-radical hysterectomy, which mostly involves removing the uterine body. In addition to removing the uterus, a radical hysterectomy also involves cleaning the cervix, a portion of the upper vagina, and the lymph nodes in the pelvis.

Chapter 2.2.6: Laparotomy! A transverse incision was created in the lower left quadrant of the abdomen, about 4 centimetres above the umbilicus. The rest of the operation followed the same protocol as laparoscopic procedures.

Subsequent Treatment, Section 2.2.7. Adjuvant treatments, such as chemotherapy, vaginal brachytherapy, and external pelvic irradiation, were administered to patients based on their clinicopathological features and risk ratings. Factors increasing the likelihood of this disease were advanced age (60+), tumour differentiation (moderate to low), depth of myometrial invasion, and high lymph vascular space invasion (LVSI).

Indicators of Observation (2.2.8). Age, body mass index (BMI), surgical techniques, clinical stage, differentiation

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degree, and myofascial invasion depth were all markers of observation.

The third section is the evaluation that follows. Telephonic postoperative follow-up was done, and patients were deemed lost to follow-up if they did not answer the phone three times. December 30, 2020 was the deadline for the follow-up. In terms of

Journal of Clinical Practice in the International Setting 3 the median duration of follow-up for patients undergoing laparoscopy was 40 months, and it ranged from 6 to 89 months. In the laparoscopic group, 14 cases (or 3.84% of the total) were lost. The median duration of follow-up for the laparotomic group was 42 months, and it ranged from 7 to 91 months. Twenty cases, or 6.10 percent, were lost in the lapa-rotomic group.

Statistical analysis in section 2.4. Using IBM SPSS Statistics for Windows, Version 19.0 (IBM Corp., Armonk, NY, USA), we conducted an analysis of variance on all statistical data. A component ratio is used to represent the values of categorical variables, and the $\chi 2$ test was used to analyse it. The Mann-Whitney U test (for two groups) or one-way ANOVA (for multiple groups) were used to analyse the values of continuous variables, which are shown as the mean value ± standard deviation. Statistical significance was determined by a p value less than 0.05.

3. Results

3.1. Details About the Patient. The research included 693 individuals between 2012 and 2020. The number of endometrioid adenocarcinoma patients treated annually at Hainan Provincial People's Hospital from 2013 to 2019 is shown in Figure 1(a). Figure 1(b) shows the distribution of patients with varying illness stages. Laparoscopic surgery was performed on 365 patients and laparotomy on 328 patients among those who were enrolled. Patients' demographics and health status were similar across the two groups at baseline (Table 1). Out of the 365 patients who underwent laparoscopic surgery, 132 had a total hysterectomy with bilateral adnexectomy, 174 had a total hysterectomy with any combination of pelvic lymphadenectomy, paraaortic lymphadenectomy, and bilateral adnexectomy, and 59 had either a conventional less-radical hysterectomy or a radical hysterectomy with any combination of pelvic lymphadenectomy, paraaortic lymphadenectomy, or bilateral adnexectomy. From the 328 patients who had laparotomy, 44 had a total hysterectomy with bilateral adnexectomy; 132 had a total hysterectomy with bilateral adnexectomy and pelvic lymphadenectomy or paraaortic lymphadenectomy; and 162 had either a conventional less-radical or radical hysterectomy with bilateral adnexectomy and pelvic lymphadenectomy or paraaortic lymphadenectomy. In terms of the method of operation, a clear distinction was noted.

Section 3.2: Features of the Surgery. Table 2 displays the features of the surgery. those in the laparoscopic group had longer operating durations ($p = 0.03$), less intraoperative bleeding ($p < 0.001$), and shorter hospital stays after the procedure ($p < 0.001$) in comparison to those in the lapa-rotomic group.

Surgical Results Section 3.3. After that, Table 3 shows the results of the further comparison between the two groups' surgical outcomes. Relapses were less common in patients who had laparoscopic surgery.

significant ($p < 0.001$). Seven individuals (about 1.9% of the total) had a recurrence after laparoscopic surgery; the other 349 patients are still alive and well. Thirteen individuals in the group that had laparotomy experienced recurrence. In contrast, 15 patients in the laparotomic group showed distant recurrence, while only 3 patients treated with laparoscopic surgery did so ($p < 0.001$). In addition, there was a statistically significant difference in the number of patients who survived following laparoscopic surgery (349 vs. 286, $p < 0.01$) compared to laparotomy. Furthermore, Figure 2 displayed the 3-year progression-free survival and 3-year overall survival, revealing a noteworthy disparity between the two categories.

After that, we looked at the patients' disease recurrence data and categorised them according to the TNM stage (Table 4). Stage I or II disease was seen in 586 individuals. Out of 314 patients treated with laparoscopy, 3 had recurrence, and 12 cases were lost to follow-up. Relapse occurred in 8 out of 242 patients (3.30%) in the open surgery group, and 18 cases were lost to follow-up. The recurrence rate did not vary significantly between individuals with stage I and II illness ($p = 0.096$) in our study. Of the 39 patients in stages III and IV who had laparoscopy, 2 were not followed up with and 4 had recurrence. Two patients in the laparotomic group did not return for follow-up, and fifteen patients had recurrence out of sixty-eight stage III/IV cases. There was no statistically significant difference in the illness recurrence rates of III/IV patients in the two groups, according to Student's t-test analysis.

4. Discussion

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Patients diagnosed with endometrioid adenocarcinoma had better short- and long-term results after undergoing laparoscopic surgery, according to this research. Laparoscopy may provide some short-term benefits, such as a reduced intraoperative bleeding volume and a shorter hospital stay, when treating endometrioid adenocarcinoma, but these benefits may not last if the impact of tumour stage is not taken into account. Patients who received laparoscopy instead of laparotomy had a lower risk of postoperative recurrence and a higher rate of survival, and this was true even after adjusting for tumour stage. These results provide further evidence that endometrioid adenocarcinoma patients benefit from and have an improved quality of life after laparoscopy-assisted surgery. Laparoscopy and laparotomy have been the subject of many publications about their curative efficacies in the treatment of endometrioid adenocarcinoma [19-21]. Laparoscopy has the potential to reduce the length of time patients spend in the hospital and speed up their recovery after surgery, although both approaches may be equally effective in treating early-stage endometrial cancer [4, 6, 12, 22, 23]. In addition, some studies have compared the amount of time it takes to do laparoscopy and laparotomy, although they have come to various findings [24, 25]. Results from studies by Terai et al. and He et al. [26, 27] suggest that laparoscopic surgery takes more time than laparotomy. Consistent with that conclusion, our research showed that hysteroscopy resection took an average of

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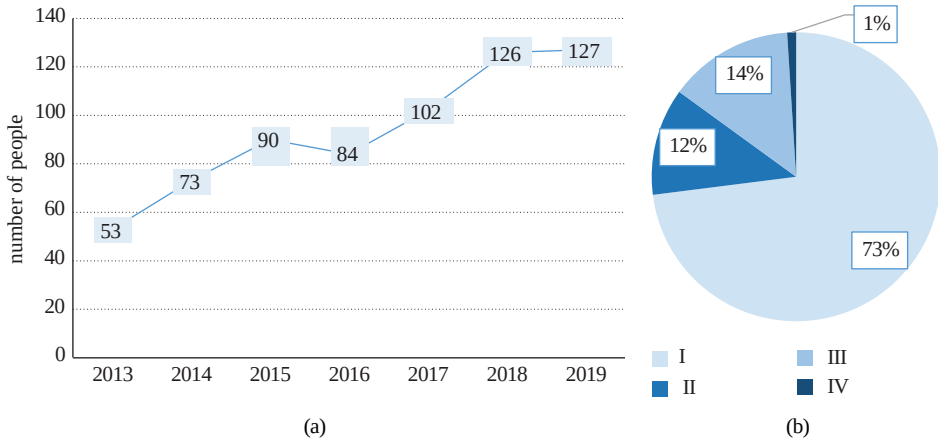

FIGURE 1: Patient recruitment and patient stage. (a) The patients of endometrioid adenocarcinoma collected from January 2012 to July 2020. (b) The distribution of patients with different stages.

more time-consuming than a laparotomy. It should be noted that Ghazali et al. [6] discovered that laparoscopy had a lower operating time compared to open surgery. In fact, a surgeon may be able to shorten the amount of time spent operating thanks to laparoscopic surgery's minimally invasive and quick opening of the abdomen. The contradictory findings can be due to a number of factors. One example is the fact that the time it takes several surgeons to complete the same procedure might range from one to two hours. Possible causes for these variations include operator skill, the utilisation of modern lumpectomy equipment, and individual variances in the learning curve. Consistent with other studies [26], we discovered a statistically significant decrease in intraoperative haemorrhage in the lap-aroscopic group compared to the open surgery group. As a result, while treating endometrioid cancer, laparoscopy may be preferable to laparotomy and may provide short-term health advantages. Less discomfort, an earlier time out of bed, and a faster recovery time are all benefits of the laparoscopic postoperative abdominal wall incision for obese patients. Obese people often have impaired lung function, and laparoscopy's belly pressure makes the airway more resistant. Intraoperative exposure complications, which may arise from the use of cumbersome surgical tools, worsen this situation even more. Obese individuals may need to be converted to open surgery due to these unforeseen complications [28]. To determine the optimal body mass index (BMI) for deciding between laparoscopy and laparotomy, further research is required. There were no instances of patients undergoing laparoscopy being converted to open surgery due to obesity, and no patient had a body mass index (BMI) more than 30 in our research.

When it comes to treating early-stage endometrial cancer, laparoscopy has been shown to be both safer and more successful than laparotomy. In addition to a quicker recovery time after surgery, laparoscopy reduces the risk of illness recurrence and patient death [4, 29]. Few studies have compared the two surgical techniques for stage III and IV endometrial cancer therapy, but our results are consistent with prior publications. With a recurrence incidence of 10.8%, 39 out of 107 patients with endometrioid adenocarcinoma stage III or IV who had laparoscopic therapy were included in our research. The recurrence rate was 22.7% in 68 individuals who had open surgery. The low percentage of illness recurrence suggests that laparoscopy could be a more beneficial procedure.

The next step was to classify the laparoscopic and laparotomic recurrence sites as either local or distant. Vaginal stump and pelvic recurrence were considered local recurrence, but pulmonary and bone metastases were considered distant recurrence, and recurrence beyond the pelvis was characterised as distant recurrence. Recurrence after laparoscopic surgery was diagnosed as lung metastasis, according to Chu et al. [29], who examined the recurrence of early-stage endometrial cancer after two surgical modalities; however, the number of recurrence cases was quite small, with only two instances reported. According to a retrospective analysis by Palomba et al. [30], there was no significant difference in recurrence rates or recurrence locations between laparo- scopic and laparotomic techniques in treating 1012 patients with endometrial cancer. Patients with endometrial cancer stage II or III had a substantially greater risk of local recurrence in the laparoscopic group compared to the laparotomic group. In contrast to previous research [4, 29], our findings indicated a much higher recurrence rate of 39.8% for stage I patients and 37% for stage II patients. Our findings also showed that individuals with

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endometrial cancer at any stage were more likely to have a recurrence in the laparoscopic group compared to the open surgery group. A greater risk of distant recurrence was also seen in the open group. On the other hand, the rates of local recurrence were similar between the two groups. According to these results, laparoscopy is just as effective as open surgery in the long run. Additionally, there are academics who think that obese patients [32] and older patients with endometrial cancer [31] should be given special attention when it comes to minimally invasive procedures. Recurrence rates were higher in the laparoscopic group compared to the open group after various surgical techniques, however the difference was not statistically significant. In

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Table 1: Comparison of clinicopathologic characteristics of patients.

	Laparoscopy group (n = 365)	Laparotomy group (n = 328)	P
Age (years)	50.7 ± 8.5	51.3 ± 8.6	0.153
BMI	24.4 ± 4.1	23.2 ± 4.1	0.065
Comorbidities			
Hypertension	95 (26%)	76 (23.2%)	0.384
Diabetes	42 (11.5%)	32 (9.8%)	0.456
Surgical modalities			<0.001
Total hysterectomy + bilateral adnexectomy	132 (36.2%)	44 (13.4%)	
Total hysterectomy + bilateral adnexectomy, pelvic lymphadenectomy, and/or paraaortic lymphadenectomy	174 (47.7%)	122 (37.2%)	
Less-radical hysterectomy or radical hysterectomy + bilateral adnexectomy and pelvic lymphadenectomy and pelvic lymphadenectomy or paraaortic lymphadenectomy	59 (16.2%)	162 (49.4%)	
Degree of pathological differentiation			0.564
Unreported	39 (10.7%)	53 (16.2%)	
G1	79 (21.6%)	76 (23.2%)	
G2	139 (38.1%)	133 (40.5%)	
G3	108 (29.6%)	66 (20.1%)	
Depth of myometrial invasion			0.885
<1/2	252 (70.0%)	213 (64.9%)	
≥1/2	113 (30.0%)	115 (35.1%)	
TNM stage			0.663
I	284 (77.8%)	218 (66.5%)	
II	42 (11.5%)	42 (12.8%)	
III	36 (9.9%)	60 (18.3%)	
IV	3 (0.8%)	8 (2.4%)	
Surgical modalities			0.001
Less-radical hysterectomy and radical hysterectomy	59	162	
Nonradical hysterectomy	306	166	

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Table 2: Comparison of surgery-related indicators between the two groups.

	Laparoscopy group (n = 365)	Laparotomy group (n = 328)	*P*
Operation time (min)	220 ± 60	210 ± 62	0.03
Intraoperative bleeding volume (ml)	250 ± 120	370 ± 140	<0.001
Hospitalization postoperative days	5 ± 2	7 ± 3	<0.001

Table 3: Comparison of recurrence and survival of two groups.

	Laparoscopy group (n = 365)	Laparotomy group (n = 328)	*P*
Nonrelapse	344	285	<0.01
Relapse	7	23	
Local recurrence	4	8	0.163
Distant recurrence	3	15	0.002
Survival	349	286	<0.01
Death	2	22	

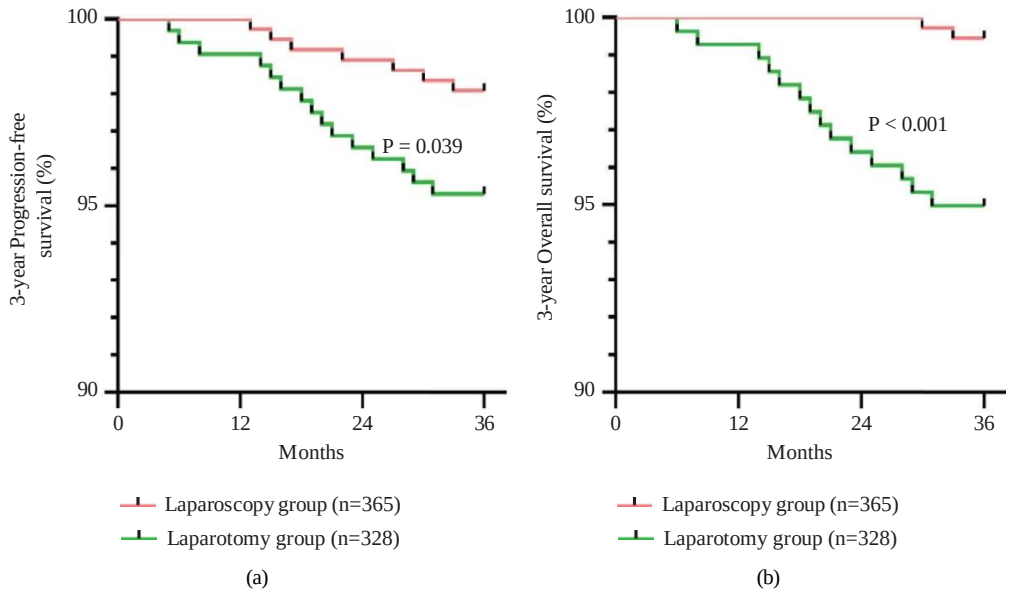

Figure 2: The 3-year survival curve. (a) 3-year progression-free survival (%). (b) 3-year overall survival (%).

Table 4: Recurrence and death of stratificated stage in two groups.

	Stage I/II patients			Stage III/IV patients		
	Laparoscopy group	Laparotomy group	*P*	Laparoscopy group	Laparotomy group	*P*
Relapse	3	8	0.096	4	15	0.135
Nonrelapse	311	234		33	51	
Death	0	7	0.008	2	15	0.023
Survival	314	235		35	51	

Furthermore, there was a significant difference in the frequency of patients receiving laparoscopic radical or subradical resection between the open and laparoscopic groups, suggesting that local recurrence is more common with laparoscopic complete

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hysterectomy compared to open radical hysterectomy. Overall, the laparoscopic group required a little more time for surgery to treat early-stage endometrial cancer than the laparotomic group; however, there was less intraoperative bleeding and shorter hospital stays for patients who had laparoscopic therapy. As for the third and fourth stages,

patients, there was no difference between the open and laparoscopic groups in terms of recurrence and survival markers, indicating that laparoscopic surgery is a safe and effective therapeutic option that does not negatively affect survival results. There are a few caveats to this study: first, the process selection was based on the operators' subjective preferences; in most cases, they went with the method they were most comfortable with. It was common practice for operators to perform laparotomy on individuals with big uteruses, complicated estimated diseases, or advanced stages of illness. According to what we found,

There were no significant changes in the patients' preoperative general health or pathological features, however laparotomy was still the preferred method for instances with a muscle layer invasion depth of 1/2 or more. Beginning in 2012, open surgery predominated over laparotomy over the first two years of the chosen technique for the patients included in this analysis. This was due, in part, to a bias in the follow-up period, which was longer for the open surgery group of cases. More instances went missing, and the majority of those cases were from earlier. To confirm the effect of laparoscopy on prognostic outcomes for survival in early, intermediate, or advanced endometrial cancer, a prospective randomised controlled trial involving several centres is required.

Data Availability

All data are available from the corresponding author upon reasonable request.

Ethical Approval

The study was approved by the Medical Ethics Committee of Hainan General Hospital (NO: Med-Eth-Re [2022] 283). This project conformed to the relevant laws and regulations, which was approved for implementation.

Consent

All the study participants signed an informed consent for inclusion in the study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

(I) Lan Hong and Genhai Zhu were responsible for study design/planning; (II) Shengtan Wang, Wei Li, Lang Zheng, Guifei Li, Lifan Shen, and Hengzhi Zhuang were responsible for data collection/entry; (III) Jun Liu and Xiuzhen Wang were responsible for data analysis/statistics; (IV) Haocheng Gao and Xiaohang Liu were responsible for data interpretation; (V) Lan Hong was responsible for the preparation of the manuscript; (VI) Lan Hong and Xiuzhen Wang were responsible for literature analysis/search; (VII) Genhai Zhu was responsible for funds' collection; (VIII) all authors gave the final approval of the manuscript.

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