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Abdel Monem Mohamed Zakaria

*Department of Obstetrics and Gynecology, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt*

Ahmed Mohamed Mohamed Saeed

*Department of Obstetrics and Gynecology, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt*

Mohamed Othman El-Imam

*Department of Obstetrics and Gynecology, Faculty of Medicine for boys, Al-Azhar University, Cairo, Egypt,*  
mhd.9489@yahoo.com

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# Comparative Study Between Total Laparoscopic Hysterectomy and Abdominal Hysterectomy in Management of Benign Gynecological Conditions

Abdel Monem Mohamed Zakaria, Ahmed Mohamed Mohamed Saeed, Mohamed Othman El-Imam\*

Department of Obstetrics and Gynecology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

## Abstract

**Background:** In benign gynecological disorders, a laparoscopic hysterectomy may be preferable than an abdominal hysterectomy due to its possible benefits, such as shorter recovery times and less blood loss.

**Aim of the work:** Intended to evaluate the safety, benefits, and consequences of laparoscopic vs open hysterectomy for benign gynecological diseases.

**Methodology:** 50 cases were subjected to a thorough medical history, physical examination, laboratory tests, abdominal ultrasound, and biopsies for suspicious pathology. Cases separated into 2 groups of equal size. The 1st for trans-abdominal hysterectomy and the 2nd for complete LH. After surgery, patients were monitored for 6 months. Statistics obtained include surgical time, blood loss, comorbidities, and hospital stay duration.

**Results:** Substantial improvements in low parity and low caesarean deliveries were observed in the laparoscopic group. In the laparoscopic group, adenomyosis was the most prevalent indication for hysterectomy (40%), followed by fibroids (28%). In the open group, fibroids were the most common indication (48%), followed by adenomyosis (32%). Contrasted to open hysterectomy, laparoscopic hysterectomy resulted in a much shorter duration of surgery (55 min vs. 70 min) and substantially less blood loss. The length of hospital stay was considerably shorter in the laparoscopic group as opposed to the open group (Mean  $\pm$  SD: 45.120  $\pm$  14.4 vs 59.52  $\pm$  20.92 h).

**Conclusion:** When treating women with benign gynecological disorders, laparoscopic hysterectomy is preferable to abdominal hysterectomy because it is safe and has a higher success rate.

**Keywords:** Abdominal, Benign, Hysterectomy, Laparoscopy

## 1. Introduction

Over than 600,000 hysterectomies are executed each year in the United States, making it by far the most common gynaecological operation.<sup>1</sup>

In the early 1990s, three laparoscopic methods were developed: total laparoscopic hysterectomy (TLH), laparoscopically assisted vaginal hysterectomy (LAVH), and laparoscopic supracervical hysterectomy (LASH). Until 1989, the only surgical options for hysterectomy were vaginal and abdominal hysterectomy.<sup>2</sup>

TAH is a crucial procedure for gynaecologists to understand since it entails removing the uterus along with its outer wall. Ureter, colon, and bladder injuries are all potential side effects of TAH. Having the uterus removed naturally and following the proper release layer method are both crucial for preventing difficulties during surgery.<sup>3</sup>

TLH is currently utilised to treat a variety of benign gynaecological problems, but the technical obstacles, including as placement of tools, bleeding, and extended operational periods, remain significant concerns for the laparoscopic gynaecologist.

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\* Corresponding author at: Department of Obstetrics and Gynecology, Resident of Obstetrics and Gynecology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt.  
E-mail address: [mhd.9489@yahoo.com](mailto:mhd.9489@yahoo.com) (M.O. El-Imam).

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Moreover, there is a substantial frequency of major complications with TLH among less seasoned surgeons. These considerations led to the development of a wide range of methods and tools aimed at optimising the operation, such as vascular sealing devices and port location aids. The TLH procedure has also benefited from the development of a number of uterine manipulators systems.<sup>4</sup>

The study was out to evaluate complete laparoscopic hysterectomy vs abdominal hysterectomy for benign gynaecological diseases with regards to safety, effectiveness, and consequences.

## 2. Patient and methods

Patients who met the study's criteria for hysterectomy were randomly selected from the pool of women who visit the outpatient gynaecological clinics at the two hospitals affiliated with Al-Azhar University (Al Hussein University Hospital and Al Sayed Galal) in Cairo from March 2021 to March 2022. Subjects who met the following requirements were included in the study: Benign uterine pathology and uterine size 14 weeks (Fibroid uterus, endometrial hyperplasia, DUB, Prolapse). Contrarily, patients who met any of the following criteria were not included in the analysis: Dimensions of the uterus more than fourteen weeks. Cancer of the uterus or cervix. Pneumoperitoneum, the Trendelenburg position, intraperitoneal mesh, cirrhosis, and portal hypertension are all conditions that rise the hazard of complications during laparoscopy. There are several situations in which laparoscopic surgery cannot be performed under general anaesthesia.

### 2.1. Ethical considerations

Al-Azhar University (Cairo) for Boys' Faculty of Medicine Ethics and Scientific Research Committee authorised the study's procedures. Before enrolling people in the research, we got their verbal approval. Participants were briefed on the purpose of the study, guaranteed of their privacy, and given the option to leave the study at any time. A solid affirmation of data usage was also voiced. The complete history, clinical examination, and laboratory investigations were performed on all patients who met the inclusion criteria. At first, a thorough medical history was taken, including questions about the patient's general health, menstruation and obstetric history, whether or not she had ever undergone a gynaecological procedure, and any medication use. In addition, a thorough vaginal and abdominal examination had been performed. Finally, the lab tests included a check of the patient's haemoglobin and

blood sugar. In the fourth place, a biopsy was taken from a suspicious area of the uterus after ultrasonography was used to discover pathology.

The 50 patients were split evenly (using the closed-envelope method of randomization) into 2 groups (each with 25 members): those undergoing TLH and those undergoing TAH. Inclusion criteria for the trial were cases experiencing symptoms from benign uterine pathology who also had excellent uterine mobility and a uterine size of less than fourteen weeks.

### 2.2. Follow-up

After a hysterectomy, patients were followed for a maximum of six months. Time in surgery, expected blood loss, length of hospital stay, and incidence of both immediate and delayed problems were all taken into account. This definition was put into practise: The duration of an operation was defined as the time it took from when the first cut was made until the last stitch was placed. Blood loss in AH were estimated by calculating the blood volume in the suction device, weighing soaked swabs, and utilising calibrated mops, while in a total laparoscopic procedure, blood loss was defined as the arithmetic difference between the volume of fluid used for irrigation and the total volume of liquid in the suction device at the end of the surgery. Excluding the day of operation from the total hospital stay was the traditional definition of a patient's length of stay. Hernia at the trocar site is an example of a late complication that might occur weeks or months after surgery. Early post-operative problems were those that occurred during the first week following surgery, such as intestinal and ureteral injuries. This hysterectomy was performed using the laparoscopic method, as reported by Kondo et al.

Analysis of data performed using the SPSS statistical software (Version 15.0; Chicago, Illinois, USA). Mean, standard deviation, and range are measures of dispersion for quantitative variables. In order to compare numerical parametric and non-parametric data, either Student [t] tests or the Mann-Whitney [U] test were utilised. Quantitative characteristics were compared using the *t*-test, whereas qualitative characteristics were compared using the  $\chi^2$  test. A *p* value  $\leq 0.05$  was formerly regarded to be substantial.

## 3. Results

There was no substantially significant variation in the average age of participants amongst the laparoscopic and open hysterectomy groups (49.88 3.83 and 49.72 3.75) in the current research. In addition,

in the open and laparoscopic groups, respectively, 60% and 56% of patients were  $\leq 50$  years old. In the laparoscopic group, 100% had had a CS before, but only 72% of the open group had done so. Nevertheless, no substantial variations were observed among the groups with respect to non-CS surgical history. It was also shown that there was no substantial distinction amongst the laparoscopic and open hysterectomy groups in terms of medical conditions [it was +ve in 68.0% and 76.0% in the laparoscopic and open groups respectively]. There was no substantial variance among the two groups when it came to the most prevalent indications for hysterectomy: fibroid (48.0%) and adenomyosis (32.0%) in the open group, and laparoscopic (40.0%) and open (28.0%) in the laparoscopic group.

There was no substantial connection between the method of hysterectomy and any adverse clinical outcomes. More than three-quarters (76%) of cases who had LH had clinically exhibited bleeding, but only 32% of patients had clinically manifested pain. Comparatively, 56% and 52% of patients in the open laparoscopic group had clinically manifested bleeding and discomfort, respectively. The length of time it took to do the operation was between 45 and 80 min, with a 15-min variance amongst the laparoscopic and open groups. Also, there was a considerable reduction in blood loss in the laparoscopic group opposed to the open group [the median was 100 ml against 200 ml]. Laparoscopic patients spent considerably less time in the hospital than those in the open group [45.120  $\pm$  14.4 versus 59.52  $\pm$  20.92 h, respectively]. Last but not least, open groups experienced more intraoperative, early postoperative, and late postoperative problems than laparoscopic groups [4percent vs 8 % (intraoperative), 4% versus 16% (early post-operative), and 4% versus 20% (late post-operative) consecutively]. The variation, however, was not substantial statistically Tables 1–4.

Table 1. Patient demographics, and past history between studied groups.

	Laparoscopic hysterectomy	Open hysterectomy	test	P
Age/years	49.88 $\pm$ 3.83	48.87 $\pm$ 5.52	t = 0.149	0.882
Age group				
$\leq 50$	14 [56.0%]	15 [60.0%]	$\chi^2 = 0.082$	0.774
$> 50$	11 [44.0%]	10 [40.0%]		
Previous CS				
$< 3$	25 [100.0%]	18 [80.0%]	FET 8.140	0.01 <sup>a</sup>
$\geq 3$	0 [0.0%]	7 [20.0%]		
Surgery other than CS				
Negative	15 [60.0%]	9 [36.0%]	MC 3.722	0.151
Once	8 [32.0%]	10 [40.0%]		
Twice	2 [8.0%]	6 [24.0%]		

CS, cesarean section.

<sup>a</sup> Significant.

Table 2. Medical disorders, indications and clinical signs of hysterectomy amongst researched groups.

	Laparoscopic hysterectomy	Open hysterectomy	test	P
Medical disorders				
Negative	8 [32.0%]	6 [24.0%]	$\chi^2 = 0.397$	0.529
Positive	17 [68.0%]	19 [76.0%]		
DM	7 [28.0%]	7 [28.0%]	$\chi^2 < 0.001$	1.000
Hypertension	9 [36.0%]	8 [32.0%]	$\chi^2 = 0.089$	0.765
IHD	0 [0.0%]	2 [8.0%]	FET = 2.083	0.490
DVT	1 [4.0%]	1 [4.0%]	FET < 0.001	1.000
AF	0 [0.0%]	1 [4.0%]	FET = 1.020	1.000
Asthma	3 [12.0%]	1 [4.0%]	FET = 1.087	0.609
Viral hepatitis	1 [4.0%]	3 [12.0%]	FET = 1.087	0.609
Indications of hysterectomy				
Failed hormonal therapy	1 [4.0%]	4 [16.0%]	FET = 2.000	0.349
Endometrial hyperplasia	3 [12.0%]	0 [0.0%]		
Ovarian mass	4 [16.0%]	1 [4.0%]		
Adenomyosis	10 [40.0%]	8 [32.0%]		
Fibroid	7 [28.0%]	12 [48.0%]		
Clinical signs				
Bleeding	19 [76.0%]	14 [56.0%]	$\chi^2 = 2.228$	0.136
Pain	8 [32.0%]	13 [52%]	$\chi^2 = 2.053$	0.152

AF, Atrial fibrillation; DM, Diabetes mellitus; DVT, Deep venous thrombosis; IHD, Ischemic heart disease.

#### 4. Discussion

Both malignant and benign disorders can be treated by hysterectomy, making it one of the most often done operations in the field of gynaecology. Whether a hysterectomy should be performed vaginally, laparoscopically, or abdominally is still a matter of debate. Although most studies advocating the use of LH, AH rate still remains significantly higher than the LH rate despite of less complications, less discomfort, less blood loss, a brief hospital stay, quicker healing timeframes, and a quicker return to daily activities with LH contrasted to AH.<sup>5</sup>

Laparoscopic hysterectomy (LH) has been shown to be feasible and safe and has distinct advantages over AH as LH is considered practically better,<sup>6</sup> where, When contrasted to AH, LH speeds up recovery and decreases the length of time patients need to stay in the hospital following surgery by reducing complications including poor wound healing and infection.<sup>7</sup>

To compare the safety, effectiveness, and complications of LH and AH for benign conditions, we executed this comparative observational study, in which 50 cases were chose from those who attended the outpatient gynaecological clinic at Al-Azhar university hospitals (Al Hussein University Hospital, Al Sayed Galal Hospital).

Table 3. Operative details amongst researched groups.

	Laparoscopic hysterectomy N = 25	Open hysterectomy N = 25	test of significance	P value
Operative Time [minutes]				
Range	45–70	60–80		<0.001*
Median	55	70	Z = 5.300	
Blood loss (ml)				
Range	50_500	100_300	Z = 5.376	<0.001*
Median	100	200		
Length of hospital stay [hours]				
Mean ± SD	45.120 ± 14.4	59.52 ± 20.92	Z = 2.604	0.009*
Median	48	48		

The average ages of the LH and AH groups were (49.88 ± 3.83) (49.72 ± 3.75) respectively, in our research. The average age of patients in the LH group was 49 years old, whereas those in the open hysterectomy group were 52 years old, which was extremely close to the results of a previous research.<sup>8</sup>

Both laparoscopic and open hysterectomy for benign diseases were shown to be equally safe, effective, and complication-free regardless of patient age. This corresponds to the results of El Shakhs et al., who found no distinction in results between the 2 groups when controlling for demographic information. This agrees with the findings of Kaya C et al.<sup>8</sup> (who compared patients treated with abdominal and laparoscopic approaches) and Study,<sup>9</sup> which determined that there was no discernible age distinction among the 2 groups.

We found that hysterectomy method was substantially associated to parity and prior CS in a gynaecological context ( $P = 0.01$ ). The hysterectomy's planned path, however, is unaffected by the presence or absence of any prior surgical interventions.

This is because, according to the scientific literature, pelvic surgery can alter normal anatomy through effacement of the operative planes, making movement and posture more difficult. Adhesions that occur amongst the bladder and uterus hamper dissection during bladder mobilisation in CS. Surgeons frequently avoid conducting vaginal and laparoscopic hysterectomies in instances involving a history of CS due to the higher likelihood of complications.<sup>10</sup>

A recent prospective case control research produced results that varied from ours; in this investigation, patients were placed into 3 groups with twenty-five women in each group for either technique of hysterectomy depending on the gynaecological lesion that suggested the surgical treatment. The study included 75 women who presented with benign disease of the uterus and failed medical management at the Obstetrics and Gynecology Department, Al-Azhar University Hospitals. Results revealed no substantial variances amongst the abdominal and laparoscopic groups with respect to parity, prior CS, or prior pelvic operations.<sup>11</sup>

According to our findings, the method of hysterectomy is unaffected by medical conditions such as diabetes, hypertension, ischemic heart disease, deep vein thrombosis, atrial fibrillation, asthma, and viral hepatitis.

Our findings were consistent with those of He et al.,<sup>12</sup> who also found that the existence of medical comorbidities did not alter the outcomes for either group.

Although immobility is a hazard factor for DVT and brief hospitalisation has been regarded as advantageous in avoiding PE, the findings of earlier research have shown that patients with DVT would be better off undergoing LH.<sup>13</sup> The reduced incidence of DVT among the LH group may be attributable to the much shorter length of hospitalisation experienced by that cohort.<sup>14</sup>

In our study, adenomyosis was the leading cause of surgery in the LH group (40 %), while fibroid was the leading cause of surgery in the OH group (48 %). According to our findings, Nagata, H et al. found that fibroids were the leading cause of a high LH and AH level (38.1%) compared to other potential explanations (endometrial polyp, endometrial hyperplasia, cervical dysplasia).<sup>15</sup>

When comparing individuals with different hysterectomy routes, there was no substantial change in their clinical symptoms.

As for the operating time, the AH group (longer duration) considerably outpaced the LH group; the median operative time for the AH group was 70 min, whereas it was just 55 min for the LH group (shorter time). This agrees with what has been discovered in Sesti et al.,<sup>16</sup> who showed that the time required for LH was less (125 ± 6 min) than

Table 4. Complications among studied groups.

	Laparoscopic hysterectomy	Open hysterectomy	Test	P
Intraoperative complications	1 [4.0%]	2 [8.0%]	FET = 0.355	0.49
Early postoperative complications	1 [4.0%]	4 [16.0%]	FET = 2.000	0.35
Late postoperative complications	1 [4.0%]	5 [20.0%]	FET = 3.030	0.070



that required for AH ( $133 \pm 7$  min). Also, both Hawe and Garry (2001) and Garry and Hercz (2001) indicated that their first experience was better in LH, with an average operative time of  $84.3 \pm 22$  min as opposed to AH, which averaged  $102 \pm 30$ ,  $93 \pm 63$  min.<sup>17</sup>

In comparison to our findings, Ali *et al.*<sup>11</sup> found that the operative time was considerably prolonged in the LH group contrasted to the AH and VH ( $110.67 \pm 35.6$  min vs.  $69.3 \pm 27.9$  min and  $58.9 \pm 15.2$  min), that they blamed on the reality that this approach requires a longer period of time to get acceptance and acquire better expertise in surgical trainings.

Moreover, Billfeldt *et al.* showed that LH took (127 min) contrasted to (97 min) for AH, and Yue *et al.*,<sup>18</sup> confirmed findings that contradicted ours, reporting that LH required greater operating time than AH ( $113.81 \pm 5.14$  min) vs. ( $103.15 \pm 5.45$ ).<sup>19</sup>

Contrary to the findings published by Van Evert *et al.*,<sup>20</sup> who found no substantial distinction in OT among the 2 groups, we find a different picture. Similar findings were reported by He *et al.*,<sup>12</sup> who found no substantial variance in OT amongst the LH and AH groups ( $106.5 \pm 34.5$  vs.  $106.2 \pm 40.3$  min).

When contrast to the laparoscopic hysterectomy group, the open hysterectomy group saw much more blood loss, with the AH group seeing about twice as much blood loss as the LH group (200 ml. versus 100 ml).

Our findings are consistent with many other research findings indicating that the approximate blood loss in LH was substantially lower than in AH, such as Hwang *et al.*,<sup>21</sup> who discovered that the mean estimated blood loss in LH versus AH was ( $156 \pm 104.2$  ml vs.  $268 \pm 136$  ml), ( $293 \pm 182$  ml vs.  $343 \pm 218$  ml), ( $152 \pm 103.4$  ml vs.  $294.8 \pm 155.5$  ml), ( $351.6 \pm 55$  ml vs.  $474.8 \pm 43$  ml) respectively, and Ali *et al.* who reported the blood loss in LH group ( $342 \pm 123.14$  ml) was substantially lower than AH group ( $435 \pm 217.5$  ml).

He *et al.* informed comparable outcomes to ours, stating that the LH group lost less blood than the AH group.<sup>12</sup>

Fathy M *et al.*,<sup>22</sup> claimed to have obtained contradictory results by finding no substantial distinction in blood loss between the LH group and the AH group.

Blood loss was not statistically distinct among the 2 groups, as reported by Van Evert *et al.*<sup>20</sup>

The mean postoperative hospital stay for cases undergoing either LH or AH was  $45.120 \pm 14.4$  h in the LH group and  $59.52$   $20.92$  h in the AH group; this is a substantial distinction among the two groups. In

line with the results of Ali *et al.*, who uncovered that patients with LH had considerably shorter hospital stays ( $2.1 \pm 2.1$  days) than those with AH ( $5.1 \pm 3.9$  days), this finding supports the need of identifying and treating AH as soon as possible. Consistent with the results of Zhang *et al.*<sup>23</sup> and Sesti *et al.*,<sup>16</sup> we find that the median hospitalisation duration following LH was shorter than that following AH ( $2.1 \pm 0.3$  days vs.  $3.4 \pm 0.7$  days), ( $2.4 \pm 1.2$  days vs.  $5.6 \pm 2$  days), and ( $2.4$   $0.16$  days vs.  $3.9$   $0.27$  days).

Zhu *et al.*<sup>24</sup> recognised that the LH group had a shorter postoperative hospital stay ( $3.5 \pm 0.8$  days) than the AH group ( $6.15 \pm 0.49$  days) and our findings corroborate this.

Because of the smaller incision and reduced postoperative discomfort, patients who have LH often are able to walk around the hospital sooner than those who undergo AH; this is one of the many benefits of the laparoscopic technique as opposed to the open one.<sup>11</sup>

While open hysterectomy had a relatively low rate of intraoperative problems (8%), the AH group had a higher rate of both early and late postoperative difficulties (16 % and 20 %, respectively). On the other hand, no substantial distinction in overall sequelae was seen among the 2 groups.

Consistent with these findings are those reported by Ali *et al.*<sup>11</sup> who found no substantial distinctions among the abdominal and laparoscopic groups in terms of the incidence of serious surgical problems; in the LH group, only 1 case was converted to open hysterectomy (3.5 %), and this was because of the difficulty of the laparoscopic approach caused by a large posterior wall fibroid that prevented inversion of the uterine horns.

The findings are consistent with those of the FINHYST project, a prospective cohort study of women who had hysterectomy for benign causes in 2006 and were recruited from 53 hospitals across Finland. Major problems were similar across methods.<sup>25</sup>

In contrast to our findings, the assess study compared LH with AH and LH with VH in two separate but parallel arms of the trial. According to research by Garry *et al.*<sup>26</sup> (11.1% vs. 6.2%,  $P = 0.02$ ), LH is linked to a greater risk of serious problems.

Our findings suggest that LH, as a minimally invasive gynaecological technique, is superior to AH, particularly for patients of advanced age, since estimated blood loss was much lower in LH contrast to AH and LH was also linked to shorter operational time and hospital stay. When compared to the traditional AH, the recovery time and number of problems following a laparoscopic procedure are

considerably lower. Nonetheless, the skill and knowledge of an experienced surgeon is essential for this procedure.

#### 4.1. Conclusion

The current results demonstrated that the laparoscopic hysterectomy can be used as a preferable alternative to open abdominal hysterectomy. AS laparoscopic hysterectomy have less intraoperative blood loss, shorter hospital stay, and faster post-operative recovery. Therefore, laparoscopic hysterectomy is more beneficial than abdominal hysterectomy in benign gynecologic surgeries.

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#### Conflicts of interest

The authors declared that there were NO conflicts of Interest.

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