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# Surgical Approach to Hysterectomy for Benign Gynecological Diseases

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## ABSTRACT

**Background:** Hysterectomy is one of the most commonly performed surgeries worldwide. Indication for hysterectomy is most often benign, which includes conditions such as prolapse, abnormal uterine bleeding, fibroids and pelvic pain. Hysterectomy can be performed vaginally, abdominally or laparoscopically.

**Objective:** The aim of work was to determine the frequency of use, evaluate and compare the most appropriate surgical method and assess the effectiveness and safety of the three approaches for hysterectomy: Abdominal hysterectomy (AH), vaginal hysterectomy (VH) and laparoscopic hysterectomy (LH) for women with benign gynecological conditions.

**Patients and Methods:** This Prospective case control study was conducted on 75 women with benign disease of uterus with failed medical management or not amenable to medical management attending at Obstetrics and Gynecology Department, Al-Azhar University Hospitals. Patients were divided into three groups (25 cases each) for either technique of hysterectomy depending on the gynecological lesion that indicated the surgical procedure.

**Results:** In the present study there was no statistically significant difference between the abdominal and laparoscopic groups as regard patients age, parity, BMI, previous CS, and previous pelvic surgeries. In our study fibroid represented the most common indication for abdominal hysterectomy (40%), vaginal hysterectomy (36 %) and Laparoscopic hysterectomy (48%).

**Conclusion:** It could be concluded that laparoscopic hysterectomy has minimally invasive and is related to a low intra and postoperative complication rate, and even when there is a history of abdomino-pelvic surgery.

**Keywords:** Abdominal hysterectomy, laparoscopic hysterectomy, vaginal hysterectomy.

## INTRODUCTION

Hysterectomy is one of the most commonly performed surgeries worldwide. Indication for hysterectomy is most often benign, which includes conditions such as prolapse, abnormal uterine bleeding, fibroids and pelvic pain. Hysterectomy can be performed vaginally, abdominally or laparoscopically. Hysterectomy can also be performed by combining two of these three routes, such as in laparoscopically assisted vaginal hysterectomy or laparoscopic hysterectomy combined with a mini-laparotomy to remove the uterine specimen from the peritoneal cavity [(1)].

Based on the patient's problem, in addition to the uterus, removal of the fallopian tubes, ovaries, or cervix may be necessary [(2)].

Selection of the route of hysterectomy for benign causes can be influenced by the size and shape of the vagina and uterus; accessibility to the uterus; extent of extrauterine disease; the need for concurrent procedures; surgeon training and experience; average case volume; available hospital technology, devices, and support; whether the case is emergent or scheduled; and preference of the informed patient. [(3)].

Minimally invasive approaches to hysterectomy should be performed, whenever feasible, based on their well-documented advantages over abdominal hysterectomy. The vaginal approach is preferred among the minimally invasive approaches. Laparoscopic hysterectomy is a preferable alternative to open abdominal hysterectomy for those patients in whom a vaginal hysterectomy is not indicated or feasible. Although minimally invasive approaches to hysterectomy are the preferred route, open abdominal hysterectomy remains an important surgical option for some patients. The obstetrician-gynecologist should discuss the options with patients and make clear recommendations on which route of hysterectomy will maximize benefits and minimize risks given the specific clinical situation. The relative advantages and disadvantages of the approaches to hysterectomy should be discussed in the context of the patient's values and preferences, and the patient and health care provider should together determine the best course of action after this discussion [(3)].

All evidence suggests that the vaginal route is the safest, most cost-effective approach to hysterectomy, affording rapid recovery, yet the majority of hysterectomies are still performed by the abdominal route[(3)].

Surgical planning is a complex process, which requires an in depth and informed conversation between a patient and her physician. Patient preferences, surgeon skill and indication for surgery all should be taken into consideration when determining the most appropriate surgical approach.

Hysterectomy has been associated with improvements in physical and mental quality-of-life measures, body image, and aspects of sexual activity, with few differences among surgical routes [(1)].



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The main aim of this thesis was to determine the frequency of use, evaluate and compare the most appropriate surgical method and assess the effectiveness and safety of the three Approaches for hysterectomy: Abdominal hysterectomy (AH), vaginal hysterectomy (VH) and laparoscopic hysterectomy (LH) for women with benign gynecological conditions.

## PATIENTS AND METHODS

This prospective case control study included a total of 75 women with benign disease of uterus with failed medical management or not amenable to medical management, attending at Obstetrics and Gynecology Department, Al-Azhar University Hospitals. This study was conducted between march 2019 to September 2019.

**Ethical Consideration:**

**Approval of the ethical committee was obtained. Study protocol was approved by Institution Research Board (IRB), Faculty of Medicine, Al-Azhar University, Cairo.** Informed verbal and written consent were obtained from each participant sharing in the study.

The included subjects were divided into three groups; 25 cases each, for either technique of hysterectomy depending on the gynecological lesion that indicated the surgical procedure.

For each patient, Patients original files and surgery reports of the LHs, VHs and AHs were analyzed prospectively for the indication of surgery, patients' age, weight, parity, time for surgery, blood loss, surgical difficulty, intra-operative complications, post-operative need of analgesics, total hospital stay, adverse events, satisfaction rate and recuperation time, complications and so on were recorded, analyzed and compared.

**Inclusion criteria:** All women with benign gynecological disorders either with failed medical management or not amenable to medical management were qualifying for hysterectomy and included in the study. The participants were perimenopausal and postmenopausal women aged 40 to 50 years who had benign gynecological disease required surgical intervention.

***Exclusion criteria***: Women with Benign disease of uterus with availability of medical management. Women with malignancies were excluded from the study, even when diagnosed during or after the study procedure. Women with medical disorder that would interfere with the decision to perform a certain method of hysterectomy such as cardiac lesions.

**Statistical Analysis**

The collected data were organized, tabulated and statistically analyzed using both Microsoft office excel 2016 (Microsoft®; USA) and statistical package for social sciences(SPSSs) version 20, running on IBM-compatible computer. For numerical data, mean and standard deviation and sometimes minimum and maximum were calculated; while relative frequency and percent distribution were calculated for categorical data. One-way analysis of variance and Chi square ($X^2$) were used for comparison between groups for numerical and qualitative data respectively. P value < 0.05 was considered statistically significant.

## RESULTS

**Table (1):** Comparison between study groups as regard the mean of baseline parameters/characteristics.

| Variable | **AH (n= 25)** | **VH (n= 25)** | **LH (n= 25)** | **P-value** |
|---|---|---|---|---|
| **Age (years)** | 47± 3 | 48 ± 6 | 46 ± 5 | 0.523 |
| **Weight (kg)** | 64 ± 5.1 | 70 ± 2.4 | 68 ± 7.6 | 0.230 |
| **BMI (kg/m$^2$)** | 23.7± 1.83 | 25.8± 1.73 | 24.8 ± 1.91 | 0.917 |
| - Data is presented as mean ± standard deviation or frequency (percentage). A two-sided **P- value** of less than 0.05 was considered statistically significant.<br>-**BMI** :Body Mass Index | | | | |

As shown in table (1), the maternal age at surgery, weight, BMI and parity did not differ significantly between study groups**.**

**Table (2):** Comparison between study groups as regard the past obstetric history

| Variable | **AH (n= 25)** | **VH (n= 25)** | **LH (n= 25)** | **P-value** |
|---|---|---|---|---|
| **Parity** | 3.0 ± 1.4 | 2.7 ± 1.2 | 2.9± 1.6 | 0.164 |
| **Previous cesarean section** | 3.6 ± 1.3 | 2.5 ± 1.4 | 3.0 ± 1.1 | 0.152 |

As shown in table (2), there was no statistical significant difference between the study groups as regard parity and previous cesarean section (p value > 0.05).

**Table (3):** Past surgical history of study groups:

| | | AH (n= 25) | | VH (n= 25) | | LH(n= 25 ) | | |
|---|---|---|---|---|---|---|---|---|
| **Variable** | | **N** | **%** | **N** | **%** | **N** | **%** | **p-value** |
| **Previous surgery** | - | 24 | 96% | 22 | 88 % | 23 | 92 % | 1.000 |
| | + | 1 | 4% | 3 | 12 % | 2 | 8 % | |
| **Previous surgery (Details)** | **Nil** | **24** | | **22** | | **23** | | 1.000 |
| | **Appendectomy** | 0 | 0.0% | 1 | 4% | 1 | 4% | |
| | **Appendectomy and laparoscopic cholecystectomy** | 0 | 0.0% | 0 | 0.0% | 1 | 4% | |
| | **Cholecystectomy** | 1 | 4 % | 1 | 4% | 0 | 0.0% | |
| | **Myomectomy** | 0 | 0.0% | 1 | 4% | 0 | 0.0% | |

* (-): Nil – (+): Positive. As shown in table (3), there was no statistical significant difference between the study groups as regard past surgical history **(**p value > 0.05).

**Table (4):** Past medical history among studied cases:

| | | AH (n= 25) | | VH (n= 25) | | LH (n= 25) | | p-value |
|---|---|---|---|---|---|---|---|---|
| **Variable** | | **N** | **%** | **N** | **%** | **N** | **%** | |
| **DM** | - | 19 | 76% | 21 | 84% | 23 | 92% | 1.000 |
| | + | 6 | 14% | 4 | 12% | 2 | 8% | |
| **Hypertension** | - | 16 | 64% | 18 | 72% | 15 | 60% | 0.479 |
| | + | 9 | 36% | 7 | 28% | 10 | 40% | |
| **IHD** | - | 24 | 96% | 24 | 96% | 23 | 92% | 1.000 |
| | + | 1 | 4% | 1 | 4% | 2 | 8% | |
| **AF** | - | 25 | 100% | 25 | 100% | 24 | 96% | 1.000 |
| | + | 0 | 0% | 0 | 0% | 1 | 4% | |
| **DVT** | - | 25 | 100% | 24 | 96% | 25 | 100% | 1.000 |
| | + | 0 | 0% | 1 | 4% | 0 | 0% | |
| **HCV** | - | 25 | 100% | 23 | 92% | 24 | 96% | 1.000 |
| | + | 0 | 0% | 2 | 8% | 1 | 4% | |

* IHD: Ischemic Heart Disease – AF: Atrial Fibrillation – DVT: Deep Venous thrombosis – HCV: Hepatitis C Virus
* (-): Nil – (+): Positive.

**Table (5):** Comparison between study groups as regard Indications for surgery:

| **Variable** | **AH (n= 25)** | | **VH (n= 25)** | | **LH (n= 25)** | | **P-value*** |
|---|---|---|---|---|---|---|---|
| | **N** | **%** | **N** | **%** | **N** | **%** | |
| **Fibroid** | 10 | (40%) | 9 | (36%) | 12 | (48%) | |
| **Endometrial hyperplasia** | 6 | (24%) | 5 | (20%) | 5 | (20%) | |
| **Dysfunctional uterine bleeding** | 5 | (20%) | 4 | (16%) | 5 | (20%) | |
| **Uterine prolapse** | 0 | (0%) | 3 | (12%) | 2 | (8%) | |
| **Endometriosis** | 3 | (12%) | 2 | (8%) | 0 | (0%) | **0.235** |
| **Adenomyosis** | 1 | (4%) | 2 | (8%) | 1 | (4%) | |
| *Fisher's exact test. | | | | | | | |

As shown in table (5), there was no statistical significant difference between the study groups as regard Indications for hysterectomy (p value > 0.05)**.**

**Table (6):** Comparison between study groups as regard operative details:

| | AH (n= 25) | | VH (n= 25) | | LH (n= 25) | | 95% CI | P-value |
|---|---|---|---|---|---|---|---|---|
| **Variable** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | | |
| **Total operative time (min)** | 69.3 | 27.9 | 58.9 | 15.2 | 110.5 | 35.6 | -35.6 to -3.2 | **0.002 (HS)** |
| **Suturing time (min)** | 6.3 | 3.5 | 5.0 | 2.1 | 9.2 | 4.5 | -6.8 to -1.7 | **0.034 (S)** |
| **Uterine weight (g)** | 155.5 | 42.5 | 147.4 | 42.1 | 149.1 | 43.2 | -37.9 to 50.6 | **0.234 (NS)** |

As shown in table (6), total operative time (min), study groups differed significantly where group 1(AH) subjects/women had a mean of (69.3) against (58.9) for group 2 (VH) subjects/women and (110.5) for group 3 (LH). Also group 3 (LH) subjects/women had a higher time (9.2) as regards the suturing time (min) than other two group (6.3) for (AH) and (5.0) for VH which was highly statistically significant (p < 0.0001).

**Table (7):** Comparison between study groups as regard Postoperative pain:

| Variable | AH (n= 25) | | VH (n= 25) | | LH (n= 25) | | P-value |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | 0.004 |
| VAS * score | 5.3 | 1.2 | 4.5 | 1.3 | 3.8 | 1.5 | (HS) |

* **VAS**: visual analogue scale

As shown in table (7), VAS score in the (**LH**) group was statistically less than the (**VH)** group and (**AH)** group with P value (0. 004).

**Table (8):** Comparison between study groups as regard postoperative use of analgesics:

| Variable | AH (n= 25) | | VH (n= 25) | | LH (n= 25) | | $x^{2*}$ | P-value |
|---|---|---|---|---|---|---|---|---|
| Time to first analgesic request (h) | 1 (1 – 2) | | 1 (1 – 2) | | 2 (2 – 2) | | 220.5* | <0.001 HS |
| Parenteral Diclofenac Consumption: | N | % | N | % | N | % | | |
| - *Only 1 dose(75mg)* | 20 | 80% | 15 | 60% | 5 | 20% | | <0.001 |
| - *2 doses( 150mg)* | 25 | 100% | 23 | 92% | 7 | 28% | 37.297* | HS |

*chi-square test data are presented as number (%). As shown in table (8), there was highly statistically significant value between study groups as regard postoperative use of analgesics with lower statistical results for time to first request and doses for analgesics in (LH) group than AH and (VH) groups .

**Table (9):** Comparison between study groups as regard blood loss and transfusion requirement:

| Variable | AH (n= 25) | VH (n= 25) | LH (n= 25) | P-value |
|---|---|---|---|---|
| Blood loss (ml) | 435 ±217.5 | 429±129.3 | 342 ±123.14 | 0.041 (S) |
| Preoperative hemoglobin (g/dl) | 11.61±1.42 | 11.67 ±1.31 | 11.59±1.25 | 0.915 (NS) |
| Postoperative hemoglobin(g/dl) | 10.07 ±1.50 | 10.34 ±1.50 | 10.55 ±1.50 | 0.213(NS) |
| Drop in hemoglobin (g/dl) | 1.56 ±0.86 | 1.37±0.54 | 1.12 ±0.61 | 0.025 (S) |
| Patients received Blood transfusion | 4 (16 %) | 2 (8 %) | 1 (4 %) | 0.021(S) |

As shown in table (9), As regards Blood loss (ml) during surgery, study groups differed significantly where ( LH) group had a lower amount for blood loss with a mean 342 ±123.14 *vs.* 429±129.3 for (AH) and 429±129.3 for (VH) groups. Also ( LH) group had a lower percentage for Patients who received Blood transfusion in comparison with (AH) and (VH) groups.

**Table (10):** Comparison between study groups as regard postoperative hospital stay:

| Variable | AH (n= 25) | VH (n= 25) | LH (n= 25) | $x^{2*}$ | P-value |
|---|---|---|---|---|---|
| Postoperative hospital length of stay (days) | 5.1±3.9 | 3.3±2.6 | 2.1±2.1 | 90.0* | <0.001 (S) |

As shown in table (10), There was statistically significant difference between the study groups as regard postoperative hospital length of stay with lower time of stay in (LH) group.

**Table (11):** Operative major Complications.

| Variable | AH (n= 25) | | VH (n= 25) | | LH (n= 25) | | P-value |
|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | |
| Hemorrhage | 4 | 16% | 2 | 8% | 1 | 4% | 1.000* NS |
| Bladder injury | 1 | 4% | 0 | 0% | 0 | 0% | 1.000* NS |
| Ureteric injury | 1 | 4% | 0 | 0% | 0 | 0% | 1.000*NS |
| Bowel injury | 0 | - | 0 | - | 0 | - | |
| Conversion to laparotomy | N/A | - | N/A | - | 1 | 0% | N/A |

*Exact probability estimated with Fisher's exact test, Data are expressed as numbers (%), NS: Non Significant, N/A: Not Applicable

As shown in table (11), There was no statistical significant difference between the study groups as regard Operative major Complication (p value > 0.05)**.**

**Table (12):** Comparison between study groups as regard minor postoperative complications:

| Variable | AH (n= 25) | | VH (n= 25) | | LH (n= 25) | | p-value |
|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | |
| **Fever** | 5 | 20 % | 3 | 12 % | 2 | 8 % | 0.654 (NS) |
| **Urinary tract infection** | 3 | 12 % | 1 | 4 % | 0 | 0 % | 0.600 (NS) |
| **Cervical mass** | 0 | 0 % | 1 | 4 % | 0 | 0 % | 1.000 (NS) |
| **Paralytic ileus** | 2 | 8% | 0 | 0% | 0 | 0% | 0.492 (NS) |
| **Wound infection** | 5 | 20% | 2 | 8% | 0 | 0% | 0.237 (NS) |

As shown in table (12), There was no statistical significant difference between the study groups as regard minor postoperative complications (p value > 0.05).

## DISCUSSION

Hysterectomy, the most common major surgical procedure for gynecological conditions, is used for both malignant diseases and benign conditions such as fibroids, endometrial hyperplasia, adenomyosis, endometriosis, uterine prolapse, dysfunctional uterine bleeding, and cervical intraepithelial neoplasia [(4)].

Extensive studies have been performed to compare different hysterectomies. A comprehensive and systematic review compared AH and VH with laparoscopic hysterectomy and assessed their potential beneficial and adverse effects in women with benign gynecological conditions. Compared with AH, the beneficial effects of VH included shorter time to normal activities, fewer febrile episodes or unspecified infections, shorter duration of hospital stay, lower intraoperative blood loss, and fewer wound or abdominal wall infections. In addition, fewer febrile episodes or unspecified infection and shorter operation time were noticed in Laparoscopically assisted vaginal hysterectomy (LAVH) procedures compared with Total Laparoscopic Hysterectomy (TLH) procedures [(5)].

LAVH is also preferred in patients with a mass in the lower segment or a relatively large uterus [(6)].

Operation time and bleeding are increased in TLH as compared with LAVH. TLH is associated with greater safety, efficacy, and improvement in the patient quality of life compared to total AH in women with benign gynecological diseases [(7)].

TLH has been regard as a more cost-effective procedure, and has several advantages over total AH, such as smaller incision, less postoperative pain, shorter hospital stay, faster recovery time and less serious complications [(7)].

This study was designed to determine the frequency of use, evaluate and compare the most appropriate surgical method and assess the effectiveness and safety of the three Approaches for hysterectomy: Abdominal hysterectomy (AH), vaginal hysterectomy (VH) and laparoscopic hysterectomy (LH) for women with benign gynecological conditions.

The study conducted on 75 women with benign disease of uterus with failed medical management or not amenable to medical management and divided into three groups (25 cases each) for either technique of hysterectomy depending on the gynecological lesion that indicate the surgical procedure.

In the present study there was no statistically significant difference between the abdominal and laparoscopic groups as regard patients age, parity, BMI, previous CS, and previous pelvic surgeries.

In the present study fibroid represented the most common indication for abdominal hysterectomy (40%), vaginal hysterectomy (36 %) and Laparoscopic hysterectomy (48%).

In agreement to **Devendra and Tay [(8)]; Kulvanitchaiyanunt [(9)]** who found that fibroid uterus was the commonest indication of LAVH. Also, **Broder *et al***, the most common indications for hysterectomy were leiomyomata (60% of hysterectomies), pelvic relaxation (11%), pain (9%), and bleeding (8%) [(10)].

In our study operative time was significantly longer in the LADH group compared to the AH and VH (110.67± 35.6 min vs. 69.3±27.9 min and 58.9±15.2 min) because this technique needs more time to gain acceptance and more skill for surgical trainings.

These results agree with **Yue *et al.*** [(11)] who found that LAVH took longer operative time than abdominal hysterectomy (113.81 ± 5.14 min.) vs. (103.15 ± 5.45), as well **Jaturasrivilai et al.** [(12)] who found that LAVH took (115.9 ± 40.8 min.) vs. (68.2 ± 14.2 min) for abdominal hysterectomy. This was also consistent with ***Kulvanitchaiyanunt*** [(9)] who found

that LAVH took (147.11 ± 19.82 min) vs.( 94.90 ± 7.76 min.) for abdominal hysterectomy.

Many other studies supported that laparoscopic hysterectomy takes longer operative time than abdominal hysterectomy like **Ottosen *et al.*** [13]; **Atabekoglu *et al.*** [14] who found that laparoscopic hysterectomy took (102 ± 31min., 85.3 ±13.5min., 105.5 ±23min.) **vs. (**68 ± 23min., 57.5 ± 12.5min).

In contrast to our study **Sesti *et al.*** [15] found that LAVH took shorter time (125± 6 min.) vs. (133 ±7min.) for abdominal hysterectomy.

**Hawe and Garry** [16]**; Garry and Hercz** [17] reported their initial experience in laparoscopic hysterectomy( LH) that the mean operative time was 84.3± 22, 102 ± 30, 93± 63 minutes respectively.

In the current study blood loss in laparoscopic hysterectomy group (342 ±123.14 ml) was significantly lower than abdominal group (435 ±217.5ml) and VH (429±129.3ml).

Our results agree with many studies that found that the estimated blood loss was significantly lower in LAVH compared to TAH like **Hwang and colleagues** [18]**; Atabekoglu et al.** [14]**; Sesti et al.** [15] who found that the mean estimated blood loss in LAVH versus TAH was (156 ± 104.2ml vs**.** 268 ± 136ml), (293 ± 182ml vs. 343 ± 218ml), (152± 103.4ml vs. 294.8± 155.5ml),( 351.6± 55 ml vs. 474.8± 43 ml) respectively.

This was in contrast to the study by **Lowell and Kessler** [19], in which LAVH had more estimated blood loss than TAH this was attributed to the non-selection of specific criteria for cases for LAVH, they did not exclude large myomatus uteri reaching 500 gram while in our study we were limited to uterine sizes not more than 14 weeks.

In the current study postoperative hemoglobin drop was significantly lower in LH group (1.12 ±0.61g/dl) compared to AH group (1.56 ±0.86 g/dl) and VH group (1.37±0.54 g/dl).

This was also consistent with a study performed by **Seracchioli et al.** [20], who found that the mean drop in the postoperative hemoglobin was (1.8 ± 1.1 g/dl) for LAVH group vs. (2.3 ±1.8 g/dl) for abdominal group**.**

In the present study postoperative pain score was significantly lower the laparoscopic hysterectomy group compared to AH and VH groups. The mean of visual analogue scale (VAS) postoperatively was (3.8±1.5) for laparoscopic hysterectomy compared to (**5.3**±1.2) for abdominal hysterectomy and (4.5± 1.3) for vaginal hysterectomy.

These results agreed with **Marana *et al.*** [21]; **Zhu *et al.*** [22] who found that postoperative pain score in the first day for laparoscopic vs. abdominal group was (5.2± 2.6 vs. 6.3 ± 1.6), (5.2± 2.3 vs. 6.6± 1.9), (2.47 ± 2.17 vs. 4.6 ± 1.69) respectively.

Our study found that significantly lower analgesics doses were required postoperatively in the LH group than AH and VH groups. In the laparoscopic group only 28% of patients needed 2 doses of parenteral diclofenac (150 mg) in the first post-operative day while 80 % of patients needed only one dose of parenteral diclofenac (75mg), while in the abdominal group all patients (100%) needed two doses (150 mg) of parenteral diclofenac in the first post-operative day. This difference was highly significant. Moreover, the time interval of the first analgesic request from the patient post operatively was significantly longer in laparoscopic group vs. abdominal and vaginal groups 2 hours (inter quartile range :2-2) vs. 1 hour with (inter quartile range:1-2) respectively.

This result was supported by **Jaturasrivilai *et al.*** who found that diclofenac required in the LAVH group was 135.0 ± 67.5 mg vs. 300.0 ± 75.0 mg for TAH. The less postoperative pain in LAVH is simply because LAVH demands a smaller incision than TAH [12].

In the current study postoperative hospital stay was significantly shorter in patients with laparoscopic hysterectomy (2.1±2.1 day) while patients with abdominal and vaginal hysterectomy stay longer time in the hospital (5.1±3.9 day and 3.3±2.6 day respectively). This might be attributed to early ambulation associated with laparoscopic hysterectomy due to the small incision and the less postoperative pain and therefore short hospital stay which is considered one of the valuable advantages of laparoscopic approach over laparotomy.

These results match with **Zhang et al.** [23] and **Sesti et al.** [15]**,** who found that postoperative hospital stay after laparoscopic hysterectomy in comparison to abdominal hysterectomy was (2.1 ± 0.3 days vs. 3.4±0.7 days), (2.4 ±1.2 days vs. 5.6 ± 2 days), (2.4 ±0.16 days vs. 3.9±0.27 days) respectively. Our results also agree with **Zhu and colleagues** [22], who found that postoperative hospital stay was 3.5 ± 0.8 days for LAVH vs. 6.15 ± 0.49 days for abdominal hysterectomy.

In the current study as regard the major operative complications in LADH group, there was one case converted to laparotomy (3.3%) due to difficulty of the laparoscopic technique due to large posterior wall fibroid precluded inversion of the fundus through the anterior colpotomy.

**Hawe and colleagues** performed 36 cases of LADH there were no major complications, or conversions to laparotomy however **Hawe and colleagues** [16] on a retrospective study over three hundred women who had a LADH five cases (1.6%) converted to laparotomy over the study period due to difficulties with the laparoscopic technique.

In LH group there were no cases of urinary tract injuries reported. This was attributed to transperitoneal exploration of the ureters before clamping every pedicle moreover, the ureters were not threatened during the laparoscopic dissection as they lie inferior to the uterine artery and the bladder and ureters were removed from the operative field by retraction during the vaginal aspect of the operation. Clamping of the uterine arteries under direct vision before the uterosacral–cardinal complex made ureteric injury less likely.

**Hawe et al.** [16] found that there were four cases (1.3%) of cystotomy, three of which were associated with previous caesarean section. All were injured in the vaginal phase of the procedure, and three were managed laparoscopically, there were no ureteric injuries.

In our study, in the AH group there was one case (4%) complicated by ureteric injury in the form of ureteric transection during clamping of Mackenrodt‘s ligament as a result of severe adhesion found in a patient with history of previous 2 caesarian deliveries, after which was managed by uretero-neocystostomy.

In the present study four case in AH group was complicated by intraoperative hemorrhage requiring blood transfusion (16%). This was due to slipped right uterine artery ligature which was managed by ligating the uterine artery as well as ligating the internal iliac artery after which the bleeding was controlled but the patient received blood transfusion intraoperatively.

In the present study no incidence of bowel injuries was recorded neither in the laparoscopic nor the abdominal group.

Our study concluded that there were no statistically significant differences between abdominal, vaginal and laparoscopic groups as regard the incidence of major operative complications.

These results agree with **FINHYST** which is a prospective cohort study undergoing hysterectomy for benign indications during 2006, drawn from 53 hospitals in Finland. There were no significant differences in major complications between approaches (4.0% in abdominal hysterectomy, 4.3% in laparoscopic hysterectomy) [24].

However the EVALUATE trial that consists of two parallel randomized trials; the first arm comparing laparoscopic with abdominal and the second arm comparing laparoscopic with vaginal ***Garry et al.*** [25] showed that laparoscopic hysterectomy was associated with a higher rate of major complications than abdominal hysterectomy (11.1% versus 6.2%, P=0.02).

As regard minor postoperative complications in our study, AH group represented 5 febrile cases of (20%), three cases of UTI (12%), five cases of surgical site wound infections (20%) managed by secondary sutures while in LH group there was 2 febrile cases with ( 8 %) with no wound complications recorded.

These results were supported by the recently updated Cochrane review of 34 randomized trials where laparoscopic hysterectomy led to significantly fewer wound infections and febrile episodes, but in contrast to our results, to more urinary tract injuries [5,26].

## CONCLUSION

This Study shows that laparoscopic hysterectomy has minimally invasive and is related to a low intra and postoperative complication rate, and even when there is a history of abdomino-pelvic surgery. Laparoscopic surgeries result in a faster recovery time and lesser hospital stay and minimal pain and complications compared to abdominal and even vaginal hysterectomy. However, this type of a surgery requires surgeon’s experience and expertise.

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