Laparoscopic Hysterectomy Versus Abdominal Hysterectomy of Enlarged Uterus

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Abstract

This prospective interventional study conducted in Cytogenetic & Endoscopic Unit, Obstetrics and Gynecology Department, Faculty of Medicine, Ain shams University. The study included 120 patients divided to 60 patient conducted total laparoscopic hysterectomies and 60 patients conduct total abdominal hysterectomy as standard method. Full history taking, gynecologic examination and ultrasound examination were done to all patients. The most common indication among our patients was fibroid uterus while adenomyosis came second. All operations were performed by the same surgeons and using the same technique.

We observe BMI is not considering as obstacle in laparoscopic group with advancement of anesthesia and sealing system. The mean operating time was slightly but not significantly lower in laparoscopic hysterectomy with highly significant difference in the estimated blood loss in favor of laparoscopic group. The total incidence of intra-operative and postoperative complication of patient submitted to laparoscopic hysterectomy lower than conventional hysterectomy group but not statically significantly. There was significant difference in pain scoring, earlier bowel movement and hospital stay in the arm of laparoscopic group. The total laparoscopic hysterectomy of enlarged uterus is a safe and reasonable alternative procedure to traditional abdominal hysterectomy in terms of operative and postoperative short-term outcomes. Conclusion: Total laparoscopic hysterectomy with LigaSure is a suitable effective technique alternative to traditional abdominal hysterectomy when the surgical team is sufficiently trained and experienced in managing complications. However more studies are necessary before this technique can become routinely applicable.

Introduction

Hysterectomy is the most common major gynecological operation performed in the world, that is often performed for symptomatic benign diseases, including menorrhagia, fibroids, pelvic pain, and uterine prolapse are responsible for more than 70% of indications for hysterectomy [1].

There is no universal agreement on the best technique for hysterectomy and the route of choice (conventional open surgery, laparoscopy or vaginal surgery) depends on clinical and technical factors, such as uterine weight and previous vaginal deliveries, as well as on the preference of the surgeon [2].

Traditionally, hysterectomy performed by laparotomy or vaginal approach; however, laparoscopy has been increasingly employed since its initial report in 1989 by Harry Reich and has become an alternative to conventional abdominal hysterectomy [3].

Advantages of the laparoscopic approach compared to its open counterpart include lower intraoperative blood loss, shorter duration of hospital stay, faster convalescence, and fewer wound or abdominal wall infections, at the cost of longer operating times and more urinary tract injuries [4].

The removal of an extremely large uterus represents a challenge to the surgeon regardless of the surgical approach and technique used. Giant myomas obstruct the pelvis and make the uterus extremely difficult to mobilize and manipulate, thus reducing the possibility to visualize the surrounding anatomic structures and partially or totally impairing the surgeon's ability to correctly develop the spaces. There are no clear guidelines about large uteri,
and the literature is vague regarding the best surgical option in these cases [5].

Specimen can be removed more efficiently by many techniques for volume reduction, including transvaginal volume reduction, laparoscopic morcellation, a combination of vaginal and laparoscopic procedures and mini-laparotomy. Generally, the transvaginal technique is preferred unless in women with morbid obesity, narrow vaginal cavity, or round and firm uterus prohibiting downward extractions. During the transvaginal procedure, bisection, morcellation, myometrial coring, vaginal myomectomy and wedge resection are used in vaginal hysterectomy to facilitate the process of removing the specimen [6,7].

Aim of the work

The aim of this study was to assess feasibility of laparoscopic hysterectomy (LH) for large uterus and compare this technique with conventional hysterectomy.

Patients and methods

This was prospective interventional clinical study carried out in Cytogenetic & Endoscopic Unit, Department of Obstetrics and Gynecology Department, Faculty of Medicine, Ain shams University from January 2019 and December 2020. This study was approved by the Research Ethics Committee, faculty of medicine, Ain shams university.

• After IRB approval, Sample size was calculated by open EPI to be 120 cases with confidence level 95% and power of test 80%.

Population of study:

• Inclusion criteria for cases:
  a) Women candidate for hysterectomy with benign lesion.
  b) Uterine weight more than 280 gm.
• Exclusion criteria:
  a) Any case with malignant lesion.
  b) Contraindications to laparoscopy such as multiple previous surgeries or cardio-vascular disorders.

Sample Size

This study included 120 patients scheduled to undergo total hysterectomy and bilateral salpingectomy with or without bilateral oophorectomy. they were divided into 2 groups.

Conventional hysterectomy group (A) : (60 patients) will undergo abdominal hysterectomy using conventional sutures.

Laparoscopic hysterectomy group (B) (60 patients) will undergo laparoscopic hysterectomy using LigaSure. Intraoperative photos were taken routinely after patient consent for imaging and publishing.

Operational design

Methods

Method of intervention was adopted according to patient’s desire. Appropriate informative consent was obtained from the patient after a thorough explanation and description of the planned procedure, its potential risks and benefits, and the possibility of conversion to laparotomy in the laparoscopic group. Patients are informed that general anesthesia will be used with proper explanation of the procedure and its potential risks by the anesthesiologist.

Full history taking, gynecologic examination and ultrasound examination were done to all patients. ultrasound examinations was performed.

• Operative details (Operative time, intraoperative complications like urinary or intestinal injuries, Estimated intraoperative blood loss, Preoperative hemoglobin and postoperative hemoglobin deficit 12 hours after surgery)
• Postoperative details (Time to resumption of bowel movements to normal, length of hospital stay, post-operative complications).

Routine preoperative tests were done for every patient including: CBC, coagulation profile, FBS, hepatitis markers screening, liver and kidney function tests and ECG. Patients with other medical problems need further evaluation by general medicine doctor who may order other laboratory tests as required.

General anesthesia is used and prophylactic antibiotics are given in the form of 2 grams cefotaxime which is repeated as one gram 12 hours after surgery.

Surgical technique

Groups A (abdominal hysterectomy with conventional sutures)

After general anesthesia, a Foley catheter is fixed within the bladder and the patient is put in Trendelenburg position. A transverse incision is made into the pubic hairline including skin and subcutaneous fat until reaching the anterior rectus fascia.

The uterus and the adnexa are brought outside the abdominal wall using the index and middle fingers as well as the thumb of the left hand and sometimes either a strong traction suture in the uterine fundus or via two long Kocher clamps lateral to the corpus. Two long, narrow abdominal retractors are used. Packing of the intestine is done.

The round and infundibulopelvic ligaments are secured and cut using either clamps or sutures. The uterine vessels are clamped, divided, ligated. The bladder is mobilized while the cardinal and uterosacral ligaments are divided. The specimen is cut away from vaginal cuff which is closed via open cuff or closed cuff techniques. The abdominal wall is closed as usual with the pelvic and parietal peritoneum.
unclosed and the rectus muscles are approximated in the midline via 2 to 3 interrupted sutures. The rectus sheath was then closed with vicryl No.1 running sutures. Subcutaneous fat was closed only if it is > 2 cm thickness using Vicryl No.2/0 sutures. The skin was closed by applying subcuticular non-absorbable polypropylene sutures.

**Group B (laparoscopic group)**

**Trocar placement**

We routinely place a Veress needle in the lower edge of the umbilicus. Sometime we enter peritoneal cavity through palmer point in case of previous lower abdominal surgery after insertion of rayel and exclude splenomegaly also to avoid injury of enlarged uterus we enter peritoneal cavity in point between umbilicus and xiphoid process lee huang pointpoint. We then insufflate to 20 mmHg prior to placement of any trocars. A 10-12 mm trocar is then placed through a vertical lower intraumbilcular incision for insertion of the zero-degree telescope (Karl Storz, Tuttinglen, Germany). Two additional 5 mm trocars are then placed into the peritoneal cavity. This pair were placed lateral to the inferior epigastric vessels approximately two fingerbreadths above the pubis, the third one was 12 mm and put in the suprapubic region.

**Identification of the ureters**

The ureters should be identified prior to securing any surrounding structures to the uterus. In most cases the ureters are visible through the peritoneum. It lies on the medial peritoneal leaf of the broad ligament.

**Securing the round ligaments**

The round ligaments can easily be desiccated by using LigaSure instrument. The uterus is deviated to the left by the manipulator and the assistant uses a grasper to place the round ligament under tension. The round ligament is coagulated and cut in the middle of the ligament with the coagulating instrument introduced from the ipsilateral side.

**Securing infundibulopelvic and uterine-ovarian ligaments**

For women who want to preserve their ovaries, the uterine-ovarian ligaments and Fallopian tubes were sealed and cut medial to the ovary using LigaSure Wikipedia instrument 5 mm.

**Creation of the bladder flap**

An assistant retroverts the uterus and pushes it cephalad using the manipulator. The upper junction of the vesico-uterine peritoneal fold is distinguished as a white line. Identification of the white line is important because, cephalad to the white line, the peritoneum is attached tightly to the uterus. Below this demarcation the peritoneum is loosely attached to the cervix and can be easily dissected away. The dome of the bladder is approximately 2 cm to 2.5 cm below the white line. Dissection of the bladder laterally helps pull the ureters away from the cervix. To achieve this, the bladder peritoneum is incised to the level of the round ligament. Dissection is continued in the avascular plane and the bladder is pushed caudally over the cervix to its junction with the anterior fornix of the vagina.

**Securing the uterine arteries**

The broad ligaments on both sides are opened downward and towards the cervix, skeletonizing the uterine vessels. Once the uterine vessels are skeletonized, they can be sealed laterally using LigaSure Wikipedia 5 mm. With meticulous dissection, the uterine vessels can be identified at the level of the ureteric canal as it crosses above the ureter. Knowledge of the course of the ureter is essential at this point to avoid injury. The uterine vessels can be secured medially as they enter the uterine body.

After that, we use the Valley laparoscopic hook or unipolar hook to open the vagina, we open the vagina anteriorly against the hard part of the manipulator and we move it laterally and posteriorly carefully to open the cuff laterally, then posteriorly.

After removing the uterus, we do underwater examination and for this purpose, we insufflate the peritoneum again, then irrigate the peritoneal cavity with 1000-1500 cc saline, and inspect carefully all the pedicles and the vaginal vault, any bleeding point was controlled using bipolar forces or LigaSure instrument. The vault is left closed laparoscopically.

We remove all the trocars under vision. CO₂ was allowed to escape gradually, and then the last trocar is removed under vision. Lastly, we close the skin using non-absorbable silk suture which is removed after 7 days.

**Statistical analysis**

Statistical analysis was performed using the Statistical Package for Social Science for Windows (SPSS, Inc., Chicago, IL) version 20.

**Results**

During the study period started from January 2017 to December 2020, a total of 120 patients underwent hysterectomy. As a consequence, 60 patients were included in conventional hysterectomy group and 60 patients in laparoscopic hysterectomy group. The p value in body mass index as shown in table 1 was significant with laparoscopic hysterectomy group (34.3±1.3 kg/m²) in comparison to conventional hysterectomy group (29.8±1.4 kg/m²). In other side no difference was found between the two groups in term of age, parity and previous abdominal surgery (table1). Fibroid uterus represented 70 % in conventional hysterectomy group, 66.6% in laparoscopic hysterectomy group.
Suspected adenomyosis represented 10% in conventional hysterectomy group and 16.6% in laparoscopic hysterectomy group.

Dysfunctional Uterine Bleeding (DUB) represented 13.3% in conventional hysterectomy group, 6.6% in laparoscopic hysterectomy group.

Also, endometrial hyperplasia represented 6.6% in conventional hysterectomy group, 10% in laparoscopic hysterectomy group.

As shown in table (3), there was highly significant difference in the estimated blood loss among the two groups with the group of laparoscopic hysterectomy having the least blood loss (110.1 ± 30.8 ml) in comparison to groups of conventional hysterectomy (170.3 ± 54.4). There was also significant difference in hemoglobin drop between group of laparoscopic hysterectomy (0.7 ± 0.2 gm/dl) to groups of conventional hysterectomy (1.4 ±0.9 gm/dl).

There is no significant difference in intraoperative blood transfusion and mean operative time between both groups as shown in table (3).

Table 4 review intraoperative and postoperative complication of patient submitted to laparoscopic hysterectomy. There were 2 patient of ureteral injury (discovered day 5 postoperative with leakage of urine per vagina, ureteric stent inserted by cystoscopy and removed after 2 months with complete healing), abdominal wall hematoma (developed at site of right lateral port with close follow up and resolve spontaneously) and postoperative febrile morbidity. However, in conventional hysterectomy group 2 patient had bladder injury (During pushing the bladder flap downwards, the injury occurred and repair was done) ileus and vaginal stump infection, 6 patient of wound seroma and infection and 10 patient with postoperative febrile morbidity.

The total incidence of intra-operative and postoperative complication of patient submitted to laparoscopic hysterectomy lower than conventional hysterectomy group but not statically significantly. As shown in table (5), there was a significant difference in the pain score; using the revised faces pain scale; among the two groups with the highest pain score being observed in conventional hysterectomy group (5.21 ± 1.11) versus laparoscopic hysterectomy group (3.81 ± 1.61).

There was a significant difference in the hospital stay among the two groups, the longest hospital stay occurred in conventional hysterectomy group (63.8 ± 5.7 hours) versus laparoscopic hysterectomy group (20.7 ± 2.5 hours). Also, a significant difference was observed in first bowel movement in both groups, the faster occur in laparoscopic hysterectomy group (16.2 ± 2.4 hours) versus conventional hysterectomy group (19.8 ± 6.7 hours).

<table>
<thead>
<tr>
<th></th>
<th>conventional hysterectomy</th>
<th>laparoscopic hysterectomy</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>48.71±3.91</td>
<td>48.51±4.11</td>
<td>0.86</td>
</tr>
<tr>
<td>Parity</td>
<td>3.11±2.11</td>
<td>3.51±2.81</td>
<td>0.75</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>29.18±1.14</td>
<td>34.13±1.13</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Previous surgery</td>
<td>4</td>
<td>2</td>
<td>0.97</td>
</tr>
</tbody>
</table>

*Statistically highly significant difference (P ≤ 0.001) all values represent; Mean ±SD; Kg: kilogram

Table 1: The demographic data for studied groups.

<table>
<thead>
<tr>
<th></th>
<th>conventional hysterectomy</th>
<th>laparoscopic hysterectomy</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Fibroid</td>
<td>42</td>
<td>70</td>
<td>40</td>
</tr>
<tr>
<td>endometiosis</td>
<td>6</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>DUB</td>
<td>8</td>
<td>13.3</td>
<td>4</td>
</tr>
<tr>
<td>Endometrial hyperplasia</td>
<td>4</td>
<td>6.6</td>
<td>6</td>
</tr>
</tbody>
</table>

DUB: dysfunctional uterine bleeding  No: number.

Table 2: Indications of hysterectomy in both groups.
Table 3: Operative details of studied groups.

<table>
<thead>
<tr>
<th></th>
<th>conventional hysterectomy</th>
<th>laparoscopic hysterectomy</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative time (minutes)</td>
<td>84.71 ± 9.91</td>
<td>77.31 ± 7.81</td>
<td>0.115</td>
</tr>
<tr>
<td>Blood loss (ml)</td>
<td>170.31 ± 54.41</td>
<td>110.11 ± 30.81</td>
<td>&lt; 0.001*</td>
</tr>
<tr>
<td>Hb Drop (gm/dL)</td>
<td>1.41 ±0.91 gm/dl</td>
<td>0.71±0.21 gm/dl</td>
<td>&lt; 0.001*</td>
</tr>
<tr>
<td>Intraoperative blood transfusion</td>
<td>0</td>
<td>1</td>
<td>0.491</td>
</tr>
</tbody>
</table>

Table 4: Intra-operative and postoperative complication of hysterectomy (conventional hysterectomy vs. laparoscopic hysterectomy).

<table>
<thead>
<tr>
<th></th>
<th>conventional hysterectomy</th>
<th>laparoscopic hysterectomy</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ureteral injury</td>
<td>0 (0)</td>
<td>2(0.03)</td>
<td>0.49</td>
</tr>
<tr>
<td>Bladder injury</td>
<td>2(0.03)</td>
<td>0 (0)</td>
<td>0.49</td>
</tr>
<tr>
<td>Ileus</td>
<td>2(0.03)</td>
<td>0 (0)</td>
<td>0.49</td>
</tr>
<tr>
<td>Pelvic and abdominal wall Haematoma</td>
<td>0 (0)</td>
<td>2(0.03)</td>
<td>0.49</td>
</tr>
<tr>
<td>Postoperative febrile morbidity</td>
<td>10 (0.16)</td>
<td>2(0.03)</td>
<td>0.15</td>
</tr>
<tr>
<td>Vaginal stump infection</td>
<td>2(0.03)</td>
<td>0(0)</td>
<td>0.49</td>
</tr>
<tr>
<td>Wound seroma and infection</td>
<td>6(0.13)</td>
<td>0(0)</td>
<td>0.24</td>
</tr>
<tr>
<td>Total number of complications</td>
<td>22(0.43)</td>
<td>6(0.1)</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Table 5: Hospital stay, bowel movement and pain score in studied group.

<table>
<thead>
<tr>
<th></th>
<th>conventional hysterectomy</th>
<th>laparoscopic hysterectomy</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital stays (hours)</td>
<td>631.8 ± 5.71</td>
<td>20.71 ± 2.51</td>
<td>&lt; 0.001*</td>
</tr>
<tr>
<td>Bowel movements (hours)</td>
<td>19.81± 6.71</td>
<td>16.21± 2.41</td>
<td>&lt; 0.001*</td>
</tr>
<tr>
<td>Pain score</td>
<td>5.21± 1.11</td>
<td>3.81 ± 1.61</td>
<td>&lt; 0.001*</td>
</tr>
</tbody>
</table>

Discussion

Most studies compared the laparoscopic approach to either the standard laparotomy approach or the vaginal route, result in the laparoscopic approach has been widely accepted as an alternative to standard laparotomy [8].

Each approach has its advantages, disadvantages, and limitations. one of the main limitations of laparoscopic approach of hysterectomy is uterine size larger than 12 weeks. With regression of clinical skills of examination and progress of ultrasound machine leading to replacement of uterine size by uterine weight for definition of enlarged uterus [9].

There is scant information in the literature regarding the optimal surgical management, the associated morbidity and the outcomes of laparoscopic hysterectomy in case of enlarged uteri. However, apart from isolated case reports or limited case series [9,10,11].

The present study we tried to find out that laparoscopic hysterectomy is feasible and safe even in case of enlarged uteri, all operations were performed by the same surgeons and using the same technique.

Obesity and its related morbidities are well-known causes that have a negative impact on surgical outcomes. Since
obesity is a risk factor for abnormal uterine bleeding, endometrial hyperplasia, adenomyosis, and other conditions, many obese women may undergo hysterectomy. In the past, laparoscopy was found medically difficult in obese patients and was often seen as a reversible procedure.

We discovered major variations in BMI in this research, with the laparoscopic hysterectomy community having the highest BMI compared to traditional hysterectomy, with a mean BMI of 29.81.4kg/m2. and laparoscopic hysterectomy group, the mean BMI was 34.31.3 kg/m2, which was similar to 35 kg/m2.

In this review, the mean operating time for laparoscopic hysterectomy was 77.3 7.8 minutes vs 84.7 9.9 minutes for traditional hysterectomy. However, we found that the operating time of the laparoscopic community improved significantly with case repetition and growth in the learning curve during the sample.

The operative time of the laparoscopy group showed a wide variation among different authors. The mean operative time in our study was similar to that reported by Hasan Terzi et al., (2016) (70 minutes) with uterus weighting over than 300gm. On the other hand, it was shorter than that reported by O’Hanlan et al., (2015) reported that operating times (109 minutes). Stefano Uccella, et al., (2017) The median operative time in the laparoscopic population was longer (139 minutes), but the uterine weight in this sample was greater than 1000 gm. In this research, the shorter length of the laparoscopic community was demonstrated by the use of the LigaSure vascular sealing procedure, which saved significant time in contrast to the usual ligation of the pedicles and arteries in the conventional form [13,14,15].

There was a significantly important difference in expected blood loss between the two groups, with the laparoscopic hysterectomy group having the least blood loss (110.1 30.8 ml) compared to the traditional hysterectomy group having blood loss (170 54.4). This substantial decrease in blood loss was also recorded in the majority of studies in this literature, such as in Stefano Uccella, et al., (2017) [15].

Because of the decreased blood loss, the mean Hemoglobin drop 24 hours after surgery was slightly lower in the laparoscopic hysterectomy group (0.70.2) relative to the traditional hysterectomy group (1.40.9). This was verified in several other reports, such as Stefano Uccella, et al., [15].

The mean length of the first postoperative bowel movement was slightly shorter in the laparoscopic hysterectomy community than in the traditional hysterectomy group. This major disparity may be attributed to less intestinal manipulation and susceptibility to dryness. The overall length of stay in the hospital was slightly less in the laparoscopic hysterectomy community than in the traditional hysterectomy group [16,17].

The average rate of intra-operative and postoperative complication in patients undergoing laparoscopic hysterectomy was lower than in the traditional hysterectomy population, but not statistically substantially lower, comparable to discovering in (Wattiez A, et al., 2012) [18].

The woman underwent laparoscopic hysterectomy with a swollen uterus. One patient had a left ureteral injury discovered postoperatively in day 5 double J ureteric stent implanted by cystoscopy and removed of two months after full recovery without any complications, 2 patient had an abdominal wall hematoma in the right ancillary port that healed conservatively, and 2 patient had postoperative febrile morbidity. On the other hand classical hysterectomy group 4 patient had bladder injury (during pressing the bladder flap downwards, the injury was discovered and repaired immediately with folly's catheter injection for ten days with successful healing). ileus and vaginal stump cancer, 6 patients with wound seroma and infection, and 10 patients with postoperative febrile morbidity.

**Conclusion**

Where the surgical team is properly qualified and skilled in treating complications, total laparoscopic hysterectomy with LigaSure is a suitable useful procedure alternative to conventional abdominal hysterectomy. However, further research is needed before this approach can be used on a regular basis.

**Reference**


