ORIGINAL ARTICLE

OUTCOMES OF TOTAL LAPAROSCOPIC HYSTERECTOMY BASED ON UTERINE SIZE IN CASES OF UTERINE LEIOMYOMAS

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Background: Uterine leiomyoma's, also known as fibroids, are benign monoclonal tumours that originate from the soft tissue of the myometrium. Extracellular factors such as proteoglycans, fibronectin, and collagen characterized the tumours. The present study aimed to determine outcomes of total laparoscopic hysterectomy (TLH) based on uterine size in uterine leiomyoma's cases. **Methods:** This cross-sectional study investigated 60 uterine leiomyomas patients who underwent total laparoscopic hysterectomy in the Department of Gynaecology and Endoscopic Unit of Patel Hospital, Karachi from January 2023 to December 2023. All the patients with benign uterine pathology undergoing total laparoscopic hysterectomy were enrolled. Patients were group based on uterine weight are as follows; Group-A (<14 weeks and <500 g) and Group B (≥14 weeks and >500 g). Variable measured included age, preoperative characteristics, body mass index, and duration of surgery, blood loss, and uterine weight. SPSS version 21 was used for descriptive statistics. **Results:** The overall mean age, and body mass index was 45.48±4.97 years, and 27.68±3.76 kg/m^2, respectively. The mean duration of surgery in Group-A was 104.20±22.50 minutes and in Group B was 114.40±33.74 minutes (*p*-0.174). Mean uterus size was 13.23±2.66 cm and mean weight was 373.495±147.92 cm. Mean total estimated blood loss was 73.02±32.36 ml. It has been observed that duration of surgery and uterus size was lower in Group-A than Group-B. **Conclusion:** The present investigation observed that total laparoscopic hysterectomy is optimal when the uterus weighs less than 500 g. Additionally, uterus weight <500 g had lower body mass index, duration of surgery and blood loss as compared to uterus weight >500 g.

Keywords: Uterine Leiomyomas; Uterine size; Laparoscopic hysterectomy; Outcomes

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INTRODUCTION

Uterine leiomyoma's, also known as fibroids, are benign monoclonal tumours that originate from the soft tissue of the myometrium. Extracellular factors such as proteoglycans, fibronectin, and collagen characterized the tumours.[1,2] The incidence of Leiomyoma approximately occurs in 80% case and causes an anaemia, obstetric issues, and combination of excessive, irregular and prolonged uterine bleeding, confusion, uterine pressure, obstructive symptoms and other factors.[3] Variation in ethnicity significantly affects the severity and incidence of leiomyoma; European women experience less severe symptoms and lower fibroid with lower uterine density as compared to African women, increasing the requirement for blood transfusion and postoperative complications.[4,5] Gonadotropin-releasing hormone (GnRH), levonorgestrel-free intrauterine systems (IUSs), and oral contraceptive pills are various hormone-based treatments for symptomatic uterine fibroids.[6] Consequently, the mainstay of treatment for uterine leiomyoma remains surgical intervention.[7]

Hysterectomy is the second most common surgical procedure performed on women worldwide, second only to surgical procedures. About 7–17% of adult women in Pakistan undergo hysterectomy, and 90% of these procedures are performed for benign conditions.[8] There are three main methods of hysterectomy: abdominal, cervical and laparoscopic, but controversy remains over the best surgical technique. Laparoscopic hysterectomy offers advantages over abdominal hysterectomy, including less intraoperative blood loss, shorter hospital stay, and recovery is faster, with fewer infections and diarrhoea but these benefits come at the expense of longer surgical procedures, and an increased risk of drowning or injury.[9,10] Previous studies have categorized uterus size as >12 weeks of gestation or weighing >280 g.[11,12] Such dilated uterus is generally associated with the higher risk of post-operative complications and prolonged hospital stay after laparoscopic hysterectomy.[13] In contrast, an earlier study suggests that TLH is the preferred surgical modality for extensive hysterectomy patients, potentially for all abdominal hysterectomies.[14] Previously polished studies

on neglected the role of uterine size in the surgical results in leiomyoma cases, resulting in a knowledge gap. Mostly studies generalize their findings to all hysterectomy indications, ignoring the special challenges presented by leiomyoma linked to the uterine changes. This becomes especially important in situations with limited resources, where understanding these characteristics is critical for improving patient care. However, this study aims to address the outcomes of laparoscopic hysterectomy in women with leiomyomas concerning uterine size, providing evidence to assist surgeons in making optimal surgical decisions.

MATERIAL AND METHODS

This cross-sectional study investigated 60 uterine leiomyoma patients who underwent total laparoscopic hysterectomy in the Department of Gynaecology and Endoscopic Unit of Patel Hospital, Karachi from January to December 2023. All the patients with benign uterine pathology undergoing total laparoscopic hysterectomy were enrolled. Endometriosis, malignancy (suspected and confirmed) and uterine rupture cases were excluded. Patients were distributed based on uterine weight are as follows; Group-A (<14 weeks and <500 g) and Group B (≥14 weeks and >500 g). Laparoscopic hysterectomy was utilized with a small incision in abdomen. Additional incisions of small types along with special removal tools were used in lower abdomen. The uterus was removed through the vagina.

The process took between 30 and 180 minutes. Uterine fibroids (leiomyomata) was defined as the most common benign tumours in women, with a lifetime prevalence of approximately 30%, characterized by excessive soft tissue connective tissue and hormone dependent. Patients underwent detailed physical examination, medical history, laboratory tests (blood tests), and pelvic ultrasonography prior to surgery. Data collected of the patients included age, parity, body mass index, preoperative symptoms, duration of surgery, amount of bleeding, and follow-up records. Each patient underwent magnetic resonance imaging (MRI) before total laparoscopic hysterectomy to detect and measure uterine size. SPSS version 21 was used for descriptive statistics. Mean and standard deviation was used for the presentation of numerical variables. Frequency and percentages presented the categorical variables. Comparison of different variables among three groups were made using Student's t-test. A *p*-value of less than 0.05 was considered statistically significant.

RESULTS

The overall mean age, parity, and body mass index was 45.48±4.97 years, 3.43±2.25, and 27.68±3.76 kg/m^2, respectively. The mean duration of surgery was 107.17±30.56 minutes. The mean duration of surgery in Group-A (n=30) and Group B (n=30) was 104.20±22.50 minutes and 114.40±33.74 minutes, respectively. Hypertension was the most prevalent comorbidities followed by diabetes. The overall mean uterus size (weeks + kg) was 13.23±2.66 weeks and 373.495±147.92 grams. The mean blood loss in Group-A (n=30) was 55.0±44.57ml and in Group-B was 111.81±51.04ml. Mean total estimated blood loss was 73.02±32.36 ml. It has been observed that duration of surgery, uterus size and blood loss was lower in Group-A than Group-B. Patients distribution based on age groups were as follows; 9 (15%) in 35–40 years, 32 (53.3%) 41–45 years, 16 (26.7%) 46–50 years, and 3 (5%) 51–55 years as shown in Figure-1. Based on body mass index, patients were distributed as follows; 19 (31.7%) 24–26 kg/m^2, 23 (38.3%) 27–29 kg/m^2, and 18 (30%) 30–32 kg/m^2 as illustrated in Figure-2. Features and results of patients undergoing total laparoscopic hysterectomy are shown in Table-1. Different indications and comorbidities represented in Table-2. Table-3 represents the categorization of patients based on the duration of surgery.

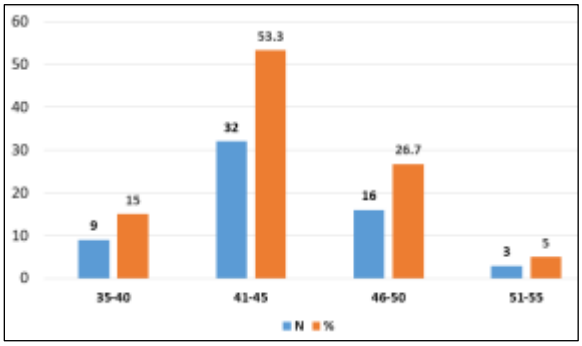

Figure-1 Age groups (N=60)

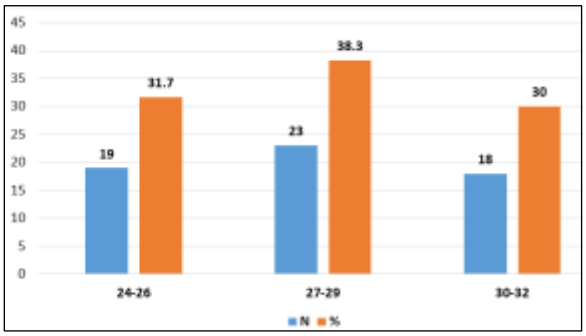

Figure-2 Patient's categorization based on body mass index (N=60)

Table-1: Features and results of patients undergoing total laparoscopic hysterectomy (N=60)

Parameters	Group-A (<500 g and <14 weeks) N=30	Group-B (≥14 weeks and >500 g) N=30	*p*-value
Age (years)	45.73±5.91	44.34±4.43	0.353
BMI (kg/m^2)	27.93±2.99	28.66±3.74	0.404
Estimated blood loss volume (ml)	55.0±44.57	111.81±51.04	0.001
Duration of Surgery (minutes)	104.20±22.50	114.40±33.74	0.174

Table-2: Comorbidities and surgeries of uterine leiomyomas patients (N=60)

Comorbidities	N (%)
Diabetes Mellitus	4 (6.7%)
Open Myomectomy	1 (1.7%)
Hepc/Prev 1	1 (1.7%)
Hypertension (HTN)	8 (13.3%)
HTN/prev 1 C/S	1 (1.7%)
HTN, DM, HCV	1 (1.7%)
HTN, Hx Pulmonary TB	1 (1.7%)
HTN.Prev 1	1 (1.7%)
Hypothyroidism	1 (1.7%)
Prev 1	1 (1.7%)
HTN/Prev 1 c/s	2 (3.3%)
Prev 1 c/s	1 (1.7%)
HTN	1 (1.7%)
Thal minor	1 (1.7%)
s/p thyroidectomy	1 (1.7%)

Table-3: Distribution of patients based on duration of Surgery (N=60)

Duration of surgery (minutes)	N (%)
30–60	7 (11.6%)
61–90	7 (11.6%)
91–120	33 (55%)
121–150	7 (11.6%)
151–180	6 (10%)

DISCUSSION

This study primarily focused on evaluating the outcomes of total laparoscopic hysterectomy based on uterine size in patients with uterine leiomyomas. The findings indicate that TLH can be safely and effectively performed in cases where the uterine size is less than 500 grams. This highlights the importance of uterine size as a critical factor influencing the feasibility and safety of laparoscopic approaches in managing leiomyomas. In aligns to this study Ishibashi T, *et al*[15] observed that patients with a uterus weighing less than 500 g experienced the shortest average operation times and the least blood loss. However, no significant differences were found in operation time or blood loss between patients with uterine weights of 500–1000 g and those with weights exceeding 1000 g. A study by Macciò A *et al*[16] analyzing 461 TLH procedures revealed that greater uterine weights were linked to extended operative times and higher blood loss. However, uterine size showed no significant association with postoperative complications or the duration of hospital stays.[16] In contrast to our findings, Adiguzel C *et al*[17] demonstrated that TLH remains a reliable and safe procedure even for patients with larger uterine sizes, the findings revealed no variations in operative duration, blood loss, or length of postoperative hospitalization based on uterine volume, highlighting its effectiveness across different uterine sizes. The difference in the results across studies may due to the differences in patient demographics, definitions of uterine sizes, surgeon experience and the hospital resources.

This study focused on the outcomes of total laparoscopic hysterectomy (TLH) for patients with uterine leiomyomas, finding that TLH is safe and effective for those with uterine sizes under 500 grams. Cervical leiomyomas, slow-growing tumours that cause symptoms such as bleeding, pain, and infertility, affect different ethnic groups in varying degrees. African American women are more likely to have larger uteri and a higher prevalence of leiomyomas, placing them at increased risk of complications during surgery, such as needing blood transfusions compared to European women.[18,19] Hormone-based therapies like oral contraceptives, intrauterine systems with levonorgestrel, and gonadotropin-releasing hormone (GnRH) agonists are commonly used to manage symptoms and reduce myoma size, offering an alternative or adjunct to surgery. Laparoscopy offers several advantages, including enhanced visualization of anatomy and pathology, improved access to key structures like the uterine arteries, vagina, and rectum, and the ability to effectively drain and remove clots. For patients, this minimally invasive technique avoids painful abdominal incisions, leading to shorter hospital stays, faster recovery, and a lower risk of infection. While the risk of ileus is relatively low, there is limited research on the feasibility of TLH for women with a large uterus.[20] Additionally, there are no established guidelines for performing TLH in cases of larger uteri, and the literature lacks comprehensive recommendations on the most appropriate surgical approaches for these patients.[21] Abdominal hysterectomy is commonly considered for cases with large cervical diameter, undescended uterine rotation, prior hysterectomy, pelvic conditions, vaginal narrowing, uterine immobility, or obesity. While laparotomy is typically preferred, specialized

laparoscopic training allows many patients to avoid this approach. Laparoscopic hysterectomy is a viable, less invasive alternative when vaginal access or uterine mobility is limited. Furthermore, Lee *et al*[22] found that uterine weights greater than 500 g in patients undergoing hysterectomy or laparoscopic hysterectomy were linked to longer hospital stays, higher blood loss, and increased postoperative complications. Several studies have shown that experienced surgeons can perform TLH successfully, even with uterine weights ranging from 700 g to 2400 g, though the need for blood transfusion tends to increase with larger uteri.[23–25] Nagata *et al*[26] observed that patients with dilated uteri required longer operative times during laparoscopic hysterectomy. Similarly, Gorge *et al*[27] demonstrated that laparoscopic-assisted vaginal hysterectomy took longer (91.1 minutes) for patients with a larger vagina compared to those with smaller vaginas (77.4 minutes), though no significant differences in postoperative complications were noted. The study possesses certain limitations, including a limited sample size, a lack of long-term follow-up, and insufficient evaluation of factors such as preoperative therapies and comorbidities, which may influence the results. To enhance future research, larger, multicenter studies with consistent definitions and methodology are required. Long-term follow-up, prospective randomized controlled trials, and a more detailed patient characterization would aid in determining the safety, efficacy, and sustainability of TLH, especially among patients with larger uterus.

CONCLUSION

Total laparoscopic hysterectomy is most effective when the uterine weight is less than 500 grams. Uterine weights below 500 grams are associated with lower BMI, reduced blood loss, and shorter surgical duration compared to uterine weights exceeding 500 grams, while few findings were statistically insignificant. Therefore, subsequent studies with larger and more diverse patient populations are recommended to validate the results and ensure their applicability to different demographics and healthcare settings.

AUTHORS' CONTRIBUTION

NH, SSD: Conceptualization of the study, write-up, proof reading. AB, MH, MH: literature search, data collection, analysis, interpretation.

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