

COMPARISON OF COMPLICATIONS BY UTERINE WEIGHT IN TOTAL LAPAROSCOPIC HYSTERECTOMY

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Objective

To evaluate the potential effect of uterine weight on short-term outcome and incidence of complications after total laparoscopic hysterectomy (TLH) for a benign gynecologic disease.

Methods

A retrospective medical record review of 771 cases where TLH was performed. Patients included in this study underwent TLH for either myoma or adenomyosis at Gil Hospital, Gachon University of Medicine and Science, from March 2006 through December 2010. Participating patients were stratified into three groups: group 1 with uterine weight less than 250 g (n=435), group 2 with uterine weight 250 to 500 g (n=272), and group 3 with uterine weight more than 500 g (n=64). The groups were compared based on total operation time, estimated blood loss, length of postoperative hospital stay, observations of postoperative complications, and rate of conversion from TLH to laparotomy.

Results

We discovered no statistical difference between the three groups in terms of overall postoperative complications or short-term surgical outcomes. Major complications such as ureter injury and necessity for reoperation occurred in each group. Operation time and estimated blood loss increased slightly as uterine weight increased, but, there was no statistical significance.

Conclusion

TLH can be successfully performed, even in cases of enlarged uterus. Patients with an enlarged uterus are suitable candidates for TLH.

Keywords: Laparoscopy; Hysterectomy; Postoperative complication

Total laparoscopic hysterectomy (TLH) is currently accepted as a safe, effective and efficient way to manage benign uterine pathology, and is an acceptable alternative to standard abdominal hysterectomy [1,2]. However, use of laparoscopic hysterectomy for patients with enlarged uterus has been the subject of controversy. Irrespective of the controversy, compelling evidence indicates that laparoscopy provides several benefits when compared with abdominal hysterectomy [3,4], and it has been suggested that enlarged uteri should be treated by laparotomy [5,6]. Most studies set an upper limit for enlarged uterus, usually 15 to 16 weeks' gestation or a weight more than 500 g [7]. The difficulties performing TLH on patients with benign gynecologic disease and enlarged uterus include incidence of limited access to the uterine vascular pedicle depending on size and location of myoma, and higher risk of complications such as hemorrhage. Other concerns

of the use of laparoscopy in cases of enlarged uterus include increased risk of bowel and urinary tract injury associated with the

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difficulty of extracting the uterus, and longer procedure duration. Under such circumstances, the safety and feasibility of the laparoscopic approach over conventional laparotomy may be of concern. In the present study, we evaluated the effect of uterine size on the short-term outcome and complication rate of patients treated by TLH for indications of a benign gynecological condition such as uterine myoma or adenomyosis.

Materials and Methods

A retrospective medical record review of 771 cases of patients treated with TLH for indication of myoma or adenomyosis was performed. Patients included in this study underwent TLH at Gil Hospital, Gachon University of Medicine and Science, from March 2006 through December 2010. The data was obtained from our departmental database and the information in the database was verified by a detailed medical record review for each patient. The patients were stratified into three groups: group 1 with uterine weight less than 250 g, group 2 with uterine weight 250 to 500 g, and group 3 with uterine weighing more than 500 g.

Comparisons were made between groups as regard postoperative hospital stay, total operation time, estimated blood loss, rate of conversion from TLH to laparotomy, and observations of postoperative complications.

Variables evaluated included patient age, body mass index (BMI), parity, total operation time, estimated blood loss, length of hospital stay, necessity for transfusion, observations of postoperative complications, and as appropriate, each patient's abdominal surgery history and/or justification for conversion from laparoscopy to laparotomy. Postoperative complications were categorized as trocar site dehiscence/hematoma, vaginal cuff dehiscence/infection, vaginal cuff bleeding, ileus, fever, ureter injury, bladder injury, transfusion, and reoperation.

For all patients in this study, a 12-mm port was placed at the umbilicus for accommodation of a 10-mm 0-degree laparoscope. Two

5-mm ports were placed approximately 4 to 5 cm below the umbilicus in the right and left paramedian positions, and one additional 5-mm port was placed in the suprapubic area. Reusable monopolar electrosurgical scissors, bipolar electrosurgical desiccating and cutting forceps, and variable tissue forceps were used to perform the hysterectomy, and if indicated, salpingo-oophorectomy. A uterine manipulator was used during hysterectomy in all patients. All surgical techniques were used in a similar way regardless of uterine size. In cases of enlarged uterus, vaginal or power morcellation was performed followed by a standard TLH procedure.

All analyses were performed using statistics were analyzed using SPSS ver. 12.0 (SPSS, Inc., Chicago, IL, USA). Analysis of variance test was used to compare patient characteristics and outcomes, and chi-square test was used to evaluate the differences in postoperative complications and conversion rates from TLH to laparotomy, with both statistical tests set with a significance of $P < 0.05$. In addition, a post-hoc Bonferroni test was performed.

Results

A total 771 women underwent TLH during the study period. The number of patients in each group were 435 in group 1, 272 in group 2, and 64 in group 3. The observed patient characteristics are summarized in Table 1. The three groups were not significantly different in terms of age, parity, and BMI. The history of previous abdominal surgery was significantly less in groups 2 and 3 ($P = 0.003$). The outcomes for each of the three groups are summarized in Table 2. Operation time and estimated blood loss was slightly prolonged as uterine weight increased, but there was no statistical significance. The duration of hospital stay and overall complication rate were similar in all three groups with no significant differences. Major complications including ureter injury, bladder injury and reoperation occurred in each group. Ureter injury occurred with three patients in group 1, three in group 2, and none in group 3. Ureter injury was identified either by intravenous administration of indigo

Table 1. Clinical characteristics of patients undergoing total laparoscopic hysterectomy

Variables	Group 1 (n = 435)	Group 2 (n = 272)	Group 3 (n = 64)	P-value
Age (yr), median (range)	45.7 (5.2)	46.4 (4.9)	47.1 (5.0)	0.072
Parity	1.8 ± 0.7	1.8 ± 0.7	1.9 ± 0.6	0.491
BMI (kg/m ²)	23.3 ± 3.2	23.9 ± 3.3	24.0 ± 3.8	0.118
Previous abdominal surgery	191 (43.9)	90 (33.1)	18 (28.1)	0.003

Values are presented as mean ± standard deviation (SD) or number (%).

Group 1, uterine weight <200 g; group 2, 200 g ≤ uterine weight <500 g; group 3, uterine weight ≥500 g; BMI, body mass index.

Table 2. Comparison of outcome and complications among groups after total laparoscopic hysterectomy

Variables	Group 1 (n=435)	Group 2 (n=272)	Group 3 (n=64)	P-value
Mean uterine weight (g, range)	173.4 (30-249)	333.7 (250-495)	647.6 (500-1160)	<0.001
Operation time (min)	127.5 ± 35.7	123.2 ± 33.9	132.0 ± 35.4	0.116
Estimated blood loss (mL)	266.8 ± 140.1	306.9 ± 197.1	326.1 ± 171.2	0.001
Transfusion	15 (3.4)	9 (3.3)	5 (7.8)	0.205
Hospital stay (day)	6.3 ± 2.1	6.3 ± 1.5	5.9 ± 1.7	0.387
Complication				
Conversion to laparotomy	5 (1.1)	3 (1.1)	0	0.692
Ureter injury	3 (0.7)	3 (1.1)	0 (0)	0.632
Bladder injury	1 (0.2)	0	0	0.679
Reoperation	3 (0.7)	0 (0)	1 (1.6)	0.221
Ileus	2 (0.5)	0 (0)	0 (0)	0.461
Fever	4 (0.9)	1 (0.4)	0 (0)	0.536
Vaginal cuff dehiscence/bleeding	15 (3.4)	9 (3.3)	2 (3.1)	0.989
Trocar site dehiscence/hematoma	6 (1.4)	5 (1.8)	0 (0)	0.532

Values are presented as mean ± standard deviation or number (%).

carmine during surgery or by postoperative intravenous pyelography, and a double-J stent was inserted on an affected side by a urologist. Reoperation was performed for three patients in group 1, none in group 2, and one in group 3. Reoperation occurred due to hemoperitoneum in three patients and panperitonitis in one patient. Two patients in group 1 experienced postoperative ileus, and both made a full recovery after conservative treatment. Vaginal cuff complications requiring suture occurred with fifteen patients in group 1, five in group 2, and none in group 3. Patients with vaginal cuff dehiscence were readmitted and transvaginal resuture was performed in the operating room under general anesthesia. Overall, we found no statistically significant differences in postoperative complications between the three groups.

A total eight cases were converted from TLH to laparotomy with five in group 1, and three in group 2. The justifications for the conversions included bladder injury, posterior cul-de-sac, and risk of encountering unidentified uterine vessels resulting from the effects of severe pelvic adhesion. Based on these results, no statistical difference was noted between the groups with respect to the conversion rate. Incidence of severe pelvic adhesion accompanied all cases with conversion.

Discussion

TLH is now a mature surgical technique and more gynecologic

surgeons choose it to perform hysterectomy for patients meeting the criteria. TLH provides patients better cosmetic results and more rapid recovery than the abdominal approach. However, surgeons may encounter challenges and potential risks when dealing with enlarged uterus resulting from protracted procedure time and a limited operative field. No definitive guide exists determining the limitations of the use of laparoscopic hysterectomy in terms of uterus size.

Uterine size has been shown to influence decision making regarding the hysterectomy method utilized. It has been suggested that uterine size should not exceed 300 g (12 weeks gestation) when undergoing vaginal hysterectomy [8]. Enlarged uterus has been reported to increase the risk of complications in women undergoing abdominal hysterectomy. In a multicenter, prospective cohort study, women with uterine weight exceeding 500 g and undergoing abdominal hysterectomy suffered increased blood loss, cuff cellulitis and blood transfusion [9]. Enlarged uterus can cause a limitation in operation field during laparoscopic surgery and therefore the incidence of bowel injury, ureter injury or other complications can occur more frequently. Literature exists that suggests that enlarged uterus should be treated by laparotomy [7].

However, several studies suggested that postoperative complications associated with TLH do not increase due to enlarged uterus and therefore, this should no longer be considered a relative contraindication of TLH. Fiaccavento, et al. [10], compared incidence of postoperative complications in groups divided by uterine

weight including those less than 350 g and those more than 500 g. There were no major complications such as bowel or ureter injury reported in any group. However, fever and changes in hemoglobin were more frequent in the larger uterus group. Sinha, et al. [11], suggested that TLH can be performed as a treatment for myoma accompanied with enlarged uterus by an experienced surgeon regardless of the size, number, or location of the myoma. They used modified laparoscopic surgical techniques by ligating the uterine artery prior to myomectomy followed by direct morcellation and hysterectomy. In their study, the average uterus weight was 700 g and the largest uterus reported was 2,240 g. Kwon, et al. [12], also reported that TLH can be successfully performed in cases of enlarged uterus and that the complication rate did not increase in a study group with enlarged uterus. Our study demonstrated that postoperative complications and short-term outcomes were the same for each group, and conversion from TLH to laparotomy was influenced, not by uterine size, but due to intraperitoneal adhesion.

Blood loss at volumes requiring blood transfusion still remains the main complication associated with enlarged uterus hysterectomy. Several steps to decrease intraoperative blood loss can be taken including infusion with oxytocin to induce uterine contraction and reduce uterine perfusion, unilateral or bilateral uterine artery occlusion and division during laparoscopic hysterectomy [13], and administration of gonadotropin-releasing hormone agonist prior to surgery in order to decrease uterine volume. These procedural steps may be useful means of decreasing blood loss, however none were used in the present study.

Operation time was observed to increase with uterine mass in the present study, but there was no statistical difference observed. Furthermore, the mean operation time in our study was longer than that reported in other studies [12,14], and we expect this is due to the fact that we calculated the operation time from start to finish of general anesthesia, while other studies recorded the beginning of operation as the time at which the uterine manipulator was inserted.

In conclusion, TLH can be performed successfully in most patients and with no accompanying increase in complication rates or short-term recovery outcomes. Patients with enlarged uterus can benefit from all of the advantages related to a minimally invasive approach such as minimized blood loss, better cosmetic outcomes, shortened hospital stay, and more rapid recovery. Thus, TLH can be considered in lieu of laparotomy in almost all cases, irrespective the uterus size and enlarged uterus is not contraindication of TLH.

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복강경하 전자궁절제술에서 자궁의 무게에 따른 합병증의 비교

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목적

양성 부인과 질환에서 복강경하 전자궁절제술을 시행할 때 자궁의 무게가 수술 후 합병증과 단기 결과에 미치는 영향을 알아보고자 하였다.

연구방법

복강경하 전자궁절제술을 시행한 771명의 의무기록을 후향적으로 조사하였다. 본 연구에 포함된 환자들은 2006년 3월부터 2010년 12월 까지 가천의과학대학교 길병원에서 자궁근종이나 선근증으로 복강경하 전자궁절제술을 시행한 경우를 대상으로 하였다. 환자는 자궁무게에 따라 3군으로 나누었다. 1군은 자궁무게가 250 g 미만으로 435명, 2군은 250–500 g으로 272명, 3군은 자궁무게가 500 g 이상으로 64명이었다. 각 군의 나이, 체질량지수, 분만력, 재원일수, 수술시간, 수혈여부, 수술중 실혈량, 개복수술로의 전환, 수술 후 합병증 등을 조사하였다.

결과

3군 사이에 수술 후 합병증의 의미있는 차이가 없었다. 요관 손상, 재수술과 같은 주요 합병증은 각 군에서 모두 발생하였고, 통계적 의미 있는 차이가 없었다. 수술시간과 실혈량은 자궁무게가 증가함에 따라 약간 증가하는 경향을 보였으나 통계적으로 의미가 없었다.

결론

자궁이 커도 복강경하 전자궁절제술을 안정적으로 시행할 수 있었으며, 자궁이 큰 경우도 복강경수술의 대상이 될 수 있다.

중심단어: 자궁절제술, 복강경, 수술 후 합병증