Total Laparoscopic Hysterectomy: Experience of the University of the Philippines - Philippine General Hospital from 2011 to 2014

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Objective: To evaluate the patient characteristics, and clinical outcomes of the total laparoscopic hysterectomy procedures performed in the Philippine General Hospital from January 2011 to June 2014
Study design: Retrospective cross sectional study
Methods: The medical records of all patients admitted for an elective total laparoscopic hysterectomy in PGH from January 2011 to June 2014 were reviewed. Patients' demographic data, intraoperative and postoperative outcomes and complications were extracted and analyzed.
Results: Data for 67 patients were analyzed. The patients operated on were mostly parous, premenopausal (94%) women with a mean age of 46.3 years, and a BMI of 23.2 kg/m2. Most of the women were admitted for uterine fibroids (55.2%), adenomyosis (26.9%), and benign ovarian new growths (9.0%). Fifteen surgeries were converted to laparotomy (22.4% failure rate). Majority (93.3%) of the conversions were due to technical difficulty in performing the hysterectomy. The mean uterine height was 10.8 cm, and mean uterine width was 8.4 cm. The mean operation time of the converted group (207.7 mins) was comparable to the TLH group (235.6 mins). The estimated blood loss for the TLH group (337.5 cc) was significantly less than that of the converted group (556.7 cc). The mean hospital and postoperative stay of the patients were 4.7 days and 2.4 days, respectively. The only intraoperative complication documented was hemorrhage (n=3). There were 2 minor postoperative complications noted (3%).
Conclusion: The patients who successfully underwent a TLH procedure were mostly parous, non-obese, premenopausal women, with non-bulky uterine sizes. Myoma uteri and adenomyosis were the most common indications for surgery. Patients who underwent successful TLH had significantly less intraoperative blood loss compared to patients whose surgeries were converted to laparotomy.

Introduction

Hysterectomies have traditionally been performed through the abdominal (laparotomy) or vaginal approach. With advancements in technology, and the rapid development of modern laparoscopic instruments, however, laparoscopic hysterectomies have gradually been gaining popularity in recent years.[1] Laparoscopic hysterectomy (LH) employs a minimally invasive technique to the surgical removal of the uterus through small incisions on the abdomen. Dr. Harry Reich, a pioneering laparoscopic surgeon in the US, performed the first laparoscopic hysterectomy, and published his experience in 1989.[2] Since then, a number of refinements to this technique have been developed and described.[3]

Evidently, surgical approaches vary markedly across countries, between institutions, and even among individual surgeons working within the same unit. Preferences continue to depend on the experience, capabilities, and biases of the surgeon.[4] Recently, a Cochrane Review group[5] addressed the optimal surgical approach to hysterectomy for women with benign gynecological conditions. In this review, the group advocated performing a vaginal hysterectomy (VH) over an abdominal hysterectomy (AH) when feasible. Where VH is not possible, a laparoscopic approach was preferred to possibly avoid an AH. The same recommendations were set by the American College of Obstetricians and Gynecologists (ACOG)[6], citing well-documented advantages and lower complication rates favoring the vaginal approach. Despite these conclusions, however, majority of hysterectomies are still done by the classical abdominal route, with VH typically employed for patients with significant uterine prolapse.[7] The latter's inherent technical limitations, which may arise from large uterine sizes, limited vaginal capacities, or presence of pelvic adhesions, have all contributed to its slow acceptance.[8] The advent of laparoscopy has helped overcome some of the technical difficulties of the vaginal approach. Through laparoscopy, clear visualization and manipulation of the adnexal structures are achieved, without the necessity of a large abdominal incision.

The advantages of laparoscopic surgery are well-documented, and include less intraoperative bleeding, shorter hospital stay, reduced postoperative pain, earlier return to normal activities, and better cosmetic results.[9,10] These, however, are offset by longer operating times, an increased major complication rate, and a steep learning curve.[11,12] Despite these shortcomings, several authors[13,14,15] strongly advocate LH as the preferred technique for hysterectomy.

Total laparoscopic hysterectomy (TLH) is a form of LH where the whole uterus and adjoining pelvic structures are removed laparoscopically, as opposed to a partial laparoscopic hysterectomy, where only the upper ligaments of the uterus are dissected and removed laparoscopically, then the rest of the hysterectomy procedure is done vaginally. TLH is the form of laparoscopic hysterectomy done in the Philippine General Hospital, Department of Obstetrics and Gynecology, and in most laparoscopy centers in the Philippines. TLH has been practiced in the Department of Obstetrics and Gynecology since 2009.

With the emerging practice of LH in the country, it is imperative that gynecologic surgeons, and training institutions review and publish their experience to educate other gynecologic laparoscopists, and avoid possible complications in their own practice.

Objective

General Objective

To evaluate the patient characteristics and clinical outcomes of the total laparoscopic hysterectomies performed in UP-PGH from January 2011 to June 2014.

Specific Objectives

1. To describe the demographic characteristics of the patients who underwent total laparoscopic hysterectomy

2. To identify the common indications for total laparoscopic hysterectomy

3. To report the intraoperative outcomes and complications encountered

4. To document the common reasons and factors for conversion to laparotomy

Materials and Methods

This is a retrospective cross sectional study of patients admitted at the Philippine General Hospital from January 1, 2011 to June 30 2014, who underwent elective total laparoscopic hysterectomy (TLH) for a benign gynecologic condition. We included all patients who underwent TLH, admitted under the charity

service of the Department of Obstetrics and Gynecology, Section of Reproductive Endocriology and Infertility of the Philippine General Hospital (PGH), whether completed successfully or eventually converted to laparotomy for any reason. We did not include cases whose records could not be retrieved, or any TLH procedure performed by other sections or departments in PGH. This study was approved by the PGH Research Ethics Board prior to conduct.

We retrieved the inpatient and outpatient medical records of all patients included in the study. We extracted patients' demographic data, intraoperative and postoperative outcomes, and complications, and recorded these data on data entry forms. Names were withheld in the forms, and replaced with codes known only to the authors. The information gathered were encoded into Microsoft Excel program version 2010. Demographic data included the following: age, gravidity, parity, weight, height, body mass index (BMI), history of previous abdominal surgery, previous vaginal delivery or surgery, menopausal status, and indication for surgery, Intraoperative outcomes included the following: pelvic surgery performed, method of vaginal vault closure, uterine size, operative time, estimated blood loss, postoperative hemoglobin drop, need for blood transfusion, intraoperative complications, and whether TLH was completed successfully or converted to laparotomy. Postoperative outcomes included the following: number of hospital stay, post-operative complications, reoperations, readmissions. The reasons for intraoperative conversion to laparotomy, reoperation and readmission were enumerated.

We also compared patient characteristics and clinical outcomes for TLH cases completed successfully versus cases converted to laparotomy.

For the data analysis, descriptive statistics were used to analyze and report demographic information. Data were expressed as frequency, percentage, mean + standard deviation (SD), with 95% confidence interval. Student t-test was used to compare continuous variables, and a level of significance was set at 0.05 to determine significant difference.

Results

There were a total of 77 patients identified to have been admitted under the Charity service of the UP PGH Department of Obstetrics and Gynecology, Section of Reproductive Endocrinology and Infertility, for an elective total laparoscopic hysterectomy from January 2011 to June 2014. Of these, 67 patient records were retrieved from the hospital records unit (Figure 1). Ten charts (13%) were not obtained, and were therefore excluded from analysis.

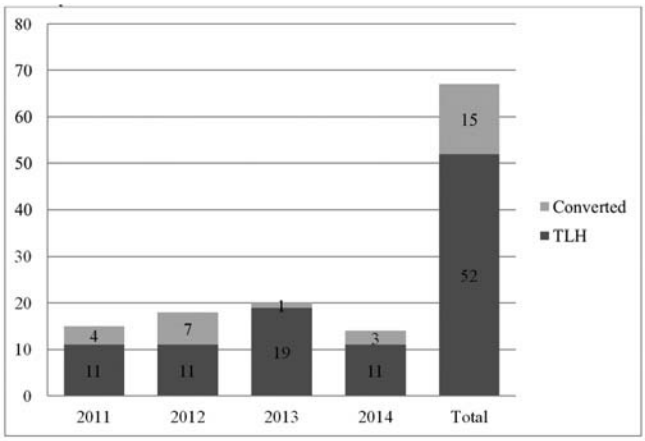

Figure 1. Number of patients admitted for total laparoscopic hysterectomy between January 2011 and June 2014.

The demographic features and benign gynecologic indications for surgery of the patients included in the study are summarized in Tables 1 and 2. The patients operated on were mostly parous, premenopausal (94%) women with a mean age of 46.3 years, and a BMI of 23.2 kg/m^2. Ten women (14.9%) had previous pelvic surgeries; none belonged to the group whose operation was converted to a laparotomy. Majority of the women (55.2%) were admitted for uterine fibroids, followed by adenomyosis (26.9%). One patient underwent a total laparoscopic hysterectomy with prophylactic bilateral salpingo-oophorectomy for a pre-existing breast carcinoma.

Fifty-two patients (77.6%) underwent a successful total laparoscopic hysterectomy, with or without adnexal surgery (Table 3). Of the 52 cases, only 21.2% (n=11) had their vaginal vault

Table 1. Patient characteristics.

Characteristic	TLH	Converted	Total	p value
Age, years (mean ± SD)	46.4 ± 4.9	45.8 ± 4.3	46.3 ± 4.8	0.66
Gravidity	3.1 ± 2.5	2.4 ± 2.2	2.9 ± 2.4	0.32
Parity	2.6 ± 2.0	2.2 ± 2.2	2.5 ± 2.0	0.58
BMI, kg/m^2 (mean ± SD)	23.4 ± 3.8	22.6 ± 4.3	23.2 ± 3.8	0.50
History of previous abdominal surgery (%)	10 (19.2)	0	10 (14.9)	
Previous laparoscopy (%)	0	0	0	
Previous laparotomy (%)	9 (17.3)	0	9 (13.4)	
Previous CS (%)	1 (1.9)	0	1 (1.5)	
History of previous vaginal delivery (%)	42 (80.8)	12 (80.0)	54 (80.6)	
Premenopausal (%)	49 (94.2)	14 (93.3)	63 (94.0)	

SD Standard deviation
BMI Body mass index
CS Cesarean section

Table 2. Primary indications for surgery

Indication	TLH	Converted	Total
Myoma uteri (%)	28 (53.8)	9 (60.0)	37 (55.2)
Adenomyosis (%)	16 (30.8)	2 (13.3)	18 (26.9)
Benign ONG (%)	5 (9.6)	1 (6.7)	6 (9.0)
Pelvic endometriosis (%)	1 (1.9)	3 (20)	4 (6.0)
EM hyperplasia (%)	1 (1.9)	0	1 (1.5)
Prophylactic (%)	1 (1.9)	0	1 (1.5)

ONG Ovarian new growth
EM Endometrial

repaired laparoscopically. Fifteen surgeries were converted to laparotomy, representing a failure rate of 22.4%. Majority (93.3%) of the conversions were due to technical difficulty in performing the hysterectomy due to severe pelvic adhesions (n=5), and large uterine sizes (n=9), both of which distort anatomic landmarks and hamper safe dissection. One surgery was converted due to equipment malfunction (Table 4).

Table 5 illustrates the intraoperative outcome measures gathered. The mean uterine height (10.8cm) and width (8.4cm) did not differ significantly between the TLH group and the converted group. The mean operative time of the converted group (207.7 mins) was comparable to the TLH group (235.6 mins). While the estimated blood loss for the TLH group (337.5 cc) was significantly less than that of the converted group (556.7 cc), the mean postoperative hemoglobin drop between the groups was not significantly different. Of the 7 (10.4%) patients who needed blood transfusion, 5 (9.6% of 52) were from the TLH group, while 2 (13.3% of 15) were from the converted group. The mean hospital and postoperative stay of the patients were 4.7 days and 2.4 days, respectively.

The only intraoperative complication documented was hemorrhage (>1,000 cc blood loss), which accounted for 4.5% (n=3) of the cases: 1 from the TLH group, and 2 from the converted group (Table 6).

Table 3. Surgery performed.

Surgical procedure	Value
TLH (%)	23 (34.3)
TLH + adnexal surgery (%)	29 (43.3)
Vaginal vault closure	
Laparoscopic (%)	11 (21.2)
Vaginal (%)	41 (78.8)
Converted to laparotomy (%)	15 (22.4)

TLH Total laparoscopic hysterectomy

Table 4. Reasons for conversion to laparotomy.

Indication	Value
Technical difficulty (%)	14 (93.3)
Hemorrhage (%)	0
Emphysema (%)	0
Anesthetic problems (%)	0
Urinary tract injury (%)	0
Bowel injury (%)	0
Major vessel injury (%)	0
Equipment malfunction (%)	1 (6.7)

Table 5. Intraoperative outcomes.

Outcomes	TLH	Converted	Total	p value
Uterine height, cm (mean ± SD)	10.7 ± 2.8	11.3 ± 2.8	10.8 ± 2.8	0.51
Uterine width, cm (mean ± SD)	8.2 ± 2.18.	9 ± 2.1	8.4 ± 2.1	0.30
Operation time, min (mean ± SD)	235.6 ± 53.5	207.7 ± 46.9	229.4 ± 53.1	0.06
EBL, cc (mean ± SD)	337.5 ± 208.6	556.7 ± 262.5	386.6 ± 238.1	0.01
Hemoglobin drop, g/L (mean ± SD)	8.3 ± 8.9	10.3 ± 12.5	8.7 ± 9.7	0.55
Need for blood transfusion (%)	5 (9.6)	2 (13.3)	7 (10.4)	
Hospital stay, days (mean ± SD)	4.8 ± 1.3	4.4 ± 1.1	4.7 ± 1.2	0.29
Postoperative hospital stay, days (mean ± SD)	2.4 ± 0.8	2.2 ± 0.4	2.4 ± 0.7	0.12

EBL Estimated blood loss

Table 6. Intraoperative complications.

Complication	TLH	Converted	Total
Hemorrhage (%)	1 (1.9)	2 (13.3)	3 (4.5)
Emphysema (%)	0	0	0
Urinary tract injury (%)	0	0	0
Bowel injury (%)	0	0	0
Major vessel injury (%)	0	0	0
Vaginal injury (%)	0	0	0

There were 2 minor postoperative complications noted (3%) : a vaginal hematoma and a urinary tract infection, both of which occurred in the TLH group of patients. One (1.5%) major postoperative complication, a case of organ space surgical site infection in a patient whose laparoscopic surgery was converted to a laparotomy, necessitated a re-admission, and re-operation. The patient underwent exploratory laparotomy, adhesiolysis, evacuation of abscess, jejunorrhaphy, segmental resection and anastomosis of the jejunum, double barrel sigmoid colostomy, Jackson-Pratt drain insertion (Tables 7, 8, 9).

Discussion

While hysterectomy remains to be a common gynecological surgical procedure, controversy still surrounds the optimal and preferred approach to performing it. With the rapid development of advanced laparoscopic instruments, as well as surgical techniques, laparoscopic hysterectomy is

Table 7. Postoperative complications.

Complication	TLH	Converted	Total
Pyrexia (%)	0	0	0
Surgical site infection (%)	0	1 (6.7)	101 (1.5)
Abdominal (%)	0	1 (6.7)	1 (1.5)
Vaginal (%)	0	0	0
Hematoma (%)	1 (1.9)	0	1 (1.5)
Abdominal (%)	0	0	0
Vaginal (%)	1 (1.9)	0	1 (1.5)
Urinary tract infection (%)	1 (1.9)	0	1 (1.5)
Neurologic injury (%)	0	0	0
Deep venous thrombosis (%)	0	0	0
Re-operation (%)	0	1 (6.7)	1 (1.5)
Re-admission (%)	0	1 (6.7)	1 (1.5)

Table 8. Reasons for re-operation.

Indication	Value
Organ space surgical site infection (%)	1 (1.5)

Table 9. Reasons for re-admission.

Indication	Value
Organ space surgical site infection (%)	1 (1.5)

increasingly gaining more popularity and acceptance among surgeons and patients alike. LH has been associated with less intraoperative blood loss, less postoperative wound infections and febrile episodes, a shorter hospital stay, and quicker return to normal activities compared to laparotomy.[1] In addition, laparoscopic hysterectomy has been found to provide substantial financial benefits to society, with an over-all total reduction in cost compared to the open technique.[16]

Despite the known benefits of laparoscopic surgical approach, laparoscopic hysterectomy cases comprise just a small fraction of the total number of hysterectomy procedures done in the Philippine General Hospital. Only 77 elective total laparoscopic hysterectomy cases were identified between January 1, 2011 and June 30, 2014, and the patients were mostly parous, non-obese, premenopausal women, with non-bulky uterine sizes. Of the 67 cases retrieved, 15 TLH procedures were converted to laparotomy, equivalent to a failure rate of 22.4%. This failure rate however, may have either gone down or up significantly had the 10 missing charts were retrieved, and included in the analysis.

Table 10, adapted from Ng and Chern[1], summarizes published laparoscopic hysterectomy series and their clinical outcomes. In comparison, our failure rate is more the 3 times the greatest percentage of laparotomy conversions reported, and more than 24 times the least. Nonetheless, Figure 2 suggests a decreasing trend in the observed rates of conversion to laparotomy over the study period from 2011 to 2014. In this study, technical

difficulty due to dense pelvic adhesions and large, distorted uteri accounted for almost all conversions to laparotomy. Better preoperative assessment should be employed in order to identify patients at risk for conversion, so that alternative methods may be considered for them.

In a retrospective study of 414 cases[17], the factors found to be independently related to the risk of conversion of TLH to laparotomy included the following: body mass index; uterine width on transvaginal ultrasonography (US) between 8 and 10 cm (adjusted OR 4.01); uterine width on US greater than 10 cm (adjusted OR 9.17); lateral myoma measuring greater than 5 cm on US (adjusted OR 3.57); and history of adhesion-causing abdomino-pelvic surgery (adjusted OR 2.92). In another retrospective study of 288 patients[18], conversion to laparotomy was reported to be due to adhesions (P = 0.000), and heavier uterine weights (331.5 ± 157.1 vs. 270.3 ± 132.5 g, P = 0.038). In this present study, no such correlation was found, probably largely due to the small number of cases included.

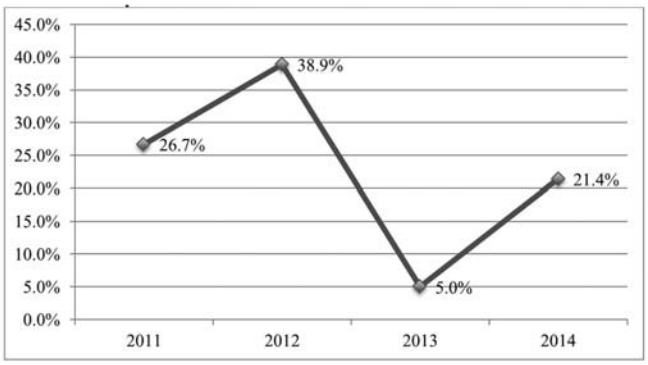

Figure 2. Rate of conversion of total laparoscopic hysterectomy to laparotomy between January 2011 and June 2014.

Of the intraoperative outcome measures, only the estimated blood loss was found to be significantly less in the TLH group compared to the converted group (337.5 ± 208.6 vs 556.7 ± 262.5 cc, P = 0.01). This was also evident in the study by Park, et al.[18], where the estimated blood loss was greater in the failed group (455.6 ± 143.7 vs. 304.2 ± 45.8 ml, P = 0.047). The clinical significance of this result becomes evident when paralleling the converted group to abdominal hysterectomy, favoring the laparoscopic approach in terms of intraoperative blood loss, as suggested by literature.[9] In addition, a Cochrane review[5] found that in the evaluation of 8 trials including 641 women, LH was associated with significantly fewer blood transfusions than AH (OR 0.50).

The mean operative time for the TLH group of 235.6 minutes (range 151 to 410 minutes) is at least double those tabulated by Ng and Chern[1] (Table 10), and those reported by the Cochrane review.[5] This discrepancy supports what previous studies[19,20,21] have highlighted regarding the learning curve effect in TLH, and the impact of surgical experience on operative times and complication rates.

Of the successful laparoscopic hysterectomies performed, only 1 intraoperative complication was reported (hemorrhage). No case of emphysema, bowel injury, major vessel injury, or vaginal injury was incurred. Urinary tract injuries, the visceral injury found to be significantly increased in LH compared to AH[5], were not observed, as well. The anticipation of such intraoperative complications may account for the

Table 10. Published series of laparoscopic hysterectomies.[1]

	N	Mean operating time (min)	Laparotomy conversion N (%)	Mean hospital stay (days)	Major complication rate N (%)
Ng	512	133	9 (1.8)	2.7	26 (4.5)
Cook	424	122	4 (0.9)	3.4	18 (4.2)
Wattiez	1,647	101	41 (2.5)	?	66 (4.0)
Chapron	313	141	21 (6.7)	3.3	27 (8.6)
Garry	920	83	32 (3.5)	3.0	101 (11.0)

frequent, and early decision to convert to laparotomy, ultimately effecting a high failure rate.

Postoperatively, 2 minor complications were incurred in the group who underwent a successful TLH, including a vaginal hematoma in a patient on whom an episiotomy was performed in order to deliver the uterus vaginally. The major complication of organ space surgical site infection, which required re-admission, re-exploration and major bowel surgery, was noted in a patient whose surgery was converted to a laparotomy early. This, therefore, may have been incurred from the laparotomy, or after.

Overall, results of this analysis may serve as guide for gynecologic laparoscopists, especially in doing preoperative evaluation of candidates for TLH, and avoid conversion to laparotomy. The small number of cases precludes a more definite interpretation of results, so the authors recommend a follow-up study with more TLH procedures, ideally engaging a multi-center collaboration to pool all results from more institutions and test the robustness of this study's findings.

Conclusion

The patients admitted at the UP-PGH Department of Obstetrics and Gynecology who successfully underwent a TLH procedure were mostly parous, non-obese, premenopausal women, with non-bulky uterine sizes. Myoma uteri and adenomyosis were the most common indications for surgery. Our institution recorded a failure rate of 24.4%, with conversions to laparotomy largely due to severe pelvic adhesions, and large uterine sizes. Patients who underwent successful TLH had significantly less intraoperative blood loss compared to patients whose surgeries were converted to laparotomy.

The high conversion rate seen in this study may be due to the surgeons' limited experience in this relatively new procedure. To overcome the steep learning curve of this alternative procedure, the department needs more cases, carefully selected and thoroughly evaluated, to improve intraoperative and postoperative outcomes.

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