Journal of Minimally Invasive Gynecology (2007) 14, 334–338

THE JOURNAL OF MINIMALLY INVASIVE GYNECOLOGY

What is the value of preoperative bimanual pelvic examination in women undergoing laparoscopic total hysterectomy?

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KEYWORDS:
Bimanual examination;
Uterine size/weight;
Operating time;
Estimated blood loss;
Laparoscopic hysterectomy

Abstract

OBJECTIVE STUDY: To estimate the value of preoperative bimanual examination of the pelvis in women undergoing total laparoscopic hysterectomy (TLH).

DESIGN: Prospective observational cohort study.

SETTING: Private hospitals and centre.

PATIENTS: One hundred fourteen consecutive women undergoing TLH.

INTERVENTION: All women who were scheduled to undergo TLH from May 2005 through June 2006 had a bimanual examination of the pelvis performed before surgery and the size of the uterus clinically estimated and recorded as gestational equivalents. The operating time, the estimated blood loss (EBL) during TLH, and the final weight of the uterus at histologic study were recorded. Spearman correlation coefficient analysis was used to determine whether there was a correlation between the estimated uterine size before surgery and actual uterine weight, operating time, and EBL.

MEASUREMENTS AND MAIN RESULTS: Of the one hundred fourteen consecutive women eligible for the study, 75 had complete data and therefore were included in the final analysis. The median age was 46 years (range 34–71 years); 22.7% (17/75) had a clinically estimated normal uterus, 10.7% (8/75) had an 8–10/40 uterus, 12% (9/75) had a 10–12/40 uterus, 14.6% (11/75) had a 12–14/40 uterus, 20.0% (15/75) had a 14–16/40 uterus, 9.3% (7/75) had a 16–18/40 uterus, and 10.7% (8/75) had an 18–20/40 uterus. The median operating time was 110 minutes (range 59–240 minutes); the median EBL was 80 mL (range 20–1000 mL); and the median weight of the uterus was 181 g (range 52–1080 g). Histologic diagnoses included leiomyomata in 64.0% (48/75), adenomyosis in 44.0% (33/75), endometriosis in 22.7% (17/75), endocervical polyp in 4.0% (3/75), and normal uterus in 8.0% (6/75). The Spearman correlations between clinical size of the uterus and the weight of the uterus, the EBL, and the operating time were 0.81, 0.33, and 0.29, respectively; that is, the 2 variables tended to increase together. These correlations were all significant ($p < .0001$, .0044, and .0114, respectively).

The authors have no commercial, proprietary, or financial interest in the products or companies described in this article.

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Submitted August 4, 2006. Accepted for publication December 4, 2006.

1553-4650/$ -see front matter © 2007 AAGL. All rights reserved.
doi:10.1016/j.jmig.2006.12.001

CONCLUSIONS: This study showed significant correlation between clinical estimate of uterine size and histologic weight of the uterus, operating time, and EBL in women undergoing laparoscopic hysterectomy. These findings are of great value in preoperative counseling in relation to the risk of bleeding and the potential need for blood transfusion, and in operating room planning.
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Women who present with gynecologic symptoms routinely undergo bimanual examination of the pelvis. This is done to estimate the uterine size, palpate the adnexal region for disease, and assess for the presence or absence of pelvic tenderness. As such, bimanual examination has been shown to be more accurate in uterine assessment than adnexal evaluation.[1] Uterine size estimate by bimanual pelvic examination has been found to correlate well with preoperative ultrasound assessment in women with leiomyomata.[2,3]

Clinical estimation of uterine size is routinely performed and recorded in antenatal assessments in terms of gestational weeks. Significant correlation has also been shown in a recent study performed on a first trimester population between bimanual examination and ultrasound estimation of gestational age.[4]

Although there is evidence that correlates bimanual clinical estimation of uterine size with actual uterine weight,[5] there are no published data that compare preoperative estimation of uterine size with operating time and estimated blood loss (EBL). The aim of this study was to evaluate whether there was a correlation between estimated clinical size of the uterus and the operating time, as well as EBL in women who subsequently undergo total laparoscopic hysterectomy (TLH). This would establish whether a preoperative bimanual examination of the pelvis in the outpatient setting is necessary in women who undergo TLH.

Methods

We undertook a prospective observational study of all women who were scheduled for TLH at the Centre for Advanced Reproductive Endosurgery, Sydney, from May 2005 through June 2006. All women who were planning a TLH underwent a bimanual examination of the pelvis in the outpatient setting before surgery by the same clinician (A.L.). The examination was explained to the women, and verbal consent was obtained before the bimanual examination was performed. Wearing disposable gloves, the clinician gently parted the labia minora with the left hand and placed 2 fingers (index and long finger) of the examining right hand inside the vagina and into the posterior fornix. The left hand was then placed on the lower abdomen, between the umbilicus and pubic symphysis, and the uterus was balloted between the 2 hands to estimate the size of the uterus. The estimated clinical size of the uterus was then recorded before surgery. The uterine size was recorded in terms of gestational weeks, for example, if the uterus was estimated to be a 10-week size, then this was recorded as 10/40 size. For the purposes of this study, a normal-size uterus was a 6/40 size.

The estimated clinical size of the uterus was then compared with the final weight of the uterus in grams at histologic examination, as well as the operating time in minutes and the EBL in mL. The EBL was based on "visual estimation of blood loss," and we discuss the limitations of such an approach in the discussion. Those women who had complete data for age, preoperative clinical estimation of uterine size, uterine weight, operating time, and EBL were included in the final analysis. All the aforementioned data were transferred into Microsoft Excel, version 2002 (Microsoft Corporation, Redmond, WA).

Scatter plots were created for each pair: estimated uterine size versus operating time, EBL, and uterine weight, respectively. We also generated a smoothed curve on each of the scatter plots on the basis of a spline method.[6] This smoothed curve served to give an idea about the relationship between the 2 variables; it was not our aim to formally develop a regression model to predict the outcome measurements.

Spearman correlation coefficient (r) analysis was used to determine whether there was a correlation between the preoperative estimated uterine size and actual uterine weight, operating time, and EBL. Statistical analyses were conducted with Statistical Analysis System, Version 9.1 (SAS, Cary, NC).

Results

One hundred fourteen consecutive women were eligible for the study. Seventy-five women had complete data for age, preoperative clinical estimation of uterine size, uterine weight, operating time, and EBL; therefore these were included in the final analysis. The median age of these women

Table 1 Estimated size of uterus clinically (n = 75)

Size of uterus	No.	%
Normal size	17	22.7
8–10 weeks	8	10.7
10–12 weeks	9	12.0
12–14 weeks	11	14.6
14–16 weeks	15	20.0
16–18 weeks	7	9.3
18–20 weeks	8	10.7

Table 2 Spearman correlations between clinical size of uterus and outcome measurements

Correlation between size of uterus and	No.	Correlation coefficient	p
Estimated blood loss	75	0.33	.0044
Operating time	75	0.29	.0114
Weight of uterus	75	0.81	<.0001

was 46 years (range 34–71 years). Clinical estimates of size of the uterus are shown in Table 1.

The median operating time was 110 minutes (range 59–240 minutes); the median EBL was 80 mL (range 20–1000 mL); and the median weight of the uterus was 181 g (range 52–1080 g). Histologic diagnoses included leiomyomata in 64.0% (48/75), adenomyosis in 44.0% (33/75), endometriosis in 22.7% (17/75), endocervical polyp in 4.0% (3/75), and normal uterus in 8.0% (6/75).

The Spearman correlation between the estimated clinical size of the uterus and the operating time (0.29) and EBL (0.33) was moderate. The Spearman correlation between estimated size and weight of the uterus (0.81) was very strong. All 3 correlations were found to be statistically significant for each outcome measurement (Table 2).

Scatter plots were created for each pair: estimated uterine size versus operating time, EBL, and uterine weight, respectively (Figures 1–3). As the estimated uterine size increased, so too did the operating time (Figure 1). As the clinically estimated uterine size increased, so too did the actual uterine weight and the EBL; however, this effect appeared to be greater for clinically larger estimated uteri (Figures 2 and 3). Note that the graph concerning EBL has 1 case with an estimated blood loss of 1000 mL, which is an outlier compared with the other cases. Because the Spearman correlation coefficient uses the ranks instead of the actual values, it is therefore not influenced by the outlying value.

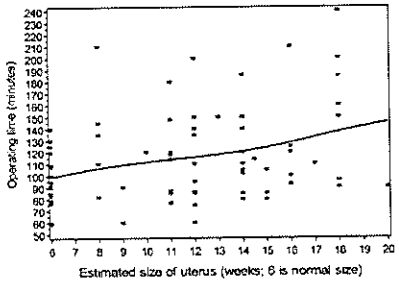


Figure 1 Scatter plot showing estimated uterine size and operating time.

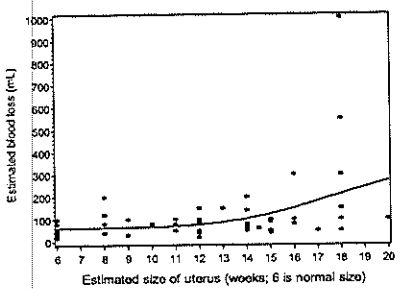


Figure 2 Scatter plot showing estimated uterine size and estimated blood loss.

Discussion

This is the first study to prospectively evaluate the correlation between size of the uterus estimated before surgery and operating time, as well as EBL in women who undergo TLH. As the clinical estimation of uterine size increases, so too do the operating time and the EBL. Interestingly, this positive effect seemed to be greater as the clinical estimation of uterine size increased. On the basis of the results of this study, performing a bimanual examination in the outpatient setting is justified in our TLH population.

Bimanual examination of the pelvis is routinely performed as a method of assessing the size of the uterus. It is also used to check for adnexal masses and pelvic tenderness. Although such examination has been shown to be of limited value in evaluating the adnexal region,[7] determining the location of leiomyomata, and distinguishing between adenomyosis and leiomyomata, bimanual examination is, however, a reliable way to estimate the actual weight of the uterus.[5,8] Uterine mobility and even body mass index (BMI) are important variables that contribute to preoperative planning for TLH. These factors were not studied in the context of this trial; however, they would be worth evaluating in future studies.

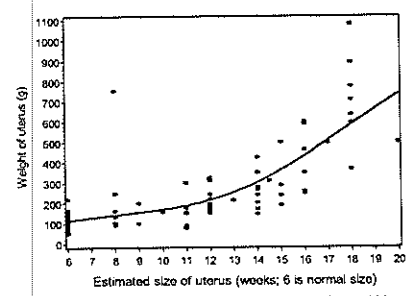


Figure 3 Scatter plot showing estimated uterine size and histological weight of uterus.

For more accurate assessment of the adnexal region,[9–11] location and measurement of leiomyomata,[12] or determination of the presence or absence of adenomyosis,[13] the use of transvaginal ultrasonography is advocated as an adjunct to the clinical examination. There is substantial evidence to support the use of transvaginal ultrasonography in the management of women with acute and chronic pelvic pain,[14–19] as well as women with abnormal uterine bleeding.[20–25] Transvaginal probes produce high-resolution images of the pelvic organs, providing reliable and reproducible information. Transvaginal ultrasonography also provides an accurate assessment of the adnexa, both in the nonpregnant and pregnant woman.[9–11] Experienced sonographers can characterize benign adnexal disease, as well as reliably differentiate malignant from benign masses in most cases.[26]

The correlation between size of the uterus and operating time estimated before surgery was very strong. This correlation was moderate when we evaluated the relationship between size of the uterus and histologic uterine weight estimated before surgery, as well as EBL. As the clinical estimation of uterine size increased, so too did the effect on the EBL (Figure 2) and histologic uterine weight (Figure 3). Figure 1 suggests an almost linear relationship between the clinical estimation of uterine size and operating time. If these findings are confirmed in other surgical centers, then such information may be helpful in predicting the operating time for women undergoing TLH on the basis of clinical uterine size estimate. In addition, it may also help estimate the intraoperative blood loss and, hence, the risk of blood transfusion.

We acknowledge the limitations of visually estimating the blood loss during surgical procedures. This has long been known to be imprecise, inaccurate, and often underestimated. In a recent study, errors in estimating blood loss were found to be dependent on actual blood loss volume, and blood loss was overestimated at low volumes and underestimated at high volumes.[27] In our study, almost all the women had an EBL less than 200 mL, and we therefore believe that the EBL if anything was overestimated rather than underestimated. Notwithstanding this, the relationship between the clinical estimation of uterine size and EBL is representative.

We acknowledge that these results are specific to this unit, and extrapolation of these data to other units may not be applicable. We believe that each laparoscopist must correlate his or her own preoperative bimanual examination findings with their own surgical outcome measures. At our center, we advocate TLH with laparosonic coagulating shears (Ethicon Endosurgery, Cincinnati, OH) and bipolar diathermy forceps (B-Braun; Aesculap, Tuttlingen, Germany). The technique is reproducible, efficient, and safe. In our experience, the choice of total laparoscopic route helps avoid a separate vaginal setup and the vaginal steps of laparoscopic-assisted vaginal hysterectomy. This in turns means the procedure is predictable, with both the operating time and estimated blood loss being shown to be related to the preoperative estimation of uterine size.

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