

Comparison of Cost-Effectiveness And Clinical Outcomes of Abdominal, Vaginal And Total Laparoscopic Hysterectomy In A Selected Group

Abdominal, Vajinal Ve Total Laparoskopik Histerektominin Maliyet Etkinliklerinin ve Klinik Sonuçlarının Seçili Hasta Grubunda Karşılaştırılması

Çetin KILIÇÇI ¹, Evrim Bostancı ERGEN ¹, Mesut POLAT ¹
Aysen BOZA ¹, Çiğdem Yayla ABİDE ¹

1. Zeynep Kamil Research Hospital, Department of Obstetrics and Gynecology, İstanbul, Türkiye

ABSTRACT

Objective: The aim was to compare the perioperative and postoperative outcomes of total laparoscopic hysterectomy (TLH), total abdominal hysterectomy (TAH), and vaginal hysterectomy (VH) in a selected group of patients.

Material and Methods: Two hundred twenty-three hysterectomies were included in this study. The patients were separated into three groups. Group 1 included patients with TLH (n=63); TAH patients were placed in Group 2 (n=133), and Group 3 was made up of patients who underwent VH (n=37). All three groups had similar ages, parities, and uterine sizes. The main outcome measures were operation time, fever, need for analgesia, duration of hospital surveillance, return to work time, perioperative and postoperative complications, the number of blood transfusions, and costs of the surgery.

Results: The total operation time was the shortest in the VH group. There was no significant difference in the hospital surveillance duration between the three groups. The VH was found to be the cheapest type of hysterectomy. When the VH group was compared with the TLH group, there was no difference in the use of analgesics for postoperative pain or the time return to work. The VH group patients required more blood transfusions in contrast with the TAH (p=0.001) and TLH groups (p<0.001).

Conclusion: VH had similar operative and postoperative outcomes but the shortest duration of operation and the lowest surgical cost compared with the other two techniques.

Keywords: total laparoscopic hysterectomy, total abdominal hysterectomy, vaginal hysterectomy, cost-effectiveness, complication

ÖZET

Amaç: Total laparoskopik histerektomi (TLH), total abdominal histerektomi (TAH) ve vajinal histerektominin (VH) perioperatif ve postoperatif sonuçlarını; seçili hasta grubunda karşılaştırmaktır.

Gereçler ve Yöntem: 223 histerektomi çalışmaya dahil edildi. Hastalar üç gruba ayrıldı. Grup 1'de TLH (n = 63); Grup 2'de TAH (n = 133), Grup 3 ise VH (n = 37) yapılan hastalardan oluşuyordu. Her üç grubun da benzer yaş, parite ve uterus boyları vardı. Başlıca değerlendirilen ölçütler; ameliyat süresi, ateş, analjezi gereksinimi, hastanede kalış süresi, işe geri dönüş süresi, perioperatif ve postoperatif komplikasyonlar, kan transfüzyonu sayısı ve ameliyat masrafları idi.

İletişim Bilgileri

Sorumlu Yazar: Evrim Bostancı ERGEN

Yazışma Adresi: Zeynep Kamil Research Hospital, Dept. of Obstetrics and Gynecology, Üsküdar, İstanbul 34668, Türkiye
E-posta: evrimbostanc6666@gmail.com

Tel: +90 (216) 391 06 80

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Bulgular: Operasyon süresi VH grubunda en kısa idi. Üç grup arasında hastanede kalış süreleri açısından anlamlı farklılık saptanmadı. VH en ucuz histerektomi tipi idi. VH grubu TLH grubuyla karşılaştırıldığında; analjezik gereksinimi ve işe geri dönüş süresi açısından istatistiksel fark tespit edilmedi. VH grubunda; TAH (p = 0.001) ve TLH gruplarına kıyasla daha fazla kan transfüzyonu gerektiği saptandı (p < 0.001).

Sonuç: VH diğer iki teknik ile karşılaştırıldığında en kısa operasyon süresi ve en düşük cerrahi maliyete sahipken; benzer perioperatif ve postoperatif sonuçlar saptandı.

Anahtar Kelimeler: laparoskopik histerektomi, abdominal histerektomi, vajinal histerektomi, maliyet etkinliği, komplikasyon

INTRODUCTION

Hysterectomy is the most common gynecological surgery in the world. In the United States (US) alone, almost 600,000 hysterectomies are carried out each year (1, 2). One of three approaches is typically selected: total abdominal hysterectomy (TAH), vaginal hysterectomy (VH), or total laparoscopic hysterectomy (TLH). The approach choice is based on various factors, including the uterine size, surgeon's experience, and patient properties. Minimal invasive surgical procedure tendency has been increasing during the past decade, laparoscopic hysterectomy was first reported in 1989 (3).

Many recent reviews have aimed to determine the optimal surgical procedure for hysterectomy, including the Cochrane Collaboration. VH is recommended over TAH when feasible (4-7). TLH is associated with a faster recovery time and less post-operative pain but also has some disadvantages, such as a longer operation time, a greater rate of complications, and higher hospital costs (3, 6, 8). VH requires a shorter time to perform and carries lower costs compared with TLH. No noticeable difference in complication rates or quality of life have been reported between VH and TLH (9). TLH and VH have been associated with similar hospital stays and postoperative recovery times (10-12).

The aim was to compare the perioperative and postoperative outcomes of VH, TAH, and TLH at a single center in a selected group of patients. Thus, we aimed to evaluate the benefits and disadvantages of different surgical hysterectomy techniques.

MATERIAL AND METHODS

This was a prospective comparative study conducted using data from 233 hysterectomies performed during the period from July 1, 2013, to February 28, 2014, at the gynecology clinic of our hospital. The study was approved by Zeynep Kamil Research and Education Hospital Ethical Committee (18.12.2012/22249). All patients were scheduled for hysterectomies for benign reasons. The inclusion criteria were as follows: patients who had given birth to at least two children vaginally, were currently at least 55 years old, had no cardiac or pulmonary diseases, exhibited hemoglobin levels > 11 mg/dl, had a uterine size < 16 weeks of pregnancy, displayed no contraindications for being placed in the lithotomy position, and were indicated for a hysterectomy due to meno-metroragia that was resistant to medical treatment. Any patients with a malignancy, who required an additional operation beside hysterectomy (such as salpingo-oophorectomy), had a large uterine size (> 20 weeks of pregnancy), reported a history of two or more caesarean sections, had a history of previous abdominal surgery, or who had been diagnosed with an autoimmune disease or a coagulation disorder were excluded from the study. Detailed history of each patient was receipted. The physical examination was performed to evaluate the size of the uterus, flexibility, descent and depth of posterior fornix. A transvaginal ultrasonography was performed to evaluate the size of the uterus and any gross adnexal pathology. The preoperative laboratory investigation included hemoglobin values. The patients were divided into three groups: Group 1 included patients who received TLH ($n=63$), Group 2 was made up of those who underwent TAH ($n=133$), and Group 3 included patients who received VH ($n=37$).

All operations were performed by the same experienced surgeons who had performed more than 100 prior TLH, TAH, or VH operations. Informed consent for all procedures was obtained. All patients were admitted to the hospital one day before surgery.

Measurement

The main outcome measures were as follows:

1. The duration of the operation as minutes (from the first incision to the last suture).
2. The need for blood transfusion (by measuring preoperative and 24 hours after the end of surgery).
3. Febrile morbidity (defined as temperature of 38.8°C or higher in two measurements at least 6 h apart).
4. Perioperative and postoperative complications (bowel and urinary tract injury, laparotomy in cases of VH or TLH or relaparotomy in the TAH group and wound infection).
5. The need for analgesics (for postoperative pain management).
6. Postoperative hospitalization duration (in days).
7. Late postoperative complications (The patients were followed up at one and six weeks after the surgery to identify any further complications).
8. Costs of each procedure (The hospital costs were obtained from the hospital billing center).

Measurement

The statistical significance level was set at 0.05. All analyses were performed using the Statistical Package for the Social Sciences (SPSS) software for Windows (ver. 19.0). Descriptive statistical methods (mean and standard deviation) were used to evaluate the data. Mann-Whitney U and Ki kare test were used for nonparametric variables for statistical analyzes.

RESULTS

The patients' ages were ranged from 40–55 years. There was no statistically significant difference among the groups for mean age, mean uterine weight, or parity (Table I). The total operation time was the shortest in the VH group. There was no significant difference in the length of hospitalisation duration or the need to use analgesic for postoperative pain between the three groups. The return to work time in the TLH and VH groups was significantly shorter than that of the TAH group. The VH was the least expensive procedure, while the TLH was the most costly hysterectomy type (Table II).

When the VH group was compared with the TLH group, there was a significant difference in the total operation time and also the cost of the surgery, but we observed no differences in using analgesic for postoperative pain or in return to work time in these groups. However, there was a significant difference in the cost of surgery, the return to work time, and the use of analgesics for postoperative pain between the VH and the TAH groups. We also found a significant difference in total operation time, cost of surgery, and need for analgesics to control postoperative pain between the TLH and the TAH group, but there were no differences in the amount of time before patients were able to return to work in these two groups.

There were also no significant differences between the three groups regarding wound infection ($p=0.190$), fever ($p=0.532$), or bladder or bowel injury ($p=0.071$). VH group patients required more transfusions compared with the TAH ($p=0.001$) and TLH groups ($p<0.001$). The amount of blood loss was greater in the VH group than it was for the TAH and TLH groups, but there was no significant difference between the TLH and TAH groups ($p=0.168$). There was no mortality in any of the participants. Additionally, no patient required reoperation in any of the three groups.

Table I: Preoperative patient characteristics.

	VH($n=37$)	TLH($n=63$)	TAH($n=133$)	p
Age	48.4 \pm 3.4	46.8 \pm 4.1	47.7 \pm 4.0	0.146 (NS)
Parity	2	2	2	NS
Uterine weight (grams)	260.8 \pm 142.9	320.4 \pm 134.4	295.4 \pm 119.0	0.079 (NS)
Preoperative hemoglobin	11.5 \pm 1.7	11.8 \pm 1.4	11.7 \pm 1.7	0.635 (NS)

NS: not significant.

Table II: Characteristics and clinical variables of the study participants.

	VH	TLH	TAH	p
Operation time (min)	82.2±22.4	109.7±32.1	89.1±20.8	<0.0001
Analgesia for postoperative pain (amp)	4.2±1.6	4.6±1.4	4.7±1.4	0.206
Hospitalisation duration (days)	2.4±1.0	2.3±0.6	2.5±0.7	0.075
To return to worktime (days)	6.8±1.7	7.3±1.9	8.7±2.9	<0.0001
Cost of surgery (TL)	893.4±178.6	1695.7±630.1	1052.0±114.4	<0.0001

DISCUSSION

In our comparative prospective study, we aimed to compare outcomes especially about cost-effectiveness between TLH, VH, and TAH performed at a single center with same surgeons in a group of patients with similar ages, parities, and uterine sizes. The VH group had the shortest operation time, the lowest cost of surgery, a similar time for the return to work time, a similar postoperative pain level but the highest incidence of blood transfusions compared with the TAH and TLH groups. Nieboer et al. previously reported that only a few randomized studies have compared more than two different surgical methods of hysterectomies (13). To our knowledge, few have directly compared the TLH, VH, and TAH procedures (11, 14-17).

We observed that the operation time was significantly shorter in the VH than in the TLH groups, while the postoperative pain and the return to work time was almost the same in the TLH and VH groups. Similarly, Sesti et al. reported that the length of hospitalisation duration was significantly shorter in patients who underwent VH than it was for those who had TLH or LAVH ($p=0.01$ and $p=0.000$, respectively), but almost the same between TLH and LAVH patients ($p=0.58$). They also reported that the operation time was significantly shorter with VH ($p=0.000$) than it was for TLH and LAVH. These researchers concluded that TLH had no specific advantage when compared with VH and LAVH (17). Sesti et al. highlighted that VH had the shortest operation time of all hysterectomy procedure types (18).

In our study, we observed no significant difference between bladder and bowel injuries between three groups; in contrast, Makinen et al. analyzed 2434 laparoscopic hysterectomies and reported a two-fold increase in bladder injuries in TLH compared with TAH (19). Johnson et al. suggested at their meta-analysis that the urinary complication rate was significantly higher with laparoscopy (7). In contrast, Donnez et al. highlighted that major complication rates in TLH were lower than those reported for TAH and VH (20). Walsch et al. highlighted that minor perioperative complications, blood loss, and a longer hospitalisation duration were more common in the TAH group than in TLH group (21). Allam et al. found that perioperative complications were lower in TLH patients than they were for those who underwent TAH or VH (14).

Young et al. analyzed 39 papers and reported that the outcome of TLH was similar to that of TAH (22), which was in agreement with our study results. Doganay et al. observed that TLH and VH had better outcomes than TAH and concluded that there was no absolute proof of the advantages of any one hysterectomy technique over another (23). Drahonovsky et al. reported at their prospective randomized study that TLH did not show a specific advantage when compared with LAVH and VH (24). Such as we also did not observe any advantages of the TLH procedure.

In our study, VH was the cheapest hysterectomy technique. Similarly, Lenihan et al. reported that the cost of VH was significantly lower than both TAH and LAVH, but the return to work time was significantly longer in the VH group than it was in the LAVH group, while the time was similar amongst VH and TAH patients (25).

In contrast to the published literature, we observed more blood transfusions in VH patients than in the TLH and TAH groups. However, Sesti et al. highlighted that VH was linked with less blood loss when compared with TLH (18). Doğanay et al. reported that VH group patients required fewer transfusions than patients in the TAH and TLH groups ($p<0.05$) (23).

There was a limitation of our study. Small number of patients included in this study limits the generalizability of our results to a larger population.

Our study agrees with some prior studies in the literature (17, 18, 24) that VH should be selected as a hysterectomy technique when feasible because it was associated with the shortest operation time and almost the same length of hospitalisation duration and it had the lowest cost. Johnson et al. reported that no evidence supports the use of laparoscopic hysterectomy instead of VH (7). Therefore, TLH maybe recommended instead of TAH in cases where VH is not feasible (24).

CONCLUSION

The VH group demonstrated similar outcomes but especially the lowest cost of surgery compared with TAH and TLH patients. We observed no specific advantages of TLH over VH.

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