

Abdominal, vaginal and total laparoscopic hysterectomy: perioperative morbidity

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Abstract

Purpose The aim of our retrospective study was to assess and to compare the surgical complications of hysterectomy regarding the choice of procedure [abdominal (AH), vaginal (VH), and total laparoscopic hysterectomy (TLH)].

Methods A total of 6,480 patient charts undergone hysterectomy were retrospectively analyzed. Data including transfusion, bladder, ureteral and bowel injury, cuff dehiscence, pulmoner embolus, febrile morbidity, hematoma, reoperation, pelvic wall problems were gathered. The Chi-square test and Student's *t* test were used in the statistical analysis.

Results The most common perioperative complication was blood transfusion which occurred in 114 patients (2.6%). VH patients required significantly less blood transfusion than AH (2.1, 2.6%, respectively). AH had significantly more bladder injury than VH (0.7, 0.4%, respectively). AH had significantly more ureteral injury than VH (0.2, 0.1%, respectively). AH had the same bowel injury as VH (0.1%). AH and VH necessitated significantly more reoperation than TLH (0.4, 0.2, 0.0%, respectively).

Conclusion To our study, VH ensures less complication rates than AH. In experienced centers, VH can be a reliable alternative to AH. Controlled prospective studies with large

patient volumes are required to compare TLH and VH according to complication rates.

Keywords Hysterectomy · Complication · Laparoscopic · Vaginal · Abdominal

Introduction

Hysterectomy is the most frequent major gynecological operation worldwide. There is still no consensus on the optimum method of hysterectomy [1]. There are lots of randomized studies comparing outcomes of various types of hysterectomies [2–4]. Abdominal hysterectomy (AH), vaginal hysterectomy (VH) or total laparoscopic hysterectomy (TLH) can be chosen contingent on the indication for surgery, uterine size, surgeon's experience, and patient characteristics and the preference. Abdominal approach is still the choice of procedure at the majority of hysterectomies.

Abdominal and vaginal hysterectomies have been performed for centuries [5]. However, TLH was introduced by Reich [6]. TLH is a reliable and less invasive alternative to especially AH and has better postoperative recovery, reduced need of analgesics and shorter hospital stay [7–11]. VH is associated with shorter operating time and lower costs when compared with TLH [12].

The aim of our retrospective study was to compare the operative data and postoperative outcomes of VH, AH, and TLH at a single center in a given period of time.

Methods

We analyzed the surgical reports and files of all patients' undergone hysterectomies for benign reasons between

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January 2001 and December 2009 at the gynecology clinic of Zekai Tahir Burak Women Health Education and Research Hospital, Ankara, Turkey. Patients with malignancy, additional operation beside hysterectomy, autoimmune disease, and coagulation disorders were excluded from the study. The study group consisted of 6,480 cases. The operations were performed by seven consultant gynecologists and their senior residents and fellows. Informed consent for all operations was warranted.

Of the 6,480 procedures, 4,398 (67%) were AH, 1,944 (30%) were VH, and 138 (2.1%) were TLH. In our hospital VH is preferred in patients with pelvic relaxation and no known malignancy. VH has performed about 90 min in our institute. If other interventions such as anterior and posterior colporrhaphy have been added to the surgery operation time is extended about 35 min. AH is preferred in patients with large uteruses (>12 weeks of gestation), previous pelvic surgery and malignancy suspicion. TLH is preferred in patients with benign adnexial masses, small uterus and no previous pelvic surgery. In our institute, THL has been performed since 2008. Only two surgeons could perform this kind of surgery because of its learning curve. Surgeons have learned the surgery by performing 20 THL operations in a 6-month period. In TLH surgeries, vaginal vaults have been closed laparoscopically in 91 patients (66%) and by vaginal interference in 47 patients (34%). None of the patient showed vaginal cuff perforation.

We compared the perioperative and early postoperative complications among the hysterectomy groups. Hemoglobin levels, incidence of complications including urinary tract injury (bladder and ureteral injury), bowel injury, and hemorrhage >500 ml were compared in the perioperative period. The reoperation rates among the groups were also assessed. Early postoperative period covered the complications within the first postoperative 7 days. Secondary outcomes as duration of the operations, uterus weight, hospital stay, analgesic need, and perioperative Hb levels were also assessed.

Data were processed via the SPSS software (version 11.0; SPSS Inc, Chicago, IL) statistic program. The Chi-square test and Student's *t* test were used for statistical comparison and $p < 0.05$ was accepted as significant.

Results

Of the 6,480 hysterectomies, the choice of the procedure was AH in 4,398 (67.8%) cases, VH in 1,944 (30%), and TLH in 138 (2.1%). Indications for hysterectomy are shown in Table 1.

There found to be no significant difference among patients regarding their characteristics those undergone different hysterectomies, however, AH group had higher body mass index (>30) rates than the others ($p = 0.04$) (Table 2).

The most frequent concomitant procedures included in the VH were anterior colporrhaphy (73%) and posterior colporrhaphy (68%) (Table 3).

Perioperative major and minor complications of the different hysterectomy methods are shown in Table 4. Perioperative complication rate of the total group was 5.6% ($n = 369$). The most common intraoperative complication was blood transfusion which necessitated in 156 patients (2.4% of whole group), however 114 patients (2.6%) were in the AH group, 40 patients (2.1%) in the VH group, and 2 patients (1.4%) in the TLH group. VH group patients had less transfusion need comparing AH and TLH groups ($p < 0.05$).

Bladder injury occurred in 38 patients (0.5% of whole group), including 30 patients (0.7%) in the AH group, 7 patients (0.4%) in the VH group, 1 patient (0.7%) in TLH group. AH group had the same bladder injury rate with TLH.

Ureteral injury occurred in ten patients (0.1% of whole group) and composed of eight patients (0.2%) in the AH group and two patients (0.1%) in the VH group. Ureteral

Table 1 Indications of hysterectomy

Indications	Abdominal hysterectomy ($n = 4,398$)	Vaginal hysterectomy ($n = 1,944$)	Total laparoscopic hysterectomy ($n = 138$)
Uterus fibroids	2,331 (53%)	447 (23%)	65 (47%)
Adenomyosis	483 (11%)	175 (9%)	16 (12%)
Excessive anemia ^a	572 (13%)	117 (6%)	8 (6%)
Endometriosis	527 (12%)	–	7 (5%)
Tubo-ovarian abscess	353 (8%)	–	6 (4%)
CPP ^b	132 (3%)	–	15 (11%)
Uterovaginal prolapse	–	1,205 (62%)	–
Adnexial mass	–	–	21 (15%)

^a Meno-metroragia resistant to medical treatment

^b Chronic pelvic pain

Table 2 Distribution of patient's characteristics

	Abdominal hysterectomy (<i>n</i> = 4,398)	Vaginal hysterectomy (<i>n</i> = 1,944)	Total laparoscopic hysterectomy (<i>n</i> = 138)	<i>p</i>
Age				
Range	41–67	40–79	42–61	
Mean age (years) + standard deviation	53.76 ± 4.91	54.32 ± 8.46	52.78 ± 6.31	0.53
Parity				
Range	1–8	2–7	1–6	0.230
Mean	3.4	3.1	2.9	
Standard deviations	0.86	0.81	0.76	
Body mass index (BMI)				
<25	616 (14%)	350 (18%)	18 (13%)	0.12
25–30	3,254 (74%)	1,477 (76%)	114 (83%)	0.16
>30	528 (12%)	117 (6%)	6 (4%)	0.04

Table 3 Concomitant procedures performed with vaginal hysterectomy

Anterior colporrhaphy	1,419 (73%)
Paravaginal repair	136 (7%)
Posterior colporrhaphy	1,322 (68%)
Vaginal vault suspension ^a	466 (24%)
Oophorectomy	38 (2%)
Anal sphincteroplasty	19 (1%)

^a Includes uterosacral vaginal vault suspensions and sacrospinous ligament fixation

injury was not encountered in TLH group, however, AH group had higher ureteral injury rates than the others ($p < 0.05$).

Bowel injury occurred in six patients (0.09% of whole group), composed of four patients (0.1%) in the AH group, two patients (0.1%) in the VH group. There was no bowel injury in TLH group.

Of the whole group, 22 patients (0.3%) underwent reoperation and it composed of 18 patients (0.4%) from the AH group, 4 patients (0.2%) from the VH group. The indication for reoperations was intraabdominal bleeding.

Additionally, there were 12 (0.2%) abdomen wall problems, 4 (0.09%) necrotizing fasciitis, 6 (0.1%) hematoma and 2 (0.04%) patients had dehiscence in AH group.

Secondary outcomes regarding operations are shown in Table 5.

There was no mortality in the study group.

Discussion

Hysterectomy is the most frequent gynecologic operation and AH (67.9%) is still the mostly preferred approach for

hysterectomy in our hospital. AH rates are reported to be 63% in USA [13] and 80% in Denmark [14]. In our retrospective study, we compared the complication rates of AH, VH and TLH in the selected patient group at the single center where different surgical approaches are applied up to the preference of the surgeon. The purpose of TLH is not to replace VH but rather to avoid the need for AH in endometriosis and adnexal tumors. Sesti et al. [16] reported the VH as the fastest operative technique and favored to be associated with less blood loss when compared with TLH, in their randomized trial. Similar to Sesti's study, our findings revealed that VH serves less blood loss compared to TLH and AH. VH is the choice of procedure for patients with small uterus, and without other adnexal pathologies and previous surgery, because VH is a cost-effective, time-saving procedure with short recovery period [9, 17]. In our study group, as AH was the choice of the procedure in patients with large uterus volume and/or had previous pelvic surgery, the major complication rates were higher in this group. Notwithstanding, TLH operations need an experience that would settle in time for a center, and for this reason, our group had limited number of cases underwent TLH which also limits our study.

Johnson et al. [9] published a meta-analysis of prospective randomized trials and stated that the rate of urinary complications was higher with laparoscopy. Garry et al. [18] in their randomized prospective trial found higher bladder injury rates in the laparoscopy group, but they noticed that their group had considerable amount of previous caesarean section and endometriosis. These selection biases can affect complication rates. Previous caesarean section has already been shown as a risk factor for VH [19] and AH [20]. In our study, there were no urinary complications in TLH group. To make a proper estimation on the urinary complication rates of hysterectomy types, study

Table 4 Perioperative complications associated with hysterectomy

	Abdominal hysterectomy (<i>n</i> = 4,398), <i>n</i> (%)	Vaginal hysterectomy (<i>n</i> = 1,944), <i>n</i> (%)	Total laparoscopic hysterectomy (<i>n</i> = 138), <i>n</i> (%)	Total hysterectomy (<i>n</i> = 6,480), <i>n</i> (%)
Major complications	160 (3.6)	54 (2.7)	4 (2.8)	218 (3.3)
Bladder injury	30 (0.7)	7 (0.4)	1 (0.7)	38 (0.5)
Ureteral injury	8 (0.2)	2 (0.1)	– (0.0)	10 (0.1)
Bowel injury	4 (0.1)	2 (0.1)	– (0.0)	6 (0.09)
Blood transfusion	114 (2.6)	40 (2.1)	2 (1.4)	156 (2.4)
Cuff dehiscence	3 (0.06)	3 (0.16)	1 (0.72)	7 (0.1)
Pulmoner embolus	1 (0.02)	– (0.0)	– (0.0)	1 (0.01)
Minor complications	121 (2.7)	29 (1.4)	1 (0.7)	151 (2.3)
Febrile morbidity	4 (0.1)	6 (0.3)	1 (0.7)	11 (0.1)
Hematoma	87 (2)	19 (1)	– (0.0)	106 (1.6)
Reoperation	18 (0.4)	4 (0.2)	– (0.0)	22 (0.3)
Abdominal wall problem ^a	12 (0.2)	– (0.0)	– (0.0)	12 (0.18)
Total minor and major complication	281 (6.3)	83 (4.2)	5 (3.6)	369 (5.6)

^a Necrotizing fasciitis [4], hematoma [6], dehiscence [2]

Table 5 Secondary outcomes

	Abdominal hysterectomy (<i>n</i> = 4,398), <i>n</i> (%)		Vaginal hysterectomy (<i>n</i> = 1,944), <i>n</i> (%)		Total laparoscopic hysterectomy (<i>n</i> = 138), <i>n</i> (%)		<i>p</i>
	Median	Range	Median	Range	Median	Range	
Operative time (min)	125	35–240	95	30–108	130	70–260	<0.01 (VH–TLH)
Uterus weight (g)	310	20–2,450	105	30–370	180	50–930	<0.04 (AH–VH)
Blood loss (ml)	300	80–1,800	250	50–800	200	50–650	<0.07 (AH–TLH)
Hospital stay (days)	5	3–40	2	5–20	2	1–15	<0.01 (AH–VH)
Analgesic need (days)	3	0–20	2	0–10	1	0–7	<0.01 (AH–TLH)
Preoperative Hb	11.6	4.2–14.8	12.1	6.3–13.8	12.4	8.8–14.6	<0.01 (AH–TLH)
Postoperative Hb	10.4	8.9–12.4	11.8	9.7–14.2	11.3	9.2–14.8	>0.05

groups should be homogeneous regarding aforementioned risk factors.

Donnez et al. [21] favored laparoscopic hysterectomy as having multiple advantages over AH and VH, and with no increase in major complication rates regarding their series of 3,190 laparoscopic hysterectomy cases. Walsh et al. [22] highlighted the laparoscopic approach as offering advantages over the AH for benign diseases particularly with respect to minor perioperative complications, blood loss and hospital stay, however they also noted the need for larger studies to address the major complications and long term outcomes like pelvic organ prolapsus and bladder dysfunction. Young et al. [15] reviewed 39 papers and found that the outcome of TLH was not better than AH. Our series suggests better outcomes for TLH and VH than AH. These two approaches are less invasive than AH, however, they cannot replace AH in all circumstances.

Conclusion

Regarding our study, there is no clear evidence on the superiority of the hysterectomy methods one to another. However, VH seems to be advantageous over other methods in the centers with sufficient surgical experience. Prospective randomized trials including large number of patients are required to make clear definitions on the optimum surgical approach for hysterectomy.

Conflict of interest None.

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