Original Research
Medical Journal of the Islamic Republic of Iran. Vol. 22, No. 1, May 2008. pp. 22-28

Comparison of laparoscopically assisted vaginal hysterectomy and total abdominal hysterectomy

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Abstract

Background: Hysterectomy is the second most common major surgery procedure done after cesarean section by gynecologists in many countries and the most common procedure is total abdominal hysterectomy (TAH). The incidence of laparoscopically assisted vaginal hysterectomy (LAVH) performed for benign lesions has progressively increased in recent years. Our objective was to compare the relative advantages and disadvantages of LAVH and TAH procedures.

Methods: A clinical trial was performed on patients who were candidates for hysterectomy with benign reasons in Arash hospital from March 2006 to April 2007. By simple randomization, 90 patients (30 for LAVH and 60 for TAH) were selected. Demographic details and intra-operative and post-operative complications were recorded by the staff and were compared between the two groups.

Results: On average, LAVH operations took significantly longer than TAH operations (100.17 ± 39.35 minutes; 145.83 ± 41.55 minutes; P< 0.0001). The total length of hospital stay was significantly shorter after LAVH than after TAH (3.43 ± 0.90 days; 3.94 ± 1.02; P= 0.025). Although the hemoglobin (gr/dl) drop in LAVH was significantly higher than TAH (1.22 ± 0.94 and 0.58 ± 0.82, P=0.0012), blood transfusions were more common in TAH (1 case versus 3 cases). The drug requirement to control pain during hospitalization after the two surgeries was not significantly different between the two groups. Fever was observed more often in the TAH group (P = 0.051). Finally, Intra-operative and post-operative complications were lower in LAVH than TAH.

Conclusion: Although operation length is significantly higher in LAVH, this procedure is safer and more comfortable for patients and health care providers.

Keywords: blood transfusion, hemoglobin, intraoperative complications, laparoscopic assisted vaginal hysterectomy, postoperative, LAVH, total abdominal hysterectomy, TAH.

Introduction

Hysterectomy is one of the most common operations performed by gynecologists, and it is the second most common major surgical procedure done in the United States after cesarean section [1]. The average age of a woman undergoing hysterectomy in the US is 42.7 years with 74% of the patients between the ages of 30 and

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54 [1].

The general indications for a planned hysterectomy are independent of the chosen procedure, and include symptoms related to leiomyomata, abnormal uterine bleeding, pelvic relaxation, chronic pelvic pain and malignant and premalignant disease [1].

Studies in the US show that the most common type of hysterectomy performed is abdominal and the abdominal route with 66.1% is higher than other techniques [2]. While this prevalence showed a decrease from 1997 to 2005 [3], it is still very high. Vaginal hysterectomy is preferable due to faster recovery, decreased morbidity and the absence of an abdominal incision [4]. However, vaginal hysterectomy is not always feasible, for example where the patient exhibits a non-prolapsed uterus. In cases in which vaginal hysterectomy is difficult such as non-prolapsed uterus, laparoscopy can be used to facilitate vaginal removal of the uterus (laparoscopically assisted vaginal hysterectomy or LAVH).

The first laparoscopic vaginal hysterectomy was performed in January 1988 and reported by Reich and De Caprio in 1989 [5]. The use of operative laparoscopy to complete some or all of the hysterectomy procedures has been grown rapidly [2,3]. Laparoscopic hysterectomy or LAVH has become a major alternative to conventional abdominal hysterectomy, with patients often opting for the laparoscopic approach for cosmetic and faster recuperative reasons.

It is well accepted that laparoscopy offers superior tissue image and anatomic view of the abdominopelvic cavity, facilitates meticulous hemostasis, reduces the morbidity associated with laparotomy, and allows the performance of adnexal surgery, ureterolysis, retroperitoneal dissection, and also excision of endometriosis.

Patients are in favor of laparoscopic hysterectomy because of its smaller incisions, less postoperative pain and discomfort, shorter hospital stay and quicker return to normal activity [6,7]. These advantages make these procedures more acceptable than abdominal techniques, however there is still a lot of argument about the type of hysterectomy.

In this paper, we explore some of the advantages and disadvantages of LAVH compared to total abdominal hysterectomy (TAH) in one of the hospitals in Iran; this is the first study of these two surgical methods performed in this country.

Methods

A clinical trial was carried out in the Arash Hospital of Tehran University of Medical Sciences to compare LAVH and TAH in patients who were candidates for hysterectomy with benign reasons from March 2006 to April 2007. The patients were simply randomized into two groups using consecutively numbered, opaque sealed envelopes. We selected 30 samples for LAVH and twice the number for TAH. Based on the other study we assume that LAVH is clinically superior to TAH in further reducing complications from 45% to 10 % and Odds Ratio equal to 0.14 [8]. To find such a difference, 30 samples in each group were deemed to be enough for an 80% power.

Exclusion criteria were those that would be considered complications for laparoscopy: obesity (BMI>30), enlarged uterus (>14 weeks of pregnancy), malignancy, history of cardiopulmonary disease, diabetes and history of multiple abdominal operations. Patients with enlarged uterus or multiple previous abdominal operations were excluded due to limitation of inspection, difficulty of departure of uterus from vagina, increased rate of adhesions and the inherent difficulty of operation, especially in laparoscopic surgery.

Operative Techniques

Based on the reference book [9], in LAVH, our plan was to perform these steps laparoscopically: the round ligament was coagulated and cut approximately 3 cm from the uterus. Using

hydrodissection, the anterior leaf of the broad ligament was opened toward the vesicouterine fold and the bladder flap was developed. The anterior leaf of the broad ligament was grasped with forceps, elevated and dissected from the anterior lower uterine segment with hydrodissection. The utero-ovarian or infundibulopelvic ligament, proximal tube and mesosalpinx were electrodesiccated and cut and the posterior leaf of the broad ligament was opened.

The uterovesical junction was grasped and elevated with forceps while being cut with the scissors or electrode. The bladder pillars were coagulated and cut. The bladder was dissected from the uterus by pushing downward with the tip of a blunt probe along the vesicocervical plane until the anterior cul-de-sac was exposed completely. Then the uterine vessels were desiccated and cut to free the lateral borders of the uterus laparoscopically or vaginally. The remainder of the procedure, including dissection of the cardinal and uterosacral ligaments and closure of the vaginal cuff was performed vaginally.

In TAH, after a Pfannenstiel, Maylard or vertical incision, all of the procedures were performed abdominally.

In this hospital, as a teaching hospital, both surgeries were performed by attending and chief residents under direct supervision of the attending. In LAVH, insertion of trocar; grasping, coagulating and cutting the round ligament and infundibulopelvic ligament were performed by residents and ligation of uterine vessels and dissection of the bladder and opening the vaginal cuff were performed by the attending. In TAH, the operation procedure were divided into two parts (right side, left side) and each surgeon (attending and chief resident) performed one side of the surgery.

Information such as age, parity, chief complaints, history of disease and surgery was obtained from patients by means of a questionnaire. Other characteristics of intra-operative and post-operative complications such as urinary tract and bowel damage, vault hematoma, wound infection, fever, decrease in hemoglobin level, use of analgesics, blood transfusion, and hospitalization was also recorded by the staff. After surgery and a short stay in the recovery room, the patients were transferred to the wards. They were discharged when they were able to void, pass flatus and tolerate oral agents to control pain. Discharge criteria were the same for both groups and none of the patients had discharge difficulties such as insurance or individual problems. All patients were visited after two weeks of surgery and their quality of activity was evaluated. We designated the return to normal activity as "bad" if the patient continued to need bed rest two weeks after the operation; if bed rest was no longer required, and the patient could independently perform routine activities, such as household chores, the return was classified as "good".

The study was approved by the ethics institutional review board of the Tehran University of Medical Sciences, and informed consent was obtained from all participants.

Statistical analysis was performed with JMP software (Version 4; SAS institute, USA).

Statistical significance for differences was tested by student's t-test, χ^2-test when appropriate. A P value less than 0.05 were considered statistically significant.

Results

As shown in Table 1, demographic characteristics such as age, parity, BMI and uterus size did not differ significantly between the two groups. Previous pelvic surgery in both groups was not significantly different ($P = 0.44$). The main indications for surgery in the two groups were abnormal uterine bleeding (AUB), abdominal or pelvic pain and postmenopausal bleeding (PMB).

From Table 2, we see that operation time for LAVH was significantly longer than for TAH (145.83 ± 41.55 minutes versus 100.17 ± 39.35 minutes, $P < 0.0001$). The total length of hospi-

	LAVH N = 30	TAH N = 60	P value
Age (years)	46.53 ± 4.06*	47.72 ± 5.46	0.38
BMI (kg/m^2)	27.77 ± 2.15	27.04 ± 2.55	0.61
Uterus size	10 ± 1.30	10.35 ± 1.86	0.35
Parous	30 (100%)	56 (90%)	0.07
Previous pelvic surgery			
Neg	21(70%)**	37 (61.67%)	
Pos	9 (30%)	23 (38.33%)	0.44
Indication for surgery			
AUB	25 (83.33%)	50 (83.33%)	
Pain	3 (10%)	9 (15%)	
PMB	2 (6.67%)	1 (1.67%)	0.39

BMI: body mass index. Neg: negative. Pos: positive. AUB: abnormal uterine bleeding. PMB: postmenopausal bleeding.*Values are given as means ± standard deviation. **Values are given as number with percentage in brackets. P value less than 0.05 is statistically significant. P value refers to t-test and χ^2-test.

Table 1. Demographic characteristics of patients in both groups.

tal stay was significantly shorter after LAVH than after TAH (3.43 ± 0.90 days; 3.94 ± 1.02; P = 0.025). The drug requirement to control pain (Injection or Oral) during hospitalization after two surgeries and specimen weight were not significantly different between the two groups (P > 0.05). At the same time, the hemoglobin drop (gr/dL) in LAVH is significantly higher than TAH (1.22 ± 0.94 in LAVH and 0.58 ± 0.82 in TAH, P = 0.0012). Fever was observed more often in the TAH group (11.67% vs 0%, P= 0.051). In Table 3, we tabulate intra-operative complications such as urinary tract and bowel damage, and post-operative complications such as urinary tract and gastrointestinal (GI) problems, vault hematoma and wound infection. Among patients undergoing TAH, two cases had urinary damage (ureter obstruction and bladder damage) at the time of surgery, while after the surgery, three cases with urinary tract problems, one case of vault hematoma and four cases of wound infection were reported. In the LAVH group, no intra-operative complications were encountered and only one patient exhibit-

	LAVH	TAH	P value
Total length of anesthetic time (min)	145.83 ± 41.55	100.17 ± 39.35	<0.0001
Total length of stay (day)	3.43 ± 0.90	3.93 ± 1.02	0.0254
Sedative use (dose)			
Injective	1.07 ± 0.25	1.13 ± 0.43	0.44
Oral	4.40 ± 3.09	4.92 ± 2.64	0.41
Hemoglobin drop (gr/dl)	1.22 ± 0.0.94	0.58 ± 0.82	0.0012
Fever			
Neg	30 (100%)	53 (88.33%)	
Pos	0 (0%)	7 (11.67%)	0.51
Return to normal activity (after 2 w)			
Good	26 (86.67%)	39 (65%)	
Bad	4 (13.33%)	21 (35%)	0.31

P value refers to t-test and χ^2-test.

Table 2. Major items of resource use.

	LAVH N = 30	TAH N = 60
Intraoperative complications		
Urinary damage	0	2
Bowel damage	0	1
Post-operative complications		
Urinary tract problems	1	3
GI problems	0	0
Vault hematoma	0	1
Wound infection	0	4
Blood transfusion	1*	3**
Readmission	1	5

GI: Gastrointestinal.
*Each patient received 1 unit packed cell.
**Each patient received 2 unit packed cells.

Table 3. Comparison of complications between LAVH and TAH groups.

ed urinary tract problems after surgery. Blood transfusion was required for three TAH patients, each receiving two units of whole blood; in contrast, only one patient of the LAVH group received blood, consisting of only one unit of packed cells. There were five readmissions following discharge for the TAH group, and one readmission after discharge for the LAVH group.

Based on Table 2, at review two weeks after surgery, more LAVH patients reported good return to normal activity than TAH patients (86.67%; 65%; p = 0.031).

Discussion

The results of our study indicate that although the length of operation was significantly higher in the LAVH group, reduced complications make LAVH a safer and more comfortable approach for both patients and health care providers.

Other studies showed that although the operation time is longer, hospital stay and analgesic use are lower in LAVH than TAH but blood loss was higher in LAVH surgery [10-13].

While hemoglobin drop was significantly higher in LAVH, blood transfusions were more common in the TAH group in the present study. However, one study by Lowell and Kessler showed the operation time, the mean blood loss and need for transfusion was higher in the LAVH group [14]. In Carter's study, there were no significant differences between estimated blood loss and change in hemoglobin from preoperative to postoperative day 1 levels between LAVH and TAH groups [15]. Another study showed blood transfusion was similar in LAVH (three cases from 47) and TAH (three cases from 45) groups [7]. Intra-operative and postoperative complications were lower in the LAVH group and LAVH patients returned better to normal activity after two weeks. This result supports the findings of a new study [16].

However a review article demonstrated although LAVH involves a shorter hospital stay, speedier postoperative recovery, and less analgesia use, there is also a higher rate of bladder injury (1.8% for LAVH versus 0.4% for TAH) and longer operation time [17]. Lowell et al also showed the LAVH increased the risk of intraoperative complications [14].

Similarly, the number of readmissions was substantially different between the two groups (1 for LAVH, 5 for TAH). Normal operating procedures in Arash Hospital require patients to be checked again in the hospital clinic six weeks after the operation; none of the patients participating in this study reported any complications that warranted referral to the main surgeon.

In an unpublished experiment we found that if we sort the LAVH samples by date of surgery and divide them into two groups, the average operation time of the second group is significantly shorter than that of the first group (127±32.28 minutes; 164.67±42.11 minutes; P<0.010). In Tsai et al's study also, the mean operating time in the first 20 cases was 98 min, and in the last 20 cases it was 70.9 min [12].

Another study by Seow et al in Taiwan showed not only the operation time but also the rates of surgical complications and conversion to laparotomy decreased with increased surgeon experience at performing LAVH [18]. These indicate that the longer length of operation in this study may be dependent on the proficiency of the surgical team and need more experience.

In the period of one year of our research, we calculated about 21% (30/144) of hysterectomies in this hospital were done by LAVH procedure and this data shows about 79% of hysterectomies are still performed by abdominal surgery. It should be mentioned that some of the hospitals in Iran do not offer LAVH. So, the total percentage of abdominal hysterectomy may be more than this in the hospitals of our country.

This study has some limitations. First, due to the insufficient number of LAVH operations during the study period, to have a study with higher power it is required to increase the sample size. Second, all LAVH operations were performed by two surgeons. Therefore because of difference in surgeon experience some items such as operation time may differ.

Given the benefits of LAVH in this study, we believe it should be offered as a first-line procedure to women undergoing hysterectomy for benign diseases and for whom vaginal hysterectomy is contraindicated. However, based on disadvantages that manifested in other studies we plan to explore the relative merits and demerits of these procedures in a larger-scale study incorporating a larger number of samples.

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