Original Article

A Comparison between Total Abdominal Hysterectomy versus Total Laparoscopic Hysterectomy

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Abstract

Objectives: To compare the operative and postoperative outcomes of total laparoscopic hysterectomy (TLH) and total abdominal hysterectomy (TAH).

Materials and Methods: In this retrospective comparative study, we reviewed all hysterectomies performed in the Al-Karak Governmental Hospital in Al-Karak, Jordan, from September 2018 to July 2022. We enrolled 129 patients who underwent hysterectomy. The patients were divided into the TLH (n = 39) and TAH (n = 90) groups. Patient data were accessed through hospital records and analyzed using SPSS 25.0.

Results: The most common indication for TLH was uterine fibroid, and that for TAH was abnormal uterine bleeding, although the specimen weights were comparable. There was no significant between-group difference in the patient's demographics. Although the TLH group had longer operative time, the hospital stay was shorter and there were no reported cases of wound infection. The estimated blood loss was significantly lower in the TLH group than in the TAH group, but there was no difference between the two groups in terms of blood transfusion requirement and postoperative hemoglobin level.

Conclusion: TLH and TAH had comparable overall outcomes in the Al-Karak Governmental Hospital. However, TLH was superior to TAH in terms of blood loss, and patients with TLH recovered faster without postoperative wound infection.

Keywords: Hysterectomy, intraoperative blood loss, operation time, total abdominal hysterectomy, total laparoscopic hysterectomy

Introduction

Since 2010, hysterectomy has been the most common nonpregnancy-related gynecological operation worldwide.[1,2] The standard approach is total abdominal hysterectomy (TAH).[1] However, various techniques are currently being implemented to decrease patient morbidity, caregiver burden, and inhospital stay.[2] Among them, minimally invasive surgeries (total laparoscopic hysterectomy [TLH]) are favored by many clinicians. This emerging procedure benefits some aspects of patients' quality of life.

Gupta *et al*. investigated postoperative complications of TAH and TLH and reported that the estimated blood loss (EBL) volume was significantly lower in TLH than in TAH patients. In addition, urinary tract injuries during laparoscopy were not observed in their 50 TLH cases.[3] A retrospective study from the Department of Obstetrics and Gynecology, Women's Hospital, Hamad Medical Corporation, Doha, Qatar, showed that inhospital stay was shorter in TLH than in TAH. Late postoperative complications, such as wound gaping, were significantly fewer in TLH than in TAH patients, without a significant between-group difference in EBL. Nevertheless, trends of higher operative time and intraoperative complication rates were noted in TLH.[1] Yang

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et al. also indicated that operating time was significantly higher for TLH than TAH.[2]

Information regarding the outcomes of TLH versus TAH is scarce in the Middle East and Jordan, with very few reports on TLH outcomes in Jordanian women. To bridge this knowledge gap and provide optimal patient care, we conducted this study to collect data regarding TLH and TAH outcomes in Al-Karak, Jordan.

Materials and Methods

Study design

This study was conducted in the Department of Obstetrics and Gynecology at the Al-Karak Governmental Hospital in Al-Karak, Jordan. Ethical approval was obtained from the Ethics Committee of the Faculty of Medicine, Mutah University (reference number: 802022). Moreover, this study was designed according to the principles of the Declaration of Helsinki. The requirement for informed consent was waived because the data were retrospectively assessed. Patient records from September 2018 to July 2022 were collected retrospectively. All hysterectomy cases, with or without salpingo-oophorectomy, were included; various indications for gynecological hysterectomy were included. Conversely, we excluded hysterectomies due to uterine prolapse, advanced gynecological malignancies, or delivery complications.

Outcome measures

With the help of the Information Technology Department (Jordan Ministry of Health), digital hospital records were used to save patient data (using the Hakeem software). This approach aided subsequent retrieval of data regarding the following: parity, age, body mass index (BMI), previous pelvic surgeries, preoperative and postoperative hemoglobin (HB) levels, uterus weight after removal, hysterectomy indication, operating time (from the time of anesthesia induction to the last suture), intraoperative complications, inhospital stay, wound infection status, blood transfusion requirement, and EBL (estimated by an anesthesia technician according to the number of pads and suction-collected blood volume).

Total laparoscopic hysterectomy

TLH was introduced in our hospital in 2018 by a trained consultant who had received training in gyne-endoscopy for 2 years at The Linkou Chang Gung Memorial Hospital, Taoyuan, Taiwan.

In TLH cases, the surgical approach started with the application of the Hohl uterine manipulator, followed by primary entry through the umbilicus using the Veress technique, except in cases of previous midline surgeries, where the primary entry occurred through Palmer's point. Two ancillary 5-mm trocars were inserted on the lateral left side where the surgeon stood. One was inserted medial to the superior iliac spine. The other was inserted at the fist width on the left lateral side of the umbilicus 8–10 cm away after the identification of the inferior epigastric artery. An additional 5-mm trocar was inserted medial to the right superior iliac spine. For primary entry, the abdomen was insufflated with CO_2 gas up to 20 mmHg. Then, it was decreased to 15 mmHg during the operation.

All laparoscopic cases involved TLH; the vaginal vault was sutured laparoscopically with polyglactin 910 sutures. Patients who underwent subtotal laparoscopic hysterectomy were excluded from the study. All uteri in TLH cases were removed through the vagina. Then, hand morcellation was performed through the vagina in some cases according to uterine size.

TAH was performed in the traditional way, usually by low transverse incision or midline, depending on the indication and uterine size.

Statistical analysis

Categorical variables are expressed as frequencies, and continuous variables are expressed as means. The independent *t*-test, Mann–Whitney *U*, Chi-square, and Fisher's exact tests were used for statistical analyses. The significance level was set at $P < 0.05$. Data were analyzed using IBM SPSS version 25.0 (SPSS Inc., Chicago, IL, USA).

Results

This study identified 138 hysterectomies performed from September 2018 to July 2022. The patients were divided into TLH ($n = 46$) and TAH ($n = 92$) groups. In the TLH group, seven cases were excluded (one converted to TAH, five with subtotal laparoscopic hysterectomy, and one for uterine prolapse). Thus, 39 cases of TLH were included in the data analysis. In the TAH group, two cases were excluded from the final analysis (one performed for placenta increta and the other for intractable uterine prolapse) [Figure 1].

Both the groups were similar in terms of age, parity, preoperative HB level, uterine weight, and frequency of previous pelvic surgeries [Table 1]. The BMI was significantly higher in the TLH (30.3 ± 4.1) than TAH (28.4 ± 5.3, $P = 0.017$) group. The most common indication for hysterectomy in the TLH group was fibroid uterus (51.3%), followed by abnormal uterine bleeding (AUB) (17.9%). The most common indication in the TAH group was AUB (60.0%), followed by fibroid uterus (32.2%) [Table 2].

Regarding intraoperative parameters, the operating time was significantly longer in the TLH (157.4 ± 50.0 min) than in the TAH (149.3 ± 123.4 min, $P = 0.009$) group. However, the EBL

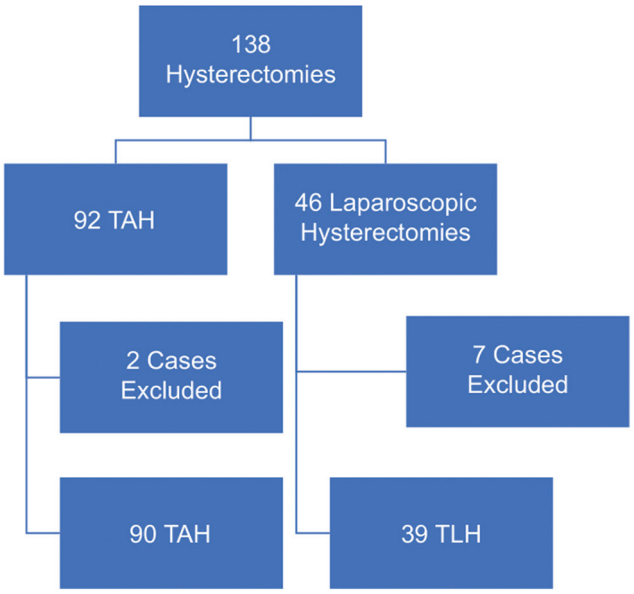

Figure 1: Flowchart of TLH and TAH patients' selection process. TLH: Total laparoscopic hysterectomy, TAH: Total abdominal hysterectomy

in the TLH group (327.8 ± 152.4 mL) was significantly lower than that in the TAH group (471.1 ± 282.4 mL, $P = 0.002$). There were no significant differences in intraoperative complications between both the groups [Table 3]. The TLH group had a shorter duration of hospitalization (1.5 ± 0.5 days) than the TAH group [2.5 ± 1.4 days, $P = 0.001$, Table 4]. Moreover, no TLH cases had wound infections (0%), unlike the 11 cases (12.2%, $P = 0.033$) in the TAH group. The groups had no significant differences in the blood transfusion requirement rates and postoperative HB levels.

Discussion

The surgical methods were chosen based on the consultant's surgical experience. Thus, patients with large uteri or a history of pelvic surgery were not excluded from the study. No definite or optimal surgical approach guidelines are available for large uteri, which are not contraindicated for TLH, which is pursued based on the surgeon's skills.[4] In 2016, a study noted that the uterus must be small enough for the surgeon to visualize surgical landmarks such as the vascular pedicles.[5] As expected, challenges were faced with TLH cases with a uterine size of >14 weeks. One TLH case was converted to open surgery because of right uterine vein bleeding, which could not be located because of the large size of the uterus. In the present study, these challenges were overcome by detaching the uterus in two steps (subtotal hysterectomy followed by cervical removal); this was done in 2/39 of the TLH cases. However, this method should be avoided in cases of suspected uterine cancer. Specimen weights were included to demonstrate the feasibility of TLH for different uterine sizes. A large uterus can be removed through the vagina, and hand morcellation is sometimes required. The average uterine size was reported to be smaller in TLH than in TAH;[1,3,5] however, this was not significant in our study.

Intraoperative blood loss volume and inhospital stay duration were lower in the TLH than in the TAH group.[1,3,5,6-15] In our

Table 1: Patient demographics

	TLH ($n=39$)	TAH ($n=90$)	*P*
Age (years)	48.5±5.5	48.8±6.2	0.883[Y]
Parity	3.6±2.4	3.2±2.5	0.274[Y]
BMI (kg/m^2)	30.3±4.1	28.4±5.3	0.017[Y]
Preoperative HB (g/dL)	12.0±1.8	12.1±1.4	0.746[X]
Weight of uterus (g)	277.0±220.8	325.4±215.9	0.143[Y]
Previous pelvic surgeries	15 (38.5)	32 (35.6)	0.753*

*Pearson's Chi-squared test, [X]Independent t-test, [Y]Mann–Whitney U-test. Data are presented as mean±SD or absolute *n* (%). BMI: Body mass index, HB: Hemoglobin, TLH: Total laparoscopic hysterectomy, SD: Standard deviation

Table 2: Indications for surgery

	TLH ($n=39$)	TAH ($n=90$)
Fibroid uterus	20 (51.3)	29 (32.2)
Adenomyosis	4 (10.3)	0 (0.0)
Endometrial hyperplasia	6 (15.4)	1 (1.1)
Adnexal pathology	1 (2.6)	4 (4.4)
Abnormal uterine bleeding	7 (17.9)	54 (60.0)
Carcinoma *in situ*	1 (2.6)	2 (2.2)

Data are presented as absolute *n* (%). TAH, total abdominal hysterectomy; TLH, total laparoscopic hysterectomy

Table 3: Intraoperative parameters

	TLH ($n=39$)	TAH ($n=90$)	*P*
Duration of surgery (min)	157.4±50.0	149.3±123.4	0.009[Y]
EBL (mL)	327.8±152.4	471.1±282.4	0.002[Y]
Intraoperative complication			
Bleeding	1 (2.6)	4 (4.4)	0.489[+]
Bladder injury	2 (5.1)	2 (2.2)	
Vaginal wall laceration	1 (2.6)	0	

[Y]Mann–Whitney U-test, [+]Fisher's exact test. Data are presented as mean±SD or absolute *n* (%). TLH: Total laparoscopic hysterectomy, EBL: Estimated blood loss, SD: Standard deviation

Table 4: Postoperative parameters

	TLH ($n=39$)	TAH ($n=90$)	*P*
Postoperative HB (g/dL)	10.8±1.7	11.1±1.7	0.324
Hospital stay (days)	1.5±0.5	2.5±1.4	0.001[Y]
Wound infection	0	11 (12.2)	0.033[+]
Blood transfusion	6 (15.4)	19 (21.1)	0.450
Postoperative HB (g/dL)	10.8±1.7	11.1±1.7	0.324

[Y]Mann–Whitney *U*-test, [+]Fisher's exact test. Data are presented as mean±SD or absolute *n* (%). TAH: Total abdominal hysterectomy, TLH: Total laparoscopic hysterectomy , HB: Hemoglobin, SD: Standard deviation

study, blood loss volume was lower in the TLH group than in the TAH group by an average of 150 mL, possibly due to blood loss during skin incision and the use of traditional hemostasis (clamping and tying) compared to advanced bipolar energy used in TLH. Similarly, other studies have related this effect to the magnified visual field and the use of bipolar diathermy.[6,16,17] Aboulfotouh *et al*. reported a decrease in intraoperative blood loss in TLH to a smaller uterine size.[1] However, the uterine weights of the two groups were comparable in our study. Bleeding during laparoscopic hysterectomy usually occurs from the descending branch of the right uterine artery, which is opposite the surgeon's intraoperative position. The uterus obstructed the bleeding site. Thus, skeletonization and ligation of the right uterine artery may be challenging and require adding a right ancillary port. Nieboer *et al*. suggested that angulation and tension on the vessel may lead to an inferior seal/transection technique.[17]

Although TLH patients had a higher BMI than TAH patients, no TLH patients had wound infection, unlike the 12% wound infection rate in TAH patients, which was mainly due to the larger incision size in TAH. Hospital stay, which can be used to assess patient recovery rate, was longer for TAH patients, although wound infection-related readmission days were excluded.

Most studies indicated that TLH patients had shorter hospital stays, even when the intraoperative time of TLH was longer than that of TAH.[3,6-15] In our hospital, the operation time was recorded from anesthesia induction until the last suture (average: 157.4 min). The significantly longer operation time of TLH may have been due to patient preparation, including patient placement in the lithotomy position and the application of a uterine manipulator. Moreover, the first few cases of TLH took longer than the subsequent cases due to increased staff experience, leading to shorter preparation times, as suggested by Gupta *et al*.[3]

Importantly, there were two cases of bladder injury in both the study groups (TLH, 5.5%; TAH, 2.2%) and no ureteral injury. While this injury rate was acceptable, medical records revealed that one case of injury during resection resulted from parasitic myoma implantation between the bladder and the anterior abdominal wall, which was suspected to be due to gas inflation of the urine bag. The other patient had four previous cesarean sections. Therefore, laparoscopy has the advantage of detecting concealed bladder injury. Most studies found no difference in the incidence of urinary tract injuries between TLH and TAH.[2,18,19] A systematic review also found a 0.14% rate of bladder or ureter injuries (122 cases) among 86,683 TLH patients.[20]

Using the Hohl uterine manipulator reduces the risk of bladder and ureteral injury to <1%,[21] as the vaginal cup delineates the vaginal wall and helps in bladder dissection. In addition, the manipulator helps to improve the exposure of the surgical site by moving the uterus to the opposite side. However, there was a case of lateral vaginal wall laceration during manipulator application, which was repaired, after which a smaller manipulator cup was used.

The limitations of this study include the small sample size and the retrospective nature. Nevertheless, this study could provide more clinical evidence to the current literature, as a prospective study may raise ethical concerns. Further research needs to focus on other parameters mainly the need for analgesia and postoperative pain. Furthermore, it needs to take into account long-term complications such as vault prolapse and bladder dysfunction.

Conclusions

Overall, TLH is a safer option in the presence of experienced staff. TLH might have some difficulties, such as a longer intraoperative time, restrictions regarding large-uterus operations, and a slightly increased risk of urinary tract injury. However, TLH was superior to TAH in terms of blood loss, hospital stay, and wound infection, which enhanced postoperative recovery.

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Conflicts of interest

There are no conflicts of interest.

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