

# A critical review of laparoscopic total hysterectomy versus laparoscopic supracervical hysterectomy

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**Abstract** The purpose of our review is to evaluate the perioperative characteristics of laparoscopic total hysterectomy (LTH) and laparoscopic supracervical hysterectomy (LASH) including the hospital stay, hemoglobin concentration, the operative time, postoperative analgesia, intra and postoperative complications. We also examine the quality of life examining general health, sexual satisfaction, dyspareunia and time to first intercourse

**Keywords** Laparoscopic total hysterectomy · Laparoscopic supracervical hysterectomy

## Introduction

Hysterectomy is the most common gynecological procedure. It is estimated that the rate of hysterectomy is 346 per 100,000 women in Canada and 550 per 100,000 women in the United States [1, 2]. These rates are over twofolds of that in Britain, Sweden, the Netherlands and Norway [3]. There are different types of hysterectomy. The most common is abdominal hysterectomy comprising 66% of all hysterectomies followed by the vaginal hysterectomy [4]. Since early nineties, laparoscopic hysterectomy has gained popularity due to its known advantages including short hospital stay, minimal wound related complications and rapid recovery.

Laparoscopic hysterectomy could be divided into laparoscopic assisted vaginal hysterectomy (LAVH), laparoscopic total hysterectomy (LTH) and laparoscopic

supracervical hysterectomy (LASH). The proponents of LASH believe that preserving the cervix plays an important role in sexual function, it maintains the pelvic floor support and prevents denervation of bladder and bowel [5–7]. Others feel that there is no strong evidence to support those claims [8–10].

The purpose of our review is to evaluate the perioperative characteristics of LTH and LASH including the hospital stay, hemoglobin concentration, the operative time, postoperative analgesia, intra and postoperative complications. We also examine the quality of life examining general health, sexual satisfaction, dyspareunia and time to first intercourse.

## Source of data

We performed a literature search using the keywords “hysterectomy, laparoscopic hysterectomy, total hysterectomy, supracervical hysterectomy and subtotal hysterectomy” and conducted the search in the Medline, OVID, EMBASE and the Cochrane of Database of systematic reviews published between 1990 and 2010. We found two prospective trials, four retrospective analyses, and two quality-of-life analysis (Table 1). The only randomized study was published in Italian language and we could only evaluate its abstract. Table 2 shows the demography of patients who underwent LTH or LASH.

## Operating time, hospital stay and blood loss

Table 3 shows the operating time, hospital stay and hemoglobin (Hgb) concentration in women who underwent LASH or LTH.

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**Table 1** Studies comparing laparoscopic total hysterectomy (LTH) and laparoscopic supracervical hysterectomy (LASH)

Authors	Design	Number of patients	Author's conclusion
Morelli et al. 2007 [25]	Randomized trial	71 LASH 70 LTH	No statistically significant difference in surgical complications and clinical outcomes
Harmanli et al. 2009 [11]	Retrospective	566 LASH 450 LTH	Similar overall short-term morbidity Small statistically significant increase risk of urinary tract injury with LTH
Mueller et al. 2009 [12]	Prospective	118 LASH 113 LTH	LTH is comparable to LASH Complication rates might be lower with LASH
Van Evert et al. 2010 [16]	Retrospective	192 LASH 198 LTH	LASH is associated with higher long term complications, while LTH is associated with higher short term complications
Mousa et al. 2009 [13]	Retrospective	122 LASH 105 LTH	LTH is associated with longer operating time, but requires less postoperative analgesia than LASH
Cipullo et al. 2009 [14]	Retrospective	157 LASH 157 LTH	LSH is a valid alternative to LTH Major complications in LASH are significantly less than those in LTH
Kafy et al. 2009 [17]	Retrospective	40 LASH 40 LTH	Both procedures result in similar improvement of general health, body image, sexual function, gastrointestinal and genitourinary functions
Nam et al. 2008 [18]	Prospective	39 LASH 51 LTH	No significant change in quality of sexual life after either procedure

### Operating time

Two of the reviewed studies showed no difference in the operating time between LASH and LTH [11, 12]. Perhaps, the time used for suturing of the vaginal opening compensated that for morcellation. However, Mousa et al.

[13] and Cipullo et al. found that LTH was longer than LASH (Table 3). The discrepancy between the studies is unclear. In our practice, we often encounter uterus that is too large to be delivered vaginally forcing us to first partially morcellate the uterus. The time spent to morcellate the uterus adds to the operating time of LTH. We also found

**Table 2** Demography of patients who underwent laparoscopic total hysterectomy (LTH) or laparoscopic supracervical hysterectomy (LASH)

	Type of procedure	Age (years)	Parity	BMI	Uterine weight (g)
Harmanli et al. 2009 [11]	LASH	43.8±5.9	1.85±1.2	28.5±6.9	190.4±170
	LTH	44.6±7.9	1.92±1.3	27.9±6.6	218.7±196.2
	<i>P</i> value	NS	NS	NS	0.007
Mueller et al. 2009 [12]	LASH	46.7±7.0	NA	25.3±5.1	286.2±209.3
	LTH	46.3±7.5		25.4±4.0	264.8±133.6
	<i>P</i> value	NS		NS	NS
Van Evert et al. 2010 [16]	LASH	44 (28–60)	NA	NA	NA
	LTH	49 (30–81)			
Mousa et al. 2009 [13]	LASH	45.7±0.6	1.6±0.1	26.6±0.4	181±12.0
	LTH	45.9±0.7	1.7±0.1	26.8±1.5	161±11.6
	<i>P</i> value	NA	NA	NA	NS
Cipullo et al. 2009 [14]	LASH	49.5±7.4	NA	27.6±3.5	162.7±112.7
	LTH	50.2±7.8		27.6±4.4	169.7±116.6
	<i>P</i> value	NS		NS	NS
Kafy et al. 2009 [17]	LASH	46.1±7.0	NA	NA	NA
	LTH	46.6±5.3			
	<i>P</i> value	NA			
Nam et al. 2008 [18]	LASH	41.9±4.7	1.8±0.7	22.5±2.4	NA
	LTH	46.3±3.7	1.9±0.7	22.8±3.2	
	<i>P</i> value	NS	NS	NS	

**Table 3** Perioperative characteristics of patients who underwent laparoscopic total hysterectomy (LTH) or laparoscopic supracervical hysterectomy (LASH)

	Harmanli et al. 2009 [11]	Mueller et al. 2009 [12]	Mousa et al. 2009 [13]	Cipullo et al. 2009 [14]
Operating time (min)	LTH 168±61	LTH 114±33.8	LTH 136±3.6	LTH 121.7±44.3
	LASH 166±62	LASH 116.5±40	LASH 111±2.9	LASH 111.4±39.1
	NS	NS	$P<0.001$	$P<0.05$
Hospital stay (day)	LTH 1.4±0.7 <sup>a</sup>	LTH 5.7±1.1	LTH 1.5±0.7	NA
	LASH 1.2±0.6	LASH 5.3±1.6	LASH 1.8±0.2	
	$P<0.01$	NS	NS	
Postoperative Hgb difference (g/dl)	LTH 1.9±1.0	LTH 1.6±1.1	LTH 2.1	LTH 2.4±0.9
	LASH 1.9±0.9	LASH 1.5±1.4	LASH 1.9	LASH 2.1±0.9
	NS	NS	NS	$P<0.01$
Postoperative analgesia	NA	<i>Ibuprofen (g)</i>	<i>Morphine (mg)</i>	NA
		LTH 3.1±0.8	LTH 28±2.9	
		LASH 2.9±0.8	LASH 37.5±3.4	
		NS	$P<0.05$	

NA not available

<sup>a</sup> Recalculated to days

that coagulating and cutting with the same instrument make surgery faster. Clearly, there are many factors that can impact the operating time.

Milad et al. [15] compared the operating time of LASH and LAVH and found that LASH was significantly shorter than LAVH. This could be due to the time used to switch from laparoscopy to the vaginal part of the procedure.

#### Hospital stay and blood loss

The duration of hospital stay of LASH and LTH is comparable. In one study, the authors found that the hospital stay after LTH was about 5 h longer than LASH [11]. It is statistically different, but clinically does not make much difference.

Estimation of blood loss by laparoscopy is usually difficult and not accurate. Using Hgb level as an index of blood loss, three of four studies showed that there was no difference in the decrease in Hgb level after LASH or after LTH [11–13]. In contrast, Cipullo et al. [14] reported that LTH might be associated more blood loss than LASH. The reason is not clear.

#### Postoperative pain

Postoperative analgesia requirement after the two types of laparoscopic hysterectomy was evaluated in two studies [12, 13]. Mueller et al. [12] found no difference in ibuprofen requirement after LTH and after LASH. Although the study was prospective, it appears that the length of uterine incisions and the surgical technique of

the surgeons were not standardized. In contrast, Mousa et al. found that the requirement of postoperative analgesia in LTH patients was lower than that in LASH patients [18]. This could be due to a larger incision ( $\geq 15$  mm) required for the morcellator among women underwent LASH (Table 1).

#### Postoperative complication

Table 4 shows complications related to hysterectomy including urinary tract injury, cervical stump complication, conversion to laparotomy, reoperation, thromboembolic events, blood transfusion and fever.

##### Ureter and bladder injury

The incidence of bladder injury was 1.2–2% with TLH and 0–0.2% with LASH [11, 14]. This could be related to more extensive separation of the bladder from the cervix in LTH. Yet, in one study the authors found similar incidence of bladder injury with the two hysterectomy techniques [13]. The incidence of ureter injury is comparable between the two techniques.

##### Cervical Stump complications and reoperation

One of the drawbacks of supracervical hysterectomy is the occurrence of cyclic bleeding from the cervical stump. For example, Van Evert et al. [16] described 6% incidence of vaginal bleeding in the LASH group, and about one-third of

**Table 4** Intra- and postoperative characteristics of patients who underwent laparoscopic total hysterectomy (LTH) or laparoscopic supracervical hysterectomy (LASH)

Total	Harmanli et al. 2009 [11]		Mueller et al. 2009 [12]		Van Evert et al. 2010 [16]		Mousa et al. 2009 [13]		Cipullo et al. 2009 [14]	
	LTH 450 n (%) OR (95% CI) <sup>a</sup>	LASH 566 n (%)	LTH 113 n (%)	LASH 118 n (%)	LTH 198 n (%)	LASH 192 n (%)	LTH 105 n (%)	LASH 122 n (%)	LTH 157 n (%)	LASH 157 n (%)
Thromboembolic event	1 (0.2)	0	NA	NA	NA	NA	0	1 (0.8)	0	1 (0.6)
Ureter injury	NA	NA	1 (0.9)	0	0	1 (0.5)	1 (1.0)	0	1 (0.6)	0
Bladder injury	10 (2.2) <sup>b</sup> 4.75 (1.21–18.56) <sup>b</sup>	3 (0.5) <sup>b</sup>	NA	NA	NA	NA	1 (1.0)	2 (1.6)	2 (1.2)	0
Blood transfusion	8 (1.8)	9 (1.6)	NA	NA	NA	NA	1 (1.0)	5 (4.1)	1 (0.6)	0
Reoperation	4 (0.9) NS	1 (0.2)	NA	NA	NA	NA	0	5 (4.1)	2 (1.2)	0
Laparotomy conversion	26 (5.8) 2.25 (1.20–4.22)	23 (4.1)	0	0 NS	3 (1.5)	9 (5)	0	1 (1.0)	NA	NA
Urinary incontinence	NA	NA	NA	NA	2 (1)	2 (1)	0	3 (2.5)	NA	NA
Vaginal bleeding	NA	NA	NA	NA	0	12 (6)	0	1 (0.8)	1 (0.6)	0
Fever	6 (1.3)	5 (0.9)	NA	NA	2 (1)	1 (0.5)	4 (3.8)	2 (1.6)	6 (3.7)	7 (4.4)

NA not available, NS not significant

<sup>a</sup> OR odds ratio, CI confidence interval

<sup>b</sup> Includes both bladder and ureteric injuries

those patients needed subsequent surgical intervention. We previously reported that 4.1% of women after LASH required trachelectomy, mostly due to annoying cyclic vaginal bleeding [13]. This was despite coagulation of the endocervix at the completion of the procedure.

#### Conversion to laparotomy and other complications

Conversion to laparotomy from LASH or TLH appears to be comparable (Table 3). This is mostly related to technical difficulties, the presence of extensive adhesions and uncontrolled bleeding [11, 16]. The incidence of blood

transfusion, thromboembolic events, urinary incontinence and febrile morbidity are also similar.

#### Quality of life

Table 5 demonstrates the quality of life after LTH and LASH.

#### General health and dyspareunia

General health or dyspareunia following LTH and LASH are comparable.

**Table 5** Quality of Life after laparoscopic total hysterectomy (LTH) or laparoscopic supracervical hysterectomy (LASH)

	Kafy et al. 2009 [17] <sup>a</sup>				Nam et al. 2008 [18] <sup>b</sup>			
	LTH 40		LASH 40		LTH 51		LASH 39	
	Before	After	Before	After	Before	After	Before	After
General health	2.2±0.4 <i>P</i> <0.001	1.9±0.4 <i>P</i> <0.005	2.3±0.5 NA	2.1±0.6 NA	NA	NA	NA	NA
Self-image	2.2±0.4 <i>P</i> <0.01	2.1±0.4 <i>P</i> <0.006	2.4±0.5 NA	2.1±0.4 NA	NA	NA	NA	NA
Sexual satisfaction	2.5±0.6 <i>P</i> <0.001	2.2±0.5 <i>P</i> <0.002	2.5±0.7 NS	2.3±0.6 NS	1.98	1.9	2.1	1.95
Dyspareunia	2.4±0.6 <i>P</i> <0.001	1.7±0.5 <i>P</i> <0.002	1.9±0.7 NA	1.6±0.5 NA	2 <sup>c</sup>	2	4	1
Time to intercourse	NA NA	NA NA	5.78±1.13 <i>P</i> <0.001	4.92±1.2				

<sup>a</sup> Kafy et al.'s scale: 1 very satisfied, 2 satisfied, 3 somewhat satisfied, 4 unsatisfied, 5 very unsatisfied

<sup>b</sup> Nam et al.'s scale: 1 not satisfied, 2 somewhat, 3 satisfied

<sup>c</sup> Number of patients

## Sexual satisfaction and time to first intercourse

Contrary to a previous report of impaired sexual satisfaction after total hysterectomy [7], Kafy et al. could not demonstrate any difference in sexual satisfaction or self image after LTH or LASH [17]. Nam et al. [18] reported earlier resumption of sexual activity in the LASH group compared to LTH group. This might be related to health personnel's advice to avoid sexual contact until 6–8 weeks after surgery. Indeed, early sexual intercourse is one of the predisposing factors for vaginal vault prolapse after total hysterectomy [19].

## Conclusions

Besides a slightly increased incidence of bladder injury with LTH and of complications related to cervical retention after LASH, the two laparoscopic techniques appear comparable. Both techniques lead to improvement in dyspareunia. Following the studies demonstrating similar sexual function with and without cervical preservation, we performed mainly LTH. In addition to post-LASH cervical bleeding, retaining the cervix is associated with the concerns of cancer development in the cervical stump. This is especially important in the regions with poor follow-up and lack of annual cervical smears. The risk of developing carcinoma in the cervical stump is less than 0.03% in women who had had previous normal cervical cytology [20].

Other cervical stump complications include obstructive mucocele, infection and sepsis [21, 22]. As there is no risk of vault prolapse, LASH could be followed by early resumption of sexual activity [23, 24]. The issue of retaining or removing the cervix along with the uterine body should be discussed thoroughly with the patient. For those opting for cervical preservation, they should be instructed to have annual cervical smear.

We conclude that LASH is an alternative to total laparoscopic hysterectomy with less incidence of bladder injury and earlier resumption of sexual activity. Cervical preservation carries a small risk of bleeding and malignant transformation that might require further intervention. Total laparoscopic hysterectomy requires less postoperative analgesia, has lower incidence of reoperation and eliminates the complications associated with cervical stump. However, it is associated with increased urinary tract injury and rarely with vault prolapse. The decision to perform either procedure depends on the surgeon's expertise and the preference of both surgeon and the patient.

**Conflicts of interest** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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