



Original Research Article

Utility of laparoscopic hysterectomy compared to vaginal and abdominal hysterectomy for benign gynecological conditions

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ABSTRACT

Background: In spite of availability of procedures which are less invasive for hysterectomy, some prefer abdominal approach for the hysterectomy (TAH). Laparoscopic hysterectomy (TLH) is useful for the patients, as they recover fast and the convalescence period is reduced.

Objective: To compare and evaluate three different methods of hysterectomy for benign gynecological disorders with regard to time for recovery, outcome after surgery, cost-effectiveness and complications due to surgery.

Materials and Methods: Prospective study conducted on 90 patients who underwent hysterectomy for benign gynecological conditions. Patients were assigned to either TAH (n=30), TLH (n=30) or Vaginal hysterectomy (VH) (n=30), with or without salpingo-oophorectomy. All patients presenting in the gynecology OPD with indications for hysterectomy with or without salpingo-oophorectomy were included. Pre-operative parameters like age, basal metabolic index, intra-operative and post-operative parameters like reduction in hemoglobin etc. were compared in three groups.

Results: The mean blood loss, Time from surgery to tolerance of normal diet (days), Time from surgery to unassisted ambulation (days), post-operative pain score on day 3, mean reduction in hemoglobin and duration of hospital stay (days) were significantly ($p < 0.05$) higher in patients who underwent total abdominal hysterectomy compared to total laparoscopic or vaginal hysterectomy. In terms of intra-operative and post-operative complications, operative time, hospital bill and satisfaction score the differences were not significant statistically ($p > 0.05$).

Conclusion: Total laparoscopic hysterectomy and vaginal hysterectomy are safe and less invasive alternative, compared to abdominal hysterectomy, and show significantly better post-operative reconstitution

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1. Introduction

Among all the surgeries carried out in the obstetrics and gynecology, hysterectomy is more frequent.¹ Most common reason for hysterectomy is benign disorders in 90% of the cases. This procedure is considered as curative for bleeding from uterus which is not acceptable. Patients treated for this disorder are more satisfied by hysterectomy rather than

any other form of treatment.^{2–4} Hysterectomy is the safest procedure. The overall rate of complications is about 3.5%. Overall the death rate associated with it is around 0.038%.⁵

There are many indications for hysterectomy. One of the most common indication is leiomyomas followed by dysfunctional uterine bleeding.⁶ Abdominal approach for the hysterectomy is widely used. But vaginal hysterectomy (VH) is superior to total abdominal hysterectomy (TAH). This is because of it is associated with less morbidity due to lack of abdominal incision. CREST study⁷ carried

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out in USA from 1978-1981 has shown this. 1851 cases of hysterectomy were reviewed. They found that the complications after surgery were seen in 24.5% of the cases who underwent VH compared to 42.7% who underwent TAH. In addition, the VH was found to be more cost-effective compared to TAH. In one randomized controlled trial, it was observed that TAH cases had spent one extra day in the hospital and they took one week extra to recover compared to VH cases.⁸

Laparoscopy surgery is one of the recent advances. Laparoscopic hysterectomy (LH) is now available for surgeons and patients. This is less invasive. The recovery is fast with minimum complications compared to TAH. In cases with large size of the uterus, adhesions in the pelvis, it is difficult to do the VH. Laparoscopic assisted vaginal hysterectomy (LAVH) offers some benefits over traditional VH but is a challenge to carry out in cases with limited vaginal capacity.⁹

LH can be performed even in the obese women safely.¹⁰ But in spite of availability of LH, some still carry out the TAH. LH is superior to TAH. It reduces the cost, helps in fast recovery, helps to minimize morbidity associated with TAH. But there is slight increase in the complications during surgery using LH compared to TAH. But this can be overcome by surgeon experience and use of latest equipment.

Hence, present study was carried out to study the effectiveness of LH compared to TH

2. Materials and Methods

This is a Prospective study conducted on 90 patients who underwent hysterectomy for benign gynecological conditions at Jaslok hospital and research center. Patients were assigned to either Total abdominal hysterectomy (n = 30), Total laparoscopic hysterectomy (n = 30) or Vaginal hysterectomy (n = 30), with or without salpingo-oophorectomy. All patients presenting in the gynecology OPD with indications for hysterectomy with or without salpingo-oophorectomy were offered the procedure. The route of hysterectomy was decided by the consultant. The criteria for choosing vaginal hysterectomy were generally based on size of the uterus which did not exceed that of 16 weeks (700 grams) with no uterine immobility or inaccessibility. Inaccessibility was defined as tuberos diameter less than 9 cm and a pubic arch less than 90 degrees as well as a vagina narrower than 2 finger breadths. Previous pelvic surgery or need for oophorectomy was not contraindication for vaginal hysterectomy.

Institutional Ethics Committee permission was obtained and informed consent was taken from all eligible participants.

Exclusion criteria in general included second or third degree uterine prolapse, significant adnexal disease, requirement for bladder or other pelvic support surgery.

The patients were fully counselled about the procedure with regard to stay in hospital, need for analgesia, postoperative recovery and complications. Patients were admitted to the hospital on the previous evening for the morning surgeries. (This was simply for convenience: to avoid traveling early in the morning and to secure a bed). All the operations were carried out by the consultants assisted by junior doctors. Laparoscopic hysterectomy was performed by two teams of surgeons and each has more than five years' experience in gynecologic laparoscopic surgery before beginning to perform TLH.

All vaginal hysterectomies were done under spinal anesthesia using standard technique. Wedge morcellation, coring, or beveling was done when necessary. All total abdominal hysterectomies were performed with a pfannenstiel incision using standard technique. The choice of anesthesia was left on anesthetist. In both the above groups, Foleys catheter was removed on post-operative day-1 (after 24 hours of the surgery).

Patients posted for TLH had full bowel preparation with a clear liquid diet in the 48 hours preceding surgery. All laparoscopic hysterectomies were performed with the patients under general anesthesia. Patients were placed in the modified semi- lithotomy position, with knees flexed in Allen stirrups, and deep Trendelenburg position. Bladder was catheterized by Foleys catheter which was removed immediately after the surgery in the theatre. All laparoscopic instruments used, were reusable. Pneumoperitoneum was created by carbon dioxide gas using a Veress needle. The intraperitoneal pressure was maintained at 15mmHg throughout the surgery. The optical port was placed just above the umbilicus. A 10 mm 30 degree laparoscope was used. . Three secondary 5 mm ports were placed under direct video laparoscopic guidance: one in each iliac fossa lateral to the inferior epigastric vessels and one in the left lumbar quadrant. A uterine manipulator was used transcervically. The round ligaments, fallopian tubes/ovarian ligaments or infundibulopelvic ligaments (if the ovaries were removed) were desiccated with bipolar electrocautery and divided with laparoscopic scissors. The utero-vesical fold was incised and the bladder dissected caudally with sharp dissection. The uterine vessels at the level of the isthmus of the uterus was identified, ligated with vicryl No 1, coagulated with bipolar electrocautery and were divided. The cardinal ligaments and the uterosacral ligaments were similarly divided. At this point, the vagina was packed with a surgical glove filled with sponges to prevent leakage of gas. Either angle of the vaginal vault was opened with bipolar electrical energy. The vault was then opened with cautery and scissors and specimen delivered. Depending on the size of the specimen and the space in the vagina, the specimen was either morcellated and removed through left lateral port or removed vaginally. The vagina was packed with gloved sponge to facilitate laparoscopic

vaginal cuff closure, or alternatively, at the discretion of the surgeon, the cuff was closed using a vaginal approach.

A bolus injection of cefuroxime 1.5 grams and metrogyl 100 cc intravenously was given to patients in each group at induction of anesthesia; oral antibiotic therapy was continued postoperatively for 5 days in all the three groups.

Age, Parity, basal metabolic index of the patient was recorded. History of previous pelvic surgery and the indication for hysterectomy was also noted

Intra-abdominal pathology was noted. At the end of each operation, removed uteri were weighed. The beginning of the operation was calculated as the moment of the umbilical incision and introduction of the Veress needle for laparoscopic hysterectomy and as the moment of skin incision for the abdominal technique. Skin closure was considered the end of the operation in both cases.

For vaginal hysterectomy, operating time started from labial stitches and ended with vault closure. Blood loss was assessed by measuring all aspirated blood together with estimate of blood on drapes and number of mops used. Any major or minor complications were noted.

To know the drop in hemoglobin, Hb measured on second postoperative day and compared with preoperative levels. Time taken for tolerance of diet and to unaided ambulation was noted. All patients received diclofenac three times a day for pain. Opioid analgesics were given when patients requested for pain relief in spite of receiving diclofenac. Assessment of pain was done by using numerical pain scale from 0 = no pain to 10 = maximum pain and number of doses of opioid analgesics taken by the patient. Hospital stay was counted from day of surgery up to the day of discharge. Patients were discharged when they were completely ambulatory, had tolerated normal diet and no longer experiencing pain requiring analgesics. Hospital charges were determined by reviewing itemized charges on each patients billing record operative charges included charges for operation theatre, surgical and medical supplies, and the doctor's fee. The total hospital charges included the operative charges plus all charges incurred by patient during postoperative hospital stay and subsequent readmission if any for surgery related complication.

After discharge patients were seen in the OPD after two weeks of surgery and again at six weeks of surgery. Overall patient satisfaction with the procedure was scored at six weeks on a numerical 1 to 10 scale, with 1 representing lowest level of satisfaction and 10 representing highest level of satisfaction.

Statistical analysis

The data was entered in the Microsoft Excel worksheet and analyzed using means with standard deviation for continuous variables and proportions for categorical variables. For comparison of means in three groups, ANOVA was used with F value, whereas for comparison of proportion, chi square test was applied. In all cases, $p < 0.05$

was taken as statistically significant.

3. Results

All three groups were comparable in terms of age in years and mean values of basal metabolic index ($p > 0.05$) (Table 1)

In total laparoscopic hysterectomy group, 80% underwent plain TLH while 16.7% underwent TLH plus bilateral salpingo-oophorectomy while in TAH group, 23.3% underwent TAH plus bilateral salpingo-oophorectomy and 13.3% in VH group. (Table 2)

The mean blood loss, Time from surgery to tolerance of normal diet (days), Time from surgery to unassisted ambulation (days), post-operative pain score on day 3, mean reduction in hemoglobin and duration of hospital stay (days) were significantly ($p < 0.05$) higher in patients who underwent total abdominal hysterectomy compared to total laparoscopic or vaginal hysterectomy. In terms of intra-operative and post-operative complications, operative time, hospital bill and satisfaction score the differences were not significant statistically ($p > 0.05$). (Table 3)

4. Discussion

While analyzing the age of the women, it was seen that there was no significant difference in the age between the three groups.

There was no correlation between parity and type of hysterectomy performed in parous women. However there was no nulliparous patient in VH group in comparison to 16.7 % patients in TLH and 3.3% in TAH group. Higher parity are usually associated with some degree of vaginal laxity and uterine descent. Such patients are better suited for vaginal hysterectomy.

No correlation was found between body mass index (BMI) and type of hysterectomy performed as the mean BMI in all the groups were similar.

In the present study, most common indication for hysterectomy was Uterine leiomyoma. Vessey et al⁶ have reported similar findings in their large cohort study of hysterectomy.

Adenomyosis was the second commonest indication contributing to 26.70% (24/90) of all hysterectomies. Yusuf F et al¹¹ in their study found similar trend.

In the present study, we observed that the rate of past laparotomies was more (in TAH 28.6%) group cases compared to VH (13.4%) and LH (16.7%) group. Those having previous surgeries are more prone to develop complications during VH procedure compared to TAH.^{12,13}

TAH group cases had more frequency of Unilateral or bilateral adnexectomy in the present study. There were no complications due to this additional procedure. Thus, if the surgeon is experienced and careful, there is no reason that complications will occur. Similar findings were reported by Kovac,¹⁴ Davies,¹⁵ and Nwosu and Gupta.¹⁶ Sheth et al¹⁷

Table 1: Comparison of pre-operative parameters in 3 groups

Variable	Groups			F	P
	TLH (N=30)	TAH (N=30)	VH (N=30)		
Age (years)	43.3+3.3	44.3+2.4	44.1+2.8	1.148	0.321
Body mass index (kg/m ²)	25.3+2.1	25.4+1.7	25.2+2.3	0.129	0.879

Table 2: Surgeries done in three groups

Surgery	Groups			F	P
	TLH (N=30)	TAH (N=30)	VH (N=30)		
TAH	0	22 (73.3%)	0		
TLH	24 (80%)	0	0		
VH	0	0	25 (83.3%)		
TAH+BSO*	0	7 (23.3%)	0		
TLH+BSO	5 (16.7%)	0	0		
VH+BSO	0	0	4 (13.3%)		
TAH+USO*	0	1 (3.3%)	0		
TLH+USO	1 (3.3%)	0	0		
VH+USO	0	0	1 (3.3%)		

(*USO=unilateral salpingo-oophorectomy"; "BSO=bilateral salpingo-oophorectomy")

Table 3: Comparison of operative parameters in three groups

Variable	Groups			F/X ²	P
	TLH (N=30)	TAH (N=30)	VH (N=30)		
Operating time (min)	94.1+17.87	91.2+15.17	90.3+20.99	0.359	0.700
Blood loss (ml)	170.5+80.40	230.17+79.94	191.67+109.23	3.886	0.024
No intra-operative complications	30 (100%)	30 (100%)	28 (93.3%)	4.09	0.394
Time from surgery to tolerance of normal diet (days)	1.78+0.67	2.68+0.65	1.70+0.34	27.34	< 0.0001
Time from surgery to unassisted ambulation (days)	2.18+2.5	3.13+3.2	2.22+2.4	92.34	< 0.0001
Post-operative day 3 pain score	0.90+0.96	2.70+0.64	0.80+0.93	47.14	< 0.0001
Post-operative complications (yes)	4 (13.3%)	7 (23.3%)	2 (6.7%)	3.417	0.182
Mean reduction in Hb (gm %)	1.00+0.69	1.62+0.29	1.32+0.82	6.886	0.002
Hospital stay (days)	3.40+1.21	6.53+4.39	3.43+1.87	12.039	< 0.0001
Hospital bill (in thousands INR)	53.4+0.39	55.9+0.12	51.12+0.66	2.69	0.074
Satisfaction score	9.13+1.22	8.57+1.41	9.10+1.06	1.976	0.145

also performed adnexectomy during hysterectomy without any complications.

In this study, the mean operative time in TLH group (94.10 minutes) was comparable to abdominal (91.20 minutes) and vaginal hysterectomy (90.30 minutes). This is attributable to the fact that operating surgeons performing total laparoscopic hysterectomy in this study were skilled laparoscopic surgeons. Wattiez et al¹⁸ have also shown that well experienced surgeons take lesser operative time. another study reported similar findings.¹⁹

Patients undergoing TAH and TLH had higher average weight of uterus compared to patients undergoing VH in the present study. "A study done by Reichr et al²⁰ supports the view that morcellation at the time of vaginal hysterectomy is safe."

Mean Blood loss in patients undergoing TLH was significantly lesser compare to patients undergoing VH and

still lesser than those undergoing TAH. Thompson et al²¹ reported similar findings.

Major intraoperative complications were seen only in vaginal group in 2 cases. One was case of bladder injury while opening anterior pouch in a patient with previous one Caesarean section. But, the risk of injury to the bladder is increased in cases with previous cesarean section whatever the approach is taken for hysterectomy.²² The incidence of bladder injury reported for vaginal hysterectomy is 0.1% to 0.5 % by Harris.²³ The other complication was hemorrhage requiring transfusion in a case of fibroid uterus weighing 550 grams. Uterine enlargement and minimal descent are important risk factors for operative hemorrhage.^{24,25}

TLH is found to be associated with complications like ureteral injury in 0.3% and bladder injury in 1-1.8% of the cases.^{26,27} In our study there were no major complications in laparoscopic group in contrast to the above reported

risks. Liu CY et al²⁸ found from their study that the complication rate is similar for TAH and TLH. Wattiez et al²⁹ also reported that the complication rate will be lesser if the surgeon is well experienced. There were also no intraoperative complication in the present study.

Due to faster postoperative recovery, hospital stay was significantly less for vaginal and laparoscopy group than for abdominal hysterectomy. This was highly acceptable to the patients. Several comparative studies have reported similar postoperative recovery.^{16,30}

There were no major postoperative complication in any of the group. Minor complications were noted in each group. 1 patient developed pyrexia only in the abdominal group and in the same group there was one case of wound cellulitis and 2 cases of wound dehiscence. In a recent Cochrane review³¹ abdominal hysterectomy was associated with more febrile morbidity compared to other 2 groups of hysterectomy. The same review reported fewer wound complication for laparoscopy group than for abdominal hysterectomy.

Cost was more for TAH group compared to VH and TLH group. In our study all the laparoscopy instruments that were used were reusable so there were no extra charges for laparoscopic hysterectomy. The charges for laparoscopic hysterectomy was slightly more than that for vaginal hysterectomy due to the operating time which was more for laparoscopic hysterectomy. Nisolle et al³² also found that TLH was cost-effective.

5. Conclusion

Thus, Comparative analysis of cases in this study reveals that there was no significant difference in age, parity, basal metabolic index, presence of medical illness and past pelvic surgery all methods of hysterectomy. The indication for surgery and mean uterine weight were also largely similar across all the three groups. There was no significant difference in operating time, intraoperative or postoperative complications between all the three groups. Total laparoscopic hysterectomy and vaginal hysterectomy were superior over abdominal hysterectomy in terms of Less blood loss, quick Post-operative recovery, Shorter period of hospitalization, Avoidance of large wounds on the abdominal wall, Less intense postoperative pain, No wound infection or fever and More cost effective. The intraoperative and postoperative outcome was similar in all the groups.

6. Source of Funding

None.

7. Conflict of Interest

None.

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