

Study of Minimal Port Laparoscopic Hysterectomy (MPLH)

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Minimal access surgery as a modality of treatment for various gynecological conditions is rapidly gaining grounds in the recent years. Although laparoscopic surgeries are widely performed, very few surgeons are performing Minimal Port Laparoscopic Hysterectomy. In this study, we have evaluated the safety and benefits of MINIMAL PORT LAPAROSCOPIC HYSTERECTOMY (MPLH).

Minimal Port Laparoscopic Hysterectomy is Total Laparoscopic Hysterectomy (TLH) performed with using minimal ports i.e. only two operative ports at surgeon side and one Camera port. This new technique uses lesser number of ports, thus further reduces morbidity. Conventional TLH has one camera port and 4 accessory ports.

This is a retrospective study of 75 patients aged 35–65 years, who underwent hysterectomies indicated for various benign pathologies during March 2019–July 2022. Patients had given their written informed consent to undergo laparoscopic hysterectomy. Patients were followed-up until 6 months after surgery.

I. Pre-operative Preparations

For all patients after pre-anesthetic checkup and fitness, pre-op antibiotics were given as per routine protocol.

For laparoscopic hysterectomy, all patients underwent pre-operative bowel preparations with polyethylene glycol dissolved in 1 l of water a day prior to surgery. A combination of regional and general anesthesia was used.

Instruments used included bipolar forceps, scissor, two endoscopic graspers, two needle holders, a uterine manipulator (the Mangeshkar's uterine manipulator), 5 mm-30° laparoscope, and three-chip camera with light source. Patient was placed in modified lithotomy position with bolster below pelvis at the level of anterior superior iliac spine. Pre-operative catheterization was done in all patients, and nasogastric tube was inserted under anaesthesia. Mangeshkar's uterine manipulator was inserted in all cases of TLH after p/v examination under anaesthesia. Assistant on the vaginal side handled this manipulator.

Main surgeon stood on the left side of the patient, while the first assistant stood on the right side of the patient.

The assistant holding the camera stood on the right side besides the main surgeon. Abdominal entry was made at the umbilical site by direct 5-mm trocar. In cases of previous surgical scar, Veress needle was inserted through Palmer's point to create pneumoperitoneum. Two ancillary 5-mm trocars were placed under direct vision lateral to the rectus abdominis muscle 2 cm above and 2 cm medial to anterior superior iliac spine on left side.

After an accurate abdomino-pelvic inspection, lysis of any adhesions was performed. Left-sided round ligament was then identified and kept stretched with the help of vaginal assistant holding uterine manipulator. It was coagulated with bipolar forceps and cut using Harmonic ace scalpel around 1 cm lateral to its attachment to uterus, the chief surgeon holding these instruments in left and right hands, respectively.

Next, the infundibulopelvic ligament (in case ovaries were removed) or the tubo-ovarian structure (in case ovaries were conserved) of left side was identified. The assistant on the vaginal end helped giving traction on the ligament. The ligament was then first coagulated with bipolar forceps and then cut scissor. The use of energy source helped in ensuring perfect haemostasis. Same procedure was repeated on the right side.

Medial cut end of round ligament was held with grasper, and anterior and posterior leaves of broad ligament were separated with two blades of harmonic ace. The vesicouterine fold was clearly identified. The fold was then cut with bipolar and scissor starting from left round ligament to the right round ligament staying close to the uterus. The bladder was then pushed down using the blunt side of a traumatic grasper at the center against the counter pressure of the cup of uterine manipulator. Few fibers of bladder pillar were then cut again. After nicely pushing the bladder down, the whole bundle of uterine vessels was coagulated with bipolar grasper at the level of internal cervical os, without skeletonizing the uterine artery. Pushing cephalad with the uterine manipulator helped to move the uterine vessels away from the ureter. Complete desiccation of vessels could be assessed visually by observing the bubbles coming and going during this process; when the bubbles stopped forming, the vessel was desiccated and safe to transect with scissors. After transection, the uterine stump falls laterally, and further dissection is performed medial to stump down the cup by coagulating and cutting.

Vaginal fornices were identified while pushing the manipulator cephalad. The upper margin of the cup of uterine manipulator presented a bulge, which helped to identify cervico-vaginal junction. The metallic active blade of harmonic scalpel was used to make a cut on anterior aspect. The cut was then extended laterally on both sides, leaving the lateral attachments. Uterus was then acutely antverted by vaginal assistant. First, a small nick was given between and just above the level of attachment of two uterosacral ligaments, using metallic hook of monopolar cautery. The cut was then completed laterally to complete the procedure. Uterus was then pulled into vagina and taken out. In cases of large uteri or limited vaginal access, wedge morcellation was also performed. Finally, the vaginal vault was sutured laparoscopically or vaginally, and then pelvis was checked in order to ensure haemostasis and pelvic irrigation performed thus removing blood clots.

II. Parameters were Evaluated

Operating time The beginning of the operation was calculated as the moment of umbilical incision and introduction of the Veress needle for laparoscopic hysterectomy and as the moment of the cutaneous incision for the abdominal technique. Cutaneous suture was considered at the end of the operation in both cases.

Amount of blood loss The amount of blood loss during laparoscopic hysterectomy was calculated as the difference between the volume of liquid introduced into the pelvic cavity for irrigation purpose and the volume of liquid aspirated during the operation. B

Duration of post-operative Ambulance It was defined as duration between the end of surgery and the ability of patient to stand and walk.

Major complications during surgery These were defined as complications requiring re-surgery on conversion to laparotomy in case of laparoscopic hysterectomy.

Minor Complications

Number of conversions to abdominal hysterectomy It was studied in the TLH group.

Need for taking extra Ports OR converting into conventional TLH

III. Results

Indications of Surgery

Most common indications for hysterectomy were uterine fibroid followed by abnormal uterine bleeding. Other indications were adenomyosis and endometrial hyperplasia (Table 1). Timothy et al. [1] reported that the most common indication of TLH was adenomyosis, while uterine fibroid was the commonest indication for TAH.

Table 1
Indications of surgery

INDICATION	NUMBER OF PATIENTS
Fibroids	48 (64%)
AUB	9 (12%)
Adenomyosis	12 (16%)
Endometrial Hyperplasia	6 (8%)
Total	75

Duration of Surgery

The average time required in MPLH was 118min. Maximum time taken for surgery was 244mins in case of huge cervical fibroid. Minimum time required was 80mins. Time taken for surgery depends on various factors like Indication for surgery, obesity, previous surgery and dense adhesions, port placement etc.

Amount of Blood Loss

Average intraoperative blood loss was significantly lower in MPLH. Average intraoperative blood loss was less than 20ml. Similar results were also observed by Baek et al. [2] and Sutasanasuang [3].

Table 2
Amount of blood loss

Amount of blood loss	Number of patients
<20ml	53 (70%)
20ml to 100ml	18 (24%)
More than 100ml	4 (5%)

This also indicates that Minimal Port Lap Hysterectomy is safe method when we consider blood loss. Only 4 cases showed more than 100ml blood loss due to poor uterine Artery ligation due to fibroids or previous adhesions.

Patients who underwent MPLH had less intensive postoperative pain.

Duration of Hospital Stay

The average durations of hospital stay was 3 days. Few patient required hospital stay upto 5 days for various reasons. Shorter hospital stay in cases of laparoscopic was found to be statistically significant. Baek et al. [2], observed that, in a study on 100 cases, the length of hospital stay was significantly shorter for TLH than for TAH. Similar results were also reported by Persson et al. [4] and Johnson et al. [5].

Postoperative Ambulance Time

The postoperative ambulance time was less. Most of patients ambulated within 12hrs of surgery.

Major Complications

Major complications observed were injury to bladder. Patients were followed for minimum 3 months period for noticing any complication.

Incidence of major complications in MPLH was 2.6 % (2 in 75) two bladder injury. The case of bladder injury was due to thermal damage caused by the use of energy source while desiccating uterine artery in Previous 2 LSCS. Bladder injury was identified intraop period and sutured in the same setting. Urine catheter was retained for 3 wks. Catheter removed without any complications. Second case of bladder injury caused during dissection of uterovesical fold of peritoneum was detected intra-op only. Since it was small rent in bladder less than 1 cm, long catheterization for 3 wks was done without any further complications.

Minor Complications

Incidence of minor complications were observed in 7 cases i.e. 9.3%. Most of these were secondary hemorrhage from the vault, urinary tract infection, surgical emphysema, hematoma at ancillary port site, and severe gastritis.

Converts to Laparotomy

No conversion to laparotomy.

IV. Discussion

The potential benefits and risks of laparoscopic hysterectomy have been widely reported since the first total laparoscopic hysterectomy was performed by Harry Reich in 1989. In another previous study by Siren and Sjoberg [6], 100 successive laparoscopic hysterectomies performed by a senior gynecologist were assessed in order to evaluate the learning curve. It was found that the duration of surgery decreased from an average of 180 min for the first ten operations to an average of 75 min for the last 20. In a systematic review on total 3643 participants by Johnson et al. [5], it was observed that there were more urinary tract injuries with laparoscopic than with abdominal hysterectomy, but no other intraoperative visceral injuries showed a significant difference between surgical approaches. In our study, there were two major complications in MPLH, and both were urinary tract injuries. Both were observed in case of 2 previous LSCS where dense adhesions were noticed intra abdominally between bladder and uterus. Previously published papers reported an incidence of serious complications of 3.5–5 per 1000 for advanced laparoscopic procedures, for example, Chapron et al. [7]. However, these results, obtained by experts in centers with considerable experience, are not representative of general situation. Our complication rate 2.6% which is comparable.

Few recommendations for performing MINIMAL PORT LAPAROSCOPIC HYSTERECTOMY MPLH

- Start only after hands-on training to learn hand–eye coordination. Keep practicing on pelvi-trainer when you are not performing surgeries.
- Learn to use both hands from the beginning as you do in open surgery.
- Arrange the equipment and be familiar with its function before starting the surgery.
- The operating surgeon must know what assistants and staff nurse are supposed to do, must guide them, and supervise them at every step.
- Take the same team for a number of cases in the beginning stages till you gain confidence.
- On the day before the surgery, check the functioning of all equipment from inlet to end result. There should be a standby for all vital equipment.
- Proper bowel preparation is imp.

- Learn to depend less on Assistant for retraction.
- Special attention to develop skill to take right side clamps using left port is important.
- Be aware of the dangers of energy devices when they are used near the bladder and ureter. No energy source is 100 % safe. So, work near the uterus or vagina leaving a margin of tissue.
- Avoid tendency to drift laterally with the instruments and properly utilize traction and counter traction of uterus.
- While performing closure of vaginal cuff and anchoring it to the uterosacral ligament, take care to avoid stitch lateral to cuff margin.
- Learning to suture vault without assistant help is imp in case of MPLH.

V. Conclusion

In conclusion, the study shows that MINIMAL PORT LAPAROSCOPIC HYSTERECTOMY can be performed within reasonable time limits even by surgeons with no previous experience of advanced laparoscopic surgeries, provided proper technique is followed and the same team initially does a number of cases. It clearly showed superior benefits of less intraoperative blood loss, early postoperative ambulance, less postoperative pain, and shorter hospital stay. Thus, MPLH is a safe, effective, and reproducible technique after completion of the period of training necessary to standardize the procedure. This approach must be established in our real, day-to-day clinical practice.

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