

Feasibility of total laparoscopic hysterectomy for benign pathology in large uteri (\geq 300 Grams)

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Abstract

The aim of this study was to analyze retrospectively and present our experience in the feasibility of total laparoscopic hysterectomy for large uteri with benign pathology. 111 patients who had symptoms with myoma uterus, Abnormal uterine bleeding who underwent Total laparoscopic hysterectomy(TLH) in our hospital. All cases of myoma uterus irrespective of size, number & location of myoma were included in the study. Standard techniques of TLH and its modifications, like prior uterine artery ligation, morcellation after uterine artery ligation. 72% of patients had previous vaginal deliveries and 25.2% had previous cesarean section. 32% of patients had family history of fibroid. Average duration of surgery was 136min (40-300). Average weight of specimen was 457grams (300- 1500). Average blood loss was 46ml (10-500). We conclude that TLH is technically feasible irrespective of the size of the uterus in the hands of an experienced gynecologic laparoscopic surgeon.

Keywords: Laparoscopic Hysterectomy, Leiomyoma, Large uterus

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Introduction

Total laparoscopic hysterectomy(TLH) offers women an option that is far less invasive than other surgical techniques. For decade's abdominal and vaginal approaches accounted for the vast majority of hysterectomies. With advanced laparoscopic skills, gynecological surgeons are performing TLH and the use of it has increased since last three decades.⁽¹⁾ TLH is defined by laparoscopic ligation of uterine arteries and veins with removal of uterus vaginally or abdominally along with laparoscopic closure of the vaginal cuff. Substantial and dynamic access to uterine vessels, vagina and rectum from many angles has firmly established TLH a safe technique with almost nil co morbidities.^(1,2) The removal of large uterus laparoscopically represents a challenge to the surgeon. After introducing total laparoscopic hysterectomy in our institute in 2006 we have started gradual implementation of TLH even in large uteri over the years. In our Centre, we have analyzed retrospectively the technical feasibilities in 111 women with uterus more than or equal to 300grams.

Materials & Methods

Data of all patients who underwent TLH with large uteri (\geq 300gm) in our centre in the last 5 years (January 2011 to December 2015) was retrospectively analyzed. We evaluated and analyzed the data in terms of patients age, parity, underlying medical disease, previous abdominal surgeries, mode of deliveries, duration of surgery, intra operative complications, average blood loss, pre operative and post operative hemoglobin, blood transfusion rate, mode of specimen retrieval and need of GnRH analogues based upon the expertise of the

surgeon. All patients were evaluated thoroughly with physical examination, basic blood investigations and pelvic ultrasound, endometrial biopsy and pap smear.

Inclusion criteria:

- All women who underwent Total Laparoscopic Hysterectomy(TLH) in our Centre for benign uterine pathology in whom the uterine weight is \geq 300grams.
- Scarred and unscarred uterus.
- Cases where two or maximum of three doses of Inj. GnRH analogues given preoperatively to reduce the size & vascularity of uterus

Exclusion criteria:

- Adenomyotic Uterus.
- Anticipated bowel adhesions, previous multiple abdominal surgeries.
- Associated endometriotic cyst
- Preoperative diagnosis or suspicion of malignancy.
- Associated ovarian pathology.
- Associated combined surgical procedures like cholecystectomy, incisional hernia repair (Laparoscopic Intraoperative onlay mesh repair).

Main indications were myoma uterus with menorrhagia, dysmenorrhea or both with or without pressure symptoms or abnormal uterine bleeding. Women with other pathology like pelvic endometriosis, endometriotic cyst, ovarian pathology, proven or suspicious cases of malignancies were excluded. All patients were kept on one or two days of liquid diet as per each surgeon's protocol. Exelyte enema was given a night before the day of surgery. Prophylactic antibiotics and subcutaneous heparin, compression stockings (until full mobilization) were given as per hospital protocol. Preoperatively anemia was corrected. MRI abdomen and

pelvis was done in indicated cases to look for the size and location of myomas and rule out sarcomatous changes if any.⁽³⁾ According to pre operative technical feasibility assessment by each surgeon, cases will be given two or a maximum of three doses of inj. GnRH analogues after assessing the size of uterus clinically every month.⁽⁴⁾ All surgical procedures were performed by surgeons with extensive laparoscopic experience. Post op review was planned after a week and then 1 to 3 months after the surgery and then followed annually.

Procedure: Under general anesthesia with patient in modified lithotomy position surgery was performed. Veress needle insertion was done per the size of the uterus. Veress needle and primary trocar were inserted approximately 6cm above the fundus of the uterus. In case of large uterine epigastric insertion of veress and primary trocar was done and in some cases palmers point Veress insertion was done.⁽²⁾ After Carbon dioxide insufflation three accessory ports were made. In our institute, the operating surgeon stands on the right of the patient therefore, the three accessory ports are placed one in right upper quadrant another one in right lower quadrant and third port sub umbilically in left side (this port placement may vary). In case of large uteri an additional left upper quadrant port may be placed if warranted if we use to myoma screws or if we change the myoma screw from right to left upper quadrant port to gain access in the abdomen.

Intraoperative Techniques: Size of uterus and location of myoma, adnexal pathology if any, presence or absence of pelvic endometriosis and gross inspection of all other viscera made. Course of ureter on both sides will be traced from the pelvic brim along the entire lateral pelvic wall noted. Few surgeons perform laparoscopic bilateral salpingectomy / BSO initially while vaginal surgeon manipulates the uterus from below and opening of broad ligaments followed by tackling of uterine arteries on both sides after insertion of myoma screw through right upper quadrant port, after dissecting the bladder down. Few surgeons prefer myoma screw insertion from the beginning of surgery by pushing the bladder down followed by tackling uterine arteries and then completing the remaining procedure.⁽⁵⁾ Specimen would be retrieved vaginally or bisected and removed vaginally or by morcellation in endobag through right later port. Vault is closed vertically or transversely with no.1 vicryl continuous sutures intracorporeally. Bilateral ovariopexy was done in selective cases (ovaries fixed to round ligament on either side using No. 2 O PDS sutures). Thorough wash given after calculating the blood loss. Specimen weighed and sent for HPE. Duration of surgery was calculated from veress insertion till placement of last skin suture. Clear liquids started 6 hours after the procedure. CBD will be removed the very next day. Discharged on 1st or 2nd POD and reviewed after a week.

Procedure adopted while removing large UTERI

1. When the uterine vascular bundle is broad and tortuous the same was ligated using No. 1 vicryl intracorporeal sutures on both sides followed by complete procedure.^(2,6)
2. To change the position of myoma screw as and when required while dissecting the bladder down.^(2,7)
3. In case of lateral wall myoma (false broad ligament myoma) when there is less space, after coagulating and dissecting the uterine pedicle on both sides, morcellation was done to gain more access to proceed further and to avoid damage to ureters.
4. Using an additional myoma screw for uterine manipulation for better visualization through left upper quadrant port.

Results

Data were entered in an excel spread sheet and analysis was done using SPSS for windows, version 14. Results are expressed as mean (minimum-maximum). 111 women who underwent hysterectomy with uteri weighing ≥ 300 grams were included in the study. All women underwent TLH with bilateral salpingectomy / bilateral salpingo oophorectomy.

The mean age of women was 43.6 (32 -60) years. Mean weight of the women was 69.3 (44- 97) Kgs. 94.5% of them were parous women and 5.4% were nullipara. The main symptoms were menorrhagia and dysmenorrhea (61.02%), pressure symptoms (14.04%) multiple symptoms (24.03%). 50.4% of women were anemic in the pre- operative period and their hemoglobin was improved using oral, parenteral iron or blood transfusion and for some women oral iron was given along with Inj. GnRH analogues. [Table 1]

Table 1: Demographic characteristic

Demographic characteristics of the patients included	
Characteristic (N= 111)	Total Laparoscopic Hysterectomy Mean (Range)
Age (Yr.)	43.6(32-60)
Weight (Kg)	69.3(44-97)
Nulliparous (%)	5.4%(6)
Previous cesarean section (%)	25.2%(28)
Previous vaginal delivery & cesarean section	2.7%(28)
Family h/o fibroid	32.4%(36)
Clinical size of uterus (Weeks)	19.75(14-34)
Pre-operative anemia (%)	50.4%(56)
Pre-operative hemoglobin (gram%)	10.6(5.2-14.2)
Pre-operative platelet count (lakhs)	3.21(1.6-6.31)
Menstrual symptoms (%)	61.2%(68)

Pressure symptoms (%)	14.4%(16)
Both menstrual & pressure symptoms	24.3%(27)
Previous myomectomy (%)	0.9%(1)
Previous uterine artery embolization (%)	0.9(1)

72% of women had previous normal delivery and 25.2% had previous cesarean section. 32% of women had family history of fibroid. Clinically the size of the uterus varied from 14 weeks to 34 weeks with mean clinical size being 19.75 weeks. Pre-operative mean hemoglobin was 10.34(8-14.2) gm%. Interestingly platelet count was elevated in some cases with minimum of 1.6 lakhs and maximum of 6.31 lakhs (Mean platelet count—3.21 lakhs).

12.4% (14 women) of the specimen were retrieved vaginally and 87.38% (totally 97 cases) specimen retrieved by morcellation through right lateral port. Average duration of surgery was 136(40-300) minutes. Average morcellation time was 35 min (15-90). Mean

weight of specimen was 457 grams (300-1500). Average total blood loss was 46 ml (10-500) [Table 2]. Average hospital stay was 1.78 days (minimum 1 day and maximum 5 days).

Table 2: Intra & postoperative characteristics

Intra & postoperative characteristics of the patients included	
Characteristics (N= 111)	Laparoscopic hysterectomy Mean (Range)
Uterus Weight (Grams)	457(300-1500)
Operative Time (Minutes)	136(40-300)
Estimated blood loss (ml)	46(10-500 ml)
Blood transfusion (%)	3.6(4)
Intra operative complications (%)	1.8(2)
Conversion to open surgery (%)	nil
Post-operative complications (%)	nil
Hospital stay (days)	1.78(1-5)

Table 3: Review of published studies describing details of total laparoscopic hysterectomies for large uteri

Author	No. of patients (n)	Age (yrs)	Wt (kg)	Duration of surgery (min)	Blood loss(ml)	Weight of uterus (kg)	Length of stay(days)	Conversion
Chapron C et al(1995)	50	NA	NA	163(110,270)	NA	NA	3.9(2,13)	NA
Soto et al (2011)	77	NA	NA	111.4	205.7	125	NA	NA
Schindelbeck et al (2008)	43	46	68	130(75,270)	200(50,600)	150	6(2,15)	NA
Bettaih et al (2014)	876	44.9	NA	20-120	NA	NA	2	8(0.93)
Kondo et al(2011)	23	49.4	NA	NA	NA	NA	NA	4(17.4)
Aniulene et al(2006)	51	NA	NA	NA	123.4	NA	8.6	NA
R Sinha et al(2009)	173	45	NA	107	228	700	1	0
Our study	111	43.6	69.3	136	46	457	1.78	0
NA-Not available								

Discussion

Laparoscopy facilitates better anatomical view and it is a suitable approach for large uteri. It also provides the advantage of performing a concomitant surgery at the same time. Several studies have concluded that TLH can be performed safely in most women with enlarged uteri without an increase in complication rate and enhanced short term recovery.^(1,2,6,8,9)

All our patients underwent laparoscopic surgery. The mean age of women in our study group was 43.6 years which was like other studies.^(2,4,8,10) The average weight of the patients operated in our study was 69.8 kg. A study by Schindelbeck et al have observed that the average weight of women in their study was 68 kg.⁽⁴⁾

Major concern in laparoscopic removal of large uteri being the distorted anatomy especially in broad ligament myoma and cervical myomas where the anatomy and course of the ureter will be distorted and in also in cases of previous cesarean section where reflecting the bladder down and tackling the uterine arteries would be very difficult. In above mentioned cases techniques like changing the position of myoma screw often to carefully delineate the ureter in each step of skeletonizing of uterus and to follow the lateral window technique in dissecting the bladder down in

cases of scarred uterus.^(2,11) 25.2% of the patients who were operated underwent previous cesarean section and we have followed the same technique in our institute for these cases for safe bladder dissection.

The mean operating time in our experience was 136 min which is comparable to studies on laparoscopic hysterectomy in larger uteri.^(4,10) Laparoscopic Hysterectomy in large uteri though technically challenging is a safe and less invasive alternative than abdominal hysterectomy and has significantly better post-operative reconstitution.⁽⁴⁾ Laparoscopy has been reported to have lesser operative time than robotic surgery when performed by trained surgeons.⁽³⁾

In the armamentarium of energy sources used in laparoscopic gynecological surgeries, using harmonic scalpel, vessel sealer, ENSEAL, ligasure and thunder beat optimally in high risk and complicated cases would be of greater use in combating the blood loss and to avoid thermal injuries to bowel, bladder and ureter.⁽¹²⁾ The average blood loss in our study was 46 ml which was lesser in comparison to other studies^(2,3,4,13) which may be attributed to the usage of advanced energy source devices and surgery being performed by surgeons with extensive experience in gynecological laparoscopy. In 4 women with a uterine size corresponding to 20 weeks, the estimated blood loss was about 500ml for which blood transfusion was given in the post operative period. [Table 3]

To address the issue of hemorrhage encountered in large uteri one must ligate and coagulate the uterine pedicle before proceeding further.^(2,9) There was a significant decrease in blood loss and the requirement of blood transfusion intraoperatively or postoperatively. The duration of surgery was significantly lesser in cases where the uterine pedicle was ligated earlier.

In cases of anterior wall myoma and cervical myoma and in cases where uterus is studded with multiple myomas of varying sizes bladder will be splayed over the lower uterine segment, we will do bladder filling to know the extent of bladder and then it is pushed down carefully to proceed further.

45 women underwent morcellation while the specimen was still attached after uterine ligation. The ability to offer less invasive surgery for leiomyomas to women often requires the removal of large tissue specimens through small incisions, which is facilitated by morcellation. The risk of occult leiomyosarcoma is extremely low, especially in reproductive age group women.⁽¹⁴⁾

One patient had deep vein thrombosis in the post operative period and was managed conservatively and recovered well. In our case series, two women had a double ureter that was noticed intraoperatively. There should be caution in patients with duplication of ureter as they follow the same course and even if there is injury to one ureter the consequences will be same. One woman had history of previous myomectomy and sigmoid colon was densely adherent to posterior surface of uterus and

the same released carefully and one woman had history of prior uterine embolization for myoma.

One woman had bladder injury (she had two cesarean sections and a hysterectomy in the past) and the same was identified intra operatively by methylene blue test and it was sutured using 3-0 PDS laparoscopically. She was catheterized for two weeks and postoperative recovery was uneventful. There was one case of unilateral ureteric injury in a 34 weeks' size uterus with left broad ligament myoma. The uterine anatomy was distorted and the ureter was displaced, the ureteric injury was managed by laparoscopic neocystostomy. None of our cases required a conversion to laparotomy and there were no major post operative complications encountered. The reports on the need of conversion to laparotomy in other studies^(8,10) may be due to the associated risk factors of previous multiple surgeries that we had excluded during case selection. Most of our patients were sent home after one day of observation. This was like the study by R Sinha et al where the patients were sent home the next day.⁽²⁾

We had administered GnRH analogues preoperatively in 39 women in whom the preoperative hemoglobin, post-operative hemoglobin and hematocrit were improved. The uterine volume and fibroid size were significantly reduced as observed by Lethaby et al.⁽¹⁵⁾

Our data analysis concludes that it is technically feasible for a laparoscopic surgeon to perform a Total Laparoscopic Hysterectomy with minimal blood loss, nil visceral organ injury and least possibility of conversion to laparotomy. However, the outcome is dependent on appropriate case selection, adapting correct techniques and technical skill, experience of the surgeon as well. Large uteri are not a contraindication for total laparoscopy as it was thought previously. Further more TLH was associated with reduced pain scores and reduced length of hospital stay compared to abdominal and vaginal routes but may take little longer time to perform.^(16,17) Other benefits of TLH includes decreased risk of wound infection and decreased blood loss.⁽¹⁸⁾ Local adaptation and clever improvisation are highly essential to the successful practice of gynecological laparoscopy. In the recent years, there is a significant increase in the use of minimally invasive approach.^(19,20)

Conclusion

Our data showed that TLH is feasible in large uteri. In accordance with other authors we conclude that large uteri can be dealt with laparoscopic approach safely as with a laparotomy irrespective of the size of uterus. Further there was significantly better post operative recovery following laparoscopic surgery.

References

1. Uccella S, Cromi A, Serati M, Casarin J, Sturla D, Ghezzi F. Laparoscopic hysterectomy in case of uteri weighing ≥ 1 kilogram: a series of 71 cases and review of the literature. *Journal of minimally invasive gynecology*. 2014 Jun 30;21(3):460-5.
2. Sinha R, Sundaram M, Lakhota S, Mahajan C, Manaktala G, Shah P. Total laparoscopic hysterectomy for large uterus. *Journal of gynecological endoscopy and surgery*. 2009 Jan 1;1(1):34.
3. Soto E, Lo Y, Friedman K, Soto C, Nezhat F, Chuang L, Gretz H. Total laparoscopic hysterectomy versus da Vinci robotic hysterectomy: is using the robot beneficial? *Journal of gynecologic oncology*. 2011 Dec 31;22(4):253-9.
4. Schindlbeck C, Klauser K, Dian D, Janni W, Friese K. Comparison of total laparoscopic, vaginal and abdominal hysterectomy. *Archives of gynecology and obstetrics*. 2008 Apr 1;277(4):331-7.
5. Hoffman CP, Kennedy J, Borschel L, Burchette R, Kidd A. Laparoscopic hysterectomy: the Kaiser Permanente San Diego experience. *Journal of Minimally Invasive Gynecology*. 2005 Jan 31;12(1):16-24.
6. Song JY, Hwang SJ, Kim MJ, Jo HH, Kim SY, Choi KE, Kwon DJ, Lew YO, Kim JH, Lim YT, Kim JH. Comparison of selective uterine artery double ligation at the isthmic level of uterus and bipolar uterine artery coagulation in total laparoscopic hysterectomy. *Minimally Invasive Therapy & Allied Technologies*. 2010 Aug 1;19(4):224-30.
7. Kondo W, Bourdel N, Marengo F, Azuar AS, Tran-ba-Vang X, Roman H, Jardon K, Pouly JL, Rabischong B, Botchorishvili R, Mage G. Surgical outcomes of laparoscopic hysterectomy for enlarged uteri. *Journal of minimally invasive gynecology*. 2011 Jun 30;18(3):310-3.
8. Kondo W, Bourdel N, Marengo F, Botchorishvili R, Pouly JL, Jardon K, Rabischong B, Mage G, Canis M. Is laparoscopic hysterectomy feasible for uteri larger than 1000g? *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2011 Sep 30;158(1):76-81.
9. Mebes I, Diedrich K, Banz-Jansen C. Total laparoscopic hysterectomy without uterine manipulator at big uterus weight (> 280 g). *Archives of gynecology and obstetrics*. 2012 Jul 1;286(1):131-4.
10. Bettaiah R, Reddy CA. Laparoscopic Hysterectomies: Our 10 Years' Experience in a Single Laparoscopic Center. *The Journal of Obstetrics and Gynecology of India*:1-8.
11. Sinha R, Sundaram M, Lakhota S, Hedge A, Kadam P. Total laparoscopic hysterectomy in women with previous cesarean sections. *Journal of minimally invasive gynecology*. 2010 Jul 31;17(4):513-7.
12. Nieboer TE, Steller CJ, Hinoul P, Maxson AJ, Schwiens ML, Miller CE, Coppus SF, Kent AS. Clinical utility of a novel ultrasonic vessel sealing device in transecting and sealing large vessels during laparoscopic hysterectomy using advanced hemostasis mode. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2016 Jun 30;201:135-9.
13. Aniliene R, Varzgaliene L, Varzgalis M. [A comparative analysis of hysterectomies]. *Medicina (Kaunas, Lithuania)*. 2006 Dec;43(2):118-24.
14. Agrawal P, Agrawal R, Chandrakar J. To Assess the Safety of Morcellation for Removing Uterine Specimen During Laparoscopic and Vaginal Hysterectomies for Leiomyomas. *The Journal of Obstetrics and Gynecology of India*:1-6.
15. Lethaby A, Vollenhoven B, Sowter MC. Pre-operative GnRH analogue therapy before hysterectomy or myomectomy for uterine fibroids. *The Cochrane Library*. 2001 Jan 1.
16. Masson FN, Pouly JL, Canis M, Mage G, Wattiez A, Pomel C, Glowaczover E, Bruhat MA. [Laparoscopic hysterectomy. A series of 318 consecutive cases]. *Journal de gynecologie, obstetrique et biologie de la reproduction*. 1995 Dec;25(4):340-52.
17. Gendy R, Walsh CA, Walsh SR, Karantanis E. Vaginal hysterectomy versus total laparoscopic hysterectomy for benign disease: a metaanalysis of randomized controlled trials. *American journal of obstetrics and gynecology*. 2011 May 31;204(5):388-e1.
18. Wattiez A, Soriano D, Fiaccavento A, Canis M, Botchorishvili R, Pouly J, Mage G, Bruhat MA. Total laparoscopic hysterectomy for very enlarged uteri. *The Journal of the American Association of Gynecologic Laparoscopists*. 2002 May 31;9(2):125-30.
19. Uccella S, Casarin J, Marconi N, Cromi A, Morosi C, Gisone B, Pinelli C, Ghezzi F. Laparoscopic vs. Open Hysterectomy for Benign Disease in Women with Giant Uteri (≥ 1500 GRAMS): Feasibility and Outcomes. *Journal of Minimally Invasive Gynecology*. 2016 May 17
20. Uccella S, Cromi A, Bogani G, Casarin J, Formenti G, Ghezzi F. Systematic implementation of laparoscopic hysterectomy independent of uterus size: clinical effect. *Journal of minimally invasive gynecology*. 2013 Aug 31;20(4):505-16.