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Research Article

A Combined Strategy of Vaginal Hysterectomy by Electrosurgery with Post Hysterectomy Check Laparoscopy in Benign Indications Associated with Known or Suspected Concomitant Pelvic Disease: A Retrospective Study

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Abstract

Purpose: A vaginal hysterectomy (VH) may be preferred when possible. However, VH is less than the ideal in benign cases with known or suspected concomitant pelvic disease and a laparoscopic approach of the hysterectomy may be favoured. The laparoscopic hysterectomy requires more surgical skills. The aim of the study is to demonstrate a combined strategy of vaginal hysterectomy by bipolar sealer -shear with post-hysterectomy check laparoscopy (VHPHCL) over laparoscopic assisted vaginal hysterectomy (LAVH) in cases with known or suspected concomitant pelvic disease.

Patients and methods: In a retrospective study in a private setup, outcomes of cases who underwent VHPHC operation were compared with cases of LAVH operation using statistical analysis and tests of the recorded data from December 2019 through January 2021.

Results: Total 574 cases underwent the hysterectomy for the benign non-prolapsed uterus below 16 weeks

size. 426(74.21%) of them had no known or suspected concomitant pelvic disease 134(23.34%) cases underwent VHPHCL, and 14(2.43%) cases underwent LAVH operations. Found that, the frequency of laparoscopic surgery significantly got reduced to 17.91% after vaginal hysterectomy in the combined VHPHCL strategy compared to100% in LAVH strategy. Thus, the laparoscopic operation time significantly decreased in VHPHCL strategy compared to LAVH strategy (12.20 ± 5.88 (5-40) (95% CI=11.20-13.21) vs 34.28 ± 15.06(15-60) (95% CI=25.58-42.98) p-value 0.0001). Similarly, the mean total VHPHCL operation time was significantly decreased compared to mean total LAVH time (88.95 ± 28.26(50-200) (95% CI=84.12-93.78) vs 122.64 ± 37.82(50-190) (95% CI=100.80-144.48) p-value 0.0001). The VHPHCL strategy was completed with low (8-10mm of Hg) intraabdominal pressure and two abdominal ports in most cases. There was no vault dehiscence or major complication in either strategy.

Conclusion: The combined VHPHCL strategy can be performed in place of LAVH in most cases with known or suspected concomitant benign pelvic diseases.

Keywords: Thin Bipolar Shear in Vaginal Hysterectomy; Thick Bi-Clamp in Vaginal Hysterectomy; Post-Hysterectomy Check Laparoscopy; Suspected Extrauterine Pelvic Pathologies; Primary Trocar Insertion Under Transvaginal Endoscopic Guidance

1. Introduction

The vaginal hysterectomy may be preferred when possible [1, 2]. This route may not be ideal in cases with known concomitant pelvic pathologies such as ovarian cyst, adnexal cyst, hydrosalpinx, broad ligament fibroids, or suspected concomitant pelvic pathologies such as adhesions, endometriosis in chronic pelvic pain, dysmenorrhea, pelvic inflammatory disease, previous pelvic operation [3-5]. These cases conventionally favour a laparoscopic approach to the hysterectomy such as LAVH or TLH [3]. The laparoscopic hysterectomy requires more surgical skills, and longer operation time than VH. To reduce the amount of laparoscopic work in these cases, this study, performed vaginal hysterectomy plus a post-hysterectomy laparoscopic survey of the pelvis to find, if any remnant concomitant pelvic pathology following VH. The remnant pathology was surgically treated by laparoscopy at the same time to fulfil the requirement of the patient. Therefore, the aim of this study is to demonstrate the feasibility of a combined strategy of vaginal hysterectomy by bipolar sealer -shear with post-hysterectomy check laparoscopy (VHPHCL) in cases with known or suspected concomitant benign pelvic pathology to simplify the laparoscopic surgery.

2. Material and Methods

A retrospective study was conducted in a private set up at Purohit General Hospital. From among cases of the hysterectomy for non-prolapsed benign indications, consecutive cases of VH with PHCL (VHPHCL) performed during the period between December 2019 through January 2021 were studied. In addition, consecutive cases of the laparoscopic hysterectomy (LH) for benign indications during this period were studied. The upper limit of uterus size for all was that of 16 weeks of gestation. This study received approval from the Purohit General Hospital institutional ethics committee on Dt.17.2.2021 before the inclusion of the first case (Reference no- 02/2021/PGHIEC). Each included candidate signed the written informed consent before undergoing the VHPHCL and laparoscopic hysterectomy procedures. The outcome measures. Preoperative clinical characteristics, frequency of the requirement of laparoscopic surgery, laparoscopic operation time, total operation time, intraoperative and

postoperative complications among others were recorded of cases who underwent VHPHCL or LH strategy. The outcomes of the VHPHCL strategy were compared with outcomes of LH using statistical analysis.

2.1 Statistical analysis

Statistical analysis was done by descriptive and inferential statistics using chi-square test and z-test to derive the difference between two means. SPSS 27.0 version and GraphPad Prism 7.0 version were used in the analysis, and $p<0.05$ was considered as the level of significance ($p<0.05$).

2.2 Operation procedure

2.2.1 Four gynaecologic surgeons performed operations:

2.2.1.1 Vaginal hysterectomy with post-hysterectomy check laparoscopy (VHPHCL): Vaginal hysterectomy was started using Purohit technique of vaginal hysterectomy [6]. No infiltration of normal saline mixed vasopressors solution like adrenaline or vasopressin was done. The vaginocervical junction of the vaginal wall was incised circumferentially by bipolar shear (Figure 1) in place of the monopolar electrode [6]. A bipolar shear (cutter) is an open sealer cum divider forceps of 5mm diameter with 18 cm long triangular Maryland insert (a short version of laparoscopic forceps). Its curved inner jaw width is 0.5 -0.7mm (Xcellance medical technologies, Mumbai, India) (Figure 2). The bipolar cutter coagulates with light pressure and divides tissue gradually on increasing pressure on the handle-lever. Lateral pedicles were exposed using right-angle forceps. All the tissues including adhesions, from the cardinaluterosacral to the upper pedicles were exposed by right angle forceps, stretched between the prongs of a right-angle forceps, coagulated close to the edge of the uterus, and divided by bipolar shear/cutter between its prongs [6] (Figure 3). Ordinary bipolar forceps for coagulation and scissors cut in Purohit technique of vaginal hysterectomy [6], have been replaced by a single bipolar cutter. In addition, the bipolar cutter was used in place of the electrosurgical bipolar vessel sealing (EBVS) clamp. Smaller steps were preferable to larger steps. Thus, the bipolar shear worked in a very narrow available space with no exchange of instruments. A skeletonized uterine artery stretched between prongs of right-angle forceps was coagulated three times along its exposed length before it was divided close to the uterus [6] (Figure 4). Large fibroid uteri were decompressed using intrauterine and sub-serosal morcellation techniques with an aim to expose lateral pedicles. In cases with the previous caesarean section, a posteroanterior approach was used to dissect ureterovesical adhesions to avoid bladder injury [7, 8]. The bipolar cutter is applied close to the edge of the uterine wall to detach adhesions. In cases faced with the obliterated posterior cul-de-sac, cardinal-uterosacral-uterine arteries were to separate extraperitionally, and then, the anteroposterior approach was used to dissect recto-uterine adhesions to avoid rectum injury [9]. The thin tip jaw of the bipolar cutter (Figure 2) releases lateral attachments of the uterus step-by-step in smaller bites. There are four applications of the right -angle forceps: when the tip of right-angle forceps is applied from the posterior aspect of the tissues (posterior application) (Figure 3), from the anterior aspect of tissue (anterior application) (Figure 5), from the lateral aspect of tissue (lateral left and right applications) (Figure 6). The target tissues were spread, coagulated, and divided by bipolar cutter between prongs of right-angle forceps (Figure 3). The uterus is separated from the body using these basic applications.

Following the vaginal hysterectomy, adhered adnexa if any to the pelvic sidewall was mobilized down towards the surgeon by transvaginal mobilization technique using tactile feel before an attempt of salpingo-

oophorectomy (SO) [10]. The vaginally visible adhesion, if any was lysed between prongs of right-angle forceps using the bipolar cutter. Deaver's retractor and fiber-optic light were used occasionally to improve the visibility of deeper fields. Indicated salpingo-oophorectomy or opportunistic salpingectomy was done by the bipolar cutter. Larger adnexal cysts were decompressed by suction aspiration before adnexectomy [10]. Indicated ovarian cystectomy was done to preserve the ovary. Haemostasis was achieved. No clamp or suture was used up to this stage. Then, the vaginally invisible upper part of the pelvis was surveyed by post- hysterectomy check laparoscopy to find, if any remnant extrauterine pathology, and treated surgically. For pneumoperitoneum, the distal end of a Ryle's tube (keeping all holes above the vault) was placed in- situ on the right side of the pelvis. The vaginal vault was closed horizontally by Allis forceps one on each side of the Ryle's tube. Carbon dioxide gas was passed through the Ryle's tube to create pneumoperitoneum to avoid transabdominal Veres's needle insertion. Then, the primary intraumbilical trocar was inserted for laparoscopy. At laparoscopy, remnant pelvic pathology, if any was treated surgically. A laparoscopic sealer-divider forceps (a long version of the vaginal bipolar cutter, figure 2), and having the same jaws were used for laparoscopic procedures. The excised specimen, if any was removed vaginally. Finally, the vault was closed vaginally. Patients were followed up to six weeks after the operation.

2.2.2 Primary trocar insertion under transvaginal endoscopic guidance: In the cases with a long previous anterior abdominal wall scar extending up to and above the umbilicus, and multiple previous laparotomies, a telescope with the cannula was inserted through the open vaginal vault. The vault was clamped by Alli's forceps on both sides of cannula, then, the abdomen was inflated with CO2 gas through side channel. In the Trendelenburg position, the anterior abdominal wall was inspected intraperitoneally to locate an adhesion - free safe site (Figure 7) for the insertion of the primary trocar to avoid the visceral injury.

2.2.3 Laparoscopic hysterectomy: Laparoscopic assisted vaginal hysterectomy (LAVH) was conducted. The uterus was lysed from the anterior abdominal wall in cases of ventrofixed uterus [8]. Lysis of other pelvic adhesions was done. Upper pedicles were separated from the uterus up to the level of the uterine artery. Adnexectomy was done in indicated cases. The uterine arteries and lower attachments were separated vaginally by procedures similar to VH described above. The vault was closed vaginally. Similar to VHPHCL strategy, the long bipolar shear was used in the laparoscopic phase, and the short bipolar shear with the right angle forcep was used in the vaginal phase. Harmonic shear was also used occasionally for lysis of ventrofixed uterus from the anterior abdominal wall.

Figure 1: Showing the incision of the vaginal wall by bipolar sealer-shear(BS), CX-cervix.

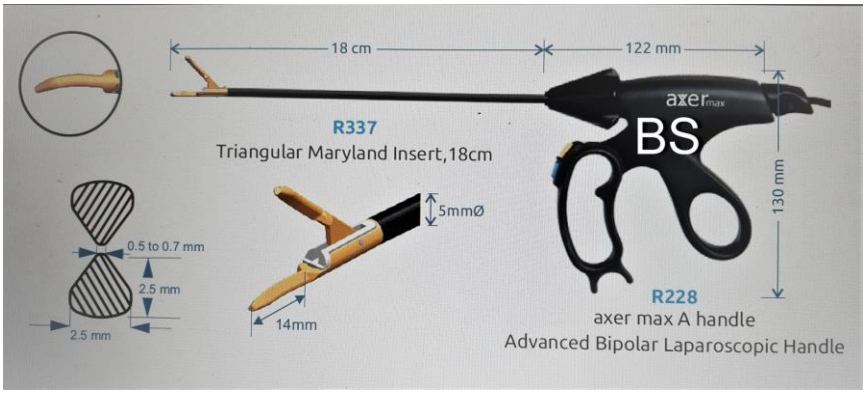

Figure 2: Showing self-explanatory different dimensions of the open bipolar sealer-shear(BS) including that of triangular curve jaws.

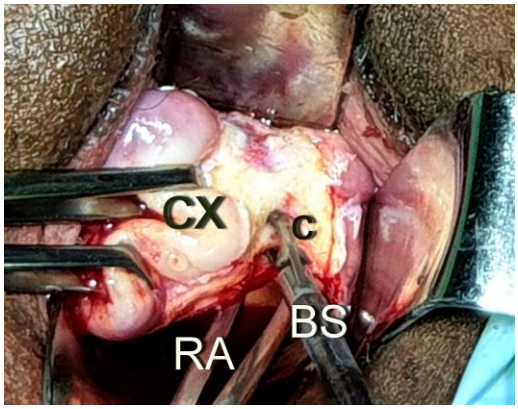

Figure 3: Showing the technique to stretch the cardinal-uterosacral ligament(C) from the posterior aspect between the prongs of a right-angle forceps(RA), to coagulate close to the edge of the uterus, and to divide by bipolar cutter(BS) between prongs of the right-angle forceps.

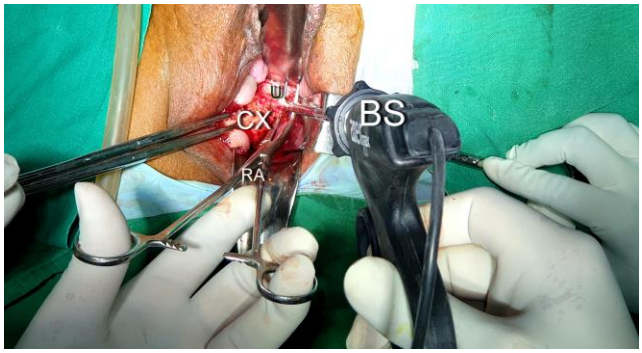

Figure 4: Showing the skeletonized left uterine artery(U), stretched between prongs of right-angle forceps(RA) from the posterior aspect, coagulated, and divided by bipolar sealer-shear(BS) close to the uterus.

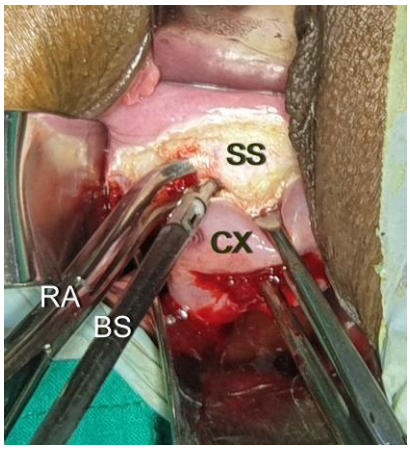

Figure 5: Showing the lateral application of the right -angle forceps(RA) to stretch and spread the supravaginal septum(SS) for the bipolar sealer-shear(BS).

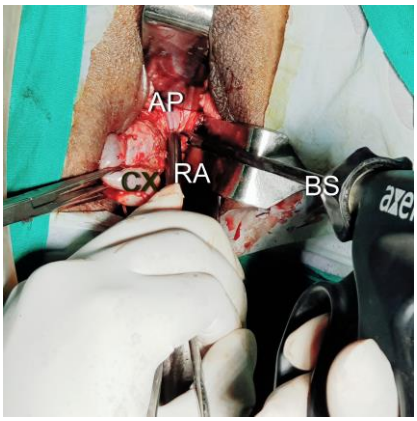

Figure 6: Showing the anterior application of the right -angle forceps(RA) to stretch the anterior cul-de-sac peritoneum for the bipolar sealer-shear(BS).

Figure 7: Showing the picture on picture shows procedure of primary trocar insertion under transvaginal endoscopic guidance.Picture A-(T)- telescope through the vaginal vault. Picture B- shows intraperitoneal trocar point (P) amidst the adhesions.

3. Result

Total number of hysterectomy cases during the study period for benign non prolapsed uterus up to 16 weeks size was 574.426 (74.21%) cases had no known or suspected concomitant pelvic disease thus, underwent VH. Other cases had known or suspected concomitant pelvic disease; 134 of 574 (23.34%) cases underwent VH with PHCL, and 14(2.43%) of 574 cases underwent LAVH operations. There was no case of abdominal hysterectomy or total laparoscopic hysterectomy (TLH). The mean age of VHPHCL cases was 42.70 ± 5.01(34-50) years (95%CI=41.84-43.55). The mean age of LAVH cases was 44.92 ± 5.99(34-55) years (95% CI=41.46-48.38). Table 1 shows the preoperative clinical characteristic of the patients underwent VHPHCL and LAVH. Associated chronic pelvic pain, dysmenorrhea, pelvic inflammatory diseases, previous pelvic operations, broad ligament fibroid, rudimentary horn of the uterus, or adnexal diseases (paraovarian cyst, ovarian cyst or hydrosalpinx) were the indications of VHPHCL. Associated chronic pelvic pain, dysmenorrhea, pelvic inflammatory disease, adnexal diseases and ventrofixed uterus (fixed adhesion of uterus to the anterior abdominal wall) (Table no1) following previous CS were the indications of LAVH [7, 8].

Table 2 Shows different procedures performed during the VHPHCL. In the VHPHCL strategy, the vaginal hysterectomy was completed in all cases including cases with large uteri, previous CS, and obliterated the posterior cul-de-sac. None of the cases with previous CS had incidental detection of ventrofixed uterus. After the vaginal hysterectomy, adhered adnexa was mobilized from the pelvic sidewall and adhesiolysis was done in 15(11.19%) cases, ovarian cystectomy was done

in three (2.23%) cases. Indicated salpingo-oophorectomy (unilateral/bilateral) was done in 16 (11.94%) cases. Indicated salpingo-oophorectomy failed in one (0.74%). Opportunistic salpingectomy failed in five (3.73%) cases. These are due to vaginally unreached upper pelvic adhesions. Table 3 Shows type of laparoscopic procedures performed at PHCL and LAVH. In LAVH, 100% of cases needed laparoscopic separation of lateral pedicles and adhesions bilaterally from the uterus up to the level of uterine artery. There was no failure of hysterectomy, salpingo- oophorectomy or opportunistic salpingectomy. In the VHPHCL strategy, on the contrary, significantly, only 24(17.91%) of 134 cases needed a laparoscopic surgery after vaginal hysterectomy. The other 110 (82.08%) cases did not need any laparoscopic procedure, as most of the concomitant pathologies were treated surgically vaginally in these cases before going for laparoscopy. Only a check laparoscopy or a lavage was enough to complete the laparoscopy (PHCL) in these cases. In contrast to the thick lateral pedicles of the uterus and tough ventrofixed adhesions of the uterus faced in LAVH, the remnant adhesions in this 17.91% cases at PHCL were mostly soft omental adhesions to the lateral pelvic wall, bladder or other pelvic organs and easily lysed. In addition, only 4.47% the cases of failed vaginal salpingectomy and adnexectomy needed excision procedures in the form of salpingectomy and adnexectomy at PHCL. Observed that the stumps produced using a bipolar cutter in both VHPHCL and LAVH, finally left with the patient, physically appeared similar.

Table 4 Shows the outcomes of the strategy of the VHPHCL and LAVH. Interestingly, significantly, PHCL was performed mostly using 2 ports in 97.76% cases than usually 3 ports in all LAVH procedures. The bipolar cutter coagulates and divides anatomy in both procedures, but needed less number of ports and few instruments exchange in PHCL compared to LAVH. Significantly, it required low (8-10mm of Hg) intra-abdominal pressure in 82.08% to perform the laparoscopic procedures in the upper part of the pelvis in PHCL compared to the requirement of standard (12-14mm of Hg) intraabdominal pressure in all of LAVH. Interestingly, the mean laparoscopic operation time in PHCL was significantly less than that of laparoscopic operation time of LAVH (12.20 ± 5.88(5-40) (95% CI=11.20-13.21) vs 34.28 ± 15.06(15-60) (95% CI=25.58-42.98) p-value 0.0001. The laparoscopic time was minimum when the less laparoscopic procedure was needed, and increased with the increasing amount of laparoscopic surgery in both PHCL and LAVH. The mean total VHPHCL operation time was significantly less than mean total LAVH time (88.95 ± 28.26(50-200) (95% CI=84.12-93.78) vs 122.64 ± 37.82(50-190) (95% CI=100.80-144.48) p-value 0.0001. There was no failed VHPHCL or failed LAVH or subsequent laparotomic conversion. Postoperative hemoglobin fall was significantly less after VHPHCL than after LAVH (0.71 ± 0.42(0.1-2.6) Gm% (95% CI=0.64-0.79) vs 1.25 ± 0.72(0.3-2.8) Gm% (95% CI=0.83-1.67). No thermal injury to any organ or no major intraoperative complication was seen during vaginal and laparoscopic procedures in both VHPHCL and LAVH. No vault dehiscence or major postoperative complication was seen following division of the vagina from the uterus by the bipolar cutter in both procedures. There was no significant difference in mean specimen uterine weight and mean hospital stay for both VHPHCL and LAVH.

Characteristics	VHPHCL		LAVH		p-value
	N=134	%	N=14	%	
Nulliparous	04	2.98	0	0	
Chronic pelvic pain	46	34.32	3	21.4	0.056,NS
Dysmenorrhea	78	58.20	3	21.4	0.0001,S
Uterine bleeding	82	61.19	8	47.14	0.064,NS
Previous Caesarean section	35	26.11	10	71.42	0.0001,S
1cs	08	5.97	2	14.28	0.09,NS
2cs	22	16.41	8	47.14	0.0001,S
3cs	05	3.73	0	0	
Previous pelvic laparotomy	06	4.47	0	0	
Uterus length more than 10 cm	42	31.34	6	42.85	0.10,NS
Uterus size of 12 -16 weeks	35	26.11	6	42.85	0.01,S
Fibroid uterus including broadligament fibroids	54	40.29	5	25.71	0.05,NS
Adenomyosis uterus	49	36.56	4	28.57	0.29,NS
Pelvic inflammatory disease	21	15.67	1	7.14	0.07,NS
Adnexal diseases including paraovarian cyst, ovarian cyst, hydrosalpinx	22	16.41	1	7.14	0.07,NS
Rudimentary horn of uterus with hematometra	1	0.74	0	0	
Ventrofixed uterus following previous CS	0	0.00	8	57.14	

Footnotes-some cases had more than one characteristic, S-significant, NS-not significant

Table 1: Preoperative characteristics of cases underwent VHPHCL and LAVH.

Operation procedures	N=134	%
VH with or without debulking	134	100
Failed VH	0	0
Posteroanterior approach in cases with previous CS	35	26.11
Anteroposterior approach in cases with obliterated posterior cul-de-sac	05	3.73
Transvaginal mobilization of adhered adnexa and vaginal adhesiolysis	15	11.19
Ovarian cystectomy	03	2.23
Salpingo-oophorectomy (uni or bilateral)	16	11.94
Failed vaginal salpingo oophorectomy (left)	01	0.74
Failed vaginal salpingectomy (uni or bilateral)	05	3.73

Foot note: some cases had more than one procedure.

Table 2: Different surgical procedures performed during vaginal hysterectomy of VHPHCL.

Procedures	PHCL		LAVH		p-value
	N=134	%	N-14	%	
Laparoscopic procedure needed	24	17.91	14	100	0.0001,S
Laparoscopic procedure not needed	110	82.08			
Adhesiolysis at PHCL -of omentum from antero- lateral pelvic wall	10	7.46	10	71.42	0.0001,S
iliac fossa, round ligament, bladder	08	5.97			
- of sigmoid colon from lateral pelvic wall	01	0.74			
-of rectum from appendix	01	0.74			
Endometriotic spots coagulated	01	0.74			
Laparoscopic salpingectomy	05	3.73	11	78.57	0.0001,S
Laparoscopic Adnexectomy	01	0.74	3	21.42	0.0001,S
Lysis of ventrofixed uterus from anterior abdominal Wall at LAVH	0	0	8	57.14	

Foot notes-few cases needed more than one procedure, S-significant.

Table 3: Different laparoscopic procedures performed at PHCL and LAVH.

Outcomes	VHPHCL		LAVH		p-value
	N=134	%	N=14	%	
Three laparoscopic ports needed	3	2.23	14	100	0.0001,S
Two laparoscopic ports needed	131	97.76	0	0	
Intraabdominal pressure:					
8-10mm Hg	110	82.0	0	0	
12-14mm Hg	24	17.91	14	100	0.0001,S
Age	42.70 ± 5.01 (34-50) yrs	(95% CI=41.84-43.55)	44.92 ± 5.99 (34-55) yrs	(95% CI=41.46-48.38)	
Mean VH time in minutes	76.23 ± 24.62 (40-160)	(95% CI=72.51-81.28)	122.64 ± 37.82 (50-190)	(95% CI=100. 80-144.48)	0.0001,S
Mean laparoscopy time in minute	12.20 ± 5.88(5-40)	(95% CI=11.20-13.21)	34.28 ± 15.06 (15-60)	(95% CI=25.58-42.98)	0.0001,S
Mean total Operation time in minute	88.95 ± 28.26 (50-200)	(95% CI=84.12-93.78)	122.64 ± 37.82 (50-190)	(95% CI=100. 80-144.48)	0.0001,S
Mean specimen uterus weight in gram	179.32 ± 96. 80 (60-620)	(95% CI =162.78-195.86)	164.14 ± 131.20 (48-500)	(95% CI=88.38-239.90)	0.59,NS
Mean 24 hours Hb fall in	0.71 ±	(95% CI=0.64-	1.25 ± 0.72(0.3-	(95% CI=0.83-	0.0001,S

gram%	0.42(0.1-2.6)	0.79)	2.8) Gm%.	1.67)	
Mean Hospital stays in day	2.08 ± 0.30 (2-6) days	(95% CI=2.03-2.13)	2.14 ± 0.36(2-3) days	(95% CI=1.93-2.35)	0.48,NS
Failed planned hysterectomy and laparotomic conversion	0	0	0		0
Ureter, Bladder, rectum injury	0	0	0		0
Fever	03	2.23	0		0
Paraesthesia of left lower limb recovered spontaneously by 5th day	01	0.74	0		0
Vault infection in 2nd week	02	1.49	0		0
Vault granulation at 6 weeks	01	0.74	0		0
Any other	00	0	0		0

Footnote. S-significant, NS-not significant

Table 4: Outcomes of VHPHCL and LAVH.

4. Discussion

For greater benefits, the vaginal hysterectomy should be preferred as the least invasive method of the hysterectomy for benign indications [1, 2]. It was possible in 74.21% in this study. This route may not be ideal in cases with known (such as ovarian cyst, adnexal cyst, hydrosalpinx, broad ligament fibroids, rudimentary horn of the uterus) or suspected concomitant pelvic pathologies (such as adhesions, endometriosis) in cases with chronic pelvic pain and dysmenorrhea (Table 1) [3, 4]. These cases conventionally favour a laparoscopic approach to the hysterectomy such as LAVH or TLH [3]. These cases constituted 23.34% in this study. The laparoscopic hysterectomy obviously requires more skill than VH. The present operating surgeons were experienced in vaginal hysterectomy by electrosurgery. Thus, in the place of the conventional laparoscopic hysterectomy (LAVH or TLH) in these cases, they performed the vaginal hysterectomy, and then, post-hysterectomy check laparoscopy (VHPHCL). The whole purpose was to complete the least invasive VH with additional procedures by bipolar sealer-shear before going for minimally invasive laparoscopy, to reduce the amount of laparoscopic work. When VHPHCL was not feasible in cases with ventrofixed uterus following previous CS [7, 8], or patient-surgeon decided for a laparoscopic hysterectomy, LAVH was done. It constituted 2.43% of the total cases in this study.

The outcomes of VHPHCL were compared with outcomes of LAVH in this study. In the laparo-vaginal LAVH strategy, conventionally, the laparoscopic lysis of the upper pelvic adhesions needed before the start of the hysterectomy [11]. On the contrary, in the present vagino-laparoscopic VHPHCL strategy, the upper pelvic adhesions are dissected laparoscopically after VH at PHCL. Thus, there was no need for pre-hysterectomy laparoscopic survey or surgery [9] in any case who underwent VHPHCL contrary to that in LAVH [11]. The frequency of laparoscopic surgery significantly got reduced to 17.91% after vaginal hysterectomy in the

combined VHPHCL strategy compared to 100% in the LAVH strategy. Only the ventrofixation adhesions could not be reached and dissected vaginally, thus, VHPHCL was contraindicated [7, 8] therefore, LAVH was indicated and performed to separate the uterus from the anterior abdominal wall (Table 3). Technical challenges using thick electrosurgical bipolar vessel sealing (EBVS) clamp [12], and conventional clamp-cut-suture ligation technique in cases with narrow lateral spaces resulted in failed VH [13], subsequent laparoscopic or laparotomic conversion, and ureteric injury in previous studies [12, 13]. In this study, utilization of the thin tip bipolar sealer-divider with the help of right-angle forceps (Figure 1, 2) among others, resulted in no failed VH in all VHPHCL cases or no failed completion of avaginal phase of LAVH. The thin tip forceps increased access to narrow lateral space with almost no thermal injury to lateral structures such as ureter in LAVH or VHPHCL procedures in this study. There was no major risk of laparoscopy during PHCL of VHPHCL strategy in this study, and was mainly is due to minimal laparoscopic surgery following maximum vaginal surgery during VH. The Ryle's tube inflation avoided Veres's needle insertion in all cases of PHCL. Primary trocar insertion under transvaginal endoscopic guidance in selected risky cases of previous multiple anterior abdominal wall scars avoided port insertion trauma to viscera in this study. Except few minor complications, there were no major complications in VHPHCL and LAVH strategies in this study.

The urinary tract injuries during VH and LH as reported by a similar recent retrospective cohort study [14], in patients with large uteri below 515 grams (about 16 weeks) can be avoided by the present combined VHPHCL strategy. The concern of prolonged laparoscopic time in performing laparoscopic hysterectomy by previous studies [1, 14], can be addressed by the present combined VHPHCL strategy. The total laparoscopic time was significantly shorter in PHCL compared to the laparoscopic time of LAVH (Table 4) in this study. It is also established by a randomized controlled trial and systematic review that VH by electrosurgery consumes less time compared to LH, and VH using sutures [2, 12, 15], a finding, similar to our findings. As a result, the combined VHPHCL operation time of this study is significantly shorter than the LAVH operation time (Table 4). In addition, it required low intraabdominal pressure in most cases to expose remnant pathologies in the upper part of pelvis, and is expected to reduce postoperative abdominal and shoulder pain [16] (Table 4). Also, the PHCL required mostly two ports and few accessory instruments, compared to three ports and many accessory instruments in LAVH (Table 4) and expected to reduce the cost of the accessories. Therefore, in benign cases with known or suspected concomitant pathologies, a VHPHCL strategy has many benefits over LAVH.

5. Conclusion

A combined strategy of the vaginal hysterectomy by the bipolar shear with a post-hysterectomy check laparoscopy can be performed in place of LAVH in most of the candidates of the hysterectomy for a benign indication with known or suspected concomitant benign pelvic diseases.

Contribution to authorship

All authors qualified for authorship.

Disclosure of interests

All authors have nothing disclosure of interest to declare.

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