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Original Research Article

The uterine fibroid study: comparative study between total abdominal hysterectomy and laparoscopic assisted vaginal hysterectomy

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ABSTRACT

Background: To compare safety and efficacy of total abdominal hysterectomy (TAH) and laparoscopic assisted vaginal hysterectomy (LAVH) in uterine fibroid patients.
Methods: It is a prospective observational study conducted at six major gynaecology hospitals located in Telangana State. The data was collected from November 2022 to April 2023 and all the safety and efficacy parameters were evaluated. The collected data entered in MS Excel and then analysed and statically evaluated by using GraphPad prism software. Internal consistency reliability Cronbach's alpha was calculated.
Results: There were 200 patients 100 each of TAH and LAVH. LAVH is less painful, has a shorter length of hospital stay and quicker return to work than TAH. On average, LAVH operations took significantly longer than TAH operations (47.9±5.953 minutes, 117.6±26.174 minutes, $p<0.0001$). The total length of hospital stay was significantly shorter after LAVH than after TAH (11.4±2.81 days, 2.66±0.95 days, $p<0.0001$). Although the haemoglobin drop in TAH was significantly higher than LAVH (173.15±40.872 and 92.5±6.83, $p<0.0001$), blood transfusions were more common in TAH (25 case versus 15 cases $p=0.0306$). The drug requirement to control pain during hospitalization after the two surgeries was not significantly different between the two groups. Fever was observed more often in the TAH group ($P=0.01$). Finally, Intra-operative and post-operative complications were lower in LAVH than TAH.
Conclusions: LAVH is less painful, has a shorter length of hospital stay and quicker return to work than TAH. It has been concluded in present study that LAVH has become a major alternative to conventional abdominal hysterectomy with patient often opting laparoscopic approach for the result of cosmetic and faster recuperative reasons.

Keywords: Gynaecology, Hysterectomy, Laparoscopy, Transfusion, Uterine fibroid

INTRODUCTION

Uterine leiomyomata (UL), commonly called "fibroids," are benign neoplasms of uterine smooth muscle. Although they are often asymptomatic, UL can cause excessive menstrual bleeding, pelvic pain and other symptoms that seriously affect a women quality of life.[1] These benign neoplasms that contain an increased amount of extracellular collagen, elastin and are surrounded by a thin pseudo-capsule. They may enlarge to cause significant distortion of the uterine surface or cavity. Their size will then be described in menstrual weeks, as in a pregnant uterus.[2] It has been estimated that at least 20 percent of women at the age of 30 have got fibroid in their wombs. Fortunately, most of them (50%) remain asymptomatic.[3]

Anatomical classification

Sub serosal or sub peritoneal

They originate in the myometrium and grow out toward the serosal surface of the uterus, lying beneath the peritoneum or may become pedunculated.

Intramural or interstitial

Myomas are located within the uterine wall of the myometrium.

Sub mucosal fibroids

They originate in myometrium and grow toward the endometrial cavity, protruding into uterine cavity.

Cervical leiomyomas

A rare type. They cause early pressure effects.[2]

Etiology

Estrogen and progesterone, growth factors & disordered wound healing, genetic factors.[1]

Risk factors

Early menarche, parity, age, obesity, diet, racial difference, luteinizing hormone, oral contraceptives.[1]

METHODS

Study design

It is a prospective, observational, multicentric, comparative study.

Study place

The study was conducted in gynaecology department in six different hospitals which are Daksha Super Speciality Hospital, Lavanya Hospital, CKM Government Maternity Hospital, Koorapati Laparoscopic and Fertility Centre, Laxmi Narasimha Hospital, Sri Uday Multi Specialty Hospital located in Telangana State.

The data was collected from November 2022 to April 2023 and all the safety and efficacy parameters were evaluated. The selection criteria includes 200 patients of age 35-50 years with uterine fibroid in which who underwent 100 each of TAH and LAVH.

Data collection

Data collection tools are UFS-QOL & HRQOL questionaries. First, a demographic detail which include personal characteristics like age, weight, parity, level of haemoglobin, comorbidities, family history diseased diagnosed. The pre-operative variables were uterus size and blood transfusions as needed prior the surgery. The post-operative clinical outcome variables were operative time, estimated blood loss, hospital stay, amount of analgesia needed, intra-operative, post-operative complications rate and the questionaries to know the severity of the disease.[4]

Uterine fibroids symptoms quality of life and health related quality of life

UFS-QOL & HRQOL stands for Uterine Fibroids Symptoms Quality of Life and Health Related Quality of Life is a measure of activity in uterine fibroids. These questionaries consist of 37 questions, divided into 2 parts. where the answer options are in the li Kert format.[5]

Evaluates symptom severity (8 questions). The second part is divided into six areas, (29 questions) which includes Concern (5 questions), Daily activities (7 questions), Mood and energy (7 questions), Self-control (5 questions), Self-consciousness (3 questions), Sexual function (2 questions).[6]

To calculate uterine fibroids symptoms quality of life and health related quality of life

Patients can answer on a 5-point Likert scale, from ‘not at all’ to ‘a very great deal’ and from ‘None of the time’ to ‘all of the time’. Scores are calculated in seven subscales:

Symptom severity (8 items, 8–40 points), Concern (5 items, 5–25 points), Activities (7 items, 7–35 points), Energy/mood (7 items, 7–35 points), Control (5 items, 5–25 points), Self-conscious (3 items, 3–15 points), Sexual function (2items, 2–10 points)

These scores are summarised into a sum score symptom severity and Health-Related Quality of Life (HRQOL) i.e., 8 items, 8-40 points &29 items, 29–145 points.[7]

TAH was performed with the patients placed in the supine position. After disinfection abdomen was opened by a Pfannenstiel incision. A paired clamps were placed on round ligaments, fallopian tubes and infundibula pelvic ligaments and then cut and sutured.

Then peritoneum of the uterovesical pouch was divided and second clamp was made to cut uterine vessels and 3rd clamp was made to cut Mackendrot's and uterosacral ligaments and then ligated. Uterus was removed and vaginal vault were repaired with interrupted suture and abdomen closed in layers.

In LAVH, patients were positioned on operating table in the lithotomy position with the legs titled slightly forward. A uterine manipulator was introduced through the vagina before the abdominal incision. A 10 mm trocar and canula was inserted first infraumbilical to hold the optic camera.[9]

A 5 mm trocar along with another 10 mm trocar was inserted in the lower abdomen. The stage-IV LAVH began with electrocoagulation and transection of the bilateral round ligaments, the fallopian tubes and ovarian ligaments.

Bilateral uterine arteries were identified and the vesico-uterine peritoneum was opened to make the subsequent hysterectomy easier to perform. The vaginal procedures began with anterior and posterior colpotomies by a circumferential incision along the uterine cervix.

The vesicocervical, cardinal and utero-sacral ligaments were clamped, cut and sutured. After that the uterine vessels and the adnexal collaterals had been clamped, cut and sutured.

The final vaginal cuff closure was also being accomplished from below. Once the vaginal cuff was closed, the peritoneal cavity was insufflated, inspected laparoscopically for haemostasis and irrigated with warm normal saline solution. The operative time was calculated from the first incision to the end of wound closure.[8]

Recruitment

Patients diagnosed with uterine fibroids. The patient's history, physical examination, systemic examination, lab investigations and other findings such as USG abdomen scan reports was examined by Gynaecologists. Additional inclusion and exclusion criteria are:

Inclusion criteria

Inclusion criteria include patients diagnosed with Uterine fibroids, patients of age 35-50 Years, benign condition of uterus, mobile uterus, uterus size>14 weeks.

Exclusion criteria

Exclusion criteria include patients of age<18 Years, pregnant women, patients who desire to maintain fertility, size of the uterus<14 weeks, patients with gynaecology malignancy, prolapse of uterus, patients with adnexal masses.

The project protocol was submitted to the Kakatiya Institutional Ethics Committee (KIEC) and got approved prior to the initiation of the research work. Our approval number is KIEC-2023/Pharm.D-2018/Project-07.

Statistical analysis

Statistical analysis was done on an intent to treat basis. For the efficacy criteria Unpaired-t-test was carried out for the quantitative variables using Graph Pad Prism version 9.3.1. Internal consistency reliability Cronbach's alpha was calculated.

RESULTS

Table 1 shows the age, weight, parity of TAH and LAVH are not significantly different. As it occurs more through the first line of genetics through their mother and the family history for 11% of TAH and 8% of LAVH. Our study gathered the type of fibroid as in Table 2 shows the intramural fibroid has more ratio than the other types fibroid.

These fibroids occupy the space of the uterus and measures in terms of pregnancy weeks as in Table 3, TAH group has more uterus size which means>16 weeks has more ratio than LAVH which is significantly different.

A specific questionnaire for assessing the severity of the disease severity of the disease symptoms and their impact on quality of life, the uterine fibroid symptom -quality of life (UFS-QoL). The purpose of the questionnaire is to provide a simple tool to assess the impact from the perspective of the patient. Women suffering from the disease exhibit significant symptoms, as shown in Table 4.

The estimated reliability of the questionnaire. The values of Cronbach's α coefficients are poor and un acceptable. This study observed that the validity of USF-QOL &HRQOL severity of the disease and impact on quality of life, maximum in TAH than in LAVH. Except sexual function the above mentioned all are significantly different in Table 5.

Reliability estimates of the ufs-qol questionnaire internal consistency

Table 6 shows the anaesthesia given prior the surgery which was significantly differed.

Table 7 level of haemoglobin was collected to know the haemoglobin level to estimate the amount of blood loss due to menorrhagia among the more amount of blood loss in TAH than in LAVH and preoperative level of haemoglobin which was significantly differed.

Clinical outcomes of operative time, estimated blood loss and hospital duration stay are significantly differed in table 8.

Table 9 shows intra-operative complications include urinary and bowel damages and post operative complications includes fever, urinary and gastrointestinal tract problems, wound infection, readmissions and pre-surgery blood transfusions as the anaemia is severe comorbidity for uterine fibroid respectively.

Post operative haemorrhage corrections in table 10 shows fifteen cases of blood transfusion in the LAVH group and in the TAH group twenty-five cases.

Table 1: Age, weight and parity distribution of subjects.

	TAH (n=100)	LAVH (n=100)
Age and weight distribution criteria in Mean±SD		
Age	43.09±4.69	43.82±5.643
Weight	59.83±5.85	59.83±5.85
Family history	11	8
Parity criteria		
P0	3	4
P1	6	7
P2	47	40
P3	28	40
P4	10	9
P5	6	0

Values are case numbers. Data was analyzed by unpaired t-test. Parity criteria of P=0.9.

Table 2: Type of fibroid among study subjects.

Type of fibroid	No. of subjects	
	TAH (n=100)	LAV (n=100)
Intramural	65	51
Multiple Intramural	8	10
Multiple Sub serosal	3	9
Submucosal	3	4
Sub serosal	17	26
Cervical	4	0

Values are case numbers.

Table 3: Uterus size before surgery among study subjects.

	No. of subjects	
Uterus size	**TAH (n=100)**	**LAVH (n=100)**
10 weeks	0	19
12 weeks	5	22
14 weeks	7	17
16 weeks	8	21
18 weeks	10	12
20 weeks	12	9
22 weeks	15	0
24 weeks	16	0
26 weeks	19	0
28 weeks	8	0
Mean±SD	21.28±4.52	14.24±3.15

Values are case numbers. Data was analyzed by unpaired t-test. P<0.0001.

Table 4: Validity of the UFS-QoL questionnaire among study subjects.

UFS-QoL subscales	TAH (n=100)	LAVH (n=100)	P value
Symptom severity	25.78±4.562	20.99±5.252	<0.000001
Concern	14.59±3.632	10.41±3.256	<0.000001
Activities	21.56±3.340	19.77±2.356	0.000013
Energy/mood	7.68±2.898	5.23±2.145	<0.000001
Control	19.49±3.872	17.84±2.684	0.000311
Self-consciousness	10.74±3.246	9.01±2.042	0.000013
Sexual function	2.04±0.851	1.92±0.676	0.250150
HRQOL total	76.1±12.50	65.58±11.320	<0.000001

Values shows Mean±SD and data was analysed by unpaired t-test.

Table 5: Reliability of the UFS-QoL questionnaire for internal consistency by Cronbach's alpha among study subjects.

UFS-QoL subscales	Number of items (κ)	Cronbach's α (α)	
		TAH (n=100)	LAVH (n=100)
Symptom severity	8	0.528191	0.728877
Concern	5	16.11252	0.873818
Activities	7	0.746044	0.287788
Energy/mood	7	0.781343	0.735599
Control	5	0.817505	0.703493
Self-consciousness	3	0.822797	0.546442
Sexual function	2	0.812918	0.801587
HRQOL total	29	0.899455	0.923676

Values shows Cronbach's alpha and data was analysed with Cronbach's alpha formula.

Table 6: Type of anaesthesia given before surgery among study subjects.

Type of anesthesia	No. of subjects	
	TAH (n=100)	LAVH (n=100)
General anesthesia	6	97
Spinal anesthesia	94	3

Values are case numbers.

Table 7: Level of haemoglobin among study subjects.

	No. of Subjects	
Level of Hb (gms)	**TAH (n=100)**	**LAVH (n=100)**
5-5.9	7	0
6-6.9	11	13
7-7.9	11	15
8-8.9	29	15
9-9.9	14	18
10-10.9	16	19
11-11.9	9	13
12-12.9	2	6
13-13.9	0	1
14-14.9	1	0
Mean±SD	8.583±0.436	9.101±1.813

Values shows Mean±SD and data was analysed by unpaired t-test.

Table 8: Clinical outcomes among study subjects.

Clinical outcomes	TAH (n=100)	LAVH (n=100)	P value
Estimated blood loss (ml)	173.15±40.872	92.5±6.834	<0.0001
Operation time (min)	47.9±5.953	117.6±26.174	<0.0001
Hospital stay (days)	11.4±2.810	2.66±0.955	<0.0001

Values show Mean±SD and data was analysed by unpaired t-test.

Table 9: Intra and post operative complications among study subjects.

Complications	TAH (n=100)	LAVH (n=100)
Intraoperative complication		
Urinary damage	4	1
Bowel damage	0	0
Post operative complications		
Fever	16	5
Urinary tract problems	3	1

Continued.

Complications	TAH (n=100)	LAVH (n=100)
Gastrointestinal problems	4	0
Wound infection	17	2
Re-admission	15	1
Blood transfusion	45	25

Table 10: Post operative haemorrhage corrections among study subjects.

Blood transfusions	TAH (n=100)	LAVH (n=100)	P value
Needed	25	15	0.0306
Not needed	75	85	

DISCUSSION

The primary goal of our research work is to compare between total abdominal hysterectomy (TAH) and laparoscopic assisted vaginal hysterectomy (LAVH).

In uterine fibroid ultimate goal of the therapy include elimination of the symptoms and to take off the impact created on the quality of life in women who are diagnosed with uterine fibroid. There are several medical, minimally invasive and surgical treatment options for women with uterine fibroid that can tailor the management of this condition to patient's characteristic symptoms goals and eligibility for the therapy. Despite the availability of many surgical options the standard treatment for symptomatic uterine fibroid has always been surgical, either hysterectomy or women who wish to preserve their fertility, the more conservative procedure of myomectomy.

In hysterectomy mainly total abdominal hysterectomy and laparoscopic assisted vaginal hysterectomy are the definitive procedures and carries an outstandingly good outcome. TAH than the other technique whereas LAVH has become a major alternative to conventional abdominal hysterectomy with patient often opting laparoscopic approach for the result of cosmetic and faster recuperative reasons, LAVH was introduced to remove the uterus without the abdominal incision. Indications for LAVH may be the same as the TAH but there may be some limitations such as large fibroid which have typically been the main reason for the conversion to TAH.

Table 1 shows the age of TAH (43.08±4.717) and LAVH (43.82±5.643) are more prone at the age of 35-40 of age and weight of TAH (59.83±5.850) and LAVH (60.32±5.641), table 1.2 shows the parity of TAH (2.55±1.085) and LAVH (2.55±0.757) are not significantly different and table 1.3 shows of blood transfusions for TAH (45%) of 100 and for LAVH 25% of 100 had blood transfusions as the anaemia is more comorbidity for uterine fibroid. As it occurs more through the first line of genetics through their mother the family history for 11% of TAH and 8% of LAVH. Most common type of fibroid is intramural and rare type is sub mucosal, our study gathered the type of fibroid as in Table 2 shows the intramural fibroid has more ratio than the other type of fibroid and the least is sub mucosal and cervical fibroids. These fibroids occupy the space of the uterus and measures in terms of pregnancy weeks as in table 3, TAH group has more uterus size which means >16 weeks has more ratio than LAVH which is significantly different

A specific questionnaire for assessing the severity of the disease severity of the disease symptoms and their impact on quality of life, the uterine fibroid symptom -quality of Life (UFS-QoL). The purpose of the questionnaire is to provide a simple tool to assess the impact from the perspective of the patient.[4] The UFS-QoL questionnaire has been chosen to be validated as the only specific clinical questionnaire to assess patients with uterine leiomyoma that included psychometric properties in its development.

Evaluating the impact caused by uterine leiomyoma on the quality of life in women is a constant challenge. Women suffering from the disease exhibit significant symptoms, including Some of the patients were found to be asymptomatic (31% of TAH and 30% of LAVH) and in the symptomatic patients the most common presenting symptom was menorrhagia (69% of TAH &70% of LAVH), dysmenorrhea (84% of TAH and 77% of LAVH), Polymenorrhagia (41% of TAH and 24% of LAVH), Metrorrhagia (63% of TAH and 43% of LAVH) passage of clots (79% of TAH and 60% of LAVH) and abdominal pain and lower back pain (98%, 82% of TAH and 91%, 86% of LAVH), Pressure symptoms, include polyuria and nocturia (54%,18% of TAH and 53%, 25% of LAVH) as shown in table 4.

This study observed that the validity of USF-QOL &HRQOL severity of the disease and impact on quality of life, maximum in TAH than in LAVH symptom severity (25.78±4.562 of TAH and of 20.99±5.252 LAVH), concern (14.59±3.632 of TAH and 10.41±3.256 of LAVH), activities (21.56±3.340 of TAH and of 19.77±2.356 of LAVH), self-conscious (10.74±3.246 of TAH and of 9.01±2.042 LAVH), energy/mood (19.49±3.872 of TAH and 17.84±2.684 of LAVH), control (10.74±3.246 of TAH and 9.01±2.042 of LAVH), sexual function (2.04±0.851 of TAH and of 1.92±0.676 LAVH),

total HRQOL (76.1±12.50of TAH and 65.58±11.320 of LAVH). Except sexual function the above mentioned all are significantly different in Table 5. The estimated reliability of the questionnaire and the values of Cronbach's α coefficients are poor and un acceptable.

Table 6 shows the anaesthesia given prior the surgery of local i.e., spinal anaesthesia of (94%) and general anaesthesia (6%) for TAH, whereas of general anaesthesia of (97%) and local i.e., spinal anaesthesia (3%) for LAVH.

Table 7 shows the level of haemoglobin were collected to know the haemoglobin level and to estimate the amount of blood loss due to menorrhagia among the more amount of blood loss in TAH than in LAVH and preoperative level of haemoglobin which was (8.583±0.436 of TAH and 9.101±1.813 of LAVH) are significantly differed.

Operative time of LAVH of (117.6±26.174) 90 min of 42% and 120 min of 24% and 150 min of 34% of group longer than the TAH of (47.9±5.953) 60 min of 72% and 90 min of 28% of group

are significantly different. Here the operation time differ from other hospital which we collected as it is directly corelates with skills of the particular surgeon. This meant that the size of the uterus in conventional TAH group didn't affect the operation time and new surgical technique of LAVH needed more time to gain more skills and experience.

As for the estimated blood loss the significant difference between TAH (173.15±40.872) of 150 ml of 24%, 180 ml of 23%, 200 ml of 26% and 250 ml of 23% is more than the LAVH (92.5±6.834) of 100 ml of 46%, 90 ml of 30% and 80 ml of 24% of TAH group. Fewer patients in LAVH significantly needed less analgesic compared with TAH group. Hospital stays which is significantly differ from LAVH (2.66±0.955) 1 day of 7%, 2 days of 41%, 3 days of 37%, 4 days of 9% and 5 days of 6% which is less than TAH (11.4±2.810) 7 days of 18%, 8 days of 6%, 10 days of 16%, 11 days of 3%, 12 days of 16%, 13 days of 3%, 14 days of 28% and 15 days of 10% in table 8.

The other study shows women who had undergone LAVH had a shorter hospitalization, fast recovery, but longer operating room time with less postoperative pain than those having TAH.[8]

The another study established indications for LAVH by statistical analysis of a retrospective review of the surgical outcomes in LAVH cases over 15 years i.e., uterine weight≥800g (>16 week gestation), the mean blood loss, mean operative time and the rate of conversion to laparotomy are all significantly higher than in patients with lower uterine weights (e.g., post removal uterine weights from<100g to ≤800g (≤16 week gestation)).Therefore, we propose that when the uterine weight is≥800g, TAH is more appropriate, because there is a significant blood loss. No statistical difference among LAVH when setting cutoff of 200 g. This meant that neither operation time nor estimated blood loss was affected by the uterine size in LAVH group.[9]

In other study there was no significant difference between estimated blood loss and change in haemoglobin from pre and post operation but, in our study, there is a change in haemoglobin level (8.583±0.436 of TAH and 101±1.813 of LAVH) and estimated blood loss (173.15±40.872 of TAH and 92.5±6.834 of LAVH).[11] TAH is more significant difference from LAVH.

However, a review article demonstrated although LAVH involves shorter hospital stay and speedier post operative recovery and less analgesics and there is higher rate of bladder injury (1.8%) of LAVH vs 0.4% of TAH). Lowell et al, also showed LAVH increased risk of intraoperative complications.[5]

Intra-operative complications like urinary damage of l% of LAVH and 4% TAH, no bowel damage in LAVH whereas, 2% of TAH, post-operative complications like urinary tract problems encountered in LAVH 1% and 3% in TAH, no gastrointestinal problems in LAVH and 4% in TAH, wound infections of LAVH are 2% and in TAH 17% were lower in LAVH readmissions was 2% of LAVH and 15% of TAH. Febrile morbidity is more (16%) in TAH than (5%) in LAVH and significantly differed between these groups in Table 9.

Table 10 shows the postoperative blood transfusions are done before they discharge from hospital 15% of 25 require 2-unit packed cells and 10% of 25 require 1-unit packed cells for TAH and 7% of 15 require 2-unit packed cells and 8% of 15 require 1-unit packed cells for LAVH and are significantly differed.

An important public policy issue now confronts us. As it is currently performed LAVH is more expensive than TAH. The issue is whether the benefits of shorter convalescence and faster return to the work force, shorter hospitalization and less need for narcotics for post operative pain outweigh the disadvantage of the higher cost. If total health care system costs are evaluated, the short-term disability cost of 2 weeks of recovery after LAVH should be compared with disability cost of 6 to 8 weeks of recovery after TAH.[8]

Another study indicates that although the length of operation was significantly higher in the LAVH group, reduced complications make LAVH a safer and more comfortable approach for both patients and health care providers. Other studies showed that although the operation time is longer, hospital stay and analgesic use are lower in LAVH than TAH but blood loss was higher in LAVH surgery.[9]

However, limitations of the present study include inadequacy of the nurses and LAVH instrumentation in all hospitals. Even nurses trained for LAVH procedure are not

adequate. Continuous quality improvement has been implemented to evaluate nursing skills. Standard LAVH instrument is small in number. Drawbacks about LAVH is that all cases are successful, still multiple myoma and large uterus often barriers and the operation time is longer. Thus, accurate preoperative diagnosis is essential. Advantages of LAVH are hospital stay, blood loss and analgesic use are lower in LAVH than TAH. LAVH group has reduced complications make LAVH a safer and more comfortable approach for patients.

CONCLUSION

The present study concluding that there are some advantages as well as disadvantages in LAVH compared to TAH. The primary advantages of LAVH are shorter hospitalization, reduced requirement for drugs to control postoperative pain and faster return to normal activities. LAVH is better than TAH regarding less complications, shorter length of hospital stays (2-3 days) and quicker return to work, significantly less requirement of analgesic usage. Disadvantages of LAVH are longer operating time than those having TAH and another one is uterus of 16-week gestation (<12 cm) on preoperative measurement is to be taken an appropriate indication for LAVH.

Given the benefits of LAVH in this study, we believe it should be offered as a first-line procedure to women undergoing hysterectomy for benign diseases and for whom vaginal hysterectomy is contraindicated. However, this new surgical technique should be improved in terms of operative time through a better learning curve in various hospitals of this region. Thus, LAVH is worthwhile promoting in future for group of well-trained operators.

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