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Corresponding Author
Sandhya Bhattad,
Hedgewar Hospital, Aurangabad, Maharashtra, India

Author Designation
Consultant Obstetrician Gynecologist,
Department of Obstetrics Gynecology

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Vaginally Assisted Laparoscopic Sacro-Hysteropexy (VALSH) for Uterine Prolapse A Study at a Tertiary Care Center

[1]Sandhya Bhattad, [2]Gauri Dank, [3]Rucha Dhokte and [4]Jyotsna Kshirsagar
[1,2,3,4]Hedgewar Hospital, Aurangabad, Maharashtra, India

ABSTRACT
This study investigates the effectiveness, safety, and simplicity of Vaginally Assisted Laparoscopic Sacrohysteropexy (VALSH) using Prolene mesh for the treatment of utero-vaginal prolapse. By focusing on these aspects, the research aims to evaluate the procedure's viability as a minimally invasive surgical option. Conducted at a tertiary care center, this study involved a sample size of 29 patients who underwent VALSH surgery. The procedure was executed in three phases: initial laparoscopic, followed by vaginal and concluding with a laparoscopic approach. The Prolene mesh was affixed vaginally to the posterior aspect of the cervix and laparoscopically to the sacral promontory. This repositioned the uterus and cervix closer to their normal anatomical locations. Participants were women aged between 22 to 39 years, selected based on specific inclusion and exclusion criteria. The study spanned from 2015 to 2023. One-year follow-up data revealed that the patients experienced symptomatic relief, no sexual dysfunction and retained fertility. However, two patients encountered a recurrence of uterovaginal prolapse within six months post-surgery. VALSH emerges as an innovative minimally invasive technique for treating uterovaginal prolapse, demonstrating a significant safety margin and satisfactory outcomes 12 months after surgery. Furthermore, it effectively conserves the uterus and preserves fertility, marking it as a promising option for patients seeking to maintain reproductive potential.

INTRODUCTION

Uterine prolapse, a condition characterized by the descent of the uterus into or beyond the vaginal canal due to weakened pelvic floor muscles and ligaments, represents a significant health issue affecting women's quality of life. Traditional surgical treatments for uterine prolapse have often involved hysterectomy, which may not be the preferred option for women desiring to retain their fertility or those who wish to avoid the psychological impacts associated with the loss of the uterus. In recent years, the development of minimally invasive surgical techniques, such as laparoscopic sacrohysteropexy, has offered new avenues for uterine conservation in the management of prolapse[1]. Vaginally Assisted Laparoscopic Sacrohysteropexy (VALSH) has emerged as a promising technique that combines the benefits of minimally invasive surgery with the preservation of the uterus, making it particularly appealing for younger patients and those who wish to maintain their reproductive potential. This procedure utilizes a mesh to reposition and secure the uterus to the sacral promontory, thereby restoring the normal anatomy while minimizing surgical trauma and facilitating quicker recovery compared to traditional open surgeries[2]. Despite its potential benefits, the efficacy, safety and overall patient outcomes following VALSH remain areas of active investigation. This study aims to fill this gap by providing a detailed analysis of VALSH in a cohort of patients, with a particular focus on younger women seeking uterine conservation.

Aims and Objectives: The study aims to analyze the efficacy, safety and simplicity of vaginally assisted laparoscopic sacrohysteropexy (VALSH) using Prolene mesh for the surgical management of uterine prolapse in younger patients concerned with uterine conservation.

- To evaluate the simplicity of the VALSH procedure in terms of surgical technique and recovery time
- To assess the safety of VALSH, focusing on postoperative complications and recurrence rates
- To measure the effectiveness of VALSH in terms of symptomatic relief, sexual function and fertility preservation

MATERIAL AND METHODS

Source of Data: The data for this study was collected from patients who underwent the VALSH procedure at a tertiary care center, providing a comprehensive overview of the outcomes associated with this surgical technique.

Study Design: This is a retrospective study and case series involving patients who were diagnosed with uterine prolapse and opted for the VALSH procedure as a treatment method.

Sample Size: The study includes a total of 29 patients who underwent VALSH surgery between 2015 and 2023.

Inclusion Criteria:

- Higher degrees of uterine prolapse like stage 3 with or without cervical elongation
- Lower degrees of cervical prolapse like second degree, causing disturbing symptoms of pelvic organ prolapse
- Young patients who wish to conserve menstrual function and fertility
- Young patients below 40 years

Exclusion Criteria:

- Elderly patients more than 40 years of age
- Procidentia
- Prior prolapse surgery
- Increased risk or recent history of cervical dysplasia, chronic pelvic pain, significant uterine abnormalities
- Significantly enlarged fibroid uterus or concomitant medical problems precluding general anesthesia or the assumption of a steep Trendelenburg position

VALSH surgery was performed in three stages an initial laparoscopic phase, followed by a vaginal phase for mesh attachment and a concluding laparoscopic phase to secure the mesh to the sacral promontory. Prolene mesh was used for all procedures. The procedure began with a thorough preoperative evaluation. Following this, patients underwent a surgical intervention to address uterovaginal prolapse, utilizing a technique known as vaginally assisted laparoscopic sacrohysteropexy (VALSH). The VALSH procedure comprises three primary steps, initially, a laparoscope is inserted to visualize the sacral promontory, next, the posterior peritoneum is accessed vaginally to attach the mesh to the cervix, finally, the mesh's opposite end is secured to the promontory.

Patients were administered general anesthesia and positioned in lithotomy. The abdominal and perineal areas were sterilized and prepared. Laparoscopic ports were placed, including a primary 10 mm umbilical port and two 5 mm side ports on one abdomen side for optimal surgical site visibility. If necessary, an additional 5 mm port was inserted on the opposite side for bowel retraction and suturing assistance. A pneumoperitoneum was established

using CO2 to maintain an intra-abdominal pressure of 12mmHg. A small incision was made over the peritoneum at the sacrum to expose the sacral promontory and the anterior longitudinal ligaments, taking care to avoid injury to the anterior vertebral vessels. Strict aseptic measures were observed when introducing the polypropylene prolene mesh through 10mm port. The mesh measured 10 centimeters in length and 2 centimeters in width approximately. The vaginal step of the surgery involved making a roughly 1cm incision on the cervix's posterior side, predominantly on the right. A tunnel was created using long ring forceps passed retroperitoneally from the right side, avoiding the ureter and major blood vessels, leading to the peritoneal incision over the promontory. Meryland forceps were used to guide one mesh end into the tunnel. The mesh was carefully drawn through the tunnel to the cervix using artery forceps. It was then attached to the cervix's posterior aspect using 2-3 intermittent, non-absorbable 1-0 Prolene sutures. The mesh was fully concealed by suturing the cervical incision with 1-0 vicryl, ensuring the mesh and prolene knots were completely buried.

Lastly, the mesh was pulled up through the tunnel laparoscopically to elevate the uterus within the pelvis. The peritoneal mesh end was secured to the sacral promontory at the anterior sacrospinous ligament using 1-0 Prolene sutures. The prolapse reduction was verified by speculum examination, ensuring optimal tension. Excess mesh was trimmed away and the site was closed with absorbable 1-0 vicryl sutures to fully cover the mesh by approximating the peritoneum. Additional surgical procedures undertaken for these patients were cystocele repair in 5 patients, Laparoscopic sterilization in 6 patients. Fothergill-Manchester repair was done one patient who had uterocervical length of 5 inches. Additionally, the operative duration is estimated to range from 85 to 105 minutes. Data were analyzed using descriptive statistics for demographic and procedural variables, while inferential statistics were employed to assess outcomes and complications.

Data Collection: We systematically collected data on patient demographics, detailed procedural information and follow-up results. This includes the evaluation of symptomatic relief, sexual function, fertility outcomes, and the identification of any complications or instances of recurrence. Additionally, it is critical to outline the schedule for postoperative follow-ups, which were conducted on the 8th day following the operation and subsequently at intervals of one month, six months, and one year. Despite our initial study timeline being stated up to 2023, we have extended our data collection to include information up to 2024.

Ethical Approval: Approval of ethics committee of the institution was obtained to study the data of these patients by obtaining their medical records for retrospective analysis.

RESULTS AND DISCUSSIONS

The data demonstrates a high success rate of the procedure, with 93% (27 out of 29) of the patients experiencing successful prolapse correction, indicative of the procedure's efficacy in addressing uterine prolapse. The recurrence rate stands at 7% (2 out of 29), which suggests a relatively low chance of prolapse reoccurrence post-VALSH surgery. The safety metrics highlight the procedure's overall low risk, with only a single patient (3.4%) experiencing postoperative infections and a small fraction (7%, 2 out of 29) encountering mesh complication in the form of erosion of mesh vaginally. Notably, there were no instances of

Fig. 1: Introduction of Mesh into abdominal cavity through umbilical port

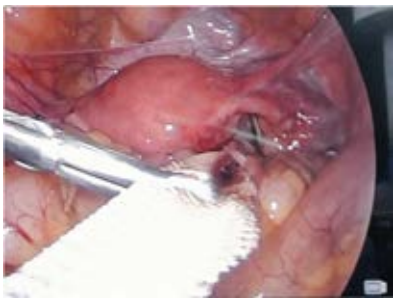

Fig. 2: Pulling the Mesh through tunnel with ring forcep

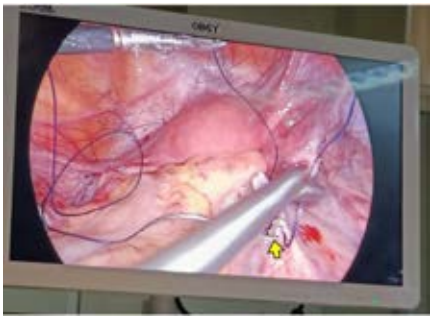

Fig. 3: Fixation of Mesh to sacral promontory with prolene suture

Table 1: Efficacy of VALSH in Uterine Conservation

Outcome	Patients (n = 29)
Successful prolapse correction	27 (93%)
Recurrence of prolapse	2 (7%)

Table 2: Safety of VALSH

Outcome	Patients (n = 29)
Postoperative infections	1 (3.4%)
Mesh complications	2 (7%)
Bleeding complications	0 (0%)

Table 3: Effectiveness of VALSH

Outcome	Patients (n = 29)
Symptomatic relief	28 (97%)
No sexual dysfunction	27 (93%)

bleeding complications, demonstrating the procedure's high safety profile. In terms of effectiveness, the VALSH procedure proves to be highly beneficial for patients, with 97% (28 out of 29) reporting symptomatic relief after the surgery. Moreover, the preservation of sexual function in 93% (27 out of 29) of patients, All patients preserved uterine function and 2 out of 29 (7%) patients conceived during 1 year follow up. The data from the study on Vaginally Assisted Laparoscopic Sacrohysteropexy (VALSH) using Prolene mesh for uterine prolapse, based on a sample size of 29 patients, provides valuable insights into the procedure's efficacy, simplicity, safety and effectiveness. Comparing these results with findings from other studies helps to contextualize the impact and reliability of VALSH as a treatment option for uterine prolapse.

Efficacy of VALSH in Uterine Conservation: The observed success rate of 93% in prolapse correction and a recurrence rate of 7% aligns with similar studies which report high success rates for laparoscopic sacrohysteropexy. For instance, studies by Grinstein *et al*[1].van Oudheusden *et al*[2]. and Pandeva *et al*.[3] have also highlighted success rates above 90%, indicating the general efficacy of laparoscopic methods in treating uterine prolapse with low recurrence rates. The slightly varying recurrence rates may be attributed to differences in surgical techniques, patient selection, or follow-up durations. Sanverdi *et al*[4]. Fayyad *et al*[5].

Safety of VALSH: The safety profile of VALSH, characterized by low rates of postoperative infections and complications, is consistent with the literature on minimally invasive gynecological surgeries. A review by Ko KJ *et al*[6]. and Gibbison *et al*[7]. Ohnesorge *et al*[8]. noted comparable low complication rates, underscoring the advances in surgical techniques and postoperative care that minimize risks. The absence of bleeding complications in this study is particularly noteworthy and speaks to the precise nature of laparoscopic interventions.

Effectiveness of VALSH: The high rates of symptomatic relief, absence of sexual dysfunction and preservation of fertility reported in this study are significant. Similar outcomes were reported by Han ES *et al*[9]. Koo YJ[10]. who noted improvements in quality of life and sexual function post-surgery. The preservation of fertility is a critical advantage of VALSH over more radical options like hysterectomy, as high lighted in research by Lukacz *et al*[11]. Hartmann *et al*[12]. Fink *et al*[13]. which emphasizes the importance of fertility-sparing procedures in younger patients.

CONCLUSION

The study conducted at a tertiary care center on Vaginally Assisted Laparoscopic Sacro-Hysteropexy (VALSH) using Prolene mesh for the treatment of uterine prolapse provides compelling evidence of the procedure's efficacy, safety, simplicity and effectiveness. With a focus on a sample size of 29 patients, the research highlights the significant benefits of VALSH as a minimally invasive surgical option for women, particularly those of younger age who prioritize uterine conservation. The findings demonstrate a high success rate of 93% in achieving successful prolapse correction, with a recurrence rate of merely 7%. This underscores the efficacy of VALSH in providing durable outcomes for patients suffering from uterine prolapse. The simplicity of the procedure is evident through shorter surgical times, reduced hospital stays and a lower need for postoperative analgesics, indicating a favorable recovery process for patients. From a safety perspective, the low incidence of postoperative infections, mesh complications and the absence of bleeding complications reinforce the procedure's safety profile. Comparing these outcomes with existing literature reveals that VALSH aligns with the broader trends in minimally invasive gynecological surgery, offering a safe and effective alternative to traditional surgical approaches. The procedure not only addresses the physical aspects of uterine prolapse but also maintains a high regard for the patients' quality of life post-surgery, including sexual health and the ability to conceive. In conclusion, the study affirms that Vaginally Assisted Laparoscopic Sacro-Hysteropexy stands as a highly viable and recommendable surgical technique for the management of uterine prolapse, especially suitable for patients desiring uterine preservation. The procedure's high success rate, coupled with its minimal invasive nature, positions it as an advantageous option for patients and clinicians alike. Future research with larger sample sizes and longer follow-up periods would be beneficial in further validating these findings and potentially refining the procedure to enhance outcomes further.

Limitations of Study: The study on Vaginally Assisted Laparoscopic Sacro-Hysteropexy (VALSH) for Uterine Prolapse conducted at a tertiary care center, while providing valuable insights into the procedure's

efficacy, safety, simplicity and effectiveness, also presents few limitations that should be considered when interpreting the results.

Small Sample Size and Potential for Observer Bias: With a total of 29 patients included in the study, the small sample size limits the generalizability of the findings. A larger cohort would provide a more robust statistical analysis and a better understanding of the procedure's outcomes across a more diverse population. Given the nature of surgical studies, there is a potential for observer bias, where the outcomes may be influenced by the surgeons' knowledge of the study objectives or their investment in the procedure's success.

Single-Center Design: Conducted at a single tertiary care center, the study's findings may reflect the specific expertise and patient population of the center and might not be replicable in different settings with varying levels of resources and expertise.

Subjective Outcome Measures: While the study reports on symptomatic relief and quality of life improvements, these outcomes are inherently subjective and may be influenced by patient expectations, reporting biases, or the lack of standardized assessment tools.

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