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Research Article

V-NOTES hysterectomy in challenging cases of benign diseases: insights from the initial 30 cases

Benign hastalıkların zor vakalarında V-NOTES histerektomi: ilk 30 vakanın analizi

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Abstract

Aim: This study retrospectively evaluated the data of the first 30 patients who underwent v-NOTES (vaginal natural orifice transluminal endoscopic surgery) hysterectomy for benign disease in our clinic. As a minimally invasive surgical method, v-NOTES offers advantages such as less pain, reduced blood loss, and cosmetic benefits. The primary aim was to assess the feasibility, safety, and effectiveness of the v-NOTES method. The secondary aim was to evaluate the surgical outcomes of the method.

Material and Methods: Patients included were aged 40-75, had elective hysterectomy decisions for benign disease, and no malignancy was detected in preoperative evaluations. The study evaluated operation time, uterine weight, hospital stay duration, complication rates, and readmission rates within 30 days.

Results: The results demonstrate that v-NOTES hysterectomy is a safe and effective method with low complication rates and a rapid recovery process.

Conclusion: When performed by experienced surgeons, this technique yields successful outcomes even in cases of large uterus, obesity, and nulliparity. If the operation is performed by surgeons trained in v-NOTES and experienced in laparoscopy, even challenging cases can be managed with low complication rates, even during the initial learning phase.

Keywords: V-notes, hysterectomy, myoma uteri, ovarian cyst

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Öz

Amaç: Bu çalışma, kliniğimizde benign nedenlerle v-NOTES (vajinal - doğal yoldan translüminal endoskopik cerrahi) histerektomi uygulanan ilk 30 hastanın verilerini retrospektif olarak değerlendirmeyi amaçlamaktadır. Minimal invaziv bir cerrahi yöntem olan v-NOTES; daha az ağrı, azalmış kan kaybı ve kozmetik avantajlar sunmaktadır. Çalışmanın birincil amacı v-NOTES yönteminin fizibilitesini, güvenilirliğini ve etkinliğini; ikincil amacı ise cerrahi sonuçlarını değerlendirmektir.

Gereç ve Yöntemler: Çalışmaya 40-75 yaş arası, benign hastalık nedeniyle elektif histerektomi kararı alınan ve preoperatif değerlendirmelerde malignite saptanmayan hastalar dahil edildi. Operasyon süresi, uterus ağırlığı, hastanede kalış süresi, komplikasyon oranları ve ilk 30 gün içindeki hastaneye yeniden başvuru oranları analiz edildi.

Bulgular: Bulgular, v-NOTES histerektominin düşük komplikasyon oranları ve hızlı iyileşme süreci ile güvenli ve etkili bir yöntem olduğunu göstermektedir.

Sonuçlar: Bu teknik, deneyimli cerrahlar tarafından uygulandığında büyük uterus, obezite ve nulliparite gibi zor vakalarda bile başarılı sonuçlar vermektedir. V-NOTES eğitimi almış ve laparoskopi konusunda deneyimli cerrahlar tarafından gerçekleştirildiğinde, başlangıç öğrenme aşamasında dahi zor vakalar düşük komplikasyon oranlarıyla yönetilebilir.

Anahtar Kelimeler: V-Notes, histerektomi, over kistleri, myom

Introduction

Annually, some 600,000 hysterectomies are conducted in the United States and 40,000 in the United Kingdom; in nations with poor socioeconomic position yet high population density, such as India, these figures are exceptionally elevated [1]. Consequently, hysterectomy is the most often conducted gynecological surgery globally. A 2021 research indicated that 14.6% of women aged 18 and older had undergone a hysterectomy. The rate escalates with age, rising from 2.8% in women aged 18 to 44 to 41.8% in women aged 75 and beyond [2].

The 2023 Cochrane Database identifies five primary techniques for conducting hysterectomy for benign gynecological diseases: abdominal hysterectomy (AH), vaginal hysterectomy (VH), laparoscopic hysterectomy (LH), robotic-assisted hysterectomy (RH) and vaginal natural orifice hysterectomy (V-NOTES) [3]. The selection of surgical technique (laparotomy, laparoscopy, or vaginal route) is crucial in instances of enlarged uterus (>280g), obesity, prior abdominal surgeries, and aesthetic considerations, as these factors correlate with an increased risk of problems [4]. V-NOTES (vaginal natural opening transluminal endoscopic surgery) is a minimally invasive procedure conducted 2-4 cm from the vaginal natural opening, without creating any incisions or scars on the abdomen. This technique amalgamates the benefits of vaginal and laparoscopic surgery compared to abdominal surgery, encompassing less pain, diminished blood loss, decreased reliance on analgesics, and superior aesthetic outcomes. Patients are often discharged within 6 to 24 hours and can promptly resume their regular activities [5-9].

This study retrospectively investigated the statistics of the initial 30 patients who received v-NOTES hysterectomy for benign indications at our clinic.

Material and Methods

The data from the files of the initial 30 patients who received v-NOTES hysterectomy for benign diseases from January 2023 to July 2025 were examined with Kütahya Health Sciences University, Clinical Research Ethics consent (Approval Number-Date: 2025/10-36-11.08.2025), and the study was carried out as a retrospective observational clinical investigation. All patients received simultaneous bilateral salpingectomy, whereas salpingo-oophorectomy was determined based on clinical indications and age.

All patients were examined preoperative and clinical assessment, encompassing an extensive medical history and pelvic examinations were done by two gynecological surgeons. Post-discharge, the patients were monitored by the surgeons on the 10th and 30th days. Patients eligible for surgery were informed of the risks and advantages associated with the v-NOTES procedure. This encompassed the potential for conversion to laparoscopy or laparotomy, risks of intraoperative hemorrhage, the necessity for blood transfusion, and the likelihood of adhesion formation. All patients provided informed consent prior to surgery. Prophylactic administration of 2g of intravenous cephalosporin was conducted immediately prior to surgery.

The inclusion criteria for the study were: patients aged 40 to 75 years, those who opted for elective hysterectomy for

benign conditions, absence of malignancy in preoperative endometrial biopsy and smear test, and provision of written agreement to participate in the study. Exclusion criteria included rectovaginal endometriosis, previous rectal surgery, history of severe pelvic inflammatory disease, virginity, and history of pelvic radiotherapy.

Information about patients was acquired from the hospital's electronic medical records. The data encompassed sociodemographic details, indications for hysterectomy, any additional surgeries conducted alongside the hysterectomy, prior abdominal surgical history, surgical technique and approach, operative duration, uterine mass, surgical conversions, hemorrhage, duration of hospitalization, perioperative and postoperative complications, and hospital readmission rates within the initial 30 days. The operative duration was defined as the interval from the initiation of the posterior colpotomy incision to the closure of the vaginal cuff. The operating surgeon conducted postoperative follow-up. The uterine weight of all patients were measured with a calibrated weight scale in the operating room and documented in the surgical record. The duration of the postoperative hospital stay was documented from the day of surgery till discharge. Complications were classified as either major or minor. Major complications were characterized as visceral injuries involving major vessels, bladder, ureter, or gastrointestinal tract, or conditions that could result in an extended hospital stay or necessitate reoperation. Minor complications were characterized as instances necessitating the patient's readmission to the hospital for assessment or intervention.

Surgical procedure

V-NOTES hysterectomy procedural steps and perioperative care were performed in accordance with the ten-step approach defined and taught in standardized v-NOTES courses [10]. The steps are presented in Table 1.

Table 1. Steps of v-NOTES hysterectomy.

1	Circumferential incision around the cervix subsequent to local anesthetic administration
2	Posterior colpotomy
3	Anterior colpotomy
4	Dissection of the uterosacral ligaments
5	Preparation and placement of the v-NOTES port
6	Identification of the ureter and dissection of the parametrium
7	Incision of the infundibulopelvic or utero-ovarian ligament
8	The control of hemostasis and extraction of the port
9	Specimen removal
10	Closure of vaginal cuff

The operation has three sections. Vaginal section included steps 1 to 4, laparoscopic section included steps 5 to 9 and last section included last step which performed vaginal. The vaginal sections employed standard protocols characteristic of traditional vaginal hysterectomies. Upon completion of the initial vaginal sections, a 9.5 cm vaginal v-NOTES port (GelPoint vPath, Applied Medical, Rancho Santa Margarita, CA, USA) was inserted into the vaginal cavity to facilitate access to the abdominal cavity at the commencement of the second section. The cavity was inflated with carbon dioxide, to establish a pneumoperitoneum at an intraperitoneal pressure of 10-12 mmHg. This configuration employed a 10-mm rigid 30° scope and three trocars for 5-mm instruments, including atraumatic holders, bipolar holders, and sealing devices. Gauze was inserted into the pelvis to retract the small intestine and rectum. A hysterectomy was subsequently conducted following the visualization of the bilateral ureters using a grasper.

The uterus was subsequently dissected from the caudal to the cranial direction. The conventional procedures of a hysterectomy were executed bilaterally, with the pedicles coagulated and separated in succession, and the infundibulopelvic ligament or utero-ovarian ligament ligated, contingent upon the indication and age. Following the attainment of hemostasis, the uterus was extracted from the cervix with a grasper; the specimen and gauze were subsequently removed from vaginal incision.

All patients underwent bilateral salpingectomy, with or without the removal of ovaries. The recractor was extracted, and the vagina was sutured with polyglactin 910 (Vicryl) size 1-0.

Statistical Analysis

Statistical analyses were performed utilizing IBM SPSS Statistics for Mac, Version 22.0 (Armonk, NY, USA). The distribution of data was evaluated by normality tests. Parametric and non-parametric variables are reported as median (range), minimum, and maximum values.

Results

This study analyzed the demographic and clinical characteristics of 30 patients. The median age of the patients was 49 years, with a range of 40 to 74 years. The median BMI values varied from 28,3 (21-51) kg/m^2. The median parity was 3 with a range of 0 to 6 (Table 2).

Table 2. Demographic and clinical characteristics of the patients (n=30).	
Variable	Value
Age (years), median (range)	49 (40–74)
Body mass index (kg/m^2), median (range)	28,3 (21–51)
Parity, median (range)	3 (0–6)
Prior abdominal surgery, n (%)	12 (40.0)
Previous cesarean section, n (%)	5 (16.6)

Forty percent (12 patients) had a history of prior surgery, while 16.6% (5 patients) had previously undergone a cesarean section. The data delineate the demographic and clinical characteristics of the patient cohort and indicate a substantial prevalence of surgical history. This study assessed the operational and histological characteristics of 30 patients. The median operation duration was 68 minutes, with a range of 45 to 95 minutes. The median uterine weight was 186 grams, with a range of 92 to 616 grams. The median duration of hospitalization was 32 hours (range: 16-72 hours). The median preoperative hemoglobin concentration was 13.1 (range: 9.4-14.8) g/dL, whereas the median postoperative hemoglobin concentration was 11.3 (range: 8.1-12.4) g/dL (Table 3).

Table 3. Perioperative and laboratory outcomes (n=30).	
Variable	Value
Operation time (minutes), median (range)	68 (45–95)
Uterine weight (grams), median (range)	186 (92-616)
Length of hospital stay (hours), median (range)	32 (16–72)
Preoperative hemoglobin (g/dL), median (range)	13.1 (9.4–14.8)
Postoperative hemoglobin (g/dL), median (range)	11.3 (8.1–12.4)

Surgical indications comprised myomatous uterus in 50% (15 patients), adenomyosis in 10% (3 patients), prolapse in 3.3% (1 patient), adnexal mass in 16.6% (5 patients), and persistent bleeding in 20% (6 patients). No conversions occurred from V-notes to laparoscopic or open surgery.

Intraoperative complications (pneumoperitoneum) occurred in 3.3% of cases (one patient), whereas postoperative complications (infected vault hematoma) also occurred in 3.3% of cases (one patient). The overall complication rate was determined to be 6.6% (2 patients). The 30-day hospital readmission rate was 3.3% (one patient). This data illustrates the comprehensive safety and efficacy of v-notes technique.

Discussion

This study analyzes the surgical results of the initial 30 challenging instances of v-NOTES hysterectomies, with or without salpingo-oophorectomy, utilizing vaginal natural orifice transluminal endoscopic surgery (v-NOTES), encompassing patients with enlarged uteri and prior surgical interventions. The procedures were conducted at a tertiary facility by two surgeons proficient in both laparoscopic and vaginal techniques. The results are promising, indicating the viability of this approach without elevating morbidity.

Currently, hysterectomy ranks as the second most prevalent surgical procedure among women, following cesarean section. Numerous official guidelines have been released throughout the years delineating the indications for the most effective, minimally invasive, safest, and most suitable surgical techniques [11-13].

V-NOTES is a pioneering minimally invasive gynecological procedure that integrates the advantages of laparoscopic and vaginal methodologies. Instruments are introduced into the pelvic cavity via the vagina, giving access to the uterus, fallopian tubes, and ovaries without necessitating an abdominal incision. This technique enables intricate procedures without noticeable scarring, promoting expedited recuperation and a swifter resumption of everyday activities [14]. Besides the aesthetic benefits of v-NOTES procedures, they facilitate adnexal surgery, allow for vaginal assessment of the abdominal cavity, enable clear visualization of the ureters during the procedure, and mitigate complications such as hemorrhage, hematoma, and hernia associated with surgical instruments used for abdominal access in laparoscopic or robotic surgeries [15].

This method of technology, due to its ergonomic benefits, enables procedures to be conducted by a single helper. Conditions that obstruct vaginal access to the abdomen represent a contraindication for v-NOTES operations. Conditions like obliteration of the Douglas space, frozen pelvis, rectovaginal endometriosis, a history of rectal surgery, and prior severe pelvic infections are contraindications for this approach [14-16].

V-NOTES hysterectomy necessitates expertise in both vaginal and laparoscopic surgical techniques. The vision through the v-NOTES port contrasts with the conventional laparoscopic perspective, necessitating adaptation for surgeons who are early in their learning process. Wang et al. have delineated four phases in the v-NOTES learning curve [16]. Surgeons skilled in both laparoscopy and vaginal surgery initially required 20 cases to learn, attained proficiency after 100 cases, and gained confidence in handling more complex cases after 180 cases. In our investigation, both surgeons were in the proficiency stage.

To expedite the learning process, video recordings of all procedures were created and subsequently examined by both

surgeons postoperatively. Following the completion of the initial 15 cases, both surgeons found it increasingly manageable to execute v-NOTES in patients with enlarged uteri (>240 g), a history of cesarean section, nulliparity, and obesity (BMI >30 kg/m2).

The median BMI in the study population was 28,3 (range, 21-51), with a maximum BMI of 51.0 kg/m2. Despite 14 patients having a BMI exceeding 30 kg/m2, we did not see any obesity-related challenges or consequences. Kaya et al. conducted a study indicating that the v-NOTES approach is suitable for obese patients and provides several benefits compared to TLH, such as reduced surgical duration, decreased postoperative hospital stay, and lower pain levels [5].

The duration of hospitalization and recuperation is reduced with v-NOTES surgery. In 2019, Baekelandt et al. [14] conducted the first randomized controlled trial (RCT) comparing the v-NOTES method to laparoscopy for hysterectomies performed for benign indications. To ensure participant, clinicians from the day-care unit and the outcome investigator blinding, performed four superficial non-therapeutic skin incisions on participant in the vNOTES group, mirroring those in the TLH group. No conversion of v-NOTES to TLH occurred, and the operational duration was markedly reduced. Patients reportedly experienced less surgical discomfort and expedited recovery. Consequently, an increased number of patients were discharged either on the same day or the subsequent day. In our study, the median operation time was 68 minutes (range: 45-95), and the median hospital stay was 32 hours (range: 16-72). In the initial 15 patient cohorts of our study, individuals were discharged on the second postoperative day as a standard protocol to mitigate potential complications, given that the procedure was in the learning phase. Following the acquisition of proficiency, select patients could be discharged on the first postoperative day.

In a multicenter retrospective analysis by Stuart et al., 4565 patients who underwent hysterectomy by the v-NOTES procedure were evaluated retrospectively [17]. The intraoperative complication rate was documented at 3.2% (n = 144), whereas the postoperative complication rate was recorded at 2.5% (n = 115). The conversion rate was 1.6% (n = 72), with merely 10 patients (0.2%) transitioning to laparotomy. The predominant surgical complication was cystotomy, occurring in 1.3%, while ureteral damage was documented in only one patient. Postoperative complications often observed were hemorrhage (n = 28), vault-related issues (n= 26), comprising 11 instances of infected vault hematomas, and cystitis (n = 18). Multicentric retrospective study of Gungorduk et al demonstrated that the mean operative time was 72.4 ± 40.2 min and intraoperative complication rate was 1.7% (n = 12), postoperative complication was 1.4% (n = 10). Furthermore study reported a conversion to laparoscopy in 6 patients (0.9%), with a mean hospital stay of 2.3 ± 1.4 days [18]. In our study, no individuals sustained significant organ damage (cystotomy, intestinal injury, etc.). Minor complications comprised intraoperative complications of 3.3% (n = 1) and postoperative complications of 3.3% (n = 1). The overall complication rate was determined to be 6.6% (n = 2). The 30-day hospital readmission rate was 3.3% (n = 1). The data indicate the comprehensive safety and efficacy of surgical operations.

In conclusion, this research illustrates the feasibility and minimal complication rate associated with v-NOTES hysterectomy. It is important point that all procedures were conducted by two proficient laparoscopic surgeons. Besides its aesthetic benefits, it is distinguished as a secure procedure because of its brief hospitalization, swift recuperation, prompt resumption of daily activities, and low perioperative and postoperative morbidity. Furthermore, v-NOTES extends the scope of vaginal surgery by offering enhanced visualization and facilitating adnexal procedures alongside hysterectomy in obese and nulliparous patients, particularly in instances involving enlarged uterus when vaginal hysterectomy is constrained.

Declaration of conflicting interests

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Ethics approval

This study was approved by Kütahya Health Sciences University, Clinical Research Ethics Committee (Approval Number-Date: 2025/10-36-11.08.2025),

Authors' contribution

S.C.I.: Study conception and design, surgical procedures (lead surgeon), data collection and processing, statistical analysis, drafting the manuscript, and final approval. C.H.: Surgical procedures (assistant surgeon), literature review, critical revision of the manuscript for important intellectual content, and final approval.

References

1. Gorina Y, Elgaddal N, Weeks JD. Hysterectomy Among Women Age 18 and Older: United States, 2021. NCHS Data Brief. 2024; 494: 1-8.
2. Rahman R, Gupta S, Manyonda I. Hysterectomy for benign gynaecological disease. Obstet Gynaecol Reprod Med2017; 27: 125-31.
3. Pickett CM, Seeratan DD, Mol BWJ, Nieboer TE, Johnson N, Bonestroo T, Aarts JW. Surgical approach to hysterectomy for benign gynaecological disease. Cochrane Database Syst Rev. 2023; 8: CD003677.
4. Druenne J, Presles E, Corsini T, Campagne Loiseau S, Curinier S, Mansour A, et al. vNOTEsHC: Hysterectomy by transvaginal natural orifice transluminal endoscopic surgery versus laparoscopic for large uteri: study protocol for a multicentre randomised controlled trial. Facts Views Vis Obgyn. 2023; 15: 277-21.
5. Kaya C, Yıldız Ş, Alay İ, Karakaş S, Durmuş U, Güraslan H, Ekin M. Comparison of Surgical Outcomes of Total Laparoscopic Hysterectomy and vNOTES Hysterectomy for Undescended-Enlarged Uteri. J Invest Surg. 2022; 35: 918-23.
6. Lowenstein L, Baekelandt J, Paz Y, Lauterbach R, Matanes E. Transvaginal Natural Orifice Transluminal Endoscopic Hysterectomy and Apical Suspension of the Vaginal Cuff to the Uterosacral Ligament. J Minim Invasive Gynecol. 2019; 26: 1015.
7. Baekelandt J, Kapurubandara S. Benign Gynaecological procedures by vaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES): Complication data from a series of 1000 patients. Eur J Obstet Gynecol Reprod Biol. 2021; 256: 221-4.
8. Li CB, Hua KQ. Transvaginal natural orifice transluminal endoscopic surgery (vNOTES) in gynecologic surgeries: A systematic review. Asian J Surg. 2020; 43: 44-51.
9. Baekelandt J, De Mulder PA, Le Roy I, Mathieu C, Laenen A, Enzlin P, et al. "HALON-hysterectomy by transabdominal laparoscopy or natural orifice transluminal endoscopic surgery: a randomised controlled trial (study protocol)." BMJ open 2016: e011546.
10. Housmans S, Stuart A, Bosteels J, Deprest J, Baekelandt J. Standardized 10-step approach for successfully performing a hysterectomy via vaginal natural orifice transluminal endoscopic surgery. Acta Obstet Gynecol Scand. 2022; 101: 649-56.
11. Kovac SR, Barhan S, Lister M, Tucker L, Bishop M, Das A. Guidelines for the selection of the route of hysterectomy: application in a resident clinic population. Am J Obstet Gynecol. 2002; 187: 1521-7.
12. AAGL Advancing Minimally Invasive Gynecology Worldwide. AAGL position statement: route of hysterectomy to treat benign uterine disease. J Minim Invasive Gynecol. 2011; 18: 1-3.
13. Committee Opinion No. 701 Summary: Choosing The Route Of Hysterectomy For Benign Disease. Obstet Gynecol. 2017; 129: 1149-50.
14. Baekelandt JF, De Mulder PA, Le Roy I, Mathieu C, Laenen A, Enzlin P, et al. Hysterectomy by transvaginal natural orifice transluminal endoscopic surgery versus laparoscopy as a day-care procedure: a randomised controlled trial. BJOG. 2019; 126: 105-13.
15. Raquet J, Namèche L, Nisolle M, Closon F. The revival of vaginal surgery in the era of endoscopy: V-NOTES initial experience with a series of 32 patients. Facts Views Vis Obgyn. 2023; 15: 69-78.
16. Wang CJ, Go J, Huang HY, Wu KY, Huang YT, Liu YC, Weng CH. Learning curve analysis of transvaginal natural orifice transluminal endoscopic hysterectomy. BMC Surg. 2019; 19: 88.
17. Stuart A, Wagenius J, Badiglian-Filho L, Schnabel J, Montealegre A, Ehrström S, et al. Intra- and Postoperative Complications in 4565 vNOTES Hysterectomies: International Registry Cohort Study. BJOG. 2025; 132: 464-72.
18. Gungorduk K, Akpak YK, Erkılınc S, Sacinti KG, Korkmaz V, Iscan SC, et al. Outcomes of transvaginal natural orifice transluminal endoscopic hysterectomy: a multi-centre retrospective study from Turkey (TR-MIGS). J Obstet Gynaecol. 2025; 45: 2548809.