American Journal of
Biomedical Science & Research

www.biomedgrid.com
ISSN: 2642-1747

Mini Review

v-NOTES as an Alternative Approach for Surgical Staging in Endometrial Cancer: A Mini Review

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To Cite This Article: *Lygizos Vasilios*, Thomakos Nikolaos, Dimitrios Efthymios Vlachos, Damaskos Christos, Garmpis Nikolaos, Tsourouflis Gerasimo, Kykalos Stylianos and Dimitroulis Dimitrios. v-NOTES as an Alternative Approach for Surgical Staging in Endometrial Cancer: A Mini Review. Am J Biomed Sci & Res. 2024 22(4) AJBSR.MS.ID.002983,* DOI: 10.34297/AJBSR.2024.22.002983

Received: : May 08, 2024 ; **Published:** May 17, 2024

Abstract

Endometrial carcinoma, as the most prevalent gynaecologic malignancy in developed countries, demands effective surgical management strategies. Minimally Invasive Surgery (MIS) plays a pivotal role in managing early-stage endometrial cancer, providing substantial benefits over conventional open surgery. Techniques such as laparoscopy, vaginal surgery, and robot-assisted surgery offer less traumatic alternatives, resulting in faster recovery and fewer complications. This approach is particularly beneficial in reducing the overall recovery time due to smaller incisions, which lead to less postoperative pain and quicker healing, allowing patients to resume normal activities sooner than traditional methods. Additionally, MIS often results in superior cosmetic outcomes with less noticeable scarring, significantly enhancing patient satisfaction. The evolution of MIS, including the development of Vaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES), provides an innovative alternative to traditional methods by minimizing external scarring and potentially reducing trocar-related complications like infections or hernias. vNOTES, primarily applied to gynaecological surgeries such as adnexal surgeries and hysterectomies, offers a promising approach with faster recovery times and minimal scarring, appealing to patients concerned about post-surgical cosmetic outcomes. Ultimately, this abstract underscores the necessity for further research and larger-scale studies to validate the safety, efficacy, and cost-effectiveness of the procedure in the surgical staging of endometrial carcinoma, thereby offering new horizons in gynaecological oncology surgery.

Introduction

Endometrial carcinoma stands as the most prevalent gynaecologic malignancy in developed countries, necessitating effective surgical management strategies. According to Global Cancer Statistics 2020 (GLOBOCAN) endometrial cancer, also categorized as cancer of the corpus uteri, was responsible for approximately 417,000 new cases globally, constituting about 2.2% of all new cancer cases. Furthermore, it caused around 97,000 deaths during the same period, representing about 1.0% of all cancer-related deaths [1]. Analysis of SEER data suggests that survival is increased in patients who are younger, have early-stage disease, and have lower-grade disease [2]. Although the majority of women are diagnosed with

early-stage disease and can expect to be cured of their endometrial cancer, up to 20% of women continue to have extra-uterine disease at presentation, with only 15% of women with stage IV disease alive five years after diagnosis [3]. Early diagnosis, therefore, remains imperative, and non-invasive tests designed to exclude endometrial cancer in the majority of women with postmenopausal bleeding are rapidly increasing in number and are likely to be more acceptable to women than endometrial biopsies. An increasingly troubling aspect is the widening disparity in survival between White, Black, Asian, and Hispanic women, which may be related as much to the lack of access to endometrial cancer treatments as the differences in tumor biology [4,5]. A fuller understanding of the genetic changes driving endometrial carcinogenesis will hopefully be used to address this gap, but this has already begun to be used to personalize treatments and to identify those women with Lynch syndrome, for whom their endometrial cancer represents a sentinel malignancy.

As outlined in the National Comprehensive Cancer Network (NCCN) guidelines, the standard of care is to remove the uterus, fallopian tubes, and ovaries. Lymph node assessment might be done either by Sentinel lymph node removal or by the pathologic features of the cancer in the uterus. Similarly, the guidelines recommend minimally invasive surgery when feasible. Concerning the hysterectomy route, the American College of Obstetricians and Gynaecologists and the American Association of Gynaecologic Laparoscopists prefer the vaginal route since it has fewer morbidity, immediate recuperation, and no visible scars for the patient. Nevertheless, the transvaginal route is rarely used in endometrial cancer for several reasons: First, visual examination of the abdomen is hindered; second, removal of the ovaries may be difficult and restricted from a postmenopausal woman; third, the lymph nodes cannot be assessed; and finally, the surgical ability to complete a hysterectomy transvaginally is becoming out of practice.

Minimally invasive surgery evolution created hope that vNOTES surgery become a promising alternative to traditional approaches for hysterectomy with bilateral salpingo-oophorectomy. This is a novel approach to endometrial carcinoma surgical management that intended to achieve all the benefits of minimally invasive surgery combined with minimal disruption for the patient and their recovery period. These abstract addresses the particular topic of whether vNOTES could be rather helpful tool not only by reducing the postoperative pain but also by shortening the postoperative hospital stay and chances of surgical sit infection for staging endometrial cancer. To investigate this topic, a review of current literature was conducted. The reviewed resources revealed that this procedure had a number of additional benefits when compared to the conventional laparoscopy, including lower post-operative pain levels, postoperative visions, and risk of inflammation on the surgical spot.

Minimal Invasive Techniques for Early-Stage Endometrial Cancer

Minimally Invasive Surgery (MIS) plays a critical role in the management of early-stage endometrial cancer, offering significant benefits over traditional open surgery. This surgical approach, which includes techniques like laparoscopy, vaginal surgical approach and robot-assisted surgery, provides patients with a less traumatic alternative, leading to various postoperative advantages. One of the primary advantages of MIS for endometrial cancer is the reduction in overall recovery time. The minimally invasive nature of the procedure means smaller incisions, which typically result in less postoperative pain and quicker healing times. Consequently, patients can often return to their normal activities much sooner than they would after traditional open surgery.

Moreover, MIS is associated with lower rates of complications. The smaller incisions reduce the risk of infection and lessen the likelihood of postoperative complications, which is particularly important in the obese population that is at a higher risk for endometrial cancer. These patients often have comorbidities that make the recovery from larger surgical wounds more challenging. In addition to physical benefits, MIS for early-stage endometrial cancer also typically results in better cosmetic outcomes. The smaller incisions are less noticeable and often result in less scarring, which can significantly impact patient satisfaction and overall quality of life.

The use of MIS for endometrial cancer has grown with advances in surgical technology, including improved instrumentation and the introduction of robotic systems, which enhance the surgeon's precision and visibility during the procedure. This progress has made minimally invasive approaches more accessible and effective, establishing them as a preferred option for treating early-stage endometrial cancer, promising equivalent oncological outcomes to open surgery with added benefits of reduced morbidity and enhanced recovery [6,7].

Exploring the Technique

Vaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES) represents a significant evolution in gynaecologic minimally invasive surgery. Despite long-standing guidelines recommending vaginal hysterectomy as the preferred approach for benign conditions, due to its minimally invasive nature, rates of vaginal hysterectomy have remained disproportionately low in the United States. vNOTES emerges as a promising technique to potentially reverse this trend, offering several advantages over traditional laparoscopic and robotic methods, such as potentially less pain, shorter operative times, improved cosmetic outcomes, and decreased risks associated with surgical procedures. This technique is an advanced, minimally invasive surgical method that utilizes natural body orifices, particularly the vagina, to conduct surgeries without external incisions, aiming to reduce patient recovery time, pain, and surgical complications. Initially developed to improve upon limitations of traditional laparoscopy, offers a significant advancement by minimizing external scarring and potentially reducing the risks associated with trocar wounds such as infection or hernias. It has been primarily applied to gynaecological surgeries such as adnexal surgeries and hysterectomies. It is particularly beneficial for patients who may not be ideal candidates for conventional laparoscopy due to factors like obesity, restricted vaginal space, or severe pelvic adhesions. The technique uses instruments inserted through the vagina, making use of a specialized surgical glove fitted over a wound

retractor to facilitate the insertion of necessary tools while maintaining sterility and maximizing surgical space.

The procedure begins with the creation of a small colpotomy, followed by the insertion of a wound retractor and a surgical glove that serves as a barrier and port through which surgical instruments are passed. This setup allows for the utilization of standard laparoscopic instruments within the confines of the vaginal canal, effectively expanding the range of procedures that can be performed with minimal external intervention. For adnexal surgeries, such as tubal sterilizations and salpingectomies, vNOTES offers a streamlined approach with potentially reduced surgical times and lesser blood loss compared to traditional methods. In the case of hysterectomies, it facilitates the surgical process by allowing better access to the uterine vessels and other pelvic structures, which can be difficult to manage in conventional laparoscopic or vaginal surgeries especially in patients with large uteri or limited mobility [8].

One of the critical advantages of vNOTES is its ability to reduce postoperative pain and shorten hospital stays, as demonstrated in clinical studies where patients reported quicker recoveries and fewer complications. Moreover, the cosmetic outcome, being virtually scar-free, is highly favourable, which can be particularly appealing to patients concerned about post-surgical scarring. Despite these advantages, vNOTES also presents unique challenges, particularly in terms of surgical access and the technical skills required for vaginal colpotomy. Conditions that scar or obliterate the posterior cul-de-sac, such as prior lower colorectal surgery, pelvic radiation, or severe pelvic inflammatory disease, can limit the applicability of vNOTES.

Feasibility and Outcomes

Studies have demonstrated the feasibility of vNOTES for the surgical staging of endometrial carcinoma, showing promising outcomes in terms of operative time, blood loss, hospital stay, and complication rates. The technique has been found to be particularly beneficial for obese patients, who are at a higher risk of endometrial cancer and often face increased surgical risks. The feasibility of Vaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES) in gynaecologic surgery is a topic of growing interest among surgical professionals. This method allows surgeons to access the abdominal cavity through the vagina, eliminating the need for abdominal incisions. This approach inherently reduces the risk of surgical site infections and postoperative hernias, issues often associated with abdominal incisions. Furthermore, the proximity of the vaginal entry to the pelvic organs decreases operative times and potentially enhances surgical precision due to the direct route to the target anatomy. These advantages suggest that vNOTES could lead to improved patient outcomes, particularly in terms of postoperative recovery and cosmetics. The technique requires specialized training and a degree of comfort with vaginal surgery that not all gynaecologic surgeons may possess. The initial learning curve can be steep, as surgeons must become proficient in performing colpotomies and navigating the pelvic anatomy from a vNOTES perspective. Additionally, certain patient factors, such as a history of pelvic surgeries or conditions that affect the posterior cul-de-sac, may limit the applicability of the method for some individuals.

In conclusion, the feasibility of vNOTES in gynaecologic surgery is underpinned by its minimal invasiveness, the potential for improved patient outcomes, and its adaptability to a range of surgical procedures. While challenges exist, particularly in terms of the learning curve and patient selection, the ongoing development of training opportunities and specialized equipment is addressing these hurdles. As the evidence base continues to grow, this innovative approach is poised to make a significant impact on the field of gynaecologic surgery, offering a promising alternative to traditional surgical methods.

Comparison with Traditional Methods

Compared to traditional laparoscopy and laparotomy, vNOTES performs equally well regarding the actual surgical stage. The benefits include lower morbidity, reduced recovery, and better cosmesis since there is no need for abdominal incisions. Therefore, the patient experiences less postoperative pain, recovers faster, and has minimal scarring, which is crucial for patients aiming for the best possible cosmetic results and quality of life. Furthermore, thanks to the vNOTES access to pelvic organs which is more straightforward than in traditional techniques, can help achieve shorter operative times and higher surgery accuracy. It also eliminates some of the risks of abdominal entry for the surgeon, for example, site infections and herniation. Nevertheless, compared to traditional laparoscopy or open surgery, vNOTES is an entirely different technique that demands a high level of expertise in vaginal surgery and comfort level for the operating surgeon. Traditional laparoscopic surgery provides decent outcomes by offering a broad field of view and a controlled instrument but raises several concerns associated with complications during or after the procedure. However, vNOTES pushes these boundaries to offer a novel alternative that can undoubtedly result in fewer side effects and quicker patient recovery. Given these findings, vNOTES seems to be a viable alternative for gynecological surgeries and will likely continue to expand the spectrum of minimally invasive procedures for both doctor and patient [9]. Despite these benefits, the adoption of vNOTES requires specialized training and expertise, limiting its availability to certain centers.

Challenges and Limitations

Adopting Vaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES) for endometrial cancer staging presents several challenges and limitations. One primary concern is the steep learning curve associated with mastering vNOTES techniques. Surgeons accustomed to traditional laparoscopic or open procedures may find the transition to vNOTES challenging due to the unique set of skills required for vaginal entry and navigation within the pelvic cavity using this approach. Another significant limitation is the selection of patients suitable for this technique. Conditions that alter the anatomy of the pelvic region, such as extensive pelvic adhesions, severe endometriosis, or previous pelvic surgeries, or difficulty on settling with Trendelenburg position for extended time due to lunh

pathology is another issue that may complicate the application of vNOTES for endometrial cancer staging. The technique may not be feasible or safe for all patients, necessitating careful preoperative evaluation to determine eligibility.

Additionally, the technical limitations associated with vNOTES, such as restricted space for instrument manoeuvrability and potential difficulties in achieving optimal visualization of the surgical field, can pose challenges. These issues may impact the surgeon's ability to perform comprehensive staging procedures, including thorough lymph node dissection, which is crucial for accurate staging of endometrial cancer.

Conclusion

Vaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES) has emerged as a pioneering approach in the realm of gynecological oncology, specifically for the surgical staging of endometrial carcinoma. Its introduction into clinical practice underscores a commitment to advancing minimally invasive surgical techniques, aiming to optimize patient outcomes while minimizing the physical burden of surgery. The allure of vNOTES lies in its promise of less invasive procedures, swifter patient recovery, and superior cosmetic results, compared to traditional laparoscopic or open surgeries.

This is increasingly turning into the first-line strategy of treatment because of its potential in achieving optimal staging and therapeutic goals while minimizing intraoperative hazards. Importantly, while RS is observed to be associated with longer operation time and greater blood loss compared to LS, RS has the advantage of reducing the length of hospitalization. On another front, v-NOTES hysterectomy has emerged as a promising technique that offers some significantly substantial benefits, including less postoperative pain, a shorter duration of hospital stays, and even the wound infection rate, all overtaking the benefits that LS and RS have. Nevertheless, besides the higher surgical costs, some of the RS limitations include no tactile feedback and rigidity in patient positioning. V-NOTES might offer a more realistic alternative, along with cosmetic and pragmatic benefits, particularly in the management of patients with difficult anatomical considerations. Development of new techniques that further improve the access to spaces and make impossible procedures possible, such as in the case of sentinel lymph node resection. This will reduce the risk related to even more radical surgeries. Such a constant innovation within minimally invasive procedures highlights a very meaningful shift toward more efficient, patient-centered approaches in the surgical treatment of endometrial cancer within the obese population [10].

However, the adoption of vNOTES, particularly for complex oncological procedures like endometrial cancer staging, necessitates a robust framework of evidence to validate its effectiveness and safety. There is a clear need for comprehensive comparative studies that pit vNOTES against established surgical methods, with a focus on long-term outcomes, recurrence rates, and patient quality of life. Such research endeavors will be instrumental in delineating the specific contexts in which vNOTES offers the most significant advantages. Enhanced access to specialized training programs, mentorship opportunities, and the development of vNOTES-specific surgical instruments are crucial steps towards ensuring that surgeons are well-equipped to perform these advanced procedures. As the surgical community continues to innovate and refine minimally invasive techniques, vNOTES stands at the frontier of this evolution, offering a glimpse into the future of surgical staging for endometrial carcinoma. The journey towards widespread acceptance and implementation of vNOTES will undoubtedly be marked by challenges, but the potential rewards for patient care and surgical excellence make it a pursuit worth undertaking. This review underscores the importance of a deliberate and informed approach to integrating vNOTES into gynaecological oncology, guided by a commitment to evidence-based practice and continuous improvement.

Acknowledgments

None.

Conflicts of Interest

None.

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