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Vaginal NOTES approach for risk-reducing salpingo-oophorectomy in BRCA mutation carriers: A video demonstration

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A B S T R A C T

Risk-reducing bilateral salpingo-oophorectomy (BSO) is an important option to prevent the development of ovarian and fallopian tube cancers in women with a BRCA1/2 mutation. Conventional laparoscopy is the current preferred technique since it is associated with less morbidity compared to laparotomy. Transvaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES) is a new minimally invasive technique that allows access to the peritoneal cavity through the vagina without skin incisions. The vNOTES technique for risk-reducing BSO is presented herein. This article includes a narrated, step-by-step video demonstration of the entire procedure.

Risk-reducing BSO using the vNOTES approach is a feasible technique that appears to be simple, safe, and reproducible. This technique has the potential to improve patients' surgical experience and provide good long-term functional and cosmetics outcomes. This technique needs to be further evaluated and compared to the conventional laparoscopic approach.

Introduction

International guidelines state that women with BRCA1/2 mutations should be offered risk-reducing bilateral salpingo-oophorectomy (BSO) by the age of 40 years or when childbearing is complete [1]. The current gold standard approach is laparoscopy. Transvaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES) is a technique recently described in gynecology, either for adnexal or hysterectomy procedures [2]. The vNOTES approach allows access to the peritoneal cavity through the vagina without skin incisions.

This paper aims to present the vNOTES technique as an alternative for risk-reducing BSO and includes a step-by-step video demonstration of the entire procedure for educational purposes [3].

Case presentation

The patient selected was a fifty two years old woman, gravida 2 para 2, and a carrier of the BRCA2 mutation. Her past-surgical history was unremarkable. Her ASA score was 1 and her body mass index was 27. According to French recommendations, she underwent a preoperative evaluation via pelvic ultrasound and CA-125 biomarker dosage [4]. The operative time was 55 min. Four hours after surgery, the patient had a VAS pain score of 0. She described "absolutely no pain" from the recovery room onwards. She was discharged at day one after surgery and the post-operative course was uneventful. The histology report on the specimen was benign. The patient gave her consent to the publication of anonymized video footage of the procedure.

Surgical technique

Operative settings

This procedure is performed under general anesthesia. The patient is placed in a lithotomy position with buttocks slightly over the edge of the operating table. The patient's abdominal wall and vagina are disinfected before a Foley catheter is placed. The patient is draped as for a classic vaginal approach. Additionally, classic drapes are set on the abdomen, in case of conversion to conventional laparoscopy or laparotomy during the procedure. The surgeon is situated between the legs of the patient as for a classic vaginal approach. The laparoscopic tower is placed on the right side of the patient to provide a screen in front of the surgeon over the abdomen of the patient. The surgeon has two assistants. During the laparoscopic part of the procedure, the first assistant is placed on the right side of the surgeon, holding the camera. The second assistant stands on the left side of the patient to provide the surgeon with laparoscopic instruments. An antibiotic prophylaxis is administered intravenously.

The four steps of the procedure

The four consecutive steps of the procedure will be presented; these are the posterior colpotomy, the placement of the vNOTES port, the adnexectomies, and vaginal closure.

1. The posterior colpotomy. The colpotomy is performed using a classic vaginal approach. The cervix is exposed using an anterior and posterior vaginal retractor. The cervix is grasped by two Pozzi forceps and pulled upwards to better expose the colpotomy site. Before starting the incision, a 10 mL solution of ropivacaine (20 mg) + adrenaline (0.1 mg) is injected into the posterior fornix to facilitate the dissection, to decrease intraoperative hemorrhage and to reduce postoperative pain. A 3 cm colpotomy is performed using a cold steel scalpel 2 mm posterior to the cervical margin, between the 4–5 o'clock and 7–8 o'clock position. The peritoneum of the Douglas cul-de-sac is subsequently cut to access the peritoneal cavity. The opening is large enough to allow the insertion of the vNOTES port when an index finger can be easily inserted.
2. The introduction of the vNOTES port into the peritoneal cavity. The vNOTES port used was the GelPOINT® Advanced Access Platform (Applied Medical, Rancho Santa Margarita, CA, USA). It has three components: a GelSeal cap, three trocars individually placed in the GelSeal cap, and an Alexis® wound retractor. The Alexis® wound retractor has two 7-cm diameter rings: a purple-colored inner ring to be placed inside the abdominal cavity beyond the posterior fornix, and a white-colored outer ring, which adheres to the vaginal entrance. A fourth device is an inserter that helps with folding the inner ring of the Alexis® retractor and inserting it through the colpotomy incision into the peritoneal cavity.
   To facilitate the insertion of the inner ring inside the abdominal cavity, the posterior fornix is exposed using a 4-cm wide vaginal retractor, allowing the placement of a 2-cm wide vaginal retractor into the colpotomy. Then, the inserter is pushed upwards at a 45° angle and the inner ring can be deployed in the abdominal cavity. We recommend sweeping the inner ring with a finger to ensure that the ring is appropriately placed in the abdominal cavity and that no tissue is trapped between the ring and the Douglas cul-de-sac. The Alexis® retractor is moderately tensioned by winding the outer ring two turns. The three trocars are positioned on the GelSeal cap as laterally as possible to benefit from maximum triangulation and to preserve the surgical ergonomics. The GelSeal cap is then fixed on the outer ring of the Alexis® retractor and the sealing valve is closed. CO2 gas insufflation starts at a 8 −10 mmHg pressure while the patient is positioned in a 15° to 20° Trendelenburg. The 0° camera in inserted in the trocars at 6 h, and the adnexectomies step can start.
3. The adnexectomies. Before starting adnexectomies, exploration of the abdominal cavity should be undertaken by moving the camera above the pelvic area. Each adnexectomy is composed of 3 consecutives sub-steps: i) the utero-ovarian ligament division, ii) the salpingotomy, iii) the infundibulopelvic ligament division.
   The camera looks at the adnexa from below. Consequently, visualization of anatomical landmarks is specific to this vNOTES approach and driven by gravity. One instrument holds the uterine fundus upwards to facilitate exposure. Before starting the adnexectomy, the adnexa is mobilized to identify the three anatomical landmarks: the utero-ovarian ligament, the proximal origin of the fallopian tube, and the infudibulopelvic ligament. Additionally, the ureter must be visualized. A bipolar electrosurgery device is used to coagulate and cut the utero-ovarian ligament and the proximal origin of the fallopian tube successively. Then, the ovary is grasped and rolled around the grasper. This grasper is positioned inwards and holds the uterine fundus upwards; this maneuver creates enough space for the infudibulopelvic ligament to be safely coagulated by the bipolar energy instrument, away from the ureter path.
   A glove filed with gas can be placed in the peritoneal cavity over the adnexa to protect the digestive tract from the coagulation device. An example is shown in the video on the left side of the patient. The surgical specimens are extracted by opening the GelPOINT platform and then sampled for final histological examination. The absence of bleeding is checked and the GelPOINT® platform is then removed.
4. Vaginal closure. Vaginal retractors are placed in the vagina, and the Pozzi forceps are again positioned on the posterior lip of the cervix to facilitate exposure. The vagina is closed with a running suture using an absorbable 0-type monofilament thread. Attention must be paid to including the peritoneum in the suture to avoid any intra-peritoneal bleeding into the cavity. The vaginal retractors and the Foley catheter are then removed.

Discussion

vNOTES is an innovative, minimally invasive technique that limits surgical trauma and potentially reduces postoperative pain. Thus, vNOTES may be a desirable approach to BSO then compared to conventional laparoscopy [5]. This technique undeniably provides a new option for the gynecological surgeon, as BSO without hysterectomy cannot be safely performed using a classic vaginal approach.

This presentation illustrates that the technique requires both vaginal surgical skills (i.e., colpotomy, vaginal closure) and laparoscopic skills specific to vNOTES (i.e., a view of the pelvic anatomy from below, ergonomic constraints inherent to the monotrocar vNOTES port). A prerequisite is good access to the peritoneal cavity. Indeed, the procedure must be avoided in patients with cul-de-sac disease such as endometriosis or suspected adhesions [6].

Risk-reducing BSO usually presents as a simple case because normal anatomy is preserved. A potential drawback of this technique is that the peritoneal cavity cannot be fully explored using a classical 0° endoscope, especially around the prevesical peritoneum. The rate of occult ovarian cancer identified following risk-reducing BSO is estimated at 2.5% [7]. Thus, the risk of undiagnosed peritoneal cancer due to the vNOTES approach is likely to be very low.

Conclusion

The vNOTES technique appears to be particularly interesting in the context of prophylactic surgery for risk-reducing BSO. We provide a step-by-step description of the technique and illustrate its feasibility. This technique needs to be evaluated and compared to the conventional laparoscopic approach.

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Declaration of Competing Interest

The authors declare no conflict of interest.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jogoh.2021.102212.

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