



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Hysterectomy and salpingo-oophorectomy by transvaginal natural orifice transluminal endoscopic surgery (V-NOTES) assisted by an umbilical camera: Case report and new hybrid technique in gynecology

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ARTICLE INFO

Article history:

Received 19 June 2018

Received in revised form 3 August 2018

Accepted 27 August 2018

Available online 5 September 2018

Keywords:

NOTES

Minimally invasive

Hybrid technique

Case report

ABSTRACT

INTRODUCTION: Natural orifice transluminal endoscopic surgery (NOTES) is a new development in the field of minimally invasive surgery. The aim of this study was to demonstrate a new hybrid NOTES technique in gynecology which can be used for hysterectomy and salpingo-oophorectomy in patients with adnexal pathology and multiple operation histories.

PRESENTATION OF CASE: A 50-year-old woman with gravida 2 para 2 was referred to our clinic with left-sided abdominal pain. She had a history of two previous abdominal surgeries and a persistent ovarian cyst for 2 years. An ultrasound examination revealed a left complex hypochoic ovarian cyst of 10 cm. Tumor markers were normal and the patient had no suspicion for malignancy. The hybrid NOTES technique assisted by an umbilical camera was planned due to the possibility of pelvic adhesions and her concerns about cosmesis.

DISCUSSION: The major difference between NOTES and umbilical camera assisted NOTES is seeing all of the major structures, such as the ureters, uterine vessels, bowels, and pelvic adhesions, which can lead to complications during the surgery. In fact, hybrid NOTES can make surgeries more feasible.

CONCLUSION: This new hybrid NOTES offers effective and safer surgical management in patients who have had previous surgery and adnexal masses.

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1. Introduction

Natural orifice transluminal endoscopic surgery (NOTES) is a new development in the field of minimal invasive surgery [1]. NOTES uses the natural orifices of the body, such as the umbilicus, mouth, anus, urethra, and vagina [2]. The majority of NOTES procedures have been performed transvaginally, and its benefits include cosmesis and reduced pain compared to conventional methods.

NOTES was first performed in 2004 in porcine model by researchers at the Johns Hopkins University [3]. Although the NOTES procedure has been applied in the field of general surgery since 2007 and has mostly used the vagina as the access route, the first hysterectomy using the NOTES procedure was done by Su et al. in 2012 [4–6]. During the past decade, minimal invasive surgeries, including NOTES, have become popular, and most surgeons have begun using these procedures [1]. Vaginal NOTES (V-NOTES) provides a safe entry, easy access, and direct vision for the peritoneal

cavity, but in rare cases, the transvaginal approach may not be possible because of intraabdominal adhesions, a narrow vagina, and restricted visualization due to a large uterus [7].

In hybrid NOTES, the surgical procedure is performed through a natural body orifice with transabdominal assistance [8]. Restricted visualization and limited operative capabilities can be present in some complex NOTES procedures, and these disadvantages can be overcome with a hybrid NOTES procedure. Although hybrid V-NOTES has been used in other fields, we performed this technique for the first time in a patient with an adnexal mass who underwent hysterectomy and salpingo-oophorectomy.

The aim of our study was to demonstrate a new hybrid technique in gynecology which has the feasibility of hysterectomy and salpingo-oophorectomy with surgical video in patients with adnexal pathology and multiple operation histories. This study is in line with the SCARE criteria [9].

2. Presentation of case

A 50-year-old woman with gravida 2 para 2 was referred to our clinic with left-sided abdominal pain. She had a history of two

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previous abdominal surgeries and a persistent ovarian cyst for 2 years. An ultrasound examination revealed a left complex hypoechoic ovarian cyst of 10 cm. The right ovary and uterus appeared normal. Tumor markers were normal and the patient had no suspicion for malignancy. The patient had no contraindication for general anesthesia, pneumoperitoneum, or Trendelenburg position. In the pelvic examination, there was no nodularity in the Pouch of Douglas, but adhesions could not be excluded. The need for hysterectomy and bilateral salpingo-oophorectomy was discussed with the patient. The hybrid V-NOTES technique assisted by an umbilical camera was planned due to the possibility of pelvic adhesions and her concerns about cosmesis.

Prophylactic intravenous antibiotic therapy, cefazolin 2 g, was administered before the surgery. General anesthesia was performed. A 5 mm port was placed at the umbilical incision, and the 3.9 mm 30° scope was inserted through the port. The patient was placed in a dorsal lithotomy position. An 18 F bladder catheter was inserted. A handmade glove port system made with Alexis Wound Protector/Retractor (Applied Medical, Rancho Santa Margarita, CA, USA) and size 8 powder free surgical gloves were used. CO₂ insufflation at 15 mmHg was achieved from the umbilical port, and CO₂ was transferred to the vaginal port to maintain an adequate pneumovagina. A cervical circular incision was made with a monopolar hook, while cervical traction was applied using Manhes forceps. At the anterior fornix, the vaginal mucosa and the bladder were pushed up along the uterine-cervical fascia using a miniature cotton swab (Endo Peanut™, Medtronic Minneapolis, MN, USA). With the aid of ultrasonic energy and advanced bipolar technology, the sacrouterine ligaments, cardinal ligaments, and uterine arteries were ligated. The anterior and posterior peritoneum were opened.

First, the ligamentum ovarii propria were cut and the uterus was completely removed. Second, infundibulopelvic ligaments were ligated and adnexes were removed from the vagen. During all of these steps, direct visualization was supplied by a camera in the vagen and a second camera in the umbilicus. After achieving hemostasis, the V-NOTES port was removed and the vaginal cuff was sutured with a one-coated Vicryl suture (90 cm, polyglactin 910; Ethicon Endo-surgery, Norderstedt, Germany). Finally, the last view of the vaginal cuff was taken with the umbilical camera, and then the umbilical port was removed. Port incision was closed by a sterile skin closure strip (3M™ Steri-Strip™, USA). A step-by-step explanation of the surgery is included (Video 1).

The operation time was 83 min; the drop in hemoglobin level was 1 g/dL. The histopathologic work-up showed a mature cystic teratoma. The Visual Analogue Scale (VAS) pain score on the first postoperative day was 1 (out of 10 points). The patient was discharged on the second postoperative day.

3. Discussion

To the best of our knowledge, this is the first report of a hysterectomy and bilateral salpingo-oophorectomy performed using V-NOTES assisted by umbilical camera being successfully performed on a patient. The major difference between V-NOTES and umbilical camera assisted V-NOTES is seeing all the major structures, such as the ureters, uterine vessels, bowels, and pelvic adhesions, which can lead to complications during the surgery. Although hybrid NOTES has been used by general surgeons and urologists for years, it has not gained popularity with gynecologists [10–12].

In all V-NOTES procedures, secure colpotomy is required, and rectal injury must be prevented. The Trendelenburg position is one of the methods to avoid rectal injury [13]. In addition, a surgeon who wants to perform NOTES assisted by an umbilical camera should be confident in both classic vaginal hysterectomy

and total laparoscopic hysterectomy. Then, the learning curve can be shorter for hybrid V-NOTES because the surgeon can see the familiar laparoscopic pelvic anatomy from the umbilical camera.

In the literature, appropriate patient selection is the most important thing for successful surgical outcomes in V-NOTES [13,14]. Depending on the experience, various exclusion criteria have been cited. On the other hand, hybrid V-NOTES can decrease the exclusion criteria, and most of the cases can be done successfully without restricted visualization. Therefore, hybrid V-NOTES can extend the scope and capability of conventional V-NOTES. The concept of minimally invasive surgery, which offers the advantage of minimal trauma to the abdominal wall, can be fulfilled with hybrid V-NOTES. Adequate endoscopic vision during surgeries or participate the surgery with the laparoscopic instruments from the umbilical port can be done with hybrid NOTES.

A prospective randomized trial of hybrid NOTES colectomy versus conventional laparoscopic colectomy for left-sided colonic tumors revealed that less wound pain and a lower wound infection rate were observed in NOTES colectomy than conventional laparoscopic colectomy [15]. Jonas et al. stated that the potential benefits of transvaginal hybrid NOTES sigmoid resection could be less postoperative pain, faster convalescence, and reduced risk of wound infections and incisional hernia compared to conventional methods [16]. Steinemann et al. also stated that hybrid NOTES reduces postoperative pain and is associated with greater cosmetic satisfaction [17]. Khan et al. revealed that hybrid V-NOTES appendectomy is associated with minimal post-operative pain, shorter healing time, and improved cosmetic outcomes [18].

Kilian et al. compared postoperative pain scores between transvaginal-hybrid, single-port-access, and conventional laparoscopic cholecystectomy. Pain scores were significantly diminished in the transvaginal-hybrid group during the early postoperative course [19].

Meta-analysis revealed that there were no statistically significant differences for intraoperative complications in women treated by NOTES compared to laparoscopy-assisted vaginal hysterectomy, we believe that this is because of the exclusion criteria for NOTES surgery [6]. Direct vision of the vaginal cuff inside the abdominal cavity after closure is one of the advantages of umbilical camera assisted V-NOTES. We believe that it can decrease vaginal cuff bleeding and hematomas postoperatively.

4. Conclusion

Vaginal hysterectomy should be the first choice in feasible cases by experienced surgeons [20]. Therefore, we used this technique in patient whose hysterectomy could not be done purely vaginally. NOTES surgery is a minimally invasive technique which improves cosmetic outcomes and reduces surgical injury. Also, it shortens the recovery time and reduces postoperative pain. In fact, because hybrid V-NOTES is performed through natural orifices, it decreases the inflammatory and neuroendocrine responses [8].

Hybrid V-NOTES is superior to laparoscopy assisted vaginal hysterectomy (LAVH). LAVH is a conventional multiport laparoscopic surgery method. On the other hand, hybrid V-NOTES is a surgery method which uses only natural orifices, such as the vagina and umbilicus.

In conclusion, we think that this new hybrid technique, second umbilical camera assisted V-NOTES, makes it safer to perform V-NOTES, especially for patients who have had previous surgeries and adnexal masses, because it provides direct visualization of the abdominal cavity. However, further investigation is needed.

Conflicts of interest

Nothing to declare.

Funding

Nothing to declare, no sponsors.

Ethical approval

The Ethics Committee of Kocaeli Derince Education and Training Hospital ruled that approval was not required for this case.

Consent

A written and signed consent was taken from the patient.

Author contributions

Conception & Design of Study; Hasan Terzi, Unal Turkey, Navdar Dogus Uzun, Mehmet Salici.

Data Conception; Hasan Terzi, Unal Turkey, Navdar Dogus Uzun, Mehmet Salici.

Responsible Surgeon or Imager; Hasan Terzi, Unal Turkey, Navdar Dogus Uzun.

Manuscript Preparation; Hasan Terzi, Navdar Dogus Uzun, Mehmet Salici.

Registration of research studies

It is a case report and according to the Education and Training Hospital regulation in Turkey approval from the patient and his/her doctor approval are enough.

Guarantor

Hasan Terzi, Navdar Dogus Uzun.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.ijscr.2018.08.053>.

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