Case Report

Vaginal Natural Orifice Transluminal Endoscopic Surgery in a Second-trimester Pregnant Woman with an Ovarian Teratoma

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Abstract

We present the first case of a pregnant woman with teratoma, who underwent vaginal natural orifice transluminal endoscopic surgery (vNOTES). Mature ovarian cystic teratomas compromise 20%–30% of all ovarian tumors. The best surgical management is still unclear, especially during pregnancy. A 21-year-old pregnant woman (gravida 1, para 0) at 14 weeks and 3 days of gestational age was admitted with an intermittent mild sharp and dull pain in her right lower abdomen when walking or moving lower limbs. Pelvic ultrasonography revealed a 5.9 cm × 5.4 cm heterogeneous mass that was suspected as a teratoma in the right adnexa. Initially, laparoendoscopic single-site ovarian cystectomy (OC) was arranged. However, the ovarian tumor was impeded by the enlarged uterus. The OC procedure was changed to vNOTES OC. The vNOTES OC was performed smoothly and the pathology confirmed the mass to be a teratoma. After the operation, she recovered well and was discharged 2 days after the operation without any complication. In conclusion, the application of vNOTES in the second-trimester pregnancy might be considered safe and effective. The vNOTES can be performed safely in selected patients and by an experienced surgeon.

Keywords: Laparoscopy, natural orifice transluminal endoscopic surgery, pregnancy, teratoma

Introduction

Webb *et al*. reviewed 27 studies (USA: 16; Korea: 4; Japan: 2; and Thailand, India, France, Hong Kong, and Turkey: 1), and the prevalence of adnexal masses found during pregnancy ranged from 0.1% to 2.4% (mean, 0.02%).[1] Although mature cystic teratomas comprise about 20%–30% of all ovarian tumors, gynecologists still face many challenges when determining the best surgical management, especially for pregnant women.[2] Potential complications associated with ovarian cystic teratomas during pregnancy include torsion, rupture, or obstruction during labor.

However, the decision between surgical or conservative treatment and which trimester to perform the surgery remains to be elucidated with ovarian teratomas during pregnancy. Laparoscopic surgery is considered safe for teratoma in pregnancy,[3] with laparoendoscopic single-site surgery (LESS) and vaginal natural orifice transluminal endoscopic surgery (vNOTES) being new laparoscopy methods.[4-6] The advantages to vNOTES include avoidance of an abdominal scar, short surgical time, and less pain.[7]

In this case, we illustrated the advantage of the vNOTES application on pregnant women. To the author's knowledge, this is the first case of a pregnant woman with a mature ovarian teratoma undergoing a vNOTES ovarian cystectomy (OC).

Case-Report

A 21-year-old woman (gravida 1, para 0) at a gestational age of 6 weeks and 3 days without any surgical history presented

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to our outpatient clinic with a history of intermittent mild sharp and dull pain in her right lower abdomen. Walking or moving her lower limbs reciprocated the painful sensation. She reported no associated nausea or vomiting.

Ultrasonography revealed a right heterogeneous mass with dimensions of 5.8 cm × 4.9 cm. We suspected the mass to be a teratoma. She continued with regular follow-ups at the outpatient department. At the gestational age of 14 weeks and 3 days (8 weeks later), the mass was found to be a size of 5.9 cm × 5.4 cm with regional hyperechoic lines and dots and complicated lower abdominal dull pain. Therefore, she was admitted for surgery due to the progressive nature of the mass and abdominal pain. A diagnosis of mature cystic teratoma was made due to the morphological features identified under ultrasonography [Figure 1a]. Her laboratory results showed a white blood cell count of 10.57 × 10^9/L and a hemoglobin level of 11.6 g/dL. The fetal heart rate was 156 beats/min.

A LESS OC was initially arranged. A single-port system was established from a 2 cm incision longitudinally along the umbilicus (open method) and inserted with a wound retractor (LapShield, Lagis, Taichung, Taiwan). A single surgical glove was then adapted to the retractor, and one 10-mm and two 5-mm trocars were inserted into three fingers of the glove. The peritoneum was inflated with CO_2 at a pressure <12 mmHg. Initially, a 5 cm × 6 cm right ovarian cyst located on the right side of the *cul-de-sac* (CDS) was seen under laparoscopy [Figure 1b]. Both the fallopian tubes, left ovary, pelvis, peritoneum, and intestine appeared normal. The right ovarian tumor was difficult to approach due to the enlarged uterus impeding the ovarian tumor. We used one gauze to move the uterus toward the left side. However, the uterus was soft and large and could not move away. On this basis, we decided to perform a vNOTES OC rather than continue with the LESS OC.

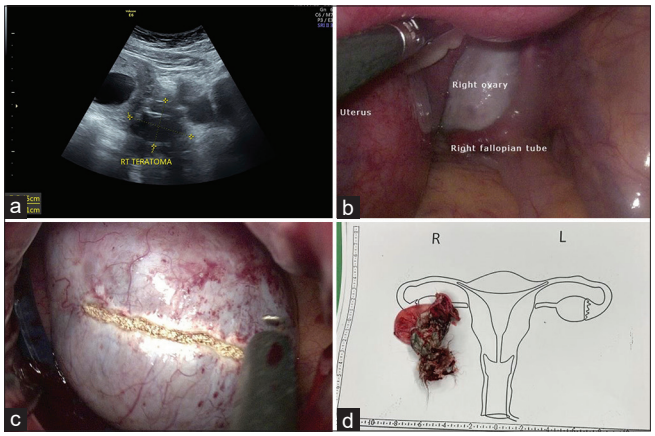

Figure 1: The ultrasound, laparoscopic, and gross picture of the teratoma. (a) Ultrasound image of teratoma, (b) Laparoscopic image of the right ovarian teratoma, (c) vNOTES view of teratoma, (d) Gross picture of removed teratoma (hair in the teratoma). vNOTES: Vaginal natural orifice transluminal endoscopic surgery

The cervix was grasped by an Allis Grasper (Medline Inc., Northfield, IL, USA) and moved upward to the good exposure of the posterior fornix. We cut vaginal mucosa with a unipolar coagulation pencil (Medtronic, Minneapolis, MN, USA). The posterior CDS was entered carefully by dissecting the posterior fornix transvaginally, and a wound retractor (Lagis) with a glove (with two 5-mm trocars and one 10-mm trocar) was inserted into the CDS. The peritoneum was inflated again with CO_2 at a pressure <12 mmHg. The right ovarian cyst was cut with unipolar energy [Figure 1c] and dissected with scissors through the ovarian wall. During dissection, the cystic wall ruptured, and the content of the teratoma came out. Normal saline was used for irrigation. Finally, the pedicle of the ovarian cyst was cut using LigaSure (Covidien, Dublin, Ireland), and the tumor was removed through the vagina [Figure 1d]. The pelvic peritoneum and vaginal wall were closed with 1-0 Vicryl. The total amount of blood lost during the procedure was <50 ml and the operation was 2 h long. The pathological report confirmed the mass to be a mature cystic teratoma.

After the surgery, there was no active bleeding or fever, and the fetal heart rate remained normal and in a stable general condition. The patient was discharged 2 days after the operation without complication. She experienced term vaginal delivery with a male baby weighing 3600 g uneventfully.

Discussion

Laparoscopic removal of a benign cystic teratoma during early pregnancy has been proven safe and feasible.[3,6] However, there are still some limitations. If the ovarian tumor is inside the pelvic cavity and accompanied by an enlarged uterus, performing transabdominal laparoscopy will be difficult, as in our case.

Our case is believed to be the first that treated a benign ovarian dermoid cyst during second-trimester pregnancy by vNOTES OC. We demonstrated the efficacy and feasibility of this approach. By approaching through the vagina, vNOTES allowed a different approach to the ovarian cyst without restricting the enlarged uterus. As the surgical scar is hidden in the vagina, satisfactory cosmetic results with minimal blood loss are achieved with vNOTES.

There could be a worry about approaching vNOTES in a pregnant woman owing to the cervical stimulation during colpotomy. Cervical stimulation may cause an inflammatory cytokine release that may cause premature cervical ripening and premature labor.[8] To minimize this stimulation, we used an Atraumatic Allis Grasper instead of a tenaculum to manipulate the cervix. Fortunately, our case did not experience a threatened abortion and preterm labor.

There are different routes of cystectomy during pregnancy, including laparoscopy and laparotomy. The pros and cons of laparoscopic surgery in pregnant women have been reported. In our previous study regarding myomectomies or ovarian surgeries, laparoscopies were associated with one or more risks for adverse fetal outcomes during pregnancy compared to those of laparotomy (adjusted odds ratio [AOR], 2.29; 95% confidence interval [CI], 1.57–3.35; $P < 0.0001$; and AOR, 2.52; 95% CI, 1.58–4.04; $P = 0.0001$, respectively).[9] The previous studies showed laparoscopic surgery to carry a significant risk of adverse fetal outcomes.[9,10] Conversely, several studies showed less risk of adverse fetal outcomes associated with laparoscopic surgeries.[11,12] In our case, fortunately, no adverse fetal outcome was noted.

LESS has been used for treating ovarian tumors during pregnancy. We previously reported a case using LESS OC for a torsion teratoma noted in a woman's pregnancy at 12 weeks.[6] The ovarian tumor was 5 cm in diameter with torsion and located at the right pelvic wall above the uterus level. Therefore, we could easily approach it. Guan *et al*. reported a large ovarian teratoma, 16 cm × 10 cm × 12 cm in size, noted in a woman pregnant at 16 weeks and was treated with LESS in bag OC.[13] Similarly, the ovarian tumor was large and above the uterus level. Therefore, LESS can be easily approached. In our case, the ovarian tumor was surprisingly not above the uterus level, but located behind the large uterus. Hence, we decided to convert to vNOTES.

The points that need to be considered when performing vNOTES in pregnant women may include the time of surgery, location of the tumor, and pelvic conditions. The better time of vNOTES is the same as laparoscopic surgery for pregnant women is suggested in the early second trimester.[14] Due to an enlarged uterus in the second trimester, if the tumor is located in the CDS, the vNOTES approach may conquer the complex abdominal approach. No pelvic adhesion, like no history of pelvic surgery, endometriosis, or pelvic inflammatory disease, may also be indicated for vNOTES.[15] Cervical stimulation during vNOTES may cause threatened abortion or preterm labor. However, it may be prevented by progesterone.[16]

With advanced technology, vNOTES has become a more popular surgical method. Compared to laparoscopic surgery, vNOTES has a shorter operation time and length of postoperative stay, better cosmetic results, and patient comfort. No difference was observed with both febrile morbidities and estimated blood loss between vNOTES OC and laparoscopic OC.[7] In this case, vNOTES proved that OC was feasible during early pregnancy, and the above advantages were observed. However, there are also limitations of vNOTES, including difficulty reaching the upper abdomen, limited endoscope view, and instrument manipulation difficulty. Advances in technology may overcome these limitations in the future.

Conclusion

In our patient, the vNOTES was performed smoothly and safely. The use of vNOTES for adnexal mass removal in the second-trimester pregnancy might be considered. The mass is located in the CDS, and no pelvic adhesions could be considered for using vNOTES. The vNOTES can be performed safely in selected patients and by an experienced surgeon.

Ethical approval

The Research Ethics Committee at Hualien Tzu Chi Hospital approved this study protocol (IRB permit number: CR111-01).

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

Prof. Dah-Ching Ding, an editorial board member at *Gynecology and Minimally Invasive Therapy*, had no role in the peer review process of or decision to publish this article. The other author declared no conflicts of interest in writing this paper.

References

1. Webb KE, Sakhel K, Chauhan SP, Abuhamad AZ. Adnexal mass during pregnancy: A review. Am J Perinatol 2015;32:1010-6.
2. Ahmed A, Lotfollahzadeh S. Cystic Teratoma. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2022.
3. Kurihara K, Minagawa M, Masuda M, Fukuyama M, Tanigaki K, Yamamoto A, *et al.* The evaluation of laparoscopic surgery on pregnant patients with ovarian cysts and its effects on pregnancy over the past 5 years. Gynecol Minim Invasive Ther 2018;7:1-5.
4. Baekelandt J. Transvaginal natural orifice transluminal endoscopic surgery: A new approach to ovarian cystectomy. Fertil Steril 2018;109:366.
5. Sinha A, Ewies AA. Ovarian mature cystic teratoma: Challenges of surgical management. Obstet Gynecol Int 2016;2016:2390178.
6. Ding DC, Chang YH. Laparoendoscopic single-site surgical cystectomy of a twisted ovarian dermoid cyst during early pregnancy: A case report and literature review. Gynecol Minim Invasive Ther 2016;5:173-7.
7. Ding DC, Chu TY, Hong MK. Hysterectomy and ovarian cystectomy using natural orifice transluminal endoscopic surgery: An initial experience at Tzu Chi General Hospital. Ci Ji Yi Xue Za Zhi 2017;29:208-12.
8. Ekman-Ordeberg G, Dubicke A. Preterm cervical ripening in humans. Facts Views Vis Obgyn 2012;4:245-53.
9. Chen YH, Li PC, Yang YC, Wang JH, Lin SZ, Ding DC. Association of

laparoscopy and laparotomy with adverse fetal outcomes: A retrospective population-based case-control study. Surg Endosc 2021;35:6048-54.
10. Prodromidou A, Machairas N, Kostakis ID, Molmenti E, Spartalis E, Kakkos A, *et al.* Outcomes after open and laparoscopic appendectomy during pregnancy: A meta-analysis. Eur J Obstet Gynecol Reprod Biol 2018;225:40-50.
11. Liu YX, Zhang Y, Huang JF, Wang L. Meta-analysis comparing the safety of laparoscopic and open surgical approaches for suspected adnexal mass during the second trimester. Int J Gynaecol Obstet 2017;136:272-9.
12. Shigemi D, Aso S, Matsui H, Fushimi K, Yasunaga H. Safety of laparoscopic surgery for benign diseases during pregnancy: A nationwide retrospective cohort study. J Minim Invasive Gynecol 2019;26:501-6.
13. Guan Z, Wang K, Ma Y, Koythong T, Wang Q, Guan X. Laparoscopic single-site "in-bag" ovarian dermoid cystectomy in a 16-week – Pregnant patient. J Minim Invasive Gynecol 2021;28:1569-70.
14. Committee Opinion No. 696: Nonobstetric Surgery During Pregnancy. Obstet Gynecol 2017;129:777-8.
15. Kapurubandara S, Lowenstein L, Salvay H, Herijgers A, King J, Baekelandt J. Consensus on safe implementation of vaginal natural orifice transluminal endoscopic surgery (vNOTES). Eur J Obstet Gynecol Reprod Biol 2021;263:216-22.
16. Norman JE, Marlow N, Messow CM, Shennan A, Bennett PR, Thornton S, *et al.* Vaginal progesterone prophylaxis for preterm birth (the OPPTIMUM study): A multicentre, randomised, double-blind trial. Lancet 2016;387:2106-16.