

Case Report

Transumbilical Single-Port Laparoscopic Cystectomy of Giant Ovarian Teratoma

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To cite this article:

Yun Yang, Huimin Tang, Yao Chen, Wulin Shan, Mengru Zhao, Mengyue Chen, Bin Tang, Hong Zheng, Bairong Xia, Jiming Chen. Case Report Transumbilical Single-Port Laparoscopic Cystectomy of Giant Ovarian Teratoma. *Journal of Gynecology and Obstetrics*.

Vol. 11, No. 2, 2023, pp. 47-51. doi: 10.11648/j.jgo.20231102.14

Received: March 27, 2023; Accepted: April 18, 2023; Published: April 27, 2023

Abstract: Mature ovarian teratomas are benign germ cell tumors of the ovary, accounting for about 10 % -20 % of ovarian tumors and 95 % of ovarian teratomas. Mature ovarian teratomas are common in young women. They are usually unilateral, slow growing, cystic, mobile, smooth, with little or no ascites. Ovarian cystectomy for benign neoplasms instead of oophorectomy is mandatory for ovarian function preservation. We report a case of a large pelvic teratoma in a 19-year-old adolescent female, approximately 20.7cm×10.5cm in size. The patient's main clinical presentation was mild lower abdominal pain. After transumbilical single-port laparoscopic ovarian cystectomy, the final histopathological report was bilateral ovarian mature teratoma. This case report suggests that transumbilical single-port laparoscopic-assisted in vitro giant ovarian tumor ablation is a safe and feasible surgical approach for patients with benign large adrenal tumors. It effectively combines the advantages of open surgery and laparoscopic resection of large ovarian tumors, which not only protects ovarian function, but also avoids cyst fluid overflow and has significant postoperative cosmetic effects. Nevertheless, this study also had some limitations. First, this was a case report and not a multi-center randomized controlled trial. Second, it included a single patient and the short follow-up data precluded us from deriving any conclusions about the long-term efficacy and safety of this method.

Keywords: Mature Ovarian Teratoma, Transumbilical Single-Port Laparoscopic, Cystectomy

1. Introduction

Teratoma is an embryonic tumor formed by the abnormal development of embryonic cells in three primitive embryonic layers (endoderm, mesoderm, and ectoderm). [1] It is usually divided into gonadal and non-gonadal sources and is prone to preaxial, median, and paracentral (such as testis, ovary, sacrococcygeal tail, mediastinum, retroperitoneal and intracranial). [2] Ovarian teratoma belongs to ovarian germ

cell tumors. The degree of benign, malignant, and malignant tumors depends on the differentiation of tumor tissue.

Ovarian cysts >10 cm in diameter are defined as giant ovarian cysts. [3] Ovarian cystectomy for benign neoplasms instead of oophorectomy is mandatory for ovarian function preservation. [4, 5] laparoscopic surgery for large ovarian cysts is still a major clinical difficulty faced by gynecologists. This is mainly due to the possibility of malignancy and technical challenges. With the development of laparoscopic instruments and the advancement of surgical techniques,

many minimally invasive operations have been advocated for the treatment of large benign ovarian cysts [6]. Chong et al. [7] reported on 25 patients undergoing single-hole extracorporeal ovarian cystectomy and compared the surgical outcomes, complications, and leakage rates with conventional laparoscopic and open surgery for large ovarian masses (> 8cm). Finally, it is concluded that single-hole surgery can replace traditional laparoscopic and laparotomy. Lee, Sa Ra [8] introduce a new hybrid cystectomy and reimplantation method for fast, leakage-proof, single-incision ovarian cystectomy for huge ovarian masses, this procedure not only reduces the operation time but can be applied to all ovarian masses even when the mass is not sufficiently large to reach the umbilicus (usually ovarian masses 10-15 cm in size). However, there is currently relatively little clinical data on transumbilical single-port laparoscopic-assisted in vitro giant ovarian tumor ablation. Therefore, the objective of this study was to supplement clinical data and further validate the feasibility, safety, and patient satisfaction of this procedure in the treatment of women with large (≥ 15 cm) ovarian cysts with benign features, and to describe the procedure and outcome in detail.

2. Case Report

A 19-year-old female patient was admitted to the hospital on May 17, 2022, with intermittent lower abdominal pain for one day. She was in good physical condition and had no past medical history. Unmarried and infertile, with a history of sexual life. Regular menstrual cycle, 6-7/30-35d, no dysmenorrhea, last menstrual period: April 20, 2022. Weight: 70kg, Height: 168cm, BMI: 24.80kg/m^2 , Physical examination: abdominal bulge, soft, abdominal wall can touch with the size of about $15\text{ cm} \times 15\text{ cm}$ mass, soft texture, activity, no tenderness. B-ultrasound: the size of the uterus was about $4.7\text{ cm} \times 4.1\text{ cm} \times 4.5\text{ cm}$, and the shape was normal. The echo inside the muscle wall was uniform. A mixed echo was seen in the abdomen and pelvis, and the size was about $20.7\text{ cm} \times 10.5\text{ cm}$. The boundary was clear, and the shape was irregular. CDFI: there was an obvious blood flow signal in it. Considering the mixed pelvic-peritoneal space occupation, teratoma is not excluded.

CA125: 1.07ng/mL , AFP: 1.75ng/mL , CEA: 1.07ng/mL , AMH: 6.24ng/mL , Total abdominal CT: irregular abnormal density images were seen in the abdomen, pelvis and right adnexal area, with a large cross-sectional area of $16\text{ cm} \times 17\text{ cm}$, and the density was uneven. Low-density fat images, water density images, soft tissue density images, and calcification images were seen in the lesions, with visible separation and possible teratoma. (Figure 1, Figure 2), According to the medical history and related auxiliary examinations, the possibility of benign tumors of ovarian origin should be considered. On May 20, 2022, transumbilical single-port laparoscopic resection of a giant ovarian tumor was performed under general anesthesia with endotracheal intubation. Since the tumor volume under laparoscopy reached that under the incision (Figure 3, Figure 4), we

decided not to use single-port laparoscopy temporarily. Firstly, about 1000ML of light yellow cyst fluid was sucked out under the incision. After the tumor volume was significantly reduced, the ovaries were pulled out of the umbilical incision. Under direct vision, there were solid tissues in the tumor cyst, which were fat and hairy. After stripping the cyst wall, (Figure 5), the ovarian cortex was sutured, and the ovary was put back into the pelvic cavity. Then a single-hole laparoscopic exploration was performed. Microscopically, the tumor originated from the left ovary. During the exploration, a mass of about $3\text{ cm} \times 3\text{ cm}$ in size was found in the right ovary. The surface was smooth, and the boundary with the surrounding tissue was clear. The right ovary tumor was treated again by the same method. (Figure 6). Suture umbilicus incision layer by layer, remodeling umbilicus morphology. (Figure 7) The operation was successful; the patients recovered well and were discharged within seven days after the operation. Postoperative pathology: The capsule is intact, and the cut surface is full of hair and yellow grease, bilateral ovarian mature cystic teratoma. (Figure 8)

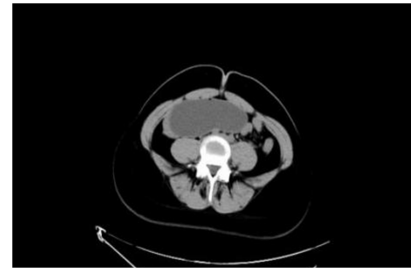


Figure 1. Pelvic CT coronal images.

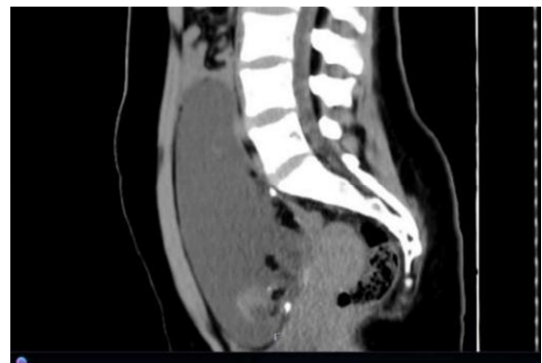


Figure 2. Pelvic CT sagittal images.



Figure 3. Establish single hole channel.

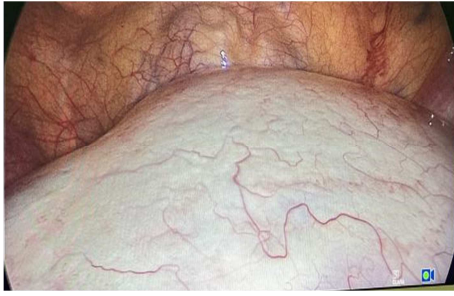


Figure 4. Microscopic images of ovarian tumors.



Figure 5. Suture of ovarian cortex.

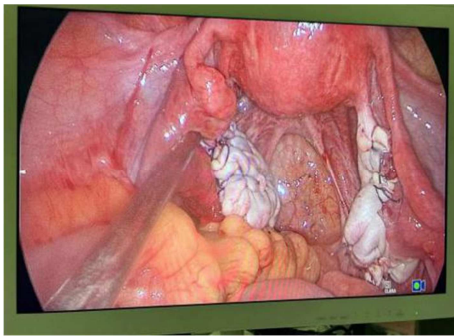


Figure 6. Laparoscopic view of bilateral ovaries after suture.



Figure 7. Umbilical image after plastic surgery.

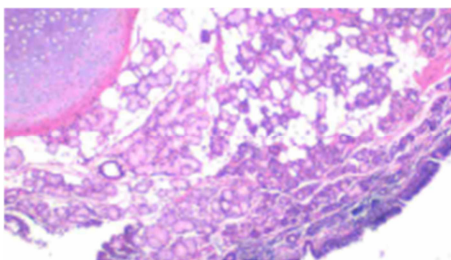


Figure 8. Postoperative histopathology:(bilateral ovarian mass) cystic mature teratoma.

3. Discussion

Ovarian tumor is a common gynecologic tumor that can occur at any age. The degree of malignancy is divided into benign, borderline, or malignant. Benign ovarian tumors account for 90 % of all ovarian tumors. They are common in younger patients, usually unilateral, cystic, smooth surface, good mobility, and slow tumor growth. [8] Mature teratoma, also known as a dermoid cyst, is mostly unilateral, filled with oil and hair in the cavity, and sometimes seen in teeth and bone. A huge ovarian cyst may become a borderline malignant tumor or malignant tumor. The size, location, and shape can be preliminarily determined by ultrasound, and enhanced pelvic magnetic resonance imaging can be performed. The potential risk of borderline or malignant ovarian tumors in patients can be further determined according to whether the cyst content is strengthened and combined with preoperative serum tumor markers such as CA125, CA199, and CEA. [9]

At present, laparoscopy is considered the gold standard for treating ovarian cysts [10]; however, laparoscopic cystectomy for huge ovarian cysts has several technical problems. First, cystic content may overflow in the process of gas injection or ovarian cyst stripping. Leather cyst overflow can cause chemical peritonitis, adhesion, infertility, and mucous cyst overflow can cause peritoneal pseudomyxoma. [11] Huge ovarian cysts may be associated with malignant tumors, so cyst fluid overflow is accompanied by the risk of iatrogenic malignant cell overflow during surgery, which will significantly reduce the postoperative survival rate of patients. [12] Second, because the size of the cyst affects the operative field of vision, it is challenging to perform laparoscopic ovarian cystectomy, which may increase the operation time and easily lead to increased intraoperative blood loss. Laparoscopic use of bipolar coagulation to stop bleeding causes thermal damage to the ovarian interstitial blood vessels and ovarian parenchyma. It is difficult to preserve as much normal ovarian tissue as possible in laparoscopic cyst removal, affecting the patient's reproductive function. [13, 14, 15] With the advancement of technology, gynecological laparoscopic surgery is also developing. Transumbilical single-port laparoscopic surgery has been adapted to the treatment of many gynecological diseases, such as benign ovarian tumors, uterine fibroids, ectopic pregnancy, and early endometrial cancer, due to its advantages of simple incision, minor trauma, beautiful surgical scar, and convenient sampling. [7] To rule out the possibility of malignancy, patients should undergo a rigorous preoperative evaluation that includes physical examination, previous surgical history, medication history, comprehensive imaging of the abdomen and pelvis, and tumor markers. [16] Despite a thorough preoperative evaluation, there is still the possibility of intraoperative malignancy, so it is also needed to make and evaluate frozen section diagnosis. In this clinical report, the clinical manifestations, physical examination, and related auxiliary examinations of patients were comprehensively

analyzed. Combined with the age and marital status of patients, transumbilical single-port laparoscopic ovarian cystectomy was considered. The main advantage of this procedure is that it combines traditional laparoscopic and laparoscopic procedures. With the port single-port system, it is possible to switch between in vitro and in vivo procedures. First, make an incision about 1.5 cm long at the umbilicus, enter the abdomen layer by layer under direct vision, and use the incision protective sleeve to expand the incision as much as possible. The gauze was placed between the tumor and the abdominal wall to avoid the infiltration of cystic fluid into the abdominal cavity. Make a purse suture on the cyst wall, then cut the cyst wall, insert the suction device into the cyst simultaneously, and ligate the suture after suctioning the cyst fluid. The above surgical procedures can effectively reduce the risk of cyst content spilling into the abdominal cavity. If the cyst contains a solid component and the ovaries need to be preserved, remove the solid part one by one, taking care to avoid spilling, and slowly remove the cyst from the umbilicus. The umbilical incision can be protected from fluid cyst contamination due to the isolation of the incision sheath. The tumor was pulled out of the abdomen, and the cystic wall was removed by open surgery. When the bleeding on the stripping surface was obvious, gauze compression or fine needle suture was used to stop bleeding. Studies have shown that stripping the ovarian cyst wall under direct vision can reduce the loss of ovarian cortex, and in vitro suture hemostasis can avoid the thermal injury of ovarian caused by electrocoagulation hemostasis, which is better than that of porous laparoscopy and is more favorable for patients who have not yet given birth. [7] The intrinsic ovarian ligament and pelvic funnel ligament of patients with huge ovarian cysts are usually overstretched, so the ovarian tissue can be pulled out of the umbilical incision after attracting most of the cyst contents.

4. Conclusions

transumbilical single-port laparoscopic-assisted in vitro giant ovarian tumor ablation is a safe and feasible surgical approach for patients with benign large adrenal tumors. It effectively combines the advantages of open surgery and laparoscopic giant ovarian tumor ablation to protect ovarian function and avoid cyst fluid overflow. It has obvious postoperative cosmetic benefits. However, to reach a definite conclusion, more data are needed, especially multi-center research trials.

Author Contributions

YY, MRZ, YMC, YC, WLS—Data curation, Writing—Original Draft; MHT, BT, HZ— Data Collection; JMC, RBX— Supervision, Review & Editing Manuscript.

Funding

This work was supported by grants from Top Talent of Changzhou “The 14th Five-Year Plan” High-Level Health

Talents Training Project (2022CZBJ074), the maternal and child health key talent project of Jiangsu Province (RC202101), the maternal and child health research project of Jiangsu Province (F202138), the Scientific Research Support Program for Postdoctoral of Jiangsu Province (2019K064), and the Scientific Research Support Program for “333 Project” of Jiangsu Province (BRA2019161).

Conflict of Interest

The authors declare no conflict of interest.

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