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Case Report

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The Role of Laparoscopy in the Diagnosis and Management of Fallopian Tube Teratomas: A Case Report

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Abstract

Background: The introduction of assisted reproductive technologies (ARTs) has diminished the role of surgery in female factor tubal infertility. The assessment of tubal patency is part of the routine tests taken for the evaluation of infertile couples. Laparoscopy with chromopertubation is still the gold standard test for the evaluation of tubal patency.

Case Presentation: In this article, a rare case of a mature cystic tubal teratoma was diagnosed laparoscopically as part of an infertility workup. An attempt was made to emphasize the importance of laparoscopy in the diagnosis and management of rare fallopian tube entities that may have an impact on female reproductive health. A literature search to find any prior similar cases was conducted using PubMed database. The search terms employed were tubal factor infertility, tubal teratoma, diagnosis, laparoscopy, in vitro fertilization (IVF), and hysterosalpingography (HSG). A total of 4 cases of mature cystic teratomas of the fallopian tube diagnosed laparoscopically as part of infertility workup were reviewed showing that laparoscopic surgery still has a major role in diagnosis and treatment of female infertility.

Conclusion: Tubal teratoma is a rare finding in patients undergoing infertility workup. It is important to highlight the benefits of laparoscopy in confirming the tubal patency test results in patients showing no intraperitoneal spillage of contrast media on hysterosalpingography test. Laparoscopy helps visualize the tubes better aiming to diagnose entities that are difficult to diagnose with hysterosalpingography or ultrasound, while simultaneously providing an opportunity for treatment.

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Introduction

Approximately 10–15% of couples are diagnosed with subfertility. It is defined as the inability to achieve a pregnancy after 12 months of having regular unprotected intercourse (1). The fallopian tube plays a vital role in female reproduction as it is the site of oocyte pick-up, fertilization, and early embryogenesis. Tubal pathologies contribute to 35 to 40% of female factor infertility cases. Thus, the evaluation of tubal patency during an infertility workup is a priority (1). Tubal factor infertility may result from obstruction and adhesions. This could be due to infection, inflammation, endometriosis, congenital anomalies, ectopic pregnancy, scarring from previous surgeries, tubal myomas, neoplasms or any other condition that may alter the tubal mucosa or muscular wall (2).

Neoplasms of the fallopian tube are the least

common tumors of the female reproductive system. Benign tubal neoplasms are encountered even less frequently. To date, only 75 cases of mature teratomas (cystic or solid) of the fallopian tubes have been reported in the literature. Three decades after the development of in vitro fertilization and improved embryo transfer techniques and despite the increased success rates of assisted reproductive technologies and the decline in tubal surgeries, the argument for performing laparoscopy as part of the tubal infertility workup still stands (3).

In this article, a rare case of a mature cystic teratoma of the fallopian tube is presented which was diagnosed through laparoscopy as part of an infertility workup. The purpose of the current study was to highlight the importance of laparoscopy in diagnosing tubal pathologies and determining the optimal management plan in patients with suspected tubal pathology identified on hysterosalpingography (HSG) or pelvic ultrasound.

Case Presentation

A 33-year-old female patient, gravida three, para one, aborta two, presented in 2020 to our fertility center at Saint George Hospital University Medical Center, Beirut, Lebanon for secondary infertility workup. Her first pregnancy was uneventful. She had a full term normal vaginal delivery and good recovery afterwards. Subsequently, she suffered from two missed miscarriages which were managed medically and surgically respectively without any reported complications. She reported no prior ectopic pregnancies and had no other significant medical issues. Her surgical history was unremarkable, with no abdominal or pelvic operations. Her menstrual cycles were regular. She reported no dysmenorrhea, dyspareunia, or dyschezia. Her cervical screening was up to date, and the latest cytology result was normal. She had no prior history of sexually transmitted infections and abstained from smoking and alcohol.

Pelvic examination was done showing normal findings with no pelvic tenderness or abnormal pelvic masses on bimanual examination. No abnormal discharge was seen.

Thrombophilia testing was done as part of a recurrent miscarriage workup which was found to be normal. Parental karyotype was done for both partners showing a normal karyotype for both. The patient's hormonal workup performed on day three of her cycle was within normal limits, including serum TSH, FSH, LH, prolactin, progesterone, and estradiol, except for a low anti-Müllerian hormone level of 0.513 *ng/ml* (1.07 *pmol/L*). Her husband's semen analysis was normal.

Hysterosalpingogram was done showing an absence of contrast media filling or spillage of the right fallopian tube. The left fallopian tube was patent but showed minimal intraperitoneal spillage. The uterine cavity appeared regular in contour (Figure 1).

Transvaginal pelvic ultrasound done on day 3 of the menstrual cycle confirmed a low ovarian reserve corresponding with the low anti-Müllerian hormone level. The antral follicular count was three on the right ovary and zero on the left ovary. It also showed a small avascular mass of mixed echogenicity in the right tube.

After a thorough discussion with the patient, the decision to perform laparoscopy was taken as a gold standard test to confirm tubal patency and to evaluate the right fallopian tube mass that was seen on transvaginal ultrasound (Figure 2). A solid-appearing mass was identified in the medial region of the ampullary segment of the right fallopian tube. The left tube and both ovaries were normal in morphology. Total right salpingectomy was done and tissue was sent to pathology. Left tubal patency was confirmed by chromopertubation using methylene blue.

The pathology report was as follows; gross examination revealed several irregular, tan-colored tissue fragments measuring between 0.2×0.2×0.3 *cm* and 1.6×1×1.1 *cm*. The largest fragment was cystic and filled with yellow mucinous material. A histopathological exam showed a mature cystic teratoma arising in the ampullary region of right

Figure 1. HSG demonstrating right proximal tubal occlusion with no intraperitoneal spillage of contrast medium. The left tube is patent with delayed contrast escape. The uterine cavity appears normal

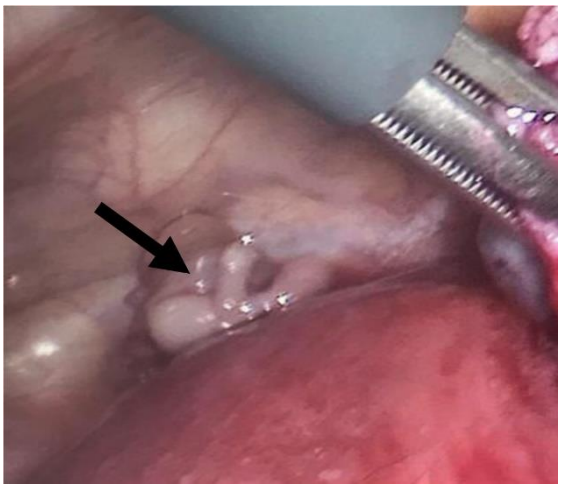

Figure 2. Laparoscopic view of the right intraluminal fallopian tube mass

the fallopian tube. All three components of germ cell layers were identified. The ectoderm consisted of squamous epithelium, the mesoderm contained mature adipose tissue, and the endoderm included a few colonic glandular structures. The patient's postoperative course was uneventful. She conceived spontaneously four months after the surgery.

Discussion

Tubal neoplasms are the least common neoplasms of the female reproductive system. Benign neoplasms of the fallopian tube are encountered even less frequently. Approximately 75 cases of mature teratomas (cystic or solid) of the fallopian tubes have been reported in the literature, of which 50 were cystic, commonly known as dermoid cysts. All of these cases were identified intraoperatively, and a preoperative diagnosis of this type of tumor has not been reported (4).

Fallopian tube teratoma may contribute to tubal factor infertility, menstrual irregularity, dysmenorrhea, and pelvic pain. The pathogenesis remains unclear; but some theories postulate that tubal teratomas arise from failure of germ cells migrating from the yolk sac to the primitive gonadal bud to reach the ovaries. These tumors are usually luminal, found in the ampulla or isthmus, but can occasionally be intramural or serosal (5). In our case, a mature cystic tubal teratoma was diagnosed. It seemed that unilateral tubal obstruction was caused by compression/blockage of the fallopian tube by the tumor. Laparoscopic salpingectomy was performed instead of salpingostomy as the fallopian tube showed some form of damaged mucosa.

Similarly, Johnson and Hansen described a 31-year-old patient, gravida 0, presenting with dysmenorrhea and infertility, who was found to have mature cystic teratoma of the left tube on laparoscopy performed 6 months after unsuccessful medical ovulation induction with clomiphene citrate. A linear salpingostomy was performed with fulguration of the pedicle connecting the mass to the fallopian tube and excision of the dermoid cyst. The patient then conceived spontaneously with an ongoing normal pregnancy two months later (6). Li et al. reported the case of a 23-year-old gravida 0 patient with an incomplete uterine septum, who was admitted for a 2-year history of infertility and was found to have a 6×4.5 *cm* left pelvic cystic mass on CT scan, suspected to be a cystic ovarian teratoma. Surgery revealed a distended left fallopian tube with cream colored sebaceous material and hair, while the left ovary and right adnexa appeared normal. Hence, left salpingectomy was performed; findings were compatible with mature cystic tubal teratoma. Uterine septum incision was performed as well during surgery. The patient then became pregnant one year following surgery (7). Similarly, Fujiwara et al. reported the case of a 31-year-old gravida 0 patient presenting for infertility counseling, in whom a swollen right fallopian tube with unconfirmed patency on hysterosalpingography was identified. Hence, laparoscopic salpingectomy was performed for a 2×1.5 cm solid mass attached to the ampullary region of the right tube, a finding that was noted intraoperatively. Histopathological findings were compatible with mature cystic tubal teratoma. The patient subsequently achieved pregnancy through IVF and embryo transfer following surgery (8).

In a study that aimed at comparing the role of both HSG and laparoscopy in diagnosing fallopian tube abnormalities, Tan et al. conducted a retrospective analysis of 1,276 women who underwent HSG as a preliminary test for examination of infertility. Women were then subjected to laparoscopy based on evidence of HSG abnormalities. It was found that although the cost-effective HSG demonstrated moderate sensitivity (65%) and excellent specificity (83%) in identifying tubal factor infertility, its reliability was questionable especially in the subgroup of women diagnosed with tubal occlusion. These limitations have been attributed to cornual spasms following contrast dye injection during HSG which occur more frequently than with the dilute dye used in laparoscopic chromopertubation, insufficient contrast agent

flow, and observer-dependent variability in HSG interpretation. The authors suggested that laparoscopy, when used complementarily, could address these shortcomings (9).

Finally, in a prospective randomized trial comparing the outcomes and cost of IVF-ET techniques with that of tubal surgeries as first-line therapy, Karande et al. found that the latter was associated with lower costs and higher overall pregnancy rates (10). However, a Cochrane study conducted by Pandian et al. showed that the success of surgery compared to IVF in the treatment of tubal factor infertility remains largely unknown and that many factors should be taken into consideration when counseling couples about their treatment options. These variables include site and degree of tubal disease, the age of the woman at conception and her ovarian reserve, male fertility, the cost of the technique, and adverse maternal and fetal perinatal outcomes associated with IVF, such as ovarian hyperstimulation and intrauterine growth restrictions (11).

Conclusion

Laparoscopic surgery should be considered in the evaluation of tubal factor infertility as it helps in diagnosing asymptomatic tubal diseases. It is still considered the gold standard test for confirming tubal patency after procedures like the hysterosalpingogram or hysterosalpingo contrast sonography (HyCosy). Gynecologists should be aware of the existence of these rare tubal neoplasms and should always include them in their differential diagnosis when approaching infertility cases. When these tubal masses are identified during laparoscopy, it is important to send them for histological testing in order to identify the nature of these masses and their potential malignancy.

Conflict of Interest

Authors declare no conflict of interest.

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