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Torsion's Tug: Unmasking Ovarian Torsion In A Borderline Tumor

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ABSTRACT

A 32-year-old woman, para 2 living 2, with a history of two previous cesarean sections and sterilization, presented with acute lower abdominal pain and backache. Imaging revealed a large right ovarian cyst with features suggestive of a borderline tumor, and tumor markers showed elevated CA-125 levels. Intraoperatively, the cyst was found to be twisted, indicating ovarian torsion, a rare complication in borderline ovarian tumors (BOTs). Frozen section analysis suggested a borderline serous cystadenoma, which was confirmed on histopathology as FIGO stage IB. The patient underwent staging laparotomy, right oophorectomy, total abdominal hysterectomy, and omentectomy, with an uneventful postoperative recovery. This case highlights the diagnostic challenges of BOTs, particularly in the context of rare complications like torsion, and underscores the importance of a multidisciplinary approach involving imaging, tumor markers, and histopathological evaluation. Early diagnosis and timely surgical intervention are crucial, especially in young women, to preserve fertility and ensure favorable outcomes. Long-term follow-up is essential to monitor for late recurrences, given the potential for late recurrence in BOTs.

1. INTRODUCTION

Borderline ovarian tumors (BOTs), also known as tumors of low malignant potential (LMP), represent a unique category of ovarian neoplasms that exhibit histological features intermediate between benign and malignant tumors. These tumors are characterized by epithelial proliferation and nuclear atypia without stromal invasion, distinguishing them from invasive carcinomas [1]. BOTs account for approximately 10-20% of all epithelial ovarian tumors and are most commonly diagnosed in women of reproductive age, with about one-third of cases occurring before the age of 40 [2]. The majority of BOTs are serous or mucinous in origin, and approximately 75% are diagnosed at FIGO stage I, indicating a favorable prognosis with a 5-year survival rate of 95-97% [3].

Despite their generally indolent behavior, BOTs can present with complications such as torsion, rupture, or, rarely, progression to invasive carcinoma [4]. Ovarian torsion, a gynecological emergency, is more commonly associated with benign ovarian masses but can also occur in the setting of BOTs, albeit rarely [5]. The diagnosis of BOTs often relies on a combination of imaging studies, tumor markers, and histopathological examination, with intraoperative frozen section analysis playing a critical role in guiding surgical management [6]. However, the accuracy of frozen section analysis in distinguishing BOTs from benign or malignant tumors can be challenging, underscoring the importance of comprehensive preoperative evaluation and postoperative histopathological confirmation [7].

This case report highlights the diagnostic and therapeutic challenges associated with a 32-year-old woman presenting with acute abdominal pain, ultimately diagnosed with a borderline serous cystadenoma complicated by ovarian torsion. The case underscores the importance of timely diagnosis and surgical intervention in managing BOTs, particularly in young women where fertility preservation may be a consideration.

2. CASE PRESENTATION

A 32-year-old woman, para 2 living 2 (P2L2), with a history of two previous lower segment cesarean sections (LSCS) and laparoscopic sterilization 8 years prior, presented with complaints of backache for the past week and acute lower abdominal pain that had been intermittent for the past 4 days. The pain was relieved with medications and was not associated with

nausea, vomiting, fever, or other significant systemic symptoms. Her menstrual history was unremarkable, with regular cycles. The patient reported a family history of breast carcinoma in her maternal aunt.

On examination, the patient was well-built and nourished, with a height of 156 cm and a weight of 86 kg. She was afebrile, with no pallor or pedal edema. Her vital signs were stable, with a blood pressure of 120/80 mmHg and a pulse rate of 88 beats per minute. Cardiovascular and respiratory examinations were unremarkable, and the central nervous system examination revealed no focal neurological deficits. Breast and thyroid examinations were clinically normal.

Abdominal examination revealed tenderness in the right iliac fossa and hypogastric region on deep palpation, but no palpable mass or free fluid was detected. Per speculum examination showed that the cervix was flushed to the anterior vaginal wall and could not be visualized. Per vaginal examination revealed a retroverted uterus, with a firm mass of approximately 10x5 cm occupying the pouch of Douglas (POD), more prominent on the right fornix. The groove sign was positive. Per rectal examination confirmed the presence of a firm mass in the POD, extending into the right parametrium.

Initial investigations included an ultrasound (USG), which revealed a well-defined cystic lesion measuring 7.4x10.5x10.9 cm in the right paraovarian/adnexal region. The lesion had mural components, internal echoes, and peripheral vascularity, but no internal septations were noted. Neoplastic etiology was suspected. Magnetic resonance imaging (MRI) further characterized the lesion as a well-defined unilocular midline cystic lesion epicentered in the POD, likely arising from the right ovary. The MRI showed multiple internal papillary projections and an enhancement pattern suggestive of a borderline ovarian tumor.

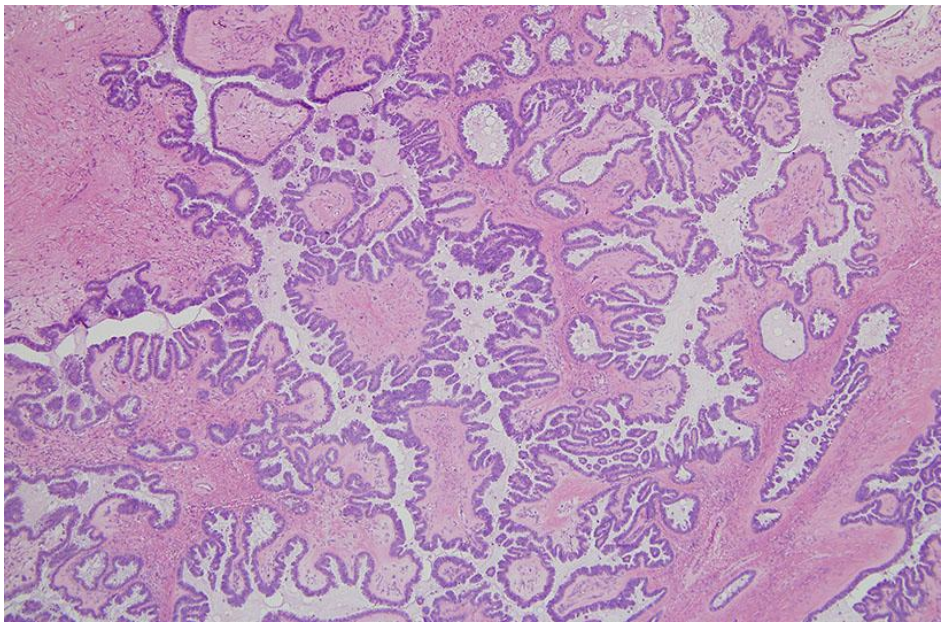

Image 1: Histology of Borderline serous tumor

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Tumor markers were elevated, with serum CA-125 at 124 U/mL and CA 19-9 at 13 U/mL. Other tumor markers were negative. The Risk of Malignancy Index (RMI) was calculated as 124, indicating a low risk for malignancy. The International Ovarian Tumor Analysis (IOTA) classification suggested a probably benign lesion with a 1.5% risk of malignancy.

The patient was taken up for a staging laparotomy with intraoperative frozen section analysis. Intraoperative findings included no ascites, a normal-sized uterus adherent to the anterior abdominal wall, and a right ovarian cyst measuring 10x10 cm, which was twisted two turns around its pedicle. The left ovary appeared polycystic. Right oophorectomy was performed, and the specimen was sent for frozen section analysis, which suggested a borderline serous cystadenoma. The procedure was extended to include a total abdominal hysterectomy, infra-colic omentectomy, and appendicectomy (as the appendix appeared inflamed). Pelvic and para-aortic lymph nodes showed no evidence of enlargement.

Image 2: Right ovarian cyst

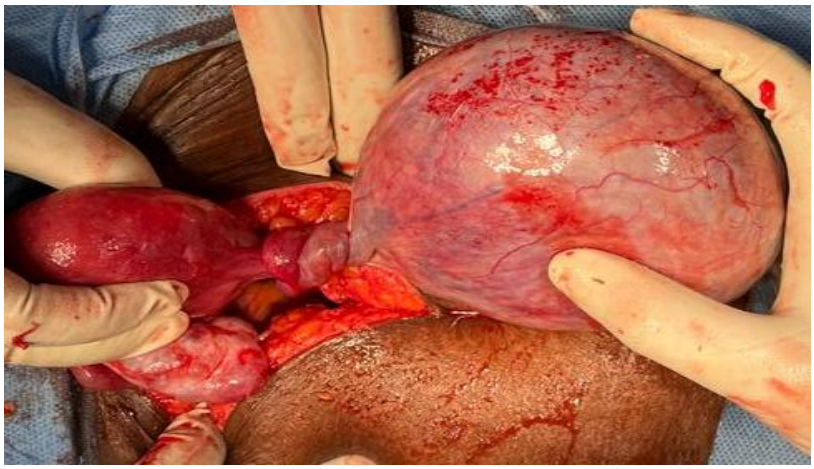

Image 3: Right ovarian cyst measuring 10x10 cm, which was twisted two turns around its pedicle

Peritoneal lavage cytology was negative for malignancy (Category II, according to the International System for Serous Fluid Cytology 2019). Histopathological examination (HPE) confirmed the diagnosis of a borderline serous cystadenoma of the ovary, staged as FIGO stage IB. The postoperative period was uneventful, and the patient was discharged on postoperative day 8.

This case highlights the diagnostic challenges and management of borderline ovarian tumors, particularly in the context of rare complications such as ovarian torsion. It underscores the importance of a multidisciplinary approach, including imaging, tumor markers, and histopathological evaluation, in guiding appropriate surgical intervention and ensuring favorable outcomes.

3. DISCUSSION

Borderline ovarian tumors (BOTs), also known as tumors of low malignant potential (LMP), are a distinct category of ovarian neoplasms that exhibit histological features intermediate between benign and malignant tumors. They are characterized by epithelial proliferation and nuclear atypia without stromal invasion, which differentiates them from invasive carcinomas [1]. BOTs account for approximately 10-20% of all epithelial ovarian tumors and are most commonly diagnosed in women of reproductive age, with about one-third of cases occurring before the age of 40 [2]. The majority of BOTs are serous or mucinous in origin, and approximately 75% are diagnosed at FIGO stage I, indicating a favorable prognosis with a 5-year survival rate of 95-97% [3].

In this case, the patient presented with acute abdominal pain and was found to have a large right ovarian cyst with features suggestive of a borderline tumor on imaging. The diagnosis was confirmed postoperatively as a borderline serous cystadenoma, FIGO stage IB. The presence of ovarian torsion, a rare complication in BOTs, added complexity to the clinical

presentation. Ovarian torsion is more commonly associated with benign ovarian masses, but it can occasionally occur in BOTs, as seen in this case [4]. Torsion is a gynecological emergency that requires prompt surgical intervention to prevent irreversible damage to the ovary and associated structures [5].

The diagnostic workup for BOTs typically involves a combination of imaging studies, tumor markers, and histopathological examination. In this case, ultrasound (USG) and magnetic resonance imaging (MRI) were instrumental in identifying the cystic lesion and its characteristics, such as papillary projections and enhancement patterns, which raised suspicion of a borderline tumor. However, neither imaging modality could definitively rule out torsion, which was only discovered intraoperatively. This highlights the limitations of imaging in diagnosing torsion and underscores the importance of clinical suspicion and timely surgical exploration [6].

Tumor markers, particularly CA-125, are often elevated in BOTs, as seen in this case (CA-125: 124 U/mL). However, CA-125 is not specific to BOTs and can be elevated in various benign and malignant conditions, limiting its diagnostic utility [7]. The Risk of Malignancy Index (RMI) in this case was 124, indicating a low risk for malignancy, which aligned with the final diagnosis of a borderline tumor. The International Ovarian Tumor Analysis (IOTA) classification further supported a probably benign lesion with a 1.5% risk of malignancy [8].

Intraoperative frozen section analysis plays a critical role in the management of BOTs, as it guides the extent of surgical intervention. However, frozen section analysis is known to have lower sensitivity and specificity in diagnosing BOTs compared to benign or malignant tumors, which can lead to diagnostic challenges [9]. In this case, frozen section analysis suggested a borderline serous cystadenoma, which was later confirmed on histopathological examination (HPE). The final HPE report confirmed the diagnosis of a borderline serous cystadenoma, FIGO stage IB, with no evidence of stromal invasion or malignancy.

The management of BOTs depends on several factors, including the patient's age, desire for fertility preservation, and the stage of the disease. In this case, the patient underwent a staging laparotomy with right oophorectomy, total abdominal hysterectomy, infra-colic omentectomy, and appendicectomy. The decision to perform a hysterectomy was based on the patient's age, completed family size, and the need for definitive surgical management to reduce the risk of recurrence [10]. Fertility-sparing surgery, such as unilateral oophorectomy or cystectomy, may be considered in younger women who wish to preserve their reproductive potential [11].

The prognosis for patients with BOTs is generally favorable, particularly for those diagnosed at an early stage. The 5-year survival rate for stage I disease is 95-97%, although late recurrences can occur, emphasizing the need for long-term follow-up [19]. In this case, the patient had an uneventful postoperative recovery and was discharged on postoperative day 8. Long-term surveillance with regular imaging and tumor marker assessments will be essential to monitor for recurrence.

This case highlights the diagnostic and therapeutic challenges associated with BOTs, particularly in the context of rare complications such as ovarian torsion. It underscores the importance of a multidisciplinary approach, including imaging, tumor markers, and histopathological evaluation, in guiding appropriate surgical intervention and ensuring favorable outcomes. Early diagnosis and timely management are crucial, especially in young women, to preserve fertility and optimize long-term prognosis.

4. CONCLUSION

Borderline ovarian tumors (BOTs) represent a unique category of ovarian neoplasms with histological features intermediate between benign and malignant tumors. Although they are characterized by a low malignant potential, BOTs can present with significant complications such as ovarian torsion, rupture, or, rarely, progression to invasive carcinoma. This case highlights the diagnostic and therapeutic challenges associated with BOTs, particularly in the context of rare complications like ovarian torsion, which require prompt recognition and surgical intervention. This case also emphasizes the limitations of preoperative diagnostic tools, such as ultrasound and MRI, in definitively ruling out torsion or confirming borderline tumors. Intraoperative frozen section analysis, though helpful, has its limitations in accurately diagnosing BOTs, necessitating reliance on final histopathological examination for definitive diagnosis. The favorable prognosis associated with early-stage BOTs, as seen in this case, highlights the importance of timely diagnosis and intervention. In conclusion, BOTs, though generally associated with a good prognosis, require careful evaluation and management, particularly in young women where fertility preservation may be a consideration. This case serves as a reminder of the potential complications associated with BOTs and the need for a comprehensive, multidisciplinary approach to ensure optimal outcomes. Long-term follow-up is essential to monitor for late recurrences and to provide ongoing care for patients with borderline ovarian tumors.

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