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Case Report

Gray zone: a case report on borderline mucinous tumor

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ABSTRACT

Borderline ovarian tumors (BOTs) represent an intermediate form between benign and malignant epithelial ovarian neoplasms, with mucinous subtype accounting for a significant proportion. These tumors often present in women of reproductive age and are frequently diagnosed at an early stage. We report the case of a 25-year-old unmarried woman with regular menstrual cycles who was incidentally found to have a complex left adnexal mass during routine imaging. Clinical examination revealed a firm, midline abdominopelvic mass corresponding to 20 weeks' uterine size. Tumor markers, including CA-125, CEA, CA 19-9, AFP, and LDH, were within normal limits. MRI pelvis revealed a 15 cm mixed solid-cystic lesion in the left adnexa. Intraoperatively, a unilateral ovarian mass with no evidence of extraovarian spread was noted. Frozen section was suggestive of a borderline mucinous tumor. The patient underwent a fertility-sparing staging laparotomy including left salpingo-oophorectomy, infracolic omentectomy, appendicectomy, pelvic lymph node dissection, and peritoneal biopsies. Final histopathology confirmed a borderline mucinous tumor, FIGO Stage IA. This case highlights the importance of thorough preoperative evaluation and intraoperative decision-making in young women with adnexal masses. Fertility-sparing surgery with complete staging offers an excellent prognosis in early-stage borderline mucinous ovarian tumors, with the added benefit of preserving reproductive potential.

Keywords: Borderline ovarian tumors, Fertility sparing surgery, Laparotomy, Salpingo-oopherectomy

INTRODUCTION

Borderline ovarian tumors (BOTs) are a heterogeneous group of epithelial neoplasms with recognized malignant potential. They are histologically characterized by epithelial proliferation and nuclear atypia without destructive stromal invasion. These tumors typically affect women of reproductive age and are often diagnosed at an early stage, frequently presenting as large, unilateral adnexal masses. The management of BOTs poses unique challenges due to their potential for recurrence and the rare risk of progression to invasive carcinoma.[1] BOTs are staged using the FIGO staging system, similar to that used for invasive ovarian carcinoma. Most BOTs exhibit low malignant potential and are confined to the ovaries at the time of diagnosis. Survival rates are generally excellent, with a 5-year survival rate of approximately 95% and a 10-year survival rate of about 90% for women with FIGO stage I-III disease. For those with stage IV disease, the 10-year survival rate decreases to around 77%.[2] Histologically, the majority of BOTs are either serous or mucinous types. Mucinous BOTs represent the second most common subtype, accounting for approximately 30-50% of all BOTs. These tumors are usually unilateral and tend to be larger than their serous counterparts. Patients with mucinous borderline tumors (MBTs) also tend to relapse less frequently than those with serous subtypes.[3]

CASE REPORT

A 25-year-old unmarried woman with regular menstrual cycles presented without any symptoms and was

incidentally found to have a complex cyst in the left adnexa on ultrasound. On abdominal examination, a firm, immobile midline mass corresponding to a 20-week uterine size was palpated. Tumor markers were within normal limits, with CA-125 at 14 U/mL, CEA at 1.66 ng/mL, CA 19-9 less than 0.6 U/mL, AFP at 0.9 ng/mL, and LDH at 169 U/L. MRI of the pelvis revealed an anteverted uterus measuring 6.7×3.4 cm with an endometrial thickness of 5 mm. A well-defined mixed solid-cystic lesion measuring 15.2×7×13.8 cm was identified in the left adnexa, containing multiple internal septations and no evidence of free fluid, hemorrhage, calcification/lymphadenopathy. Intraoperatively, minimal ascites was observed, and the liver, spleen, diaphragm, omentum, bowel, and mesentery appeared normal. Figure 1 represents the intraoperative findings and Figure 2 depicts MRI of the ovarian mass. The uterus, bilateral fallopian tubes, and right ovary were unremarkable, while a left complex ovarian mass measuring 14×15×8 cm with both solid and cystic components was noted. A frozen section suggested a borderline mucinous tumor, and a fertility-sparing staging laparotomy was performed. The procedure included a left salpingo-oophorectomy, left pelvic lymph node dissection, infracolic omentectomy, appendicectomy, and peritoneal biopsies. No enlarged pelvic/para-aortic lymph nodes were noted during surgery.

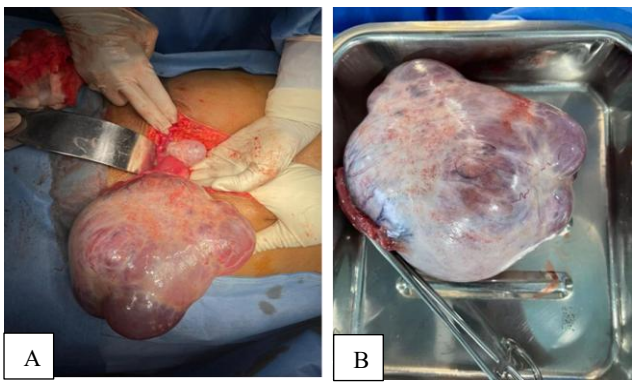

Figure 1 (A and B): Intraoperative findings showing large left ovarian cyst. Mass excised in Toto and sent for frozen section.

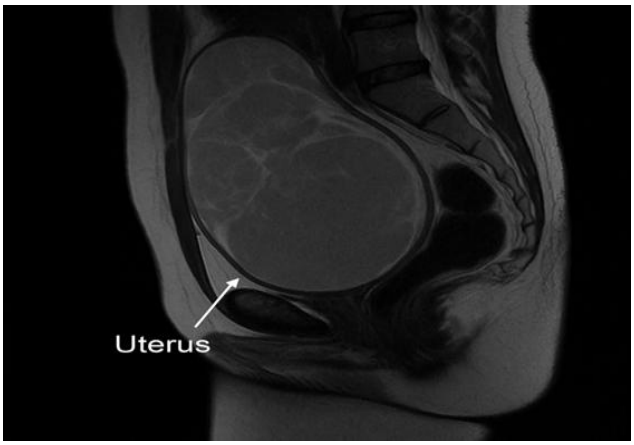

Figure 2: MRI of ovarian mass.

DISCUSSION

BOTs lie on the intermediate spectrum between benign and malignant epithelial ovarian neoplasms, characterized by cellular proliferation and atypia without stromal invasion. MBTs account for approximately 30-50% of all BOTs and are predominantly of the intestinal subtype. These tumors typically affect women in their third to fourth decade of life and often present as large, unilateral, multiloculated cystic masses.[4] Our patient, a 25-year-old unmarried woman with regular menstrual cycles, represents the typical demographic of MBTs. MBTs may exhibit intraepithelial carcinoma and are considered part of a morphological spectrum ranging from benign cystadenomas to invasive mucinous carcinoma. Genetic studies have implicated KRAS mutations in the pathogenesis of mucinous tumors. Although the overall prognosis of MBTs is excellent, approximately 11% of cases may recur or progress to invasive carcinoma.[5] Poor prognostic factors include advanced stage, micropapillary architecture, microinvasion, invasive implants, and residual macroscopic disease.[6]

Interestingly, the patient was asymptomatic, and the adnexal mass was incidentally detected during routine imaging. The presence of a large, complex adnexal cyst in a young woman warrants careful evaluation due to a broad differential diagnosis that includes benign neoplasms, endometriomas, and malignancies.[7] Tumor markers in this case were within normal limits, consistent with the typical profile of borderline tumors, which rarely cause significant elevations. While CA-125 may be mildly elevated in some cases, it lacks specificity in premenopausal women. MRI findings revealed a complex adnexal mass with both solid and cystic components and internal septations-features commonly associated with mucinous tumors. The absence of ascites, lymphadenopathy, or peritoneal implants on imaging lowered the suspicion of invasive malignancy, although a definitive diagnosis ultimately relies on histopathological examination. Intraoperatively, the lesion was large, unilateral, and confined to the ovary without evidence of extraovarian spread, consistent with the usual early-stage presentation of MBTs. The frozen section suggested a borderline mucinous tumor, facilitating timely fertility-sparing surgery. Given the patient's young age and presumed desire for fertility preservation, a fertility-preserving staging laparotomy was appropriately performed. This included left salpingo-oophorectomy, infracolic omentectomy, appendicectomy, peritoneal biopsies, and lymph node dissection.

Comprehensive surgical staging is essential in MBTs to exclude extraovarian spread, particularly peritoneal implants, which are more frequently associated with serous BOTs but may occasionally be present in mucinous variants. Appendicectomy was justifiably performed to rule out a primary appendiceal mucinous neoplasm, which can mimic or represent a metastatic source.[8] Histopathologically, MBTs are typically unilateral, as seen in this case, and when confined to the ovary (FIGO stage

IA), they are associated with an excellent prognosis. Long-term follow-up remains important due to the small but real risk of recurrence or malignant progression, especially in cases where fertility-sparing surgery is undertaken.[9]

This case underscores the importance of a structured diagnostic and surgical approach to adnexal masses in young women. Early detection, accurate intraoperative assessment, and individualized management are key to optimizing both oncologic safety and reproductive outcomes in patients with BOTs.

CONCLUSION

Borderline mucinous ovarian tumors, though rare, must be considered in the differential diagnosis of large, complex adnexal masses in young women. This case emphasizes the importance of careful preoperative evaluation, appropriate use of imaging and tumor markers, and the utility of intraoperative frozen section in guiding surgical management. Fertility-sparing surgery with complete staging offers excellent prognosis in early-stage disease while preserving reproductive potential. Long-term follow-up remains essential to monitor for recurrence. Early recognition and individualized care are key to optimizing both oncologic and fertility outcomes in such patients.

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