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Case Series

Navigating the complexities of borderline ovarian tumors: a clinical perspective: A case series

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Abstract

Background: Ovarian cancer accounts for 23% of gynecological malignancies and significantly contributes to mortality. Borderline Ovarian Tumors (BOTs) represent 10-20% of ovarian neoplasms, commonly affecting pre-menopausal women aged 34-40 years. BOTs exhibit intermediate histopathological features between benign cystadenomas and invasive carcinomas, with serous and mucinous subtypes being the most prevalent. Despite the potential for spread beyond the ovary, BOTs typically lack stromal invasion and have a favorable prognosis.

Aim: This study aims to discuss the clinical management of BOTs, with an emphasis on surgical intervention and the balance between fertility preservation and complete surgical staging. The goal is to illustrate the complexities in managing these tumors through clinical cases and highlight the importance of personalized treatment plans.

Results: Four clinical cases were reviewed, showcasing the diverse presentations and management strategies for BOTs. These cases demonstrate the challenges in decision-making, particularly regarding conservative surgery versus completion surgery, and the complexities involved in managing BOTs during pregnancy. Fertility-sparing surgery was considered for younger patients, with close follow-up using CA-125 and transvaginal ultrasound.

Conclusion: The management of BOTs requires a personalized approach, balancing the need for thorough surgical staging with the preservation of fertility in reproductive-aged women. The favorable prognosis of BOTs underscores the importance of timely and appropriate surgical intervention. Ongoing follow-up is crucial to monitor for recurrence, particularly in patients who opt for fertility-sparing surgery. The review highlights the importance of clear communication between clinicians and patients to ensure informed decision-making and adherence to follow-up protocols. Early detection and appropriate management are key to favorable long-term outcomes in BOTs.

Keywords: Borderline ovarian tumour, Gynecological malignancies, CA-125.

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1. Introduction

Ovarian cancer accounts for 23% of all gynaecological malignancies. It also accounts for 47% of deaths due to female genital tract malignancies and 5% of all cancer related deaths worldwide. Ovarian tumours manifest a wide spectrum of clinical, morphological and histological features. As ovaries are subjected to monthly endocrine and traumatic insult during ovulation, they are a common site for abnormal cell changes.[1]

Borderline ovarian tumours (BOT) comprise 10-20% of all ovarian neoplasms. The incidence of BOTs is 1.8–4.8 cases per 100,000 females per year. They typically have an excellent prognosis with an overall 10-year survival rate of 83-91%. They are predominantly diagnosed in premenopausal females aged 34–40 years and are rare in women who are 65 years of age or older. Histopathologically, this group of neoplasms exhibit behaviour that is intermediate between benign cyst-adenomas and invasive carcinomas. Two subtypes of BOTs, serous and mucinous borderline tumours are more common and have different characteristics as well as different clinical behaviour. Rarely other types like endometrioid, clear-cell or transitional cell (Brenner) borderline tumours are also present.[2]

Comprehensive staging surgery includes total abdominal hysterectomy, omentectomy, peritoneal washings, bilateral

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salpingo-oophorectomy and various biopsies, including pelvic and para-aortic lymph node sampling. Since BOTs often occur in patients during their childbearing years, numerous studies have proposed fertility sparing surgery for those patients who desire to retain their reproductive function. Neither chemotherapy nor radiotherapy is required after surgery.[3]

Borderline tumours may have the ability to spread beyond the ovary and have atypical morphological patterns; however, by definition these neoplasms lack stromal invasion. The prognosis of the borderline group of tumours is greatly improved over that of malignant epithelial tumours. The tumours of the ovary pose many problems due to their high complication rate and they are the biggest diagnostic challenge in the field of gynaecological oncology. The benign nature of the tumour may remain silent clinically for a long period of time. Though many have worked extensively in the field of Borderline ovarian tumour pathology, the wide variation in facts and figures reflect the confusion prevailing in the area of tumour.[4]

2. Cases Review

2.1. Case 1

The patient is a 42-year-old female, P2L2 presented with right lower abdominal pain for 2-3 months. Ultrasound Pelvis showed a right sided complex ovarian cyst 11cm x 9 cm (**Figure 1**). Her tumour markers were normal, except for CA – 125 which was 194 IU/ml. Hence, assuming benign nature, she underwent laparotomy and right ovarian cystectomy. Intra-operatively, it had a smooth surface and was cystic in consistency. Histopathological report stated that it is a borderline serous ovarian tumour. Later during the follow up she was advised for completion surgery, but she refused for a repeat surgery. However, she was convinced to follow up with CA-125 and Trans-vaginal Ultrasound as per protocol in the tertiary hospital.

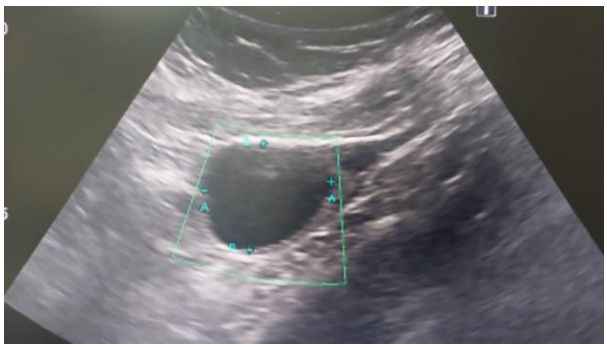

Figure 1:

2.2. Case- 2

This patient was a 48-year-old lady, presented to emergency with c/o pain abdomen. Her USG showed a large abdominopelvic thin wall cystic mass with no solid components of blood flow – 17 x 14 cm (**Figure 2**). Further imaging i.e. MRI showed thick-walled complex cystic mass with eccentric internal septation in the left ovary. Her tumour markers were all within normal limits. She underwent laparotomy with left salpingo-oophorectomy and thorough examination of the abdomen and pelvis with peritoneal washings and omental biopsy. The histopathology report came as Borderline Ovarian Tumour- Serous. She is being followed up in tertiary centre with Ca-125 and TVS.

CA-125 is a commonly used biomarker in the management of epithelial ovarian tumors, including BOTs. However, its reliability in detecting recurrence in BOTs is debated. Literature suggests that while CA-125 can be helpful, it should not be used in isolation; imaging modalities such as TVS are essential for comprehensive follow-up.[5] Transvaginal ultrasound is one of the best non-invasive methods or diagnostic techniques in monitoring a borderline tumour who underwent conservative surgery.[6] Alongside, an elevated pretreatment CA-125 more than >35 U/ml is an independent prognostic factor for epithelial ovarian cancer. Higher levels of pre-treatment CA-125 is considered to be high risk for recurrence and death.[7]

These two cases illustrate the complexities in managing borderline serous ovarian tumors. While conservative surgery and surveillance are viable options, particularly for patients wishing to preserve fertility, ongoing follow-up with CA-125 and TVS is crucial. The patient's refusal of completion surgery underscores the need for clear communication about the risks and benefits of all treatment options. A personalized approach, with shared decision-making between the patient and clinician, is associated with better patient satisfaction and adherence to follow-up protocols. The decision-making process should be collaborative, with patient preferences informed by the latest evidence-based guidelines.

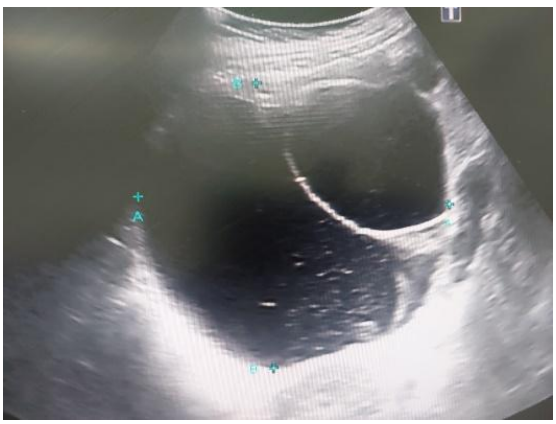

Figure 2:

2.3. Case-3

The patient was a 44-year-old, unmarried female, who came with the complaints of pain in the abdomen for 2-3 months. Her USG findings were a large cyst seen in the left ovary of 10x10x5cm (**Figure 3**) with internal echoes and mural

nodules and projections with soft calcifications. As all tumour markers were normal. Assuming benign nature, she underwent laparotomy and left ovarian cystectomy (**Figure 4**). Intraoperatively cystic left ovary was seen and cyst was easily enucleated. Histopathology revealed Borderline Serous Tumour. She was later followed up and a staging laparotomy with abdominal total hysterectomy and bilateral salpingectomy. The histopathology revealed no evidence of residual serous tumour.

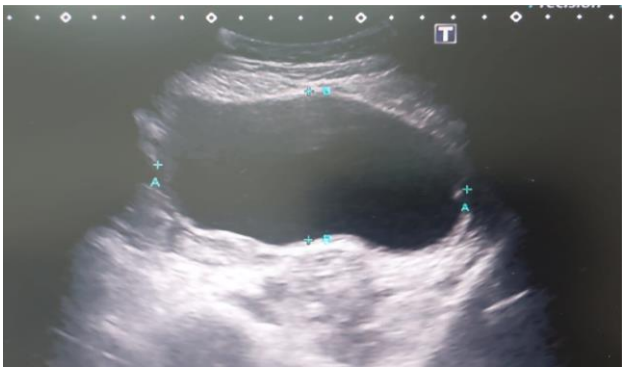

Figure 3:

Figure 4:

The most concerning risk when the histopathological report comes as a borderline tumor is its potential to grow into invasive cancer.[1] Also, there is an added benefit of choosing a fertility sparing surgery as it usually occurs in the reproductive age group. According to histological subtypes, cystectomy in unilateral serous Borderline tumour (sBOT) shows a significantly higher recurrence rate (43.2%) than unilateral salpingo-oophorectomy (USO), although this has no impact on survival. However, in cases of bilateral sBOT, it is ideal to perform cystectomy when one side oophorectomy is done, in order to preserve fertility.[8]

Borderline serous tumors generally have an excellent prognosis, with a high long-term survival rate. The key to successful management lies in adequate surgical excision and comprehensive staging to rule out residual disease. For this patient, the absence of residual tumor on histopathology post-staging surgery suggests a low risk of recurrence and a favorable long-term prognosis.[9]

2.4. Case 4

A 29-year-old G2P1L1 with 26 weeks pregnancy, came with pain in the abdomen. On examination, she was vitally stable and uterus was relaxed. On doing a transabdominal ultrasound, it showed a right ovarian cyst with septations of 12 X 15 cm. Tumour markers were not done as she was in the 2nd trimester of her pregnancy. She underwent laparotomy and right ovarian cystectomy. During enucleation, a cyst ruptured releasing thick greenish-brown material. Due to the adherent cyst wall, a decision for left salpingo-oophorectomy was taken. Histopathology report was suggestive of borderline mucinous tumour. She was later operated in tertiary centre, 6 weeks postpartum, she presented with similar complaints and USG showed a right ovarian cyst of 7x8cm. She underwent a laparoscopic staging with right salpingo-oophorectomy and appendectomy. Histopathology report was consistent with right ovarian mucinous tumour with borderline features. She was discharged and followed up. She delivered another child, 2 years later in May 2024 without any complications.

The presence of tumor cells in the margins or tumor rupture during surgery are factors that can predict relapse after cystectomy. Therefore, it is important to perform thorough pathological tests on the margins around the resected tumor, and efforts should be taken not to rupture the tumor during surgery.[10,11] The cumulative risk of developing invasive mucinous cystadenocarcinoma in the form of recurrence is 13% at 10 years. The better prognostic factor for recurrence or developing of invasive type is the use of cystectomy vs oophorectomy, suggesting that a salpingo-oophorectomy has to be done in case of fertility is to preserved.[10] Guidelines suggest that in the case of mucinous BOTs, comprehensive staging, including appendicectomy, is recommended due to the risk of pseudomyxoma peritonei and the potential for synchronous primary tumors.[12,13]

This case illustrates the complexities of managing borderline mucinous ovarian tumors during pregnancy, emphasizing the importance of a multidisciplinary approach. Surgical intervention should be timely and as conservative as possible to balance maternal and fetal outcomes, while histopathological examination remains crucial for guiding management and follow-up. The successful subsequent pregnancy and delivery in this patient highlight the potential for positive reproductive outcomes even after complex ovarian surgery.

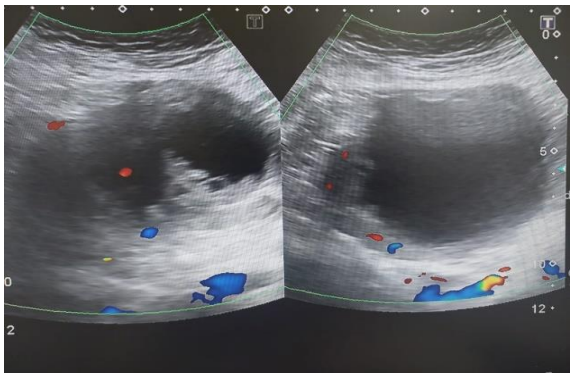

Figure 5:

3. Conclusion

Borderline ovarian tumors (BOTs), while ultimately diagnosed through histopathology, have long challenged clinicians seeking non-invasive diagnostic methods. Surgery remains the cornerstone of treatment for BOTs, with the approach tailored to the patient's age, fertility desires, willingness for completion surgery, and menopausal status. Complete surgical resection is widely recognized as the most effective curative strategy for BOTs. However, there is ongoing debate and no definitive guidelines on the extent of surgery required, the necessity of fertility preservation in younger women, the role of laparoscopic surgery, and the potential benefits of postoperative chemotherapy and fertility treatments. For patients with early-stage BOTs, fertility-sparing surgery is a viable option, provided there is diligent follow-up. Despite their rarity in clinical practice, BOTs are critical from both a treatment and prognostic perspective. Early detection and treatment are key, as BOTs are highly curable malignancies when managed in their initial stages. Given their unique behaviour, straddling the line between benign and malignant tumors, timely and appropriate intervention often leads to favourable outcomes.

4. Source of Funding

None.

5. Conflict of Interest

None.

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