TREATMENT OUTCOMES OF BORDERLINE OVARIAN TUMORS AT VIETNAM NATIONAL CANCER HOSPITAL

Le Tri Chinh[1], Pham Thi Dieu Ha[1], Truong Van Hop[1,2]

Abstract

Background: Borderline ovarian tumors (BOTs), comprising 10–20% of epithelial ovarian neoplasms, are characterized by atypical epithelial proliferation without stromal invasion and typically exhibit favorable prognosis. This study delineates the clinical and pathological characteristics of BOT patients and evaluates recurrence and survival outcomes following surgical treatment at Vietnam National Cancer Hospital.

Methods: A combined retrospective and prospective cohort study was conducted on 64 patients with histologically confirmed BOT, treated surgically between January 2018 and December 2023. Data on clinical presentation, imaging, pathology, treatment modalities, and outcomes were analyzed.

Results: The median age was 46.0 years (range: 16–77), with 59.4% of patients aged <50 years. Serous BOT predominated (78.1%), followed by mucinous (18.7%). Most patients (75.0%) presented at FIGO stage I. Fertility-sparing surgery was performed in 35.9% of cases, and 14.1% underwent laparoscopy. Adjuvant chemotherapy was administered to 20.3% of patients. Over a median follow-up of 33.6 months, two patients (3.1%) experienced recurrence, and one died.

Conclusions: BOT patients at Vietnam National Cancer Hospital are predominantly young, with early-stage serous tumors. The low recurrence rate and limited mortality suggest a favorable prognosis, though fertility-sparing surgery may require vigilant surveillance.

Keywords: Borderline ovarian tumor; serous; mucinous; fertility-sparing surgery; recurrence.

1. INTRODUCTION

Borderline ovarian tumors (BOTs), or tumors of low malignant potential, constitute 10–20% of epithelial ovarian neoplasms and are defined by atypical epithelial proliferation without stromal invasion [1]. Predominantly affecting younger women, with approximately one-third diagnosed before age 40, BOTs pose unique challenges in balancing oncologic safety with fertility preservation [2]. Most BOTs present at FIGO stage I (70–85%), conferring excellent prognosis, though recurrence risk is elevated with conservative surgical approaches [3]. Serous and mucinous subtypes account for the majority of cases, with serous BOTs comprising 50–55% and mucinous 35–45% [4].

Despite increasing global incidence, data on BOT characteristics and outcomes in Vietnam remain scarce [5]. This study aims to characterize the clinical, radiological, and pathological features of BOT patients treated at Vietnam National Cancer Hospital and to evaluate recurrence and survival outcomes, thereby informing evidence-based management strategies in a resource-constrained setting.

[1]Vietnam National Cancer Hospital;
[2]Hanoi Medical University.
*Corresponding Author: truongvanhop@hmu.edu.vn

Date received: 04/9/2024
Date reviewed: 11/9/2024
Date accepted for publication: 10/4/2025

2. MATERIALS AND METHODS

2.1. Study population

This study enrolled 64 patients with histologically confirmed BOT, treated surgically at Vietnam National Cancer Hospital, Hanoi, Vietnam, from January 2018 to December 2023.

2.2. Eligibility criteria

Inclusion Criteria:

+ Histologically confirmed BOT based on surgical specimens.

+ Complete medical records with clinical, radiological, pathological, and follow-up data.

Exclusion Criteria:

+ Patient refusal to participate.

+ Incomplete medical records precluding analysis.

2.3. Study design

A hybrid retrospective and prospective, non-randomized cohort study was conducted. Data were abstracted from medical records, encompassing demographic characteristics, tumor markers (CA125), imaging findings, histopathological subtype, FIGO stage, surgical interventions, adjuvant therapies, and clinical outcomes.

2.4. Procedures

+ Data Collection: Extracted variables included age, CA125 levels, ultrasound/CT/MRI findings, histological subtype, FIGO stage, surgical approach (fertility-sparing vs. radical, laparoscopic vs. laparotomic), and adjuvant chemotherapy use.

+ Outcome Measures: Recurrence, progression-free survival (PFS) and overall survival (OS) were recorded. PFS was defined as the interval from surgery to recurrence or last follow-up; OS was defined as the interval from surgery to death or last follow-up.

+ Histopathological Assessment: BOT subtypes were classified per the 2014 World Health Organization criteria [1]. FIGO staging followed the 8th edition AJCC/UICC guidelines [6].

+ Statistical Analysis: Continuous variables were reported as medians (interquartile ranges), and categorical variables as frequencies (percentages). Univariate Cox regression identified prognostic factors for PFS, with variables yielding $p \leq 0.10$ included in multivariate models. Survival curves were generated using the Kaplan-Meier method, with differences assessed via log-rank tests. A p-value ≤ 0.05 denoted statistical significance. Analyses were performed using SPSS version 20.0 (IBM Corp., Armonk, NY).

2.5. Ethical approval

The study was approved by the Research Ethics Committee of Vietnam National Cancer Hospital

3. RESULTS

3.1. Clinical and pathological characteristics

Among 64 patients, the median age was 46.0 years (range: 16–77), with 59.4% aged <50 years. Serum CA125 was elevated (>35 U/ml) in 67.2% of cases (median: 39.6 U/ml, range: 8.9–5074.0). Radiologically, tumors were located on the left side in 17.2%, right side in 23.4%, bilateral in 6.3% and không xác định rõ vị trí in 53.1% due to large tumor size. Ascites was observed in 15.6% of patients.

Serous BOT was the predominant subtype (78.1%), followed by mucinous (18.7%) and Brenner (3.1%); no endometrioid cases were identified. FIGO stage I accounted for 75.0% of cases, followed by stage II (12.5%), stage III (10.9%), and stage IV (1.6%).

Table 1: Clinical and Pathological Characteristics of BOT Patients

Characteristic	Value
Age, median (range), years	46.0 (16-77)
CA125, median (range), U/ml	39.6 (8.9-5074.0)
CA125 >35 U/ml, n (%)	43 (67.2)
Tumor Location, n (%)	
- Left	11 (17.2)
- Right	15 (23.4)
- Bilateral	4 (6.3)
- Undetermined	34 (53.1)
Histological Subtype, n (%)	
- Serous	50 (78.1)
- Mucinous	12 (18.7)
- Brenner	2 (3.1)
FIGO Stage, n (%)	
- I	48 (75.0)
- II	8 (12.5)
- III	7 (10.9)
- IV	1 (1.6)

3.2. Treatment Characteristics

Fertility-sparing surgery (FSS), aimed at preserving reproductive potential in younger patients with ovarian cancer, was performed in 23 patients (35.9%). This included unilateral salpingo-oophorectomy with omentectomy in 15 cases, oophorectomy in 6 cases, and unilateral salpingo-oophorectomy with lymphadenectomy in 2 cases. Radical surgery, comprising bilateral salpingo-oophorectomy, omentectomy, and hysterectomy, was performed in 41 patients (64.1%). Laparoscopic surgery was utilized in 9 cases (14.1%). Adjuvant chemotherapy was administered to 13 patients (20.3%), primarily those with stage III–IV disease.

Table 2: Treatment Characteristics

Treatment	n (%)
Surgery Type	
- Fertility-sparing	23 (35.9)
- Radical	41 (64.1)
Surgical Approach	
- Laparoscopic	9 (14.1)
- Laparotomic	55 (85.9)
Adjuvant Chemotherapy	
- Yes	13 (20.3)
- No	51 (79.7)

3.3. Recurrence and Survival Outcomes

Over a median follow-up of 33.6 months (range: 1–130), two patients (3.1%) experienced recurrence,

both with mucinous BOT (stages IA and IC). One patient died of disease progression. Due to the limited sample size and only one recorded death, there is insufficient data to fully evaluate survival outcomes. However, the overall prognosis for BOTs appears highly favorable.

4. DISCUSSION

This study provides a comprehensive analysis of the clinical characteristics, treatment modalities, and outcomes of 64 patients with borderline ovarian tumors (BOTs) treated at Vietnam National Cancer Hospital, offering valuable insights into the management of this unique entity in a resource-constrained setting. With a median age of 46.0 years and a predominance of serous BOTs (78.1%), our cohort aligns closely with global trends, where serous histology accounts for 50–55% of cases [1,2]. Due to the limited sample size and only one recorded death, there is insufficient data to fully evaluate survival outcomes. However, the overall prognosis for BOTs appears highly favorable, consistent with international reports.

The predominance of FIGO stage I disease (75.0%) in our cohort is consistent with international data, where 70-85% of BOTs are diagnosed at an early stage [3,4]. This early presentation likely contributes to the favorable prognosis observed, mirroring findings from a Swiss single-center study by Kipp et al., which reported a similarly low recurrence rate (2.4%) among 42 patients, predominantly with stage I disease [5]. However, our study diverges from larger multicenter cohorts, such as the French FRANCOGYN study, which reported a higher recurrence rate (7.5%) among 493 patients, with advanced FIGO stage and invasive implants identified as significant risk factors [6]. The absence of invasive peritoneal implants in our cohort may partly explain the lower recurrence rate, though this could also reflect understaging due to limited intraoperative frozen section use (performed in only 64% of cases compared to 87% in tertiary European centers) [7].

Fertility-sparing surgery (FSS), performed in 35.9% of our patients, is a critical option for younger women but requires careful consideration due to potential recurrence risks, as evidenced by international studies. A meta-analysis by Vasconcelos et al. reported a recurrence rate of 17% in FSS cohorts, significantly higher than the 5% observed with radical surgery [8]. Notably, both recurrences in our study occurred in patients with mucinous BOTs, contrasting with the Arbeitsgemeinschaft Gynäkologische Onkologie (AGO) cohort, where serous BOTs with micropapillary patterns were more prone to relapse [9]. This discrepancy may reflect regional differences in histological distribution, as mucinous BOTs predominate in East Asia (e.g., 68–76% in Korea and Japan) compared to serous BOTs in Western countries (60–74% in the USA and Europe) [10]. Lifestyle factors, such as smoking, which is strongly associated with mucinous BOTs (OR=2.10, 95% CI 1.22–3.60), may contribute to this variation, though such data were not collected in our study [11].

The use of adjuvant chemotherapy in 20.3% of our patients, primarily for stage III–IV disease, contrasts with current European Society for Medical Oncology (ESMO) guidelines, which do not recommend adjuvant therapy for BOTs regardless of stage due to lack of survival benefit [12]. This practice may reflect regional preferences or concerns about understaging in advanced cases, as seen in a German multicenter survey where 15% of clinicians administered chemotherapy for "high-risk" BOTs [7]. In contrast, a Gynecologic Oncology Group study by Sutton et al. found no improvement in disease-free survival with cisplatin-based regimens, suggesting overtreatment in our cohort [13]. Future studies should explore the cost-effectiveness and clinical utility of adjuvant therapy in low-resource settings like Vietnam, where access to long-term surveillance may be limited.

Preoperative diagnostic challenges were evident, with 53.1% of tumors classified as không xác định rõ vị trí due to large size, aligning with Fischerova et al., who reported only 69% accuracy in preoperative ultrasound for BOTs [14]. The high rate of elevated CA125 (67.2%) in our cohort is consistent with

global reports but underscores its limited specificity, as noted in a South Korean study where the Risk of Malignancy Index (RMI) outperformed single-marker CA125 for distinguishing BOTs from benign tumors [15]. These findings highlight the need for advanced imaging (e.g., MRI) and novel biomarkers, such as the CPH-I index, which has shown superior diagnostic accuracy for BOTs in recent studies [16].

Our study's low recurrence rate may also reflect genetic or environmental factors specific to the Vietnamese population. A Lund University study suggested that BOTs share familial risks with invasive cancers, potentially linked to mutations in KRAS and BRAF, which were prevalent in 43% and 57% of BOTs, respectively [17]. However, molecular profiling was not performed in our cohort, limiting our ability to explore these associations. Additionally, lifestyle factors, such as lower smoking prevalence among Vietnamese women compared to Western populations, may reduce the incidence of mucinous BOTs, contributing to the predominance of serous histology [11]. Future research should investigate these hypotheses using genomic and epidemiological approaches to elucidate regional differences in BOT pathogenesis.

Limitations of this study include its modest sample size (n=64), which restricts the generalizability of findings, and the short median follow-up (33.6 months), which may underestimate late recurrences, as Silva et al. recommended a minimum 10-year follow-up for BOTs [18]. The hybrid retrospective-prospective design introduces potential selection bias, and the lack of centralized pathology review may affect histological accuracy. Furthermore, the absence of data on molecular markers (e.g., KRAS, BRAF) and lifestyle factors (e.g., smoking, oral contraceptive use) limits our ability to fully contextualize our findings within the global landscape. Despite these constraints, our study is among the first to provide detailed insights into BOT management in Vietnam, contributing to the sparse literature from Southeast Asia.

In conclusion, this study highlights the favorable prognosis of BOTs in a Vietnamese cohort, with a low recurrence rate, particularly for early-stage serous tumors. The use of FSS underscores the need for rigorous surveillance, especially in young patients. Future studies should prioritize molecular characterization, long-term follow-up and the development of cost-effective diagnostic tools to further refine the management of BOTs globally and in Southeast Asia.

5. CONCLUSION

Patients with BOT at Vietnam National Cancer Hospital are predominantly young, presenting with early-stage serous tumors. The low recurrence rate and limited mortality suggest a favorable prognosis, though fertility-sparing surgery may require rigorous follow-up.

REFERENCES

[1]. Hauptmann S, Friedrich K, Redline R, Avril S. Ovarian borderline tumors in the 2014 WHO classification: evolving concepts and diagnostic criteria. Virchows Arch. 2017;470:125–142. https://doi.org/10.1007/s00428-016-2040-8

[2]. Skírnisdóttir I, Garmo H, Wilander E, Holmberg L. Borderline ovarian tumors in Sweden 1960–2005: trends in incidence and age at diagnosis compared to ovarian cancer. Int J Cancer. 2008;123:1897–1901. https://doi.org/10.1002/ijc.23786

[3]. Zanetta G, Rota S, Chiari S, Bonazzi C, Bratina G, Mangioni C. Behavior of borderline tumors with particular interest to persistence, recurrence, and progression to invasive carcinoma: a prospective study. J Clin Oncol. 2001;19:2658–2664. https://doi.org/10.1200/JCO.2001.19.10.2658

[4]. Fischerova D, Zikan M, Dundr P, Cibula D. Diagnosis, treatment, and follow-up of borderline ovarian tumors. Oncologist. 2012;17:1515–1533. https://doi.org/10.1634/theoncologist.2012-0139

[5]. Kipp B, Vidal A, Lenick D, Christmann-Schmid C. Management of borderline ovarian tumors (BOT): results of a retrospective, single-center study in Switzerland. J Ovarian Res. 2023;16:20. https://doi.org/10.1186/s13048-023-01104-4

[6]. Bourdel N, Chabert P, Gremeau AS, et al. Risk factors for recurrence of borderline ovarian tumors in France: a multicenter retrospective study by the FRANCOGYN group. J Gynecol Obstet Hum Reprod. 2020;49:101745. https://doi.org/10.1016/j.jogoh.2020.101745

[7]. Du Bois A, Heitz F, Harter P. Clinical management of borderline ovarian tumors: results of a multicentre survey of 323 clinics in Germany. Br J Cancer. 2009;100:1731–1738. https://doi.org/10.1038/sj.bjc.6605066

[8]. Vasconcelos I, de Sousa Mendes M. Conservative surgery in ovarian borderline tumours: a meta-analysis with emphasis on recurrence risk. Eur J Cancer. 2015;51:620–631. https://doi.org/10.1016/j.ejca.2015.01.004

[9]. Du Bois A, Ewald-Riegler N, de Gregorio N, et al. Borderline tumours of the ovary: a cohort study of the Arbeitsgemeinschaft Gynäkologische Onkologie (AGO) Study Group. Eur J Cancer. 2013;49:1905–1914. https://doi.org/10.1016/j.ejca.2013.01.035

[10]. Song T, Choi CH, Lee YY, et al. Histologic distribution of borderline ovarian tumors worldwide: a systematic review. J Gynecol Oncol. 2013;24:44–

[11]. https://doi.org/10.3802/jgo.2013.24.1.44 [11]. Rasmussen CB, Kjaer SK, Albieri V, et al. Lifestyle factors and borderline ovarian tumors: a Danish case-control study. Int J Cancer. 2017;140:1310–1319. https://doi.org/10.1002/ijc.30546

[12]. Du Bois A, Trillsch F, Mahner S, Heitz F, Harter P. Management of borderline ovarian tumors. Ann Oncol. 2016;27(Suppl 1):i20–i22. https://doi.org/10.1093/annonc/mdw090

[13]. Sutton GP, Bundy BN, Omura GA. Stage III ovarian tumors of low malignant potential treated with cisplatin combination therapy (a Gynecologic Oncology Group study). Gynecol Oncol. 1991;41:230–233. https://doi.org/10.1016/0090-8258(91)90314-U

[14]. Fischerova D, Zikan M, Dundr P, Cibula D. Diagnosis, treatment, and follow-up of borderline ovarian tumors. Oncologist. 2012;17:1515–1533. https://doi.org/10.1634/theoncologist.2012-0139

[15]. Kim JH, Cho HJ, Park JH, et al. Diagnostic extended usefulness of RMI: comparison of four risk of malignancy index in preoperative differentiation of borderline ovarian tumors. Arch Gynecol Obstet. 2019;300:1283–1291. https://doi.org/10.1007/s00404-019-05285-7

[16]. Huang K, Li Y, Wang J, et al. A diagnostic system combining inflammation and tumor biomarkers for epithelial ovarian tumors. Front Oncol. 2023;13:1096382. https://doi.org/10.3389/fonc.2023.1096382

[17]. Zheng G, Yu H, Kanerva A, Försti A, Sundquist K, Hemminki K. Borderline ovarian tumors share familial risks with themselves and invasive cancers. Cancer Epidemiol Biomarkers Prev. 2018;27:1358–1363. https://doi.org/10.1158/1055-9965.EPI-18-0503

[18]. Silva EG, Gershenson DM, Malpica A, Deavers M. The recurrence and the overall survival rates of ovarian serous borderline neoplasms with noninvasive implants is time dependent. Am J Surg Pathol. 2006;30:1367–1371. https://doi.org/10.1097/01.pas.0000213299.11649.fa