Section: Pathology

Original Research Article

MEDLEY OF OVARIAN LESIONS IN A TERTIARY CARE HOSPITAL: A RETROSPECTIVE STUDY

K. Ashwini[1], M.Jayanandhini[1], A. Anandhi[2]

[1]*Associate Professor, Department of Pathology, Central Lab, Kalaignar Centenary Super Speciality Hospital, Chennai, India*
[2]*Assistant Professor, Department of Pathology, Central Lab, Kalaignar Centenary Super Speciality Hospital, Chennai, India*

Received *: 10/05/2026*
Received in revised form *: 18/06/2026*
Accepted *: 01/07/2026*

Corresponding Author:
Dr. A. Anandhi,
Assistant Professor, Department of Pathology, Central Lab, Kalaignar Centenary Super Speciality Hospital, Chennai, India.
Email: dr_anandhi@hotmail.com

DOI: 10.70034/ijmedph.2026.3.716

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (3); 4638-4642

ABSTRACT

Background: Ovarian neoplasms constitute a heterogeneous group of tumours and are a major cause of gynaecologic cancer mortality. More than 70% of ovarian cancers present at an advanced stage due to vague symptoms and lack of effective early screening. Imaging and tumour markers assist initial evaluation, but definitive diagnosis relies on histopathology supported by immunohistochemistry (IHC). The aim is to assess the diagnostic value of histopathology in ovarian neoplasms and to compare the tumour characteristics with published literature.

Materials and Methods: A retrospective descriptive study was conducted from June 2023 to December 2024 at the Department of Pathology, Central Lab, Kalaignar Centenary Super Speciality Hospital, Chennai. Clinical data, imaging, tumour markers, operative details, gross findings, histopathology, and IHC results were analysed. Tumours were classified according to WHO 5th Edition (2020). Lymph node involvement and neoadjuvant chemotherapy (NACT) response were recorded where applicable.

Results: A total of 60 neoplastic ovarian lesions were analysed during the study period. The mean age at diagnosis was 52.1 years. Surface epithelial tumours constituted 75% (Benign, borderline, and malignant lesions accounted for 68.9%, 11.1%, and 20% respectively), germ-cell tumours -10%, sex-cord stromal tumours- 11.7%, and metastatic tumours-3.3%. High-grade serous carcinoma was the most common malignancy.

Conclusion: This study demonstrates a predominance of epithelial tumours with serous carcinoma being the most common malignancy. Histopathology with IHC remains essential for accurate diagnosis and management.

Keywords: ovarian neoplasm, serous carcinoma, histopathology, immunohistochemistry, surface epithelial tumours, CA-125.

INTRODUCTION

Ovarian neoplasms represent a broad spectrum of tumours arising from surface epithelium, germ cells, or sex-cord stromal tissues. Globally, ovarian cancer accounts for more than 240,000 new cases annually and remains a leading cause of gynaecologic cancer-related mortality.[1,2] According to the National Cancer Registry Programme (NCRP 2020), ovarian cancer incidence in India is increasing, with considerable regional variation.[3]

Early diagnosis is challenging due to nonspecific symptoms and the deep pelvic location of the ovaries. Imaging modalities such as ultrasound, CT, and MRI, along with serum tumour markers including CA-125, AFP, β-hCG, and CEA, aid in the initial evaluation, but lack specificity.[4] Hence, histopathology remains the gold standard for diagnosis and prognostication. The WHO 5th Edition (2020) classifies ovarian tumours into four major categories: surface epithelial, germ-cell, sex-cord stromal, and metastatic tumours.[5]

IHC plays an essential role in resolving diagnostic dilemma, differentiating between morphologically overlapping tumours, and establishing tumour lineage[4]. This study analyses the clinical and pathological spectrum of ovarian neoplasms in our

tertiary centre and compares findings with published literature.

MATERIALS AND METHODS

Study Design & Period: This retrospective descriptive study was carried out in the Department of Pathology, Central Lab, Kalaignar Centenary Super Speciality Hospital, Chennai, over an 18-month period from June 2023 to December 2024.

Inclusion Criteria:

Sixty histologically confirmed neoplastic ovarian lesions were included.

Exclusion Criteria:

Non-neoplastic lesions including follicular cysts, corpus luteal cysts and endometriosis were excluded. Relevant information such as age, laterality, imaging diagnosis, operative procedure, tumour size, and serum tumour markers (CA-125, AFP, β-hCG, CEA) were recorded from patient files and laboratory databases.

Methodology: Specimens were received in 10% neutral buffered formalin, adequately fixed, grossed systematically, processed by routine paraffin-embedding, sectioned at 4 µm, and stained using haematoxylin and eosin. IHC was performed in selected cases using a marker panel comprising WT1, PAX8, CK7, CK20, Inhibin, Calretinin, Napsin A, CD117, SMA, Desmin, Vimentin, and GATA3.[4]

Tumours were classified according to the WHO 5th Edition (2020).[5]

Details of lymph node dissection, nodal metastasis and peritoneal fluid cytology were documented for malignant cases wherever applicable. In patients who received neoadjuvant chemotherapy (NACT), post-treatment tumour response was also assessed[17]. Descriptive statistics were calculated using Microsoft Excel.

RESULTS

A total of 60 neoplastic ovarian lesions were analysed during the study period. The age distribution of ovarian tumours showed the highest incidence in the 41–50 years age group, followed by 51–60 years, mean age at diagnosis being 52.1 years.[9-12] The detailed age-wise distribution is shown in [Figure 1].

Right-sided ovarian involvement predominated, followed by left-sided and bilateral involvement.[9-12] Laterality details are depicted in [Figure 2].

Surface epithelial tumours constituted the predominant category, accounting for 75% of cases, followed by germ cell tumours, sex-cord stromal tumours, and metastatic tumours.[9-12] [Figure 4].

The overall distribution according to major histological subtypes is represented in [Figure 3].

Among surface epithelial tumours, benign lesions predominated (68.9%), followed by borderline tumours (11.1%) [Table 1] and malignant tumours (20%). Serous cystadenoma was the most common benign epithelial tumour.[9-12] Borderline tumours were exclusively mucinous.[16] Malignant surface epithelial tumours were predominantly serous carcinomas, with both low-grade and high-grade variants reported.[6,15] Other epithelial malignancies included clear-cell carcinoma [Figure 5] and endometrioid carcinoma. One case of carcinosarcoma [Figure 6B] and a rare case of mucinous cystadenoma associated with a benign Brenner tumour [Figure 6A] was also encountered.[16]

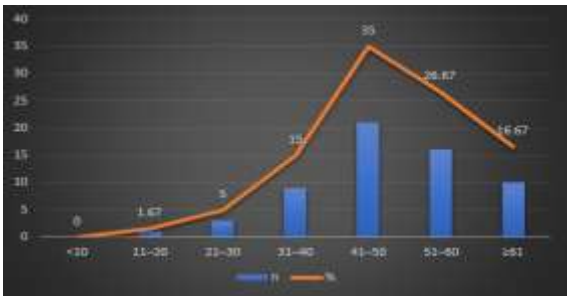


Figure 1: Age Distribution of Ovarian Neoplasms (n = 60)

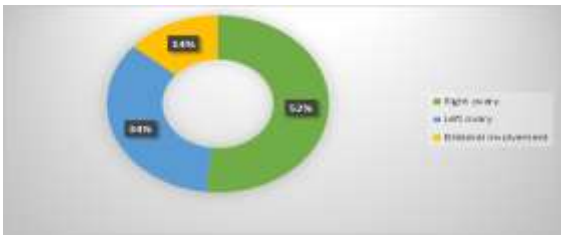


Figure 2: Pie chart showing the laterality of ovarian neoplasms in the present study.

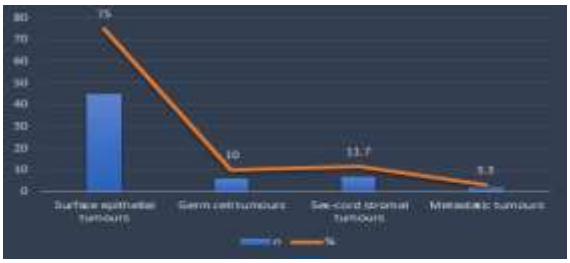
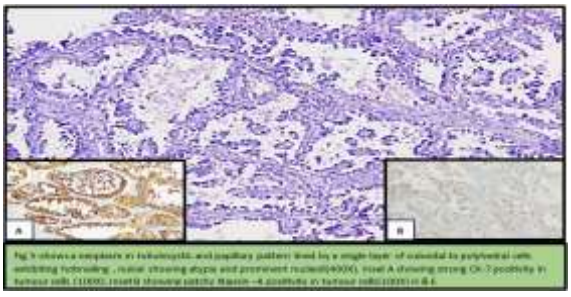
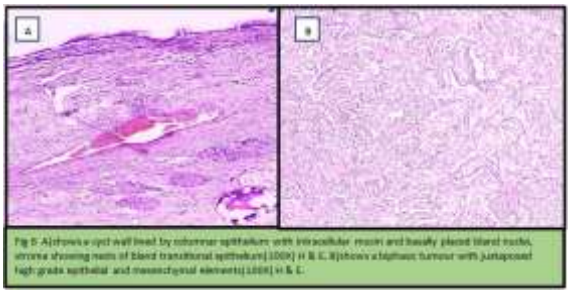
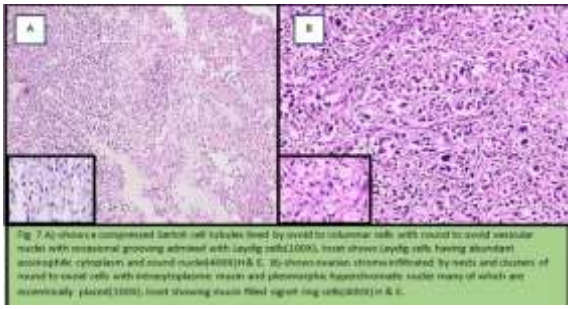


Figure 3: Histological Distribution of Ovarian Tumours (n = 60)







Sex-cord stromal tumours constituted 11.7% of ovarian neoplasms in the present study. Fibroma was the most frequently encountered tumour in this category, followed by a rare case of Sertoli–Leydig cell tumour.[7] [Figure 7A].

Germ-cell tumours comprised 10% of cases in our study. Benign cystic teratoma was the most common germ-cell tumour identified,[9-12] followed by dysgerminoma.

Metastatic ovarian tumours accounted for 3.3% of cases, with both cases diagnosed as Kruckenberg tumours.[6] [Figure 7B]

Lymph-node evaluation was performed in all malignant cases, and metastatic deposits were identified in eight cases.[8]

Immunohistochemistry findings in our study reflected selective and case-specific application rather than routine use in all malignant tumours.[4] Following are some of the IHC markers that aided the diagnosis of certain neoplastic lesions of the ovary reported in our hospital. [Table 2].

A comparative evaluation with six published studies is shown in [Table 3 and 4]. [Table 3] presents comparison of histologic groups, while [Table 4] compares benign–borderline–malignant proportions.

Table 1: Surface Epithelial Tumours: Benign, Borderline and Malignant Distribution (n = 45)

Category	Number (n)	Percentage (%)
Benign	31	68.9
Borderline	5	11.1
Malignant	9	20.0

Table 2: IHC Profile in Malignant Tumours

IHC Marker
WT1- serous carcinoma
CK7 and Napsin- clear cell carcinoma
Inhibin and calretinin- Sertoli Leydig cell tumour
CD117, AFP and CD 30- Germ cell tumour
Desmin, SMA and Vimentin-fibroma and leiomyoma
Pan CK, SMA and vimentin-carcinosarcoma

Table 3: Comparison of Histopathological Groups (%)

Study	Surface epithelial (%)	Germ-cell (%)	Sex-cord stromal (%)	Others (%)
Dhende et al	68	28	4	0
Gaikwad et al	75	20.2	4.8	0
Das et al	62.86	28.5	7.86	0.71
Ibrahimkhil et al	52	39.9	7.1	0.5
Prakash et al	64.5	24.2	5.7	0
Varsha Pandey et al	73.14	9.25	7.4	1.85
Present study	76.2	11.9	7.1	4.8

Table 4: Comparison of Tumour Behaviour (%)

Study	Benign (%)	Borderline (%)	Malignant (%)
Dhende et al	79.3	6	14.6
Gaikwad et al	88.1	2.4	9.5
Das et al	69.3	2.1	28.6
Ibrahimkhil et al	81.8	1.5	16.7
Prakash et al	96.8	—	3.2
Varsha Pandey et al	40.7	3.7	55.55
Present study	68.9	11.1	20

DISCUSSION

Ovarian tumours continue to show wide morphological diversity, and the distribution of lesions in our study reflects this heterogeneity. The mean age in our series was 52.1 years, with benign lesions occurring predominantly between 40–60 years and malignant lesions clustering around 50–70 years. This pattern is comparable to the observations of Dhende et al. and Das et al,[9,12] who also reported benign tumours within the 31–40-year age group and malignant lesions around the fifth and sixth decades.

Gaikwad et al. and Ibrahimkhil et al. reported comparatively younger benign cohorts.[10,13] Varsha Pandey et al. noted a higher proportion of malignancy (55.55%) with most cases falling within 40–59 years.[15]

Unilateral involvement was observed in 83.3% of our cases, in agreement with Dhende et al. (94.6%), Gaikwad et al. (94.6%), and Prakash et al.[9-12] (90.8%). Ibrahimkhil et al. reported a slightly lower unilateral rate (75.7%),[13] while Varsha Pandey et al. additionally documented right-sided predominance (39.81%).[15] Malignant tumours in our series were also mostly unilateral, consistent with most published literature.[9-12] These findings reinforce the understanding that bilateral involvement is relatively uncommon and often associated with specific tumour types such as serous carcinoma, metastasis, and certain germ-cell tumours.[6]

Tumour size demonstrated the expected distribution, with most lesions in our study measuring between 6–15 cm. This is similar to the reports by Dhende et al. and Ibrahimkhil et al., who also documented majority of tumours within the 6–20 cm range.[9,13] Gaikwad et al. and Das et al. showed comparable observations, with malignant lesions tending to be larger at presentation.[10,12] These findings collectively support the established trend that benign lesions tend to grow slowly and present earlier, whereas malignant tumours achieve larger dimensions due to delayed symptom onset and presentation.[1]

In the present study, surface epithelial tumours constituted the largest histological category, accounting for 75% of all ovarian tumours.[9-12] Within this group, benign epithelial tumours predominated (68.9%), while borderline and malignant epithelial tumours accounted for 11.1% and 20% respectively.

The benign tumour spectrum in our study showed serous cystadenoma as the most common lesion, followed by mucinous cystadenoma and benign cystic teratoma. This pattern is consistent with the findings of Dhende et al., Gaikwad et al., Das et al., and Prakash et al.[9-12] A rare histological combination of mucinous cystadenoma with benign Brenner was documented.[16] Coexistence of Mucinous cystadenoma with Brenner tumor is a rare mixed epithelial tumor of the ovary.[16] We also encountered a rare ovarian leiomyoma, representing <1% of ovarian tumours[7]. Ovarian leiomyomas are typically unilateral, solid, and may clinically mimic fibroma or Brenner tumour. The presence of these rare neoplasms in our cohort underscores the morphologic diversity of benign ovarian neoplasms.

The proportion of borderline tumours (11.1%) in our series is comparable to the findings of Dhende et al. and Gaikwad et al,[9,10] and Das et al., who observed a similar low frequency.[12] The borderline tumours in our study were exclusively mucinous, a pattern consistently reported across most Indian studies and global data.[16]

The proportion of malignant surface epithelial tumours in our study (20%) is higher than that reported by Dhende et al. and Gaikwad et al,[9,10] but comparable to Das et al. and Varsha Pandey et al,[12,15] High-grade serous carcinoma was the predominant malignant tumour in our cohort, followed by low-grade serous carcinoma and clear-cell carcinoma. One case of carcinosarcoma was also identified. Ovarian carcinosarcoma is very rare, making up only 1–3% of all malignant ovarian tumors.[8]

In terms of histological categorisation, surface epithelial tumours formed the largest group in our study (75%), consistent with the findings of Dhende et al., Gaikwad et al., Das et al., Prakash et al., and Varsha Pandey et al.[9-12,15] Germ-cell tumours accounted for 10%, aligning with the observations of Das et al. and Prakash et al,[11,12] though lower than the significantly higher germ-cell proportions noted by Ibrahimkhil et al. (39.9%).[13] Sex-cord stromal tumours comprised 11.7% of our cases, a distribution similar to most referenced studies.[7] Metastatic tumours made up for 3.3%, with only two cases of Krukenberg tumour identified.[6] In addition, a rare occurrence of Sertoli–Leydig cell tumour among the sex-cord stromal tumours was documented, further supporting the referral-based nature of our centre 7. It is a rare tumor of the ovary, making up less than 0.5% of ovarian tumors.

Immunohistochemistry was employed selectively to support histomorphological diagnosis in challenging cases 4 WT1 positivity was observed in serous carcinoma. Clear cell carcinoma showed immunoreactivity for CK7 and Napsin A. Inhibin and Calretinin positivity supported the diagnosis of Sertoli–Leydig cell tumour. Germ cell tumours demonstrated positivity for CD117, AFP, and CD30. Stromal tumours such as fibroma and leiomyoma exhibited immunoreactivity for Desmin, SMA, and Vimentin. Carcinosarcoma showed positivity for Pan-cytokeratin, SMA, and Vimentin.[14]

Serum tumour markers were used selectively and included CA-125, CEA, β-hCG, and AFP 4.

CONCLUSION

In this study, surface epithelial tumours formed the largest category of ovarian neoplasms, with serous carcinoma emerging as the most common malignancy. The distribution of tumour types and subtypes showed strong concordance with major Indian studies [9–12] although our centre demonstrated a high proportion of malignant tumours, likely reflecting its role as a tertiary referral institution.[15] The occurrence of rare ovarian neoplasms in our series highlights the referral nature of our centre and the importance of comprehensive histopathological examination. Histopathology, supplemented by immunohistochemistry, remains the cornerstone for accurate tumour classification, identification of lineage, and guiding clinical decision-making.

Limitations

A limitation of this study is that it was conducted in a tertiary referral centre, which receives a higher number of complex and rare ovarian tumours. Therefore, the findings may not reflect the true prevalence of ovarian neoplasms in the general population.

REFERENCES

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2021;71(3):209-249.
2. Shabir S, Gill PK. Global scenario of ovarian cancer. Adesh Univ J Med Sci Res. 2020;2(1):17-25.
3. Mathur P, Sathishkumar K, Chaturvedi M, Das P, Sudarshan KL, Santhappan S, et al. Cancer statistics, 2020: Report from National Cancer Registry Programme, India. JCO Glob Oncol. 2020;6:1063-1075.
4. Momenimovahed Z, Tiznobaik A, Taheri S, Salehiniya H. Ovarian cancer: Epidemiology and risk factors. Int J Womens Health. 2019;11:287-299.
5. IARC. WHO classification of female genital tumours. 5th ed. Lyon: International Agency for Research on Cancer; 2020.
6. Vang R, Shih IM, Kurman RJ. Ovarian low-grade and high-grade serous carcinoma: Pathogenesis, molecular biology, and clinicopathologic features. Am J Surg Pathol. 2009;33(5):684-693.
7. Kurman RJ, Shih IM. The origin and pathogenesis of epithelial ovarian cancer: A proposed unifying theory. Am J Surg Pathol. 2010;34(3):433-443.
8. Prakash A, Chinthakindi S, Duraiswami R, Indira V. Histopathological study of ovarian lesions in a tertiary care centre in Hyderabad. Int J Adv Med. 2017;4(3):745-749.
9. Gupta N, Yadav M, Gupta V, Chaudhary D, Patne SC. Distribution of histopathological types of ovarian tumors. J Lab Physicians. 2019;11(1):75-81.
10. Sharma P, Bharadwaj S. Histomorphological spectrum of ovarian tumors in North India. J Med Sci Clin Res. 2019;7(5):841-845.
11. Chakrabarti PR, Chattopadhyay M, Gon S, Banik T. Role of histopathology in ovarian neoplasms. Niger Postgrad Med J. 2021;28(2):108-111.
12. Phukan A, Borgogoi M, Ghosh S. Histopathological spectrum of ovarian tumors: An institutional perspective. Int J Res Med Sci. 2018;6(8):2639-2643.
13. Swati S, Pachori P, Pachori G, Kumar M. Spectrum of ovarian lesions: A 3-year retrospective study. J South Asian Feder Menopause Soc. 2018;6(1):39-43.
14. Sinha AK, Jain RR, Pradhan SK. Epidemiological trends of cancer at a regional cancer centre in central India. Int J Health Sci Res. 2018;8(4):53-59.
15. Pandey V, Mangrulkar K, Hatgyan K, Agrawal A. Histopathological spectrum of ovarian tumors in a tertiary care centre of central India. MGM J Med Sci. 2023;10(4):621-629.
16. Young RH. Ovarian sex cord-stromal tumours: Recent developments and diagnostic challenges. Mod Pathol. 2005;18(Suppl 2):S7-S18.
17. Jose V, Mathias M, Shetty J. Histopathological study of ovarian lesions. Natl J Lab Med. 2021;10(1):PO34-PO37.
18. Nair RV, Sughija G. Histopathological study of ovarian tumors. Obs Gyne Rev J Obstet Gynecol. 2020;6(1):22-27.
19. Sampurna K, Jyothi B. Histomorphological spectrum of ovarian tumors. Asian J Med Sci. 2022;13(3):111-117.
20. Aggarwal N, Tomar V, Sharma G, Jain A. Histopathological spectrum of ovarian tumors in a tertiary care centre. Int J Med Res Prof. 2017;7(2):67-70.