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Original Research Article

Clinical profile of ovarian tumours at a tertiary centre in north Karnataka

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Abstract

Background: Ovarian neoplasms are a significant cause of morbidity and mortality in gynecologic oncology due to their diverse histopathological profiles and late diagnosis. Given the high mortality rates associated with ovarian cancer, this study aims to analyze the clinical profile of ovarian tumours at a tertiary care centre to improve early detection and management strategies.

Materials and Methods: This retrospective study was conducted over two years at the Department of Obstetrics and Gynaecology, focusing on women of reproductive to postmenopausal age with suspected ovarian tumours confirmed by ultrasound. Data were collected on patient demographics, clinical presentation, tumour markers, imaging, surgical interventions, and histopathological findings.

Results: The majority of patients (34%) were aged 21-30, and 78% were multiparous. Abdominal pain was the most common presenting symptom (48%). Most tumours were unilateral (94%), and 92% of participants had normal or undetectable CA-125 levels. Large ovarian cysts were identified in 44% of cases, with benign mucinous cystadenomas being the most frequent histopathological diagnosis (24%). Laparotomy with cystectomy was the most commonly performed surgical procedure (30%).

Conclusion: This study provides a comprehensive clinical profile of ovarian tumours at a tertiary care centre, highlighting the predominant symptoms, imaging findings, and histopathological diagnoses. The findings underscore the importance of clinical vigilance and the use of diagnostic tools in identifying ovarian tumours. Increased awareness and targeted diagnostic strategies, particularly for younger women, are essential to reduce the burden of ovarian cancer.

Keywords: Ovarian neoplasms, Ovarian cysts, CA-125, Laparotomy, Benign mucinous cystadenoma.

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1. Introduction

Ovarian neoplasms have become increasingly significant in the field of gynecologic oncology due to their varied histopathological profiles and their considerable contribution to mortality rates among female genital cancers. Ovarian cancer is the seventh most common cancer among women worldwide and the fifth leading cause of cancer-related deaths, making it a major public health concern. Ovarian tumours are diverse and can range from benign to highly aggressive malignant forms. These tumours account for approximately 15-25% of all primary malignancies in the female genital organs. The vast spectrum of ovarian neoplasms includes epithelial tumours, germ cell tumours, sex cord-stromal tumours, and metastatic tumours, each with unique biological behaviors and clinical implications. The ovaries are intricate intra-pelvic organs within the female reproductive system and are susceptible to both benign and malignant tumors across all age groups, from the intrauterine period to post-menopause.[1] In Indian females, the prevalence of ovarian tumors ranks just behind cervical and uterine cancers. Ovarian cancer constitutes 3% of all cancers in women and is the fifth leading cause of cancer-related deaths among females.[2] Additionally, ovarian cancers account for approximately 30% of all cancers affecting the female genital tract.[3] The significant mortality rate associated with ovarian cancer is largely attributed to its late diagnosis and the absence of effective screening methods. Globally, ovarian cancer is the sixth most frequent malignancy in women and the seventh leading cause of cancer mortality.[4]

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Ovarian cancer is a global health issue with considerable geographic variation in incidence and mortality rates. High incidence rates are observed in industrialized countries such as the United States, Canada, and Northern Europe, while lower rates are reported in developing countries in Asia and Africa. The reasons for these differences are multifactorial, involving genetic, environmental, and lifestyle factors. The mortality rate remains high due to the lack of early detection strategies and limited access to advanced medical care in rural and semi-urban areas.

Ovarian tumours can occur at any age, from prepubertal girls to elderly women, but the risk increases with age. The peak incidence of ovarian cancer is observed in women aged 55-65 years. However, benign ovarian tumours are more common in younger women, particularly germ cell tumours, whereas epithelial tumours are more prevalent in older women. Solid and papillary projections may indicate cancer.[5]

Several risk factors have been associated with the development of ovarian cancer. These include genetic predisposition, reproductive factors, lifestyle factors, diet, obesity, and hormone replacement therapy and other medical conditions. Imaging methods such as USG, CT Scan, and MRI might be misleading, while cytology has its own limitations and issues.

Given the high mortality associated with ovarian cancer and the challenges in early diagnosis, it is crucial to study the clinical profile of ovarian tumours at a tertiary care centre. Understanding the demographic characteristics, clinical presentation, and histopathological patterns can provide valuable insights into the epidemiology and natural history of ovarian tumours. Therefore, the present study was undertaken to determine the demographic profile, clinical presentation and symptoms associated, Interaoperative findings and to identify the most common Histopathological findings.

2. Materials and Methods

This study employs a retrospective descriptive design to evaluate the clinical profile of ovarian tumours diagnosed at the Department of Obstetrics and Gynaecology at Gulburga Institute of Medical Sciences, Gulburga in North Karnataka. The study spans a period of two years, from January 2021 to January 2023. This centre serves a diverse population, providing a robust dataset for understanding the clinical profile of ovarian tumours in this region.

2.1. Inclusion criteria

1. Age group of reproductive to postmenopausal women
2. All clinically suspected case with ultrasound evidence

2.2. Exclusion criteria

1. Patients with simple cyst or functional cysts.
2. Incomplete medical records that lacked critical information required for the study.

2.3. Data collection procedure

Data were collected from the Medical Records Department of the tertiary centre. The medical records of patients who met the inclusion criteria were reviewed to extract relevant data. Patients provided all essential clinical and radiological information. Formalin-fixed surgical specimens received by the Histopathology Section were assessed for size, shape, weight, consistency, and appearance. The following information was collected: Age, parity, clinical features, risk factor, investigation, tumour marker, surgical management, Interaoperative findings, and Histopathological findings were studied. Specimens were grossly dissected, then fixed, dehydrated, cleared, and impregnated using an automatic tissue processor (**Figure 1** and **Figure 2**). The study utilized standard clinical and imaging assessments, complemented by histopathological confirmation of surgically excised specimens. Histological classifications adhered to internationally recognized guidelines. Dermoid tumours and mature cystic teratomas were collectively assessed under germ cell tumours, with terminological distinctions noted in clinical records. Approval was obtained from the Institutional Ethics Committee of the college. Given the retrospective nature of the study, informed consent was waived, but all patient data were anonymized to ensure privacy and confidentiality.

2.4. Data analysis

The data were tabulated in counts and percentages. Descriptive statistics were used to summarize the demographic, clinical, and histopathological characteristics of the ovarian tumours. The chi-square test was employed for categorical variables, and t-tests were used for continuous variables. A p-value of <0.05 was considered statistically significant.

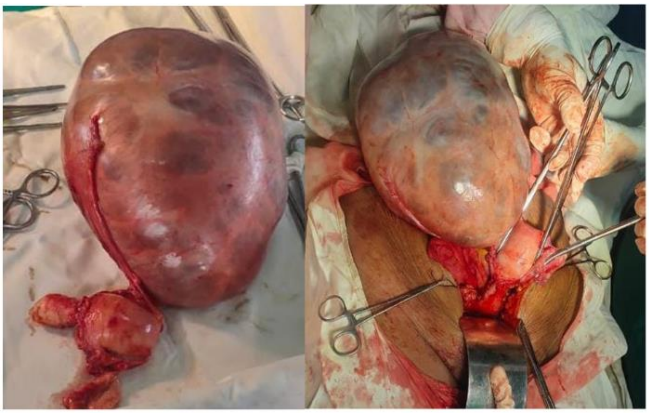

Figure 1: Serous cystadenoma

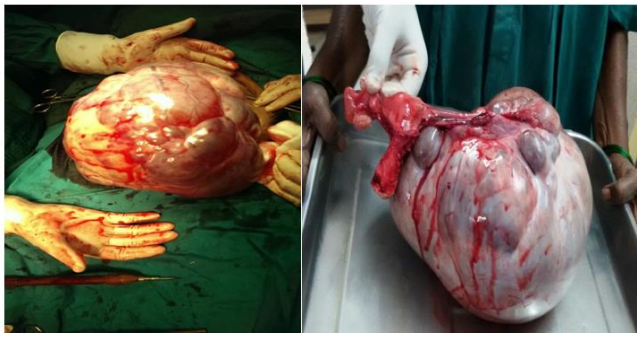

Figure 2: Mucinous cystadenoma

3. Results

Table 1: Basic characteristics

Characteristics	Number	Percentage
Age group		
<20	04	08.00
21 – 30	17	34.00
31 – 40	14	28.00
41 – 50	10	20.00
> 50	05	10.00
Parity		
Unmarried	04	08.00
Nulliparous	01	02.00
primiparous	06	12.00
Multiparous	39	78.00
Chief complaints		
Abdomen distension	2	04.00
Mass per abdomen	23	46.00
Pain abdomen	24	48.00
Pain abdomen, abdomen distension	1	02.00
Menstrual History		
Menstruating women	39	78.00
Attained menopause	11	22.00

The study group consisted of individuals aged between 18 and 67 years. The largest proportion of participants were in the 21-30 age group, accounting for 34.0% (16 participants) followed by age group was 31-40 years, comprising 28.0% (14 participants), aged 41-50 years made up 20.0% (10 participants), smaller percentage of participants were in the > 50 years age group, representing 10% (5 participants) and the least represented age group was < 20 years, with 8% (4 participants).

Among the participants, 2% were nulliparous, 12.0% wereprimiparous whereas the majority, 78.0% were multiparous.

The most common chief complaint among the participants was pain abdomen, reported by 48.0% (24 participants) followed by Mass per abdomen was the second most frequent complaint, reported by 46.0% (23 participants), Abdominal distension was reported by 4.0% (2 participants), combination of abdominal pain and abdominal distension was reported by 2.0% (1 participant).

The majority of participants (78%) were menstruating, while 22% had attained menopause. This distribution highlights that a significant portion of the study population was in the pre-menopausal stage (**Table 1**).

Table 2: Tumor marker & site

Parameter	Number	Percentage
CA 125		
Normal	46	92.00
Raised	04	08.00
Site		
Unilateral	47	94.00
Bilateral	03	06.00

In this study, 92% of the participants had normal or undetected levels of the CA 125 tumor marker, indicating that elevated CA 125 levels were uncommon. Only 8% of the participants showed slight elevations in CA 125, suggesting a low prevalence of conditions typically associated with elevated CA 125 in this population.

The majority of tumors were unilateral, accounting for 94% of cases, while only 6% were bilateral. This indicates a strong prevalence of tumors affecting a single ovary in the study population (**Table 2**).

Table 3: Clinical diagnosis

Clinical diagnosis	Number	Percentage
Benign ovarian tumour	8	16.00
Complex ovarian cyst	1	02.00
Complex ovarian cyst with torsion	1	02.00
Dermoid cyst	1	02.00
Fibroid uterus with ovarian cyst	1	02.00
Mucinous cystadenoma	5	10.00
Ovarian carcinoma	3	06.00
Ovarian cyst	22	44.00
Ovarian cyst b/l with rt ovarian torsion	1	02.00
Serous cystadenoma	7	14.00
Total	50	100.0

In this study, the majority of participants were diagnosed with ovarian cysts, accounting for 44% of cases. Benign ovarian tumors and serous cystadenomas were also common, representing 16% and 14% of the diagnoses, respectively. Less frequently observed conditions included mucinous cystadenomas, ovarian carcinomas, and complex ovarian cysts, among others (**Table 3**).

Table 4: USG findings

	Number	Percentage
Benign ovarian tumor	08	16.00
Complex ovarian cyst	01	02.00
Complex ovarian cyst with torsion	01	02.00
Dermoid cyst	01	02.00
Fibroid uterus with ovarian cyst	01	02.00
Ovarian carcionoma	03	06.00
large ovarian cyst	22	44.00
B/lovarian cyst with right ovarian torsion	01	02.00
Mucinous cystadenoma	05	10.00
Serous cystadenoma	07	14.00

Ultrasound findings revealed that large ovarian cysts were the most common, identified in 44% of cases. Other notable findings included benign ovarian tumors (16%) and serous cystadenomas (14%). Ovarian carcinoma was found in 6% of the cases, while complex ovarian cysts, Dermoid cysts, and fibroid uterus with ovarian cyst were less common, each observed in only 2% of cases (**Table 4**).

Table 5: Surgery

Surgery	Number	Percentage
TAH + BSO + Omentectomy	5	10.00
Laparatomy and salphingoophorectomy [RSO / LSO / BSO]	6	12.00
TAH + BSO	10	20.00
TAH + LT Cystectomy	2	04.00
LAP + Cystectomy (Right + Left)	15	30.00
LAP + Ovariotomy	2	04.00
TAH + BSO + B/L PLND	2	04.00
LAP + RSO + LT Cystectomy	1	02.00
LAP + LSO + RT Tubectomy	1	02.00
TAH + BSO + Omentectomy + Appendicectomy	1	02.00
TAH + LEFT Cystectomy + Omentectomy	1	02.00
Exploratory Laparotomy	2	04.00
TAH + LEFT Cystectomy	2	04.00
Total	50	100.00

The most frequently performed surgical procedure was laparotomy with cystectomy (right and left), representing 30% of cases. Total abdominal hysterectomy (TAH) with Bilateral salpingo-oophorectomy (BSO) was the second most common, comprising 20% of the surgeries. Other procedures, such as TAH + BSO + Omentectomy and various laparoscopic approaches, were less common, each ranging from 2% to 12%. This distribution highlights a preference for more extensive interventions in managing ovarian conditions (**Table 5**).

Table 6: Histopathological characteristics

HPD	Number	Percentage
Adult type granulosa cell tumour	01	02.00
Benign cystic teratoma	01	02.00
Benign mucinous cystadenoma	12	24.00
Complex ovarian cyst	02	04.00
Dermoid cyst	03	06.00
Mature cystic teratoma	06	12.00
Mucinous borderline tumour	01	02.00
Mucinous cystadenoma with torsion	01	02.00
Ovarian carcinoma	01	02.00
Retroperitoneal schwanomma	01	02.00
Ovarian fibroma	01	02.00
Serous cystadenofibroma	02	04.00
Serous cystadenoma	10	20.00
Serous cystadenoma of ovary with reactive lymph nodes	01	02.00
Torsion ovarian cyst	06	12.00
Haemorrhagic cyst	01	02.00
Total	50	100.0

The histopathological analysis revealed that benign mucinous cystadenomas were the most common finding, occurring in 24% of cases. Serous cystadenomas were also prevalent, accounting for 20% of cases. Mature cystic teratomas and torsion of ovarian cysts each represented 12% of the findings. Other conditions, including dermoid cysts, complex ovarian cysts, and various rare tumors, were less frequent, each constituting 2-6% of the cases. These results highlight the diversity of ovarian pathologies identified through histopathological examination (**Table 6**).

Table 7: Association between the clinical findings and UGC

	Ultrasound findings									
Clinical diagnosis	**Benign ovarian tumour**	**Complex ovarian cyst**	**Complex ovarian cyst with torsion**	**Dermoid cyst**	**Fibroid uterus with ovarian cyst**	**Mucinous cystadenoma**	**Ovarian carcinoma**	**Ovarian cyst**	**Serous cyst adenoma**	**Ovarian cyst B/L with RT ovarian torsion**
Benign ovarian tumour	6								2	
Complex ovarian cyst		1								
Complex ovarian cyst with torsion			1							
Dermoid cyst				1						
Fibroid uterus with ovarian cyst					1					
Mucinous cystadenoma	1					4				
Ovarian carcinoma							3			
Ovarian cyst								21	1	
Ovarian cyst b/l with rt ovarian torsion										1
Serous cystadenoma	1					1		1	4	

$\chi 2 = 24.7$, $p<0.001$, significant association

There was statistically significant association between Clinical Diagnosis and Ultrasound Findings ($p<0.001$) (**Table 7**).

Table 8: Association between the clinical findings and HPD

	HPD findings															
Clinical diagnosis	**Adult type granulosa cell tumor**	**Benign cystic teratoma**	**Benign mucinous cystadenoma**	**Complex ovarian cyst**	**Dermoid cyst**	**Haemorrhagic cyst**	**Mature cystic teratoma**	**Mucinous boderline tumour of ovary**	**Mucinous cystadenoma with torsion**	**Ovarian carcinoma**	**Ovarian fibroma**	**Retroperitoneal schwanomma**	**Serous cystadenofibroma**	**Serous cystadenoma**	**Serous cystadenoma of ovary with reactive lymph nodes**	**Torsion ovarian cyst**
Benign ovarian tumour			5					1						2		
Complex ovarian cyst				1												
Complex ovarian cyst with torsion							1									
Dermoid cyst					1											
Fibroid uterus with ovarian cyst																1
Mucinous cystadenoma			4											1		
Ovarian carcinoma	1									1	1					
Ovarian cyst		1	1	1	2	1	4		1				1	6	1	3
Ovarian cyst B/L with RT ovarian torsion																1
Serous cystadenoma			2				1					1	1	1		1

$\chi 2 = 5.6$, $p=0.02$, significant association

There was statistically significant association between clinical diagnosis and HPD findings (p=0.02) (**Table 8**).

4. Discussion

This study provides an insightful overview of characteristics of various ovarian conditions, as well as the associated histopathological findings. The findings highlight a range of diagnoses, surgical interventions, and tumor markers, offering a comprehensive understanding of the conditions encountered.

The demographic distribution observed in this study, with a significant proportion of younger women affected by ovarian tumors, aligns with other studies that have reported a higher incidence of benign ovarian tumors in younger populations. Mondal et al. found that benign ovarian tumors were more common in younger women, which is consistent with our finding that 32% of participants were aged 18-27 years.[5] In another study, investigators underlined that most ovarian tumours (47.2%) are seen between 21 and 40 years, however the majority of malignant tumours (73.1%) are noted above 40 years.[6] This may reflect the hormonal and reproductive factors influencing ovarian tumor development in this age cohort.

The clinical presentation in our study, particularly the predominance of abdominal pain and palpable masses, is consistent with findings from other studies. A study by Patel A et al. also reported that most common clinical presentation was pain abdomen (54%) and abdominopelvic lump (26%).[7] This commonality across studies highlights the importance of these symptoms as key diagnostic indicators for ovarian pathology.

In terms of histopathological findings, the high prevalence of benign conditions in our study mirrors the results of similar research conducted in tertiary centers. A study by Geomini P et al. found that benign ovarian cysts and serous cystadenomas were among the most frequently diagnosed ovarian conditions, which corresponds with our findings.[8] However, the relatively low incidence of ovarian carcinomas and the infrequent elevation of CA 125 levels in our study contrast with studies conducted in populations with a higher risk of malignancy, such as those with a genetic predisposition or in postmenopausal women.

4.1. Ovarian conditions

The most frequently diagnosed condition in this study was the ovarian cyst, which was present in 44% of participants. This finding aligns with the common clinical presentation of ovarian cysts in gynecological practice. Benign conditions, such as mucinous and serous cystadenomas, were also prevalent, together comprising 40% of the cases. This high incidence of benign conditions is consistent with existing literature, which suggests that the majority of ovarian masses are non-malignant.

Ovarian cysts, particularly simple cysts, are frequently seen in premenopausal women and are typically asymptomatic, only being discovered incidentally during routine examinations or imaging studies. According to Mondal et al, benign ovarian conditions, including cysts, constitute the majority of ovarian masses identified during clinical evaluations.[5]

In our study, benign mucinous and serous cystadenomas were diagnosed in 40% of cases, further supporting the predominance of non-malignant ovarian masses. This is in line with other studies, such as those by Kanthikar et al., which reported that benign ovarian tumours, particularly serous and mucinous cystadenomas, are among the most frequently encountered histopathological types in ovarian neoplasms.[9] Moreover, Gupta et al. also observed that the majority of ovarian lesions are benign, which correlates with our findings.[10] However, the presence of such benign conditions still warrants close monitoring and evaluation to rule out malignancy, especially in post-menopausal women, where the risk of ovarian cancer is higher.

4.2. Histopathological findings

The histopathological analysis revealed a significant occurrence of benign mucinous cystadenomas and serous cystadenomas, each found in 20% of cases. These results align with numerous studies in the field of ovarian pathology, reinforcing that benign epithelial tumours, particularly mucinous and serous cystadenomas, are among the most frequently encountered ovarian neoplasms. In studies by Mondal et al. and Kanthikar et al. similarly found that benign cystadenomas are the predominant type of ovarian tumour, representing a significant portion of ovarian masses identified in clinical settings.[5,9] In another study conducted in a tertiary care hospital in North India reported that benign epithelial tumors formed the majority, with serous cystadenomas being the most common.[11]

Mature cystic teratomas and torsion ovarian cysts, each accounting for 12% of cases, further illustrate the diversity of ovarian conditions observed. These findings are consistent with the literature, where mature cystic teratomas, also known as dermoid cysts, are reported as one of the most frequent germ cell tumours of the ovary. Gupta et al. and Sawant and Mahajan have reported similar frequencies of mature teratomas in their studies, further confirming the commonality of this pathology.[10,12] Torsion is a well-known complication of ovarian cysts and is associated with significant morbidity if not promptly treated. The presence of torsion in our study correlates with findings from Sawant and Mahajan, who also observed that ovarian cysts, especially those of larger size, are at risk of torsion.[12]

Less frequent findings included various types of cysts and tumors, emphasizing the wide spectrum of ovarian pathology.The diversity observed in the histopathological analysis, including rare tumours, is typical of ovarian

pathology, as described by several studies, including those by Prakash et al. and Sheikh et al., which documented the range of both benign and malignant ovarian lesions in clinical practice.[13,14]

4.3. Surgical interventions

The surgical approach in this cohort predominantly involved Total Abdominal Hysterectomy (TAH) with Bilateral Salpingo-Oophorectomy (BSO), performed in 20% of cases. This extensive procedure reflects the severity of the conditions and the need for comprehensive surgical management, common practice of aggressive surgical management in ovarian neoplasms, particularly in postmenopausal women or those with complex masses. Our findings align with previous studies, such as those by Sawant and Mahajan, which also reported TAH with BSO as the most frequently performed surgical intervention in ovarian tumour cases, especially when there is suspicion of malignancy.[12] This approach is corroborated by studies indicating that bilateral salpingo-oophorectomy is performed in a significant proportion of benign hysterectomies, especially among women aged 45 to 50 years.[15]

Laparoscopic procedures, such as left and right cystectomies, were also common, highlighting the trend towards minimally invasive techniques in managing ovarian masses. Studies by Prakash et al. and Modi et al. similarly highlight the increasing use of laparoscopy in the management of benign ovarian cysts and masses, reinforcing its role in gynecologic surgery.[13,16]

4.4. Tumor markers

The CA 125 tumor marker levels were predominantly normal or undetected in 92% of participants, indicating that elevated CA 125 levels were relatively rare in this study population. This finding suggests that while CA 125 is a useful marker for detecting ovarian cancer, its levels may not always be elevated in benign conditions. CA 125 is widely recognized as a valuable marker for epithelial ovarian cancer, particularly for monitoring disease progression and recurrence. However, its utility as a diagnostic tool for benign ovarian masses or early-stage ovarian cancer is limited. Studies, including those by Gupta et al. and Mondal et al., have similarly found that CA 125 is often within normal limits in patients with benign ovarian conditions, reinforcing the notion that its elevation is more strongly associated with malignant tumours.[5,10]

5. Future Research

Future research should focus on larger, multicenter studies to validate these findings and explore the generalizability of our results to other populations. Additionally, investigating the correlation between tumor markers such as CA 125 and histopathological findings could enhance the accuracy of preoperative diagnostics and inform surgical decision-making. Such studies could contribute to the development of more refined management protocols for ovarian tumors, balancing the need for thorough evaluation with the goal of minimizing unnecessary surgical procedures.

6. Limitations

This study is limited by its relatively small sample size and single-center design, which may restrict the generalizability of the findings. The lack of a control group or comparison with a broader population also limits the ability to draw definitive conclusions about the epidemiology and management of ovarian tumors. Future research with larger, multicenter cohorts is needed to confirm these results and explore additional factors influencing the clinical management of ovarian tumors.

The findings of this study underscore the diagnostic challenges associated with ovarian tumours. While tools such as the Guff/Modified Guff Symptom Index and the IOTA ADNEX classification system were not utilized, their inclusion in future studies is strongly recommended to enhance diagnostic precision. Furthermore, the predominance of open surgeries for benign lesions reflects existing constraints, such as the limited availability of minimally invasive surgery (MIS) facilities and the need for broader adoption of such techniques.

7. Conclusion

This study provides valuable insights into the clinical profile of ovarian tumours at a tertiary centre in North Karnataka. By identifying demographic patterns, clinical presentations, and histopathological characteristics, we contribute to the understanding of ovarian neoplasms and highlight the need for improved diagnostic and therapeutic strategies. The findings underscore the importance of clinical vigilance and the use of diagnostic tools in identifying ovarian tumours. Furthermore, the integration of histopathological analysis reinforces the clinical observations, contributing to more accurate diagnoses and effective patient management strategies. Enhancing diagnostic precision through advanced tools and minimally invasive surgical techniques remains a key objective for future practice. Future efforts should focus on integrating advanced diagnostic indices and promoting minimally invasive surgical techniques to optimize patient outcomes.

8. Source of Funding

None.

9. Conflict of Interest

None.

10. Ethical Approval

Ethical No.: GIMS/KLB/PHARMA/IEC/205/2023-24.

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