

A STUDY ON HISTO-MORPHOLOGICAL SPECTRUM OF OVARIAN LESIONS IN WOMEN REPORTING AT TERTIARY CARE INSTITUTE

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Introduction

The ovaries are two basic reproductive organs located in the pelvis on either side of the uterus. Their primary functions are to create eggs or ova. Reproductive hormones produced include estrogen and progesterone. Despite their modest size, these organs can acquire a wide range of diseases from neonatal to post-menopause.

Lesions are classified as non-neoplastic or neoplastic, with additional sub-categories based on various characteristics. Non-neoplastic lesions include functional cysts (Corpus luteal and Follicular), endometriotic cysts, tubo-ovarian abscesses, polycystic ovarian syndrome cysts, inflammatory lesions, and surface epithelial inclusion cysts.

Functional cysts are common in young females in their second decade due to ovulation failure. However, fewer occurrences were reported in perimenopausal and postmenopausal women [1]. In most circumstances, things resolve themselves. Large, persistent, or painful ovarian cysts necessitate surgery [2]. Neoplastic lesions are classified into benign, borderline, and malignant. The histogenesis of ovarian tumors is centered on four major components: surface epithelium, germ cells, sex cord, and ovarian stroma, both specialized and general(3)

Germ cell neoplasms are more common in young adults and prepubertal children, while epithelial lesions are more common in the elderly and postmenopausal women (4). Approximately 80% of ovarian neoplasms are benign and exhibit cystic, solid, or mixed features [5]. The remaining 20% of tumors are malignant and have a catastrophic prognosis [6].

Clinically, distinguishing between non-neoplastic and neoplastic lesions is challenging but crucial for guiding treatment. Non-neoplastic cystic lesions can cause pelvic masses and aberrant hormonal signs, leading to diagnostic uncertainty. The diagnosis is based on

histology [7]. Ovarian cancer affects 2.5% of female cancers but kills 5% due to low survival rates due to late stage diagnosis [8].

Ovarian cancer ranks as the fourth most frequent malignancy in India. Ovarian cancer has a poor prognosis due to the absence of early detection and screening technologies, resulting in most cases being discovered at advanced stages [9]. Improving prevention and early detection is a research goal due to the 93% 5-year relative survival rate for diseases identified locally [8].

This study aimed to categorize various types of ovarian lesions based on their age, clinical presentation, and pathological findings, recognizing the importance of histological diagnosis in proper management.

MATERIALS AND METHODS

After obtaining clearance from Institutional ethics committee this prospective observational study was conducted by the Pathology department of our institute from January 2022 to December 2024, spanning over two years. Clinical data was obtained from histopathology requisition forms and hospital records of individuals with ovarian lesions. Biopsies and surgical specimens were preserved in 10% formalin, embedded in paraffin, sectioned at 3-5 μ , and stained with hematoxylin and eosin. Special stains, such as Periodic Acid Schiff (PAS), were used when needed. The investigation comprised all ovarian lesion specimens, including hysterectomy specimens, from the histopathology division of pathology. The study excluded previously treated patients of ovarian lesions with recurrence. This study included 110 cases with ovarian lesions that met these criteria. Histologically, ovarian lesions were divided into non-neoplastic and neoplastic masses. Non-neoplastic masses were further split into several forms of cysts, while other lesions and neoplastic masses were separated into benign, borderline, and malignant lesions.

RESULTS

A total of 110 cases presented as ovarian lesions was included in this study. Minimum age of the patients presenting with the ovarian lesion in our study was 19 years while maximum age was 79 years. Mean age of presentation was 42.33 years. Ovarian lesions were most common in the age group of 41-50 years, comprising of 46(41.8%) cases. [Table 1] Overall a total of 75 cases were included in peri-menopausal and menopausal age group (41-80) while 27 cases were seen in the reproductive age group of 21-40 years

A total of 68(61.8%) cases were unilateral while 42(38.2%) cases were bilateral. [Table 2] Among unilateral lesions, 38(%) cases were seen on the right ovary while 30(%) cases were seen on the left ovary. 88 cases were non-neoplastic while 22 cases were neoplastic. Among neoplastic cases, 16 cases were benign, 1 case were categorized as borderline and 5 cases were malignant. Maximum number of non-neoplastic lesions were seen in 41-50 year age group(46 cases) followed by 51-50 year age group(14 cases). Maximum number of neoplastic benign lesion were also seen in 10-40 years age group(10 cases) followed by 41-60 year age group(6 cases). Among malignant lesion 3 cases were seen in 51-80 year age group followed by 2 cases in 10-40 year age group.

Most of the ovarian lesions presented with pain abdomen (49/110) followed by swelling abdomen (18/110) either alone or in combination with pain abdomen. Other presenting symptoms were abnormal uterine bleeding (37/110) in the form of menorrhagia or metrorrhagia, primary or secondary infertility, amenorrhoea or dysmenorrhoea in occasional

cases. [Table-3] 20 cases were asymptomatic. Associated findings in specimens of Hysterectomy with salpingo-oophorectomy were also found. Most common was leiomyoma either alone or in combination with adenomyosis. Other associated findings were chronic cervicitis, carcinoma endometrium, carcinoma cervix; hydrosalpinx etc. [Table- 4] Systemic symptoms in some of the lesions were hypothyroidism, diabetes mellitus, hypertension etc. Corpus luteal cyst was the most common non-neoplastic lesion with 22 cases(%) followed by 11cases of endometriotic cyst(%) and 9 cases of Cystic follicle(%). [Table- 5] Other non-neoplastic lesion were Parovarian cyst (8cases) ,Follicular cyst and chronic non-specific oophoritis (7 cases each), Torsion ovary, ectopic gestation,ovarian abscess, hemorrhagic cyst and simple cyst.Among the neoplastic lesions, surface epithelial tumors was the most common(18 cases) followed by Germ cell tumor(3 cases) and sex cord stromal tumors(1 cases) [Table6]. Among the Benign lesion, Serous cystadenoma was the most commonly

encountered lesion with 7(%) cases, followed by Mucinous cystadenoma (5 cases) and Dermoid cyst(3cases) and one case of Serous-mucinous Cystadenoma. Among Borderline lesions, one case of Borderline Mucinous cystadenoma was recorded. Among the malignancies, Serous carcinoma was the most common comprising of four cases and one case of granulosa cell tumor was recorded[Table 7]

TABLE 1: AGE DISTRIBUTION OF ALL CASES OF OVARIAN LESION

Age (yrs)	Non-neoplastic lesions(%)	Neoplastic (benign) lesions(%)	Neoplastic (borderline) lesions (%)	Neoplastic (malignant) lesions (%)	Total number(%)
11-20	3(3.4)	4(25)	0	1(20)	8(7.27%)
21-30	7(8)	4(25)	0	0	11((10%)
31-40	12(13.6)	2(12.5)	1	1(20)	16(14.83%)
41-50	42(47)	4(25)	0	0	46(41.8%)
51-60	14(16.4)	2(12.5)	0	1(20)	17(15.20%)
61-70	09(10.5)	0	0	1(20)	10(9.09%)
71-80	1(1.1)	0	0	1(20)	2(1.81%)
Total	88(100)	16(100)	1	5(100)	110

TABLE 2. LATERALITY OF OVARIAN LESIONS

Laterality	Side	Number & % age	Total Number
Unilateral	right	38(42.6)	68
	Left	30(41.1)	
Bilateral		42(25.2)	42
Total		110	110

TABLE 3: CLINICAL PRESENTATION OF ALL THE CASES OF OVARIAN LESION

Clinical presentation	Number of cases
Pain Abdomen	25
Swelling abdomen	08
Pain abdomen and Swelling abdomen	10
Abnormal uterine bleeding (AUB)	23
Pain abdomen & Abnormal uterine bleeding (AUB)	14
Infertility	08
Amenorrhoea	02
Asymptomatic	20
total	110

TABLE-4: ASSOCIATED CONDITIONS ASSOCIATED WITH OVARIAN LESION

Associated Conditions	No. of Cases
Adenomyosis	11
Leiomyoma	14
Adenomyosis and Leiomyoma	12
Chronic cervicitis	05
Prolapse	02
Hydrosalpinx	04
Carcinoma Endometrium	01
Diabetes Mellitus	04
Hypertension	01
Total	54

TABLE-5: NON-NEOPLASTIC LESIONS OF OVARY WITH LATERALITY AND NUMBER

TYPES OF CYST	RIGHT	LEFT	BILATERAL	TOTAL
Cystic follicle(CF)	2	4	3	9
Follicular cyst(FC)	3	1	3	7
Corpus Luteal Cyst(CLC)	5	5	12	22
Hemorrhagic cyst(HC)	4	4	3	11
Endometriotic cyst(EMC)	3	1	0	4
Ectopic Gestation(EG)	1	4	0	5
Parovarian Cyst(PC)	5	1	2	8
Simple Cyst(SC)	1	2	1	4
Torsion ovary	0	1	5	6
Ovarian Abscess(OA)	0	2	3	5
Chronic nonspecific oophoritis(CO)	0	2	5	7
TOTAL	24	27	37	88

TABLE-6: CATEGORIZATION OF NEOPLASTIC OVARIAN LESION

Type of Ovarian tumour	Number & Percentage (%)
Surface epithelial tumour	18
Germ cell tumour	03
Sex cord stromal tumour	01
Total	22

TABLE-7: NEOPLASTIC LESIONS WITH LATERALITY AND NUMBER

Category of Neoplastic lesion	Type of Neoplastic Lesion	Right	Left	bilateral	Total
Benign	Serous cystadenoma	4	1	2	7
	Dermoid cyst	2	0	1	3
	Mucinous Cystadenoma	3	2	0	5
	Sero-mucinous Cystadenoma	1	0	0	1
Borderline	Borderline Mucinous cystadenoma	1	0	00	1
Malignant	Serous carcinoma	0	0	4	4
	Granulosa cell tumor	0	0	1	1
Total		11	3	8	22

DISCUSSION

Ovarian lesions exhibit diverse clinical and histological characteristics. A total of 110 cases were included in our investigation. The patients' ages ranged from 19 to 79. The average age group recorded was 42.33 years. In a research by Farooq et al., the average age of females with ovarian masses was 40.61 ± 13.74 years (10).

The most common age group affected was perimenopausal women (41-50 years old). Non-neoplastic and cancerous benign lesions were frequent in this age range. This is consistent with previous research, which found that the majority of benign ovarian lesions occur in women of reproductive age [11, 12].

In the present study neoplastic malignant lesions were recorded in women of all ages - including reproductive, peri-menopausal, and postmenopausal women. Murthy NS et al. found that the incidence of ovarian cancer rises with age, peaking between 55-64 years [13, 14]. Research suggests that ovarian cancer is more prevalent in women aged 40 and above, both in the Western world and in India [15, 16]. Poverty, short life expectancy, and ignorance may explain these variations in emerging countries, including India.

In line with research by Gurung et al. (88.15% unilateral and 11.85% bilateral) [17] and Thakkar and Shah (88.4% unilateral) [18], our investigation found that 68 out of 110 ovarian specimens (61.8%) were unilateral 42 (38.2%) were bilateral. Our results differ slightly from those of the Kanithkar et al. study, which found that 21.82% of tumors were bilateral and 78.18% of tumors were unilateral [19].

The most prevalent complaint amongst all ovarian lesions was abdominal pain and lump, which was followed by abnormal uterine bleeding. Similar clinical presentations were also noted by Pilli et al. and Kanthikar SN et al. in non-neoplastic lesions. [19, 20]

Our study indicated that majority of non-neoplastic lesions and benign tumors were primarily cystic, while malignant tumors were mostly solid. This is consistent with Pilli et al. [20]

In the current study, 88 lesions (80%) out of 110 cases were non-neoplastic lesions, and 22 lesions (20%) were neoplastic lesions. These values differ with study by Martinez-Onsurbe P et al. that found that out of 132 ovarian lesions overall, 55 cases (41.67%) had non-neoplastic lesions, while Kreuzer GF et al. found that out of 203 ovarian lesions, 82 cases (40.39%) had non-neoplastic lesions [21, 22]. In their investigation, Gurung et al. discovered 56.3% malignant lesions and 43.7% non-neoplastic lesions [17].

Functional cysts accounted for the majority of non-neoplastic lesions. The most prevalent ovarian abnormalities were corpus luteal cysts, followed by endometriotic cysts and paraovarian cysts. Similar findings were noted by Choi and Kim, who found that the most prevalent ovarian abnormalities in their study were corpus luteum cysts [22]. Farooq et al. and Abdullah et al. also showed similar findings in regards to corpus luteal cysts. (10,23) Guerriero et al. differed slightly with endometrioma being most prevalent ovarian mass, followed by functional cysts [24]. According to studies by Yasmin et al. [25], Maliheh et al. [26], and Thakar et al. [18], follicular cysts are the most frequent non-neoplastic lesion in the region.

The exact cause of this variance is unknown, however it could be due to environmental, hormonal, or genetic factors. Our investigation found that simple/serous cysts are also frequently diagnosed. Other studies worldwide have reported similar cysts [27, 28]. Our analysis found 12 cases (10.9%) inflammatory masses, compared to 10.6% in another study [29] and 3 cases (2.8%) by Nehal Ahmad et al. [42]

Out of 22 neoplastic lesions studied, 16 (72.7%) were benign, 1 (4.5%) were borderline, and 5 (22.8%) were malignant. This study aligns with Sheikh et al., N. Gupta et al. and Nehal Ahmad et al. [30, 31, 42] but contradicts Ahmad Z et al.'s study, which found a relatively high rate of malignant lesions (40.6%) [32].

Based on the WHO classification criteria for ovarian cancers, the most prevalent lesion worldwide is commonly understood to be arising from surface epithelium. According to current study, 81.3% were surface epithelial tumors. Nonetheless, the second most common ovarian tumor (13.6%) was the germ cell tumor [Table-6] similar to Nehal Ahmad et al. [42] showing surface epithelial tumors 73% and germ cell tumors 21.3%. While conflicts with reports from Sheikh et al. (India) [30], Lagos by Onyiaorah et al [33], and other sources where the most prevalent ovarian lesion was a germ cell tumor. According to Pilli et al., ovarian epithelial surface tumors make up 70.9% of all ovarian tumors, with germ cell tumors making up the remaining 21.2%. Metastatic tumors and sex cord stromal tumors made up 6.7% and 2.1 percent, respectively.

Amongst surface epithelial tumor, the commonest was serous cystadenoma, followed by mucinous cystadenoma. This corresponded with earlier research conducted by Gupta et al. [32] Yasmin et al. , & Narang et al. and also Nehal Ahmad et al., where the of reported findings that are similar[.25 and 35 ,42] Teratomas were the most prevalent type.

Our study indicated that germ cell tumors account for 3 (13.6%) of all ovarian tumors, with slight variation to those reported by Yasmin et al. and Zaman et al. Results showed 18% and 19.35%, respectively [25, 36]. Our investigation included a single case of Granulosa cell tumor.

Ovarian tumors on the borderline have a good prognosis, a relatively early beginning age, and little chance of becoming malignant [37]. They make up between 4% and 14% of all ovarian epithelial neoplasms [38]. One case (4.5%) of borderline ovarian tumors were identified in our investigation, comprising one case of borderline mucinous cystadenoma having similar case percentage with Nehal Ahmad et al[42]

High grade serous carcinoma 4cases (22.7%) was the most prevalent malignant epithelial neoplasm in the current investigation. This investigation was conducted in close proximity to one by Zaman et al. [36], which reported on endometrioid adenocarcinomas (3.87%) and serous cystadenocarcinomas (4.5%). Serous cystadenocarcinoma (4.8%) and endometrioid adenocarcinoma (3.2%) were reported by Sharma I et al. [39], however the results of our study conflict with those of Krishna M et al., who reported a greater rate (10.4%) of serous cystadenocarcinoma [40].


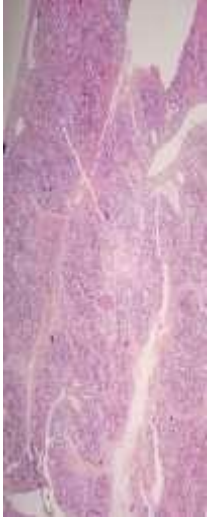
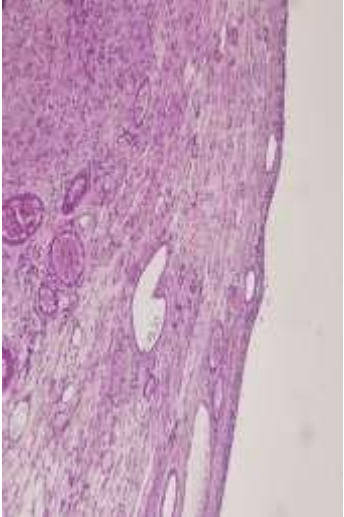

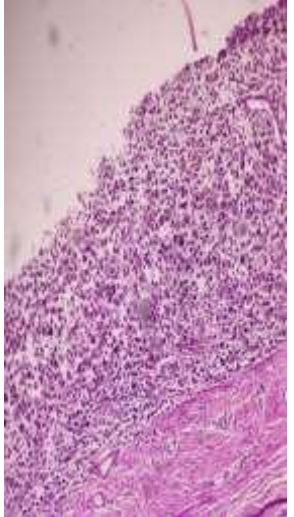


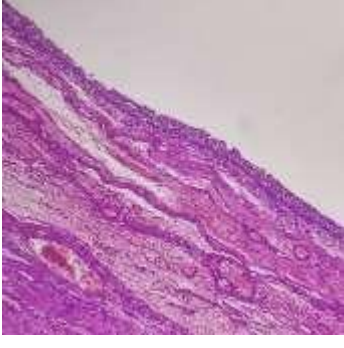

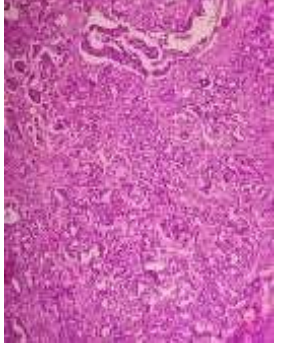
The endometrium, breast, colon, stomach, and cervix are the most common sites of metastases to the ovaries, occurring moderately frequently [41]. In our investigation, one incidence of Granulosa cell tumor was identified among sex cord stromal tumors.

CONCLUSION

The ovary, a tiny pair of organs in the female genital system, has a complicated design made up of several cell types. Therefore, it includes a wide range of lesions, including benign, borderline, malignant, and neoplastic lesions. We have compared these lesions with several factors in our study, including age, the location and clinical presentation of the lump, related lesions, and various histological subtypes. All of these clinical and histo-morphological factors, along with cutting-edge, more modern diagnostic techniques, can aid in making an early, conclusive diagnosis, formulating a treatment plan, and determining prognostic importance.

Clinical, radiological, and surgical characteristics of ovarian lesions are frequently comparable in non-neoplastic and neoplastic cases. Thus, a study of histopathology is vital for ovarian tumor diagnosis and prognosis prediction. Benign functional cysts may resolve on their own, so treating symptoms and keeping an eye on these patients can reduce the need for surgery. Even though cases are discovered later, an early diagnosis can improve the prognosis and length of survival for the patient.

FIGURES: Benign and Malignant ovarian lesions

				
<p>Figure 1 simple serous cyst</p>	<p>Figure 2 cystic follicle</p>	<p>Figure 3 simple serous cyst</p>	<p>Figure 4 paraovarian cyst</p>	<p>Figure 5 Endometriotic cyst</p>
				
<p>Figure 6 Degenerated corpus luteum</p>	<p>Figure 7Follicular cyst</p>	<p>Figure 8serous cystadenoma with epithelial proliferation</p>	<p>Figure 9 serous cystadenocarcinoma</p>	<p>Figure 10 mucinous cystadenocarcinoma</p>

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