Original Research Article

Ovarian Lesions in Cystectomy Specimens: A Histopathological Analysis

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Abstract

Introduction: Physiologically ovary is considered to be a cystic organ. Cysts occurring in the ovary can be functional or pathological, simple or complex. The actual prevalence of ovarian cysts is unknown, as many patients are believed to be asymptomatic and undiagnosed. Management depends on the patient's age, menopausal status, size, and characteristics of the cyst.

Aim: 1) To study the prevalence of various types of ovarian cysts and their relation to parameters like age and menopausal status of the patient. 2) To assess the relationship of gross characteristics of the cysts to their nature.

Materials and Methods: This is a retrospective study of 122 ovarian specimens received at the Department of Pathology, GMC/GGH, Ananthapuramu, for a period of 5 years.

Results: A total of 122 cases were studied. Out of which 48 (39%) were Non-Neoplastic and 74 (61%) were Neoplastic. The most common non-neoplastic condition was a Simple follicular cyst, followed by ovarian torsion. Among the neoplasms, Benign were 59 cases (80%), borderline 2 (2%), and malignant 13 (18%). The commonest benign neoplasm was serous cystadenoma, and the malignant was high-grade serous cystadenocarcinoma.

Conclusion: Both non-neoplastic and neoplastic ovarian lesions frequently exhibit similar clinical and radiological characteristics. Thus, the diagnosis and prognosis of ovarian lesions depend on histological evaluation.

Keywords: ovarian lesions, neoplastic, non-neoplastic.

Introduction

The ovary is a complex organ where a variety of physiological and pathological cysts are encountered. It undergoes more structural changes than any other organ, thus making it the third most common site for developing malignancy in the female genital tract. [1,2]

Ovarian lesions can be asymptomatic or symptomatic, occur at any age, and can be cystic or solid [3]. The most common lesions found in the ovary are cysts and tumors [3]. Non-neoplastic lesions often mimic neoplastic lesions in terms of clinical and radiological findings [4,5].

Benign conditions causing ovarian enlargement are functional cysts or benign neoplasms, whereas malignant conditions arise from epithelial tissue, stroma, sex cord derivatives, and germ cells [3,6].

Hence, Histopathological diagnosis is the key to decision-making. [5]

Methods

Study Design and Setting: This retrospective observational study was conducted over a period of five years at the Department of Pathology, GMC/GGH, Ananthapuramu.

Sample Size: This study encompassed 122 ovarian specimens received at the Department of Pathology during the study period. These patients were identified from hospital records, including emergency, surgical, and operative registers. All the ovarian cystectomy specimens received separately or with hysterectomy specimens were included in the study, whereas ovaries received with hysterectomy specimens with no remarkable pathology were excluded.

Study procedure: Ovarian cystectomy specimens received were fixed in 10% neutral buffered formalin to ensure proper fixation and preservation

of tissue architecture. A meticulous gross examination was conducted, and were then processed for Histopathological evaluation to aid in accurate diagnosis. Standard Haematoxylin and eosin (H&E) staining was performed on the processed tissue sections to enable detailed histological examination. The findings were systematically recorded to classify the lesions and correlate them with clinical and gross pathological features. Patient age, surgical notes, and final histopathological diagnosis were recorded and compiled.

Statistical Analysis: The collected data were entered into a Microsoft Excel sheet, and the statistics were calculated using SPSS software version 25. Categorical variables were summarized using frequency and percentage. Results were presented using appropriate tables, figures, and graphical representations to enhance clarity and facilitate interpretation.

Results:

A total of 122 cases were studied. Out of which 48 (39%) were Non-Neoplastic and 74 (61%) were Neoplastic.

The most common non-neoplastic lesion was simple follicular cyst (30 cases- 63%). Among the neoplastic lesions, Benign were 59 cases (80%), borderline were 2 cases (2%), and malignant were 13 cases (18%). The commonest benign neoplasm was serous cystadenoma, and the malignant was high-grade serous cystadenocarcinoma.

Table 1: Age distribution of ovarian lesions

Age	Non Neoplastic	Neoplastic			Total
		Benign	**Borderline**	**Malignant**	
0-19 YRS	5	4	-	-	9 (7%)
20-39 Yrs	33	23	1	-	57 (47%)
40-59 Yrs	9	25	1	11	46 (38%)
>60 Yrs	1	7	-	2	10 (8%)
Total	48	59	2	13	122 (100%)
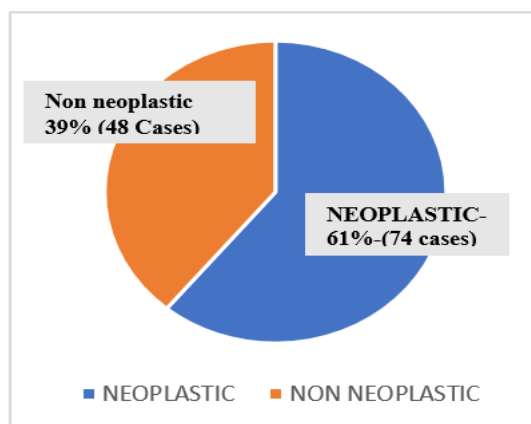
Graph 1: Distribution of neoplastic and non-neoplastic cases
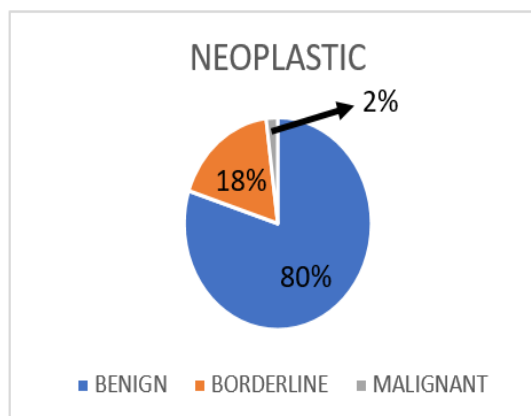
Graph 2: Percentages of neoplastic lesions
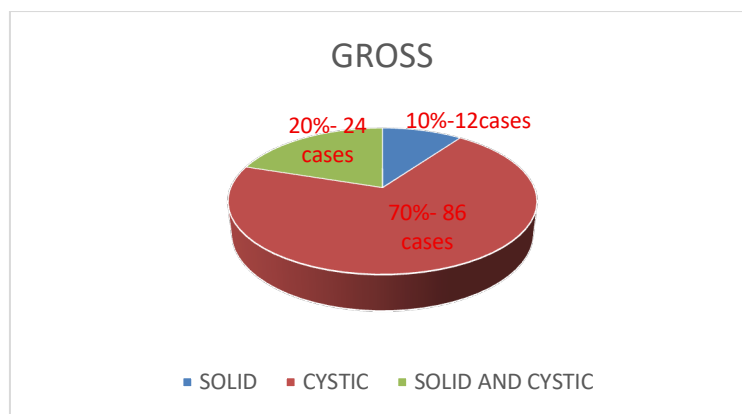
Graph 3: Distribution of gross characteristics of the ovarian lesions

**Table 2: Distribution of non-neoplastic ovarian lesions**

Non-neoplastic lesion	No. of cases	Percentage (%)
Simple follicular cyst	30	63 %
Torsion ovary	12	25 %
Corpus luteal haemorrhagic cyst	4	8 %
Chocolate cyst	2	4 %
Total	48	100 %

Table 3: Distribution of neoplastic ovarian lesions

| Neoplastic lesions	No. of cases	Percentage (%)
BENIGN		
Serous cystadenoma	25	35 %
Mucinous cystadenoma	18	24 %
Papillary serous cystadenofibroma	7	10 %
Mature teratoma	6	8%
Benign Brenner	1	1 %
Fibroma	1	1 %
Fibrothecoma	1	1%
TOTAL	59	80%
BORDERLINE		
Serous borderline tumor	1	1 %
Mucinous borderline tumor	1	1 %
MALIGNANT		
High grade Serous cystadenocarcinoma	4	6%
Low grade Serous cystadenocarcinoma	2	3 %
Endometrioid adenocarcinoma	1	1 %
Clear cell carcinoma with oxyphilic change – tubulocystic variant	1	1%
Malignant Brenner	1	1 %
Granulosa cell tumor	2	3 %
Secondary deposits	2	3%
Total	13	18%

Figure 1 & 2: Gross - Serous cystadenoma FIG 1: External surface- smooth and shiny; FIG 2: Cut section shows uniloculated thin walled cyst
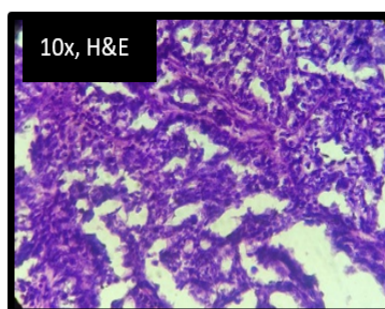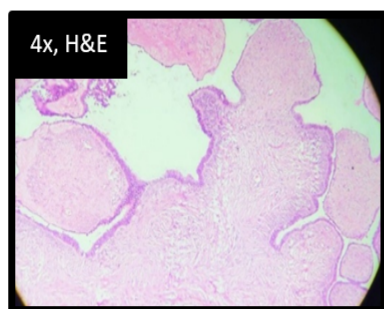
Figure 3& 4: Microscopy - Serous cystadenofibroma & serous cystadenocarcinoma. Fig 3: Serous cystadenofibroma: Papillary structure with hierarchical branching pattern and lined by cuboidal epithelium. Fig 4: High grade serous cystadenocarcinoma- tumor cells arranged on papillae with pleomorphic hyperchromatic nuclei.
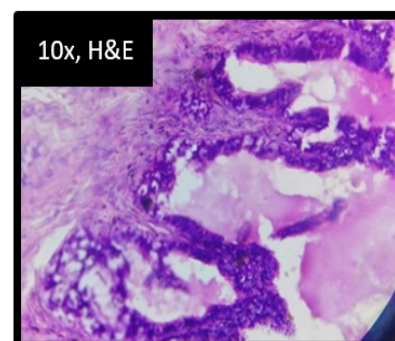
Figure 5 & 6: Gross And Microscopy – Mucinous cystadenoma. Fig 5: Gross -Mucinous cystadenoma: Cut section shows multiloculated thin walled cyst filled with mucoid material. Fig 6: Microscopy - Papillae lined by mucinous epithelium with mucin.
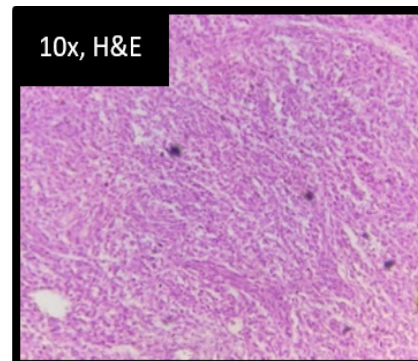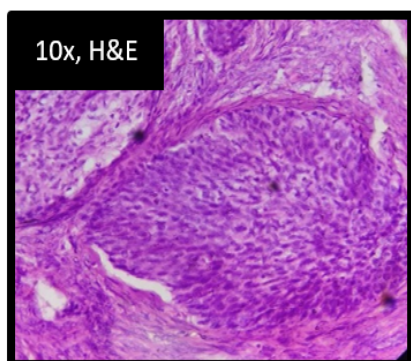
Figure 7 & 8: Brenner Tumor and Granulosa Cell Tumor -Microscopy – Fig 7(Brenner tumor): Nests of transitional epithelial cells in fibromatous stroma. FIG 8(Granulosa cell tumor): MICROSCOPY – diffuse sheets of small cuboidal cells with angulated nuclei with a groove.

Discussion

Our present study includes a total of 122 cases of ovarian lesions, which include non-neoplastic and neoplastic lesions. The majority of our patients were in the age group 20-39 years (57 patients, 47%), while those in the age group 40-59 years were the second largest group (46 patients, 38%). This is in concordance with the studies of Maru et al [6] (20-39 years – 58%; 40-59 years – 32%), Solanki et al [9] (20-39 years – 49.78 %; 40-59 years – 36.44 %), Baladaniya B et al [10] (20-39 years –50.3 %; 40-59 years – 37.3%). However,

studies done by Kar et al [7] and Nirali N. Thakkar et al [11] reported 40-59 years to be the predominant age group with ovarian lesions. The predominance of ovarian lesions in the 20–39 year age group in our study and other similar studies aligns with hormonal activity, ovulatory cycles, and functional cyst formation, which are common in reproductive-age women.

Akin to the study of Nirali N. Thakkar et al [11] and Nehal Ahmad et al [12], our study shows **cystic** lesions to be predominant in the ovary, which are often benign [8].

Table 4: Non neoplastic and neoplastic lesions in various studies in comparison with present study

Study	Non neoplastic	Neoplastic
Maru et al [6]	44%	56%
Solanki et al [9]	43.55 %	56.45%
Prakash et al [13]	44.10%	55.92%
Present study	39.34%	60.65 %

In our study, 48 cases (39.34%) were non-neoplastic, and 74 cases were neoplastic (60.65 %). Study done by Maru et al [6], Prakash et al [13], and Solanki et al [9] shows similar results 44% and 56%, 44.10% and 55.92%, and 43.55 % and 56.45% respectively, of non-neoplastic and neoplastic ovarian lesions. (Table 4)

Table 5: Most common Non neoplastic and neoplastic lesions in various studies in comparison with present study

	Present study	Panchonia DA et al [2]	Maru et al [6]	Solanki S H et al [9]	Balandaniya B et al [10]	Shah HP et al [14]	Dhule SM et al [15]	Ghaikwad et al [16]
Non Neoplastic								
Simple follicular cyst	27.8 %	10.5%	20%	16.88%	46.9%	39.8 %	70 %	21.8%
Torsion ovary	9.8%	-	-	-	-	-	-	-
Simple serous cyst	-	36 %	-	14.22%	43.9%	32.7%	-	-
Corpus luteal cyst	-	25%	14%	6.67%	5.1%	12.4%	-	27.7 %
Neoplastic								
Serous cystadenoma	35 %	38.3%	28%	21.33%	29.9%	-	-	40.5%
Mucinous cystadenoma	24 %	-	-	-	-	-	32.78%	-
High-grade serous cystadenocarcinoma	6%	-	01%	0.89%	2.3%	-	-	25%

Among the non-neoplastic lesions the most common were simple follicular cyst (30 cases-27.8%), followed by torsion ovary (12 cases-9.8%). This is similar to the studies done by Maru et al [6], Shah HP et al [14], and Dhule SM et al [15], which showed 20%, 39.8 % and 70 % of Follicular Cysts, respectively. This is in discordance with studies done by Panchonia DA et al [2], and Ghaikwad et al [16], which showed simple serous cyst (36 %) and corpus luteal cyst (27.7 %), respectively. (Table 5). Nonetheless, the non-neoplastic lesions were most commonly attributed to the functional ovarian cysts due to unruptured Graafian follicles or failed involution of dominant follicles, which are common occurrences in women of reproductive age.

Our study showed the most common benign neoplastic lesion to be serous cystadenoma (25 cases - 30.5 %). This is in synchrony with the studies done by Panchonia DA et al [2], Gaikwad et al [16], Solanki S H et al [9] and Balandaniya B et al [10], which showed the most common benign neoplasm to be serous cystadenoma. This might be because surface epithelial tumors account for 65–70% of all ovarian tumors. (Table 5) Malignant neoplastic lesions constituted 18 % in our study. Among them, the most common malignant lesion is high-grade serous cystadenocarcinoma (4 cases- 6 %). This is similar to the studies done by Nehal Ahmad et al [12] (3.57%) and Mega Samly et al [17] (7%) where serous carcinoma is the most common malignancy in ovarian lesions. This might be due to its origin from tubal-type epithelium, which is closely related embryologically and anatomically to the ovary, and frequent ovulation-induced injury promotes malignant transformation along the serous (tubal) pathway (Table 5).

Conclusion

The ovary, due to its complex histological architecture, can give rise to a wide array of lesions ranging from functional cysts to malignancies. In our study, neoplastic lesions were more common than non-neoplastic ones, with benign tumors predominating particularly in women over 40 years of age, and were mostly cystic in nature.

Non-neoplastic lesions, on the other hand, often mimic neoplasms both clinically and radiologically, underscoring the vital role of histopathology in definitive diagnosis. Accurate histopathological evaluation is thus essential not only for differentiating benign from malignant lesions but also for guiding appropriate clinical management and avoiding unnecessary surgical interventions.

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