

**ORIGINAL RESEARCH ARTICLE****HISTOPATHOLOGIC SPECTRUM OF CYSTIC OVARIAN MASSES**

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ABSTRACT

Ovarian cysts can be non-neoplastic or neoplastic. There are several histopathologic diagnoses under both the rubrics. This research was a cross sectional analytic observational histopathological study of cystic ovarian lesions carried out over three years from March, 2012 to February, 2015 at Chitwan Medical College Teaching Hospital in Nepal. The objective of this study was to study cystic ovarian masses histopathologically. A total of one hundred and fourteen patients with cystic ovarian masses were included into the study. 46.5% lesions were non-neoplastic (83% physiologic and 17% pathologic) and 53.5% lesions were neoplastic (91.8% benign and 8.2% malignant). Follicular cyst was the most common ovarian cystic lesion overall, followed by mature cystic teratoma and serous cystadenoma. 14.9% of all the ovarian cysts had undergone torsion; among them mature cystic teratoma was the most common lesion to have undergone the complication. Neoplastic ovarian cysts were more common than non-neoplastic. Follicular cyst was the most common ovarian cyst overall. Mature cystic teratoma was the ovarian cystic lesion to be affected by torsion most commonly.

Key words: Non-neoplastic, Neoplastic, Nepal, Ovarian cyst.

INTRODUCTION

Ovarian cysts are fluid-filled sacs that form within or on the ovary, which can either be nonneoplastic or neoplastic. Non-neoplastic cysts can be physiologic or pathologic and are more common than neoplastic cysts.¹ Nonneoplastic physiologic cysts are follicular cysts and corpus luteal cysts. 95% of physiologic ovarian cysts disappear spontaneously, usually over the course of one or two menstrual cycles. Non-neoplastic pathologic ovarian cysts are endometriotic cyst, tubo-ovarian abscess, cysts of polycystic ovarian syndrome and surface epithelial inclusion cysts.^{2,3}

According to Robbins and Cotran Pathologic Basis of Disease, a follicular cyst is defined as a benign ovarian cyst measuring at least 2 cm and lined by granulosa and theca interna cells. But according to Pathology Outlines, an online pathology text book, the cutoff value is 3 cm. If a cyst with similar morphology measures less than 3 cm, it is called a cystic follicle,

which is considered normal.^{3,4} An ovarian cyst lined by luteinized granulosa and theca cells measuring at least 3 cm in diameter is called a corpus luteal cyst. Any smaller cysts lined by similarly luteinized granulosa and theca cells are called "cystic corpus luteum", which are physiologic.⁵ Endometriosis is defined as a lesion with the presence of two of the following three microscopic features in any site outside the uterus: endometrial glands, endometrial stroma and hemorrhage or hemosiderin-laden macrophages. The ovary is the most commonly affected site. When repeated bouts of hemorrhage in the affected ovary convert it into a cyst filled with brown material, the cyst is called a chocolate cyst or endometrioma.³

Ovarian epithelial tumors can be benign, borderline or malignant. Benign tumors can be completely cystic (cystadenomas), can have cystic and fibrous areas (cystadenofibromas), or can be predominantly

fibrous (adenofibromas). The borderline tumors and the malignant tumors that have cystic component are called cystadenocarcinomas.³

About 80% ovarian tumors are benign. Benign and borderline tumors occur at a younger age group between the age of 20 and 45 years, while malignant tumors occur in older age group between the age group of 45 and 65 years. Most of the primary ovarian neoplasms are derived from müllerian epithelium. Three major histologic types of epithelial tumors have been identified, namely: serous, mucinous and endometrial tumors.³

Because of asymmetry, an ovary with a mass or a cyst is more prone to torsion. Although it can occur at any age, women in the reproductive age-group are more at risk.⁵ Ovarian torsion is rare, with an incidence of 2–3% of gynecologic emergencies.⁶

MATERIAL AND METHODS

Aim and objectives: The aim of this research was to study cystic ovarian masses histopathologically with the following objectives: to find out the proportion of nonneoplastic and neoplastic lesions, to categorize both nonneoplastic and neoplastic lesions histopathologically and to find out the incidence of torsion and its most frequent cause.

Study design

This research was a cross sectional analytic observational histopathological study of cystic ovarian lesions carried out over three years from March, 2012 to February, 2015 in Chitwan Medical College Teaching Hospital (CMCTH), Nepal adhering to the institutional ethical guidelines. Samples were received in 10% formalin solution. Gross features of the tissue samples were noted. Tissue sections of the ovarian lesions were stained with hematoxylin and eosin stain for light microscopic study.

Data collection and analysis

Data were entered into the Statistical Package for Social Sciences 20.0 (SPSS 20.0). Univariate analysis was performed for each variable using frequency distribution and means.

Results

The total number of patients was one hundred and

fourteen. The age-range of patients was 10 to 70 years with a mean age of 35.6 years.

The mean age for four categories of cystic ovarian lesions was as follows: 33.6 years for physiologic cysts, 35.4 years for pathologic cysts, 36.5 years for benign neoplasms, 45.5 years for malignant neoplasms.

59.6% patients were in the age-group of 20 to 40 years. Cystic ovarian lesions were uncommon after 50 years and before 20 years of age, each group having 7.9% patients each (Table 1).

Table 1: Frequency distribution in relation to age-group of patients

Age-groups	Frequency (%)
10-20 years	09 (7.9)
20-30 years	36 (31.6)
30-40 years	32 (28.1)
40-50 years	28 (24.6)
> 50 years	09 (7.9)
Total	114 (100)

46.5% lesions were non-neoplastic and 53.5% lesions were neoplastic. Among non-neoplastic lesions, 83.0% were physiologic and 17.0% were pathologic. Among neoplastic lesions, 91.8% were benign and 8.2% were malignant (Table 2).

Table 2: Broad categories of ovarian cystic lesions

Type of ovarian cyst	Frequency (%)
Nonneoplastic- physiologic	44 (38.6%)
Nonneoplastic- pathologic	09 (7.9%)
Neoplastic- benign	56 (49.1%)
Neoplastic- malignant	05 (4.4%)
Total	114 (100%)

83.3 % (95 cases) were unilateral and 16.7% (19 cases) were bilateral. Among unilateral cases, 61.1% (58 cases) occurred on the right side. Among bilateral cases, most frequent lesions were follicular cyst and serous cystadenoma: 8 cases (42.1%) and 5 cases (26.3%) respectively. Other bilateral cystic lesions were as follows: mature cystic teratoma (15.8%), mucinous cystadenoma (10.5%) and corpus luteal cyst (5.3%).

Table 3: Histologic types of cystic ovarian lesions

SN	Histologic type	Freq (%)
1.	Follicular cyst	31 (27.2)
2.	Mature cystic teratoma	29 (25.4)
3.	Serous cystadenoma	19 (16.7)
4.	Mucinous cystadenoma	12 (8.8)
5.	Corpus luteal cyst	12 (10.5)
6.	Endometriotic cyst	04 (3.5)
7.	Serous cystadenocarcinoma	02 (1.8)
8.	Mucinous cystadenocarcinoma	01 (0.9)
9.	Mixed serous papillary and mucinous cystadenocarcinoma	01 (0.9)
10.	Serous papillary borderline tumor	01 (0.9)
11.	Inflammatory cystic lesion	01 (0.9)
12.	Serous cystadenofibroma	01 (0.9)
	Total	114 (100)

In one case of endometriotic cyst on the left side, serous cystadenoma was also present on the right side. In one case of serous papillary borderline tumor, serous cystadenoma was also present in the ovary. Among serous cystadenomas, one of the cases had the morphology of serous papillary cystadenoma. In one case of endometriotic cyst, hemorrhagic corpus luteal cyst was also present on the same side. In two cases, twisted gangrenous mucinous cystadenoma was present on the right side and mucinous cystadenoma was present on the left side.

Ovarian torsion

14.9% (17 cases) of all the ovarian cysts had undergone torsion. Histologic diagnoses in relation to torsion are mentioned below: mature cystic teratoma (35.3%), follicular cyst (23.5%), corpus luteal cyst (23.5%), mucinous cystadenoma (11.8%) and chocolate cyst (5.9%).

DISCUSSION

In this study, 83.3 % ovarian cystic masses were unilateral and 16.7% cases were bilateral; the data are similar to the observation of Pudasaini et al.⁷ Another study from Nepal found bilateral ovarian lesions to be 11.85%.⁸

National and international literature is not consistent on whether left or right ovary is more commonly involved. In this study, it was found that right ovary

was more often affected than the left ovary similar to the study of Maharjan.⁹ In contrast, left ovaries were involved more commonly than right ovaries in another study.⁷ But Agrawal et al¹⁰ concluded that both ovaries are equally affected.

Proportion of ovarian lesions:

We found neoplastic lesions to be slightly more common than the non-neoplastic lesions. Among non-neoplastic lesions, the majority were physiologic. Among neoplastic lesions, 8.2% were malignant. In two national studies,^{7,8} the proportion of malignant tumors was 12.7% and 5.2%. These values assert that cystic tumors are more commonly benign than solid tumors. In studies which included both cystic and solid tumors, the proportion of malignant tumors varied greatly from 16.1% to 35.4%.¹¹⁻¹³

Most common cyst:

Findings of several studies vary on the most common cystic ovarian lesion. We found follicular cyst, a non-neoplastic physiologic cyst, as the most common cystic mass lesion similar to study by Mehata et al¹³, followed by mature cystic teratoma and serous cystadenoma. Zaman et al¹⁴ found follicular cyst as the second most common lesion preceded by corpus luteal cyst. In the study of Gurung et al⁸, follicular cyst ranked fourth while mature cystic teratoma and endometriotic cyst were more common.

The corpus luteal cyst was found as the most common cystic lesion in the study of Maharjan⁹ and Zaman et al¹⁴.

However, Pudasaini et al⁷ found neoplastic lesion (serous cystadenoma) as the most common ovarian cystic lesion followed by mature cystic teratoma and hemorrhagic corpus luteal cyst.

Most common benign tumor:

Out of all the ovarian lesions, benign neoplasms and non-neoplastic lesions contributed 49.1% and malignant tumors contributed 4.4%. When talking about neoplasms only, the share of benign came out to be 91.8%. Mature cystic teratoma was found to be the most common benign tumor in this study like in other national studies.^{8,9,11,12,15} But one study⁷ found serous cystadenoma as the most common benign tumor which was followed by mature cystic teratoma.

Two studies^{13,16} from India found serous cystadenoma as the most common benign cystic neoplasm. Serous cystadenoma was followed by mucinous cystadenoma in one study¹³ while mature cystic teratoma was the second most common in another study¹⁶.

Torsion of ovarian cyst:

Ovarian cyst, physiologic or pathologic, tends to undergo torsion around the stalk. The ovary along with its stalk is covered by peritoneum. Among benign tumors, mature cystic teratomas are the most commonly affected.¹⁷ We found 14.9% of all ovarian cysts to have undergone torsion. 14.8% of adnexal tumors had undergone torsion in a study carried out in Tunisia.¹⁸ The most common type of neoplastic cyst in this study to undergo torsion was mature cystic teratoma (35.3% of all ovarian cysts and 20.7% of all mature cystic teratomas) with follicular cyst close second (23.5% of all ovarian cysts and 12.9% of all follicular cysts).

In a study done by Mahin et al¹⁹, functional cysts (43%) followed by mature cystic teratomas (24.5%) were affected by the torsion. In another study⁶, functional cysts and mature cystic teratomas were equally affected.

Ovarian tumors, mostly benign and less commonly malignant, are responsible for most of the cases of torsion.¹⁷ Malignant tumors are less likely to undergo torsion because cancerous adhesions fix the ovary to surrounding structures.²⁰ None of the 5 malignant cases had undergone torsion in our study.

60% cases of ovarian torsion occur on the right side.²¹ In this study, 58.8% cases of torsion involved right ovarian cystic masses.

CONCLUSION

Neoplastic ovarian cysts were more common than non-neoplastic. Follicular cyst was the most common ovarian cyst overall, followed by mature cystic teratoma. Mature cystic teratoma was the ovarian cystic lesion to be affected by torsion most commonly.

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