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Original Research Article

Histopathological spectrum of ovarian neoplasms - A 3 year hospital based study

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ABSTRACT

Background: Ovarian neoplasms are the fifth leading cause of cancer mortality among females worldwide. It is associated with poor survival due to late clinical presentation with most cases presenting at stage III or stage IV.

Aims & Objectives: The present study was undertaken to assess the histopathological spectrum of ovarian neoplasms according to the World Health Organization classification (2020) and to determine the frequency and age distribution of these neoplasms in a tertiary care hospital.

Materials and Methods: This observational study was conducted over a period of 3 years (August 2016 to July 2019) in the Department of Pathology, Gandhi Medical College, Telangana, India. All ovarian neoplasm specimens were routinely processed and histopathological examination was done for each specimen.

Results: A total of 115 cases were included in the study out of which 97 (84.34%) cases were benign, 6 (5.22%) cases were borderline and 12 (10.44%) cases were malignant. Surface epithelial tumours were the most common, followed by germ cell tumours and sex cord-stromal tumours. The age group of 31-40 years showed the largest percentage of ovarian neoplasms.

Conclusions: Ovaries are a common site for tumours. Most patients present at late stages due to non-specific symptoms. Ovarian neoplasms are associated with a variety of clinical and morphological features and hence a correct histopathological diagnosis is required to institute appropriate therapy.

1. Introduction

The ovaries are paired pelvic organs in the female reproductive system and are located on the sides of the uterus close to lateral pelvic wall, behind the broad ligament and anterior to the rectum.[1] They undergo changes under the effects of different hormones throughout an individual's life and are susceptible to a range of diseases, including both benign and malignant neoplasms.[2] Ovarian cancer is the fifth most common cause of cancer deaths among women and accounts for more deaths than any other cancer of the female reproductive system. In Indian women, it is the third most common primary malignancy of the female genital tract.[3]

Ovarian tumours originate from three main cell types namely: mullerian epithelium, germ cells and sex cord-stromal cells and exhibit a wide range of clinical and morphological characteristics.[4,5] Although about 80% of ovarian tumours are benign and are typically observed in young women aged 20-45 years, ovarian cancer is more common in older women, particularly those aged 63 years or older, and is more prevalent in white women.[4,6] The risk factors for ovarian cancer include postmenopausal women, increasing age, positive family history of breast or ovarian cancer, genetic factors, nulliparity, infertility and smoking, while protective factors include tubal ligation,

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use of oral contraceptive pills, lactation and multiparity.[7,8] Patients suffering from ovarian cancer typically exhibit non-specific symptoms and often presenting at late stages (stage III or stage IV). The symptoms include abdominal fullness, bloating, nausea, abdominal distension, early satiety, fatigue, and loss of weight, with advanced cases potentially showing palpable pelvic masses or ascites.[7]

The clinical and gross features of various ovarian tumours provide important diagnostic clues. For instance, sex cord-stromal tumours are usually unilateral while metastatic tumours tend to be bilateral.[9,10] Benign surface epithelial tumours are typically cystic while solid tumours with papillary projections are more likely malignant.[10] However these tumours cannot be reliably distinguished from one another based on their clinical, radiological or gross characteristics, therefore a histopathological examination is necessary to accurately diagnose the tumour to institute appropriate therapy.[11]

2. Aims and Objectives

To study the histopathological spectrum of ovarian neoplasms and to analyse their frequency and age distribution in a tertiary care hospital.

3. Materials and Methods

This observational study was conducted in the Department of Pathology, Gandhi Medical College, Telangana, India over a period of 3 years (August 2016 to July 2019). A total of 115 cases were included in the study. The specimens received were adequately fixed in 10% neutral buffered formalin for 24-48 hours and representative sections were taken after proper fixation. The sections were routinely processed with paraffin embedding and tissue sections of 4-5 micrometre thickness were prepared and stained with haematoxylin and eosin stain for histopathological examination. The tumours were classified according to the WHO classification of ovarian tumours (2020).

3.1. Inclusion criteria

All ovarian specimens which were diagnosed as neoplasms on routine histopathology were included.

3.2. Exclusion criteria

Non-neoplastic ovarian lesions and autolysed specimens were excluded.

4. Results

4.1. Histopathological spectrum of ovarian tumours

A total of 115 cases of ovarian tumours were included in the study. Out of 115 cases, 97 cases (84.34%) were benign, 6 cases (5.22%) were borderline and 12 cases (10.44%) were malignant. Most of the tumours (110 cases) were unilateral (95.65%) with remaining presenting bilaterally.

Grossly 78 cases (67.82%) of ovarian tumours were cystic, composed of mostly benign tumours (72 cases). All 6 cases (5.22%) of borderline tumours were cystic in the present study. Malignant tumours were mixed (both solid and cystic, 7 cases (6.10%)) or solid (4 cases (3.50%)) in consistency.

The study included 95 cases (82.60%) of surface epithelial tumours, 4 cases (3.48%) of sex cord-stromal tumours, 14 cases (12.18%) of germ cell tumours, 1 case (0.87%) of ovarian lymphoma and 1 case (0.87%) of metastatic non-ovarian tumour (Table 1).

Among surface epithelial tumours, benign serous cystadenoma (Figure 1) was the commonest neoplasm comprising a total of 55 cases (47.82%) followed by 27 cases (23.47%) of benign mucinous cystadenoma (Figure 2 a). There was 1 case (0.87%) of Brenner tumour and 6 cases (5.22%) of borderline mucinous tumour (Figure 2 b). Malignant surface epithelial tumours included 2 cases (1.74%) of malignant serous carcinoma (Figure 3 a, b), 3 cases (2.61%) of malignant mucinous tumour and 1 case (0.87%) of endometrioid carcinoma.

Sex cord-stromal tumours comprised of 2 cases (1.74%) of fibroma (Figure 4) and 1 case (0.87%) each of granulosa cell tumour and Sertoli Leydig cell tumour.

Among germ cell tumours, mature teratoma (Figure 5) was the most common with 11 cases (9.57%) followed by 3 cases (2.61%) of dysgerminoma (Figure 6).

4.2. Age distribution among ovarian tumours

Majority of patients with ovarian tumours were in the age group of 31-40 years (32 cases (32.17%)) followed by 21-30 years (29 cases (25.22%)) (Table 2). The same trend was observed for benign tumours. Among 6 cases of mucinous borderline tumours, majority (4 cases) were seen in patients ≤50 years of age. Malignant ovarian tumours (3.48%) were mostly seen over 60 years of age. The youngest patient (9 years) was diagnosed with mature teratoma and the oldest patient (72 years) was diagnosed with serous cystadenocarcinoma.

5. Discussion

Ovarian neoplasms exhibit diverse histogenesis, clinical behaviour, and malignant potential.[3] Due to nonspecific symptoms, detecting these neoplasms is challenging, often resulting in advanced-stage diagnoses and earning them the moniker "silent killer." Histopathological examination is required for accurate staging and typing of the ovarian tumours as the treatment and prognosis depends on it.[12,13]

A total of 115 cases were analysed in this study, out of which 97 cases (84.34%) were benign, 6 cases (5.22%) were borderline and 12 cases (10.44%) were malignant.

Table 1: Histopathological spectrum of ovarian tumours according to WHO (2020)

Histopathological diagnosis	Type of tumour		No. of cases (%)
Surface epithelial tumours	Serous	Benign	55 (47.82)
		Malignant	2 (1.74)
	Mucinous	Benign	27 (23.47)
		Borderline	6 (5.22)
		Malignant	3 (2.61)
	Endometrioid	Malignant	1 (0.87)
	Brenner tumour	Benign	1 (0.87)
Sex cord-stromal tumour	Granulosa cell tumour		1 (0.87)
	Fibroma		2 (1.74)
	Sertoli Leydig cell tumour		1 (0.87)
Germ cell tumour	Mature teratoma		11 (9.57)
	Dysgerminoma		3 (2.61)
Lymphoid and myeloid tumours	Ovarian lymphoma		1 (0.87)
Metastatic tumours	Primary - endometrium		1 (0.87)
Total			115 (100)

Table 2: Age distribution among ovarian tumours

Age range (in years)	Benign tumours No. of cases (%)	Borderline tumours No. of cases (%)	Malignant tumours No. of cases (%)	Total No. of cases (%)
≤10	1 (0.87)	0	0	1 (0.87)
11-20	2 (1.74)	0	1 (0.87)	3 (2.61)
21-30	25 (21.74)	2 (1.74)	2 (1.74)	29 (25.22)
31-40	35 (30.42)	0	2 (1.74)	37 (32.17)
41-50	16 (13.91)	2 (1.74)	2 (1.74)	20 (17.39)
51-60	12 (10.44)	1 (0.87)	1 (0.87)	14 (12.17)
≥61	6 (5.22)	1 (0.87)	4 (3.48)	11 (9.57)
Total	97 (84.34)	6 (5.22)	12 (10.44)	115 (100)

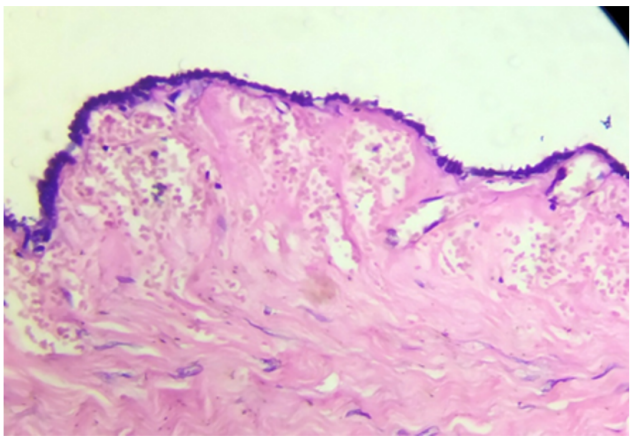

Figure 1: Serous cystadenoma (^{X} 40X) Cyst wall lined by single layer of ciliated cuboidal epithelium resting on a fibrocollagenous stroma

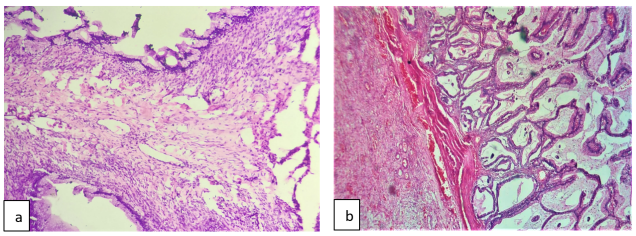

Figure 2: a): Mucinous cystadenoma (^{X} 10X) Cyst wall lined by simple non-stratified mucinous epithelium resting on fibrocollagenous stroma; **b)**: Borderline mucinous cystadenoma (^{X} 10X) Cluster of complex branched mucinous glands showing focal stratification with no stromal invasion

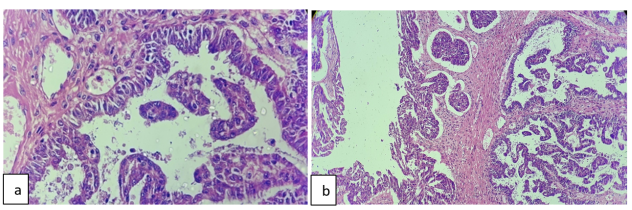

Figure 3: a): Serous carcinoma (^{X} 10X); **b)**: Serous carcinoma (^{X} 40X) Tumour cells showing papillary architecture with solid nests infiltrating the stroma

This distribution aligns with previous research reported by Thakkar NN et al., where benign tumours accounted for 84.50% of cases, borderline tumours for 2.30%, and malignant tumours for 13.20%.[14] Similarly, Kuladeepa A VK et al. conducted a study showing comparable

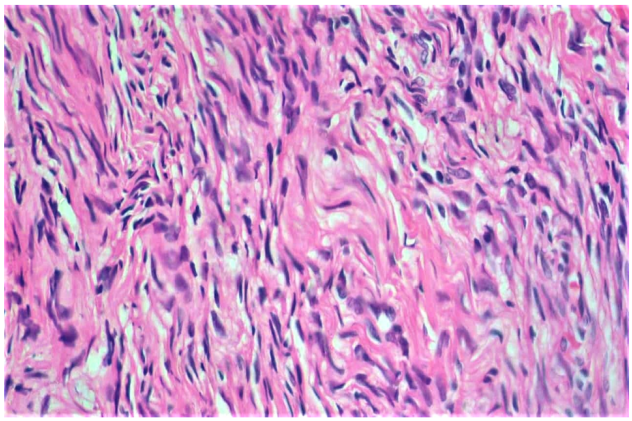

Figure 4: Ovarian fibroma (x 40X) Spindled cells with bland nuclei and scant cytoplasm arranged in intersecting bundles admixed with collagen

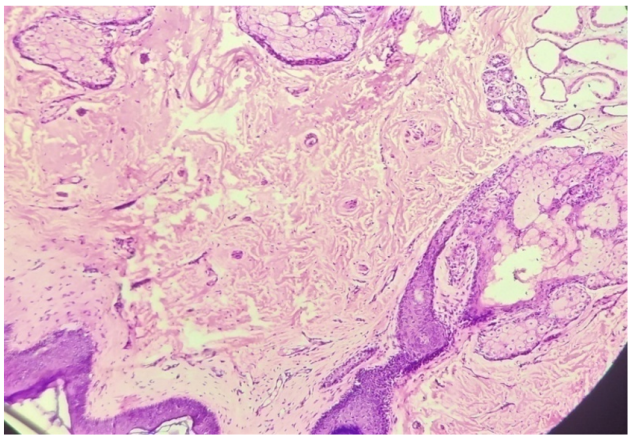

Figure 5: Mature teratoma (x 10X) Squamous epithelium seen with underlying adnexal structures

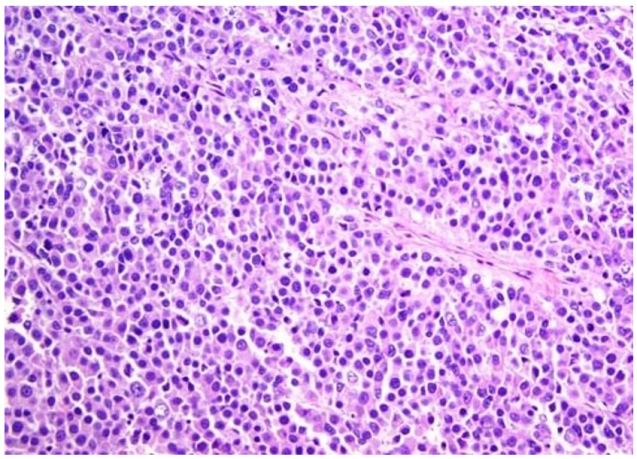

Figure 6: Dysgerminoma (x 10X) Nests and sheets of dysgerminoma cells separated by fibrous septa containing lymphocytes

results, with benign tumours comprising 82.35% of cases, borderline tumours 3.68%, and malignant tumours 13.97%.[15]

Surface epithelial tumours constituted the majority in this study, with 95 cases (82.60%), followed by germ cell tumours with 14 cases (12.18%) and sex cord-stromal tumours with 4 cases (3.48%). This distribution is consistent with the findings of Krishna M and Maurya G, where epithelial tumours accounted for 77.70% of cases, germ cell tumours for 15.50%, and sex cord-stromal tumours for 6.10%.[16] Another study by Badge S et al. yielded similar results, with surface epithelial tumours comprising 77% of cases, germ cell tumours 16%, and sex cord-stromal tumours 6%.[17]

The age distribution in this study revealed the highest number of cases in the 31-40 years age group, followed by the 21-30 years age group. These findings align with the study conducted by Kuladeepa A VK et al., which reported 36.61% of cases in the 31-40 years age group and 22.32% in the 21-30 years age group.[15] However, in the study conducted by Pilli G S et al., the maximum number of cases (marginally higher) were seen in the 21-30 years age group (30.11%), followed by the 31-40 years age group (28.25%).[18]

Most cases in this study were unilateral (95.65%) while bilateral tumours accounted for 4.35% of cases. This distribution agrees with the findings of Misra R et al., where 95.50% of cases were unilateral and 4.50% were bilateral.[19] Another study by Prabakar et al. also reported similar results, with 90.90% unilateral cases and 9.10% bilateral cases.[20]

Grossly, most tumours in this study (67.82%) exhibited a cystic consistency. Benign tumours were predominantly cystic (62.60%) or mixed (solid and cystic) (19.10%), while malignant tumours showed mixed consistency (6.10%) followed by solid consistency (3.50%). Borderline tumours (5.22%) were exclusively cystic. These findings are consistent with the study conducted by Shaik M et al., where the majority of tumours were cystic (31.50%), predominantly benign, and malignant tumours were mostly mixed in consistency.[3]

6. Conclusion

The incidence of ovarian neoplasms is increasing at a significant rate and the pattern of distribution of these tumours show immense geographical variation. The occurrence of malignancies is increasing in younger age groups and most patients are presenting at late stages. An accurate histopathological diagnosis combined with clinical staging will help in rendering prompt and appropriate treatment to patient. It is important to note that early detection and treatment are key to improving the prognosis for patients with ovarian neoplasms. Therefore, regular check-ups and screenings for women at risk, such as those

with a family history of ovarian cancer or certain genetic mutations, are essential for catching the disease early and increasing the chances of successful treatment.

7. Source of Funding

None.

8. Conflict of Interest

None.

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