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Original Research Article

Histopathological Spectrum of Ovarian Tumors in a Tertiary Care Hospital

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Abstract

Ovarian cancers account for about 3% of all cancers in women and is one of the leading causes of mortality among all cancers of the female genital tract. The study aimed to record the histopathological spectrum of ovarian neoplasms over two years in a tertiary care hospital. This retrospective study was done for a period of 2 years (JUNE 2017 to JUNE 2019) in the Department of Pathology, Narayana Medical College, Nellore. Here we studied 114 cases of ovarian mass specimens, which were fixed in 10%formalin. 4-5micrometer thick sections were cut on a microtome and stained by H and E stain for Histopathological Examination. In this study, 114 cases of ovarian neoplasms were analyzed. Out of these, 101 were benign, three were borderline and 10 were malignant. Histopathologically, surface epithelial tumors were the commonest (96). The second most common was germ cell tumor (10) followed by sex cord-stromal tumors (8). Benign tumors were frequent in 31-40 years of age, borderline tumors in 21-30 years of age, and malignant tumors in 41-50 years of age group. Ovary is a common site of neoplasia in the female genital tract and usually presents with a variety of clinicomorphological and histological features. The study revealed an increased incidence of malignancy because patients usually present in advanced stages of the disease, and this is an alarming finding.

Keywords: Ovarian Neoplasms, Benign, Malignant.

INTRODUCTION

Ovarian cancer is the 5th most common malignancy among women and the 2nd most common gynecological cancer. It is one of the most common cause of mortality due to malignancy of the female genital tract. Ovarian malignancies constitute about 25% of malignant tumors of the female genital tract [1-4]. The incidence of ovarian carcinoma is greater in high-income countries compared to middle and low-income countries. Around the world, the incidence rate of ovarian carcinoma is 11 per 100,000 in Central and Eastern Europe, 5 per 100,000 in Africa, 11.7 per 100,000 in the US, and 4.1 per 100,000 in China [2]. An increasing trend of this cancer has been observed since 1982 to date. The projected number of cases for this cancer in India for 2015 and 2020 are 45,231 and 59,276, respectively [5]. These tumors behave in a diverse way and generally escape detection until they attain a larger size. Natural history and the response to treatment vary considerably from one group of tumors to another. As there are no screening tests for ovarian tumors and these tumors cannot be clearly distinguished from each another on the basis of their clinical, radiological or gross characteristics, it is important to determine the histological pattern of ovarian tumors to achieve the optimum treatment response as prognosis depends on the degree of differentiation [1]. The study aimed to find out the histopathological spectrum of ovarian neoplasms (both benign and malignant) over a period of two years at Narayana medical college, Nellore

MATERIAL AND METHODS

This retrospective study was done for a period of 2 year (April 2017 to March 2018) in the Department of Pathology, Narayana Medical College and Hospital, Nellore. Here we studied 114 cases of ovarian mass specimen received and fixed in 10%formalin. For proper fixation, tumors were cut serially at 1cm thickness. After fixation for 24 to 48 hours, sections were given from representative areas. A minimum of four sections from the tumor was taken. 4-5micrometer thick sections were cut on a microtome and stained by H and E stain for Histopathological Examination. The detailed case history was taken with clinical

examination data, and we studied the correlation of histopathological pattern with the tumors and classified as per WHO classification of ovarian tumors.

RESULTS

A total number of 114 cases of primary ovarian tumors were studied. Benign tumors were frequent in 31-40 years of age, borderline tumors in 21-30 years, and malignant in 41-50 years of age group (Table-3).

Distribution of ovarian neoplasms according to histological types

Histopathologically, epithelial tumors were the commonest (96). The second most common was germ cell tumors (10), followed by sex cord-stromal tumors (8) [5].

Distribution of Surface Epithelial Tumours

Amongst 96 surface epithelial tumors, 8 were malignant, 03 borderline and 85 benign. On further sub classifying, there were 54 serous tumors, 40 mucinous tumors and 02 Brenner tumor.

Germ cell tumors were next in descending order. They comprised a total of 10 cases. Among these, 8 of them were mature cystic teratoma or dermoid cyst and 2 were Mixed Germ Cell tumor. Sex cord-stromal cell neoplasms were 8 in number, among them 5 were fibroma and 3 were Granulosa cell tumor.

Table-1: Distribution of Ovarian Neoplasms according to Histological Type

TYPE	NUMBER	PERCENTAGE
EPITHELIAL TUMORS	96	84.21%
GERM CELL TUMORS	10	8.77%
SEX CORD STROMAL TUMORS	8	7.01%
TOTAL	114	100%

Table-2: Distribution of Surface Epithelial Tumours

Type of Tumor	Benign	Borderline	Malignant	Total
SEROUS	52 (54.16%)	-	02 (2.08%)	54 (56.25%)
MUCINOUS	31 (32.30%)	03 (3.13%)	06 (6.25%)	40 (41.67%)
BRENNER	02 (2.08%)	-	-	02 (2.08%)
TOTAL	85 (88.54%)	03 (3.13%)	08 (8.33%)	96 (100%)

Table-3: Age wise distribution of the major tumor categories

AGE (yr)	BENIGN	BORDERLINE	MALIGNANT	TOTAL
21-30	26 (22.81%)	2 (1.75%)	1 (0.88%)	29 (25.44%)
31-40	34 (29.82%)	-	2 (1.75%)	36 (31.58%)
41-50	20 (17.54%)	1 (0.88%)	4 (3.51%)	25 (21.93%)
51-60	13 (11.40%)	-	2 (1.75%)	15 (13.16%)
>60	8 (7.02%)	-	1 (0.88%)	9 (7.89%)
Total	101 (88.60%)	3 (2.63%)	10 (8.76%)	114 (100%)

Table-4: Nature of tumor

S. No	Nature of tumor	No. of cases (n=117)	Percentage (%)
1.	Benign	101	88.59
2.	Borderline	3	2.63
3.	Malignant	10	8.77
	Total	114	100

DISCUSSION

Ovary is subjected to monthly endocrine and traumatic insults during normal ovulatory cycles and becomes susceptible to tumorogenesis [5]. The concept of a fallopian tube origin for high-grade serous carcinomas arose initially from studies on women with BRCA1/2 germline mutations who were discovered at the time of prophylactic salpingooophorectomy to have areas of marked epithelial atypia in their fallopian tubes. The lesions, called serous tubal intraepithelial carcinoma (STIC), have since been described in association with spontaneous high-grade serous carcinoma arising from the fallopian tube. A recent alternative hypothesis is that the cysts arise from implantation of detached fallopian tube epithelium at sites where ovulation has disrupted the surface of the ovary [4]. Repeated ovulatory rupture and repair theoretically creates opportunities for malignant gene mutations. This may explain the apparent protective effect of oral contraceptives, late menarche, early menopause, multiparity, and breastfeeding. Each of these factors decreases the occurrence of ovulation [7]. Although no age group is free from the tumors, different tumors tend to involve different age groups

preferentially. The complex anatomy of the ovary and its peculiar physiology with the constant cyclical changes from puberty to menopause give rise to a number of cell types, each of which is capable of giving rise to tumors. Both primary and secondary tumors of the ovary are relatively frequent showing a variety of histopathological patterns [8]. Nulliparity, family history of cancer and genetic mutations are some of the risk factors associated with the development of ovarian neoplasms although not much is clear about the risk factors involved in this neoplasm as compared to other genital tumors.[9] Ovary is the second most common site for female cancers next only to breast and is associated with the highest mortality rate. It is mainly of the fact that these neoplasms manifest at a very late stage either stage III or IV and hence carry a poor prognosis. USG/CT/MRI can be misleading sometimes and cytology has its own limitations [10]. The histopathological type of ovarian tumor correlates with the prognosis as well. Hence histopathological diagnosis remains the mainstay in achieving an optimum treatment response [11]. WHO classification of the ovarian tumors is based on the tissue of origin of the tumors which have been found to arise from one of the three ovarian components- (1) epithelium, (2) the germ cells and (3) the stoma of the ovary. The vast majority of ovarian tumors are benign and these occur mostly in young women between the age of 20-45 years [12]. In our study, the majority of the cases were epithelial tumors. This observation is consistent with other studies like Naseer *et al*., [13], Kar *et al*., [14] and Pilli *et al.*, [15].

Table-5: Comparasion of our study with other studies

Histopathological type	Present study	Naseer *et al*., [13]	Kar *et al*., [14]	Pilli *et al*., [15]
Surface epithelial tumors	84.21%	81%	79%	70.9%
Germ cell tumors	8.77%	10.95%	16%	21.2%
Sex-cord stromal tumors	7.01%	2.7%	5.03%	6.7%

They constitute about two-thirds of all ovarian tumors. Epithelial tumors have traditionally been thought to derive from the epithelium that usually lines the outer aspect of the ovary, variously referred to as a surface, coelomic or germinal epithelium.

Out of the epithelial tumors, serous tumors constitute 30-40% and are common in the 4-5th decade. In our study, 54 cases were serous tumors, out of which 02 were malignant, and 52 benign (Figure 1 & 2). Next is a mucinous tumor, which constitutes 20-25% of all ovarian tumors. Most of these tumors are usually unilateral multilocular cystic masses containing viscous mucoid material [16]. In our study, we found 40 cases of mucinous tumor, out of which 31 were benign, 3 were borderline and 6 were malignant (Figure 3 & 4). They occur principally in the middle adult life and are rare before puberty and after menopause. Mucinous tumors are known to produce large cystic masses. In our study mucinous tumors as large as (20x15cm) were found. All the cases found in our study were unilateral tumors. Transitional cell tumors contain neoplastic epithelial cells resembling urothelium and are usually benign. They comprise roughly 10% of ovarian epithelial tumors and are also referred to as Brenner tumors [10]. In present study, two Benign Brenner tumors were noticed. Microscopically, in the Benign Brenner, there were nests of proliferating epithelial cells, mainly of transitional type embedded in the fibrous stroma. No stromal invasion was present (Figure-6).

Fig-1: Serous cystadenoma showing cystwall lined by single layer of cuboidal epithelium (H&E, x100)

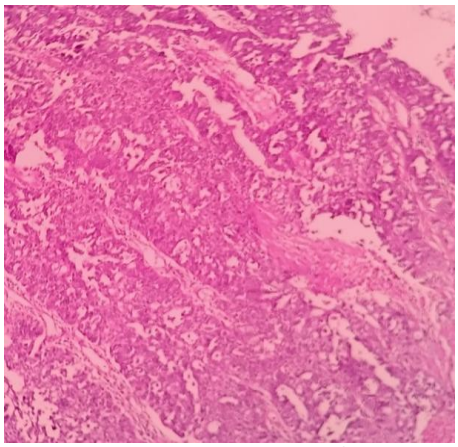


Fig-2: Serous cystadenocarcinoma showing infiltrating tumor cells into the stroma (H&E, x400)

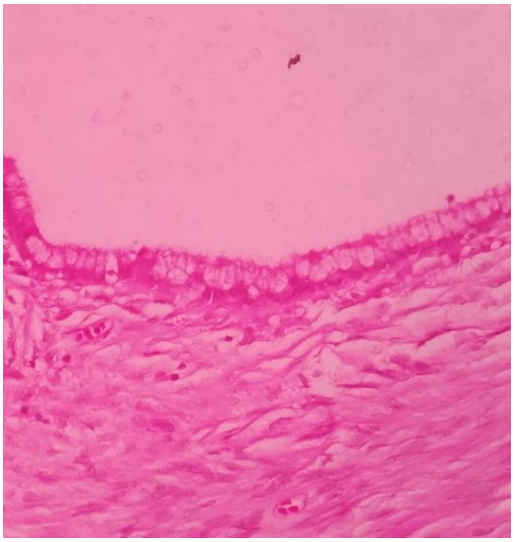


Fig-3: Mucinous cystadenoma showing cyst wall lined by columnar cells with apical mucin & basally placed nuclei (H&E, x400)

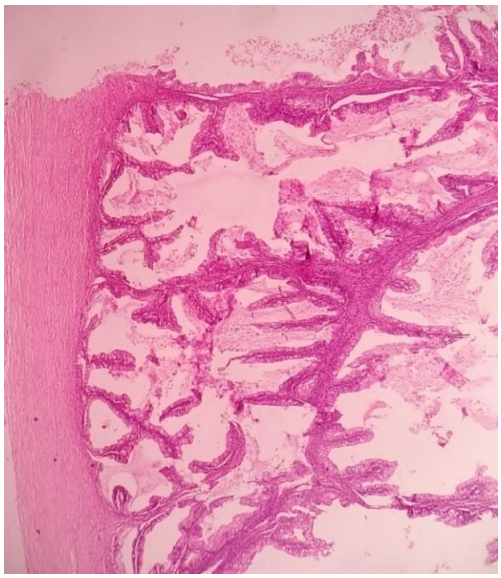


Fig-4: Mucinous cystadenocarcinoma showing expansile growth pattern (H&E, x400)

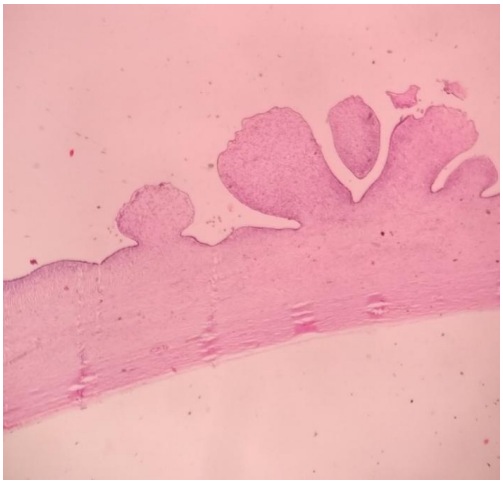


Fig-5: Papillary serous cystadenofibroma showing papillary structures with a prominent stromal component. (H&E, x400)

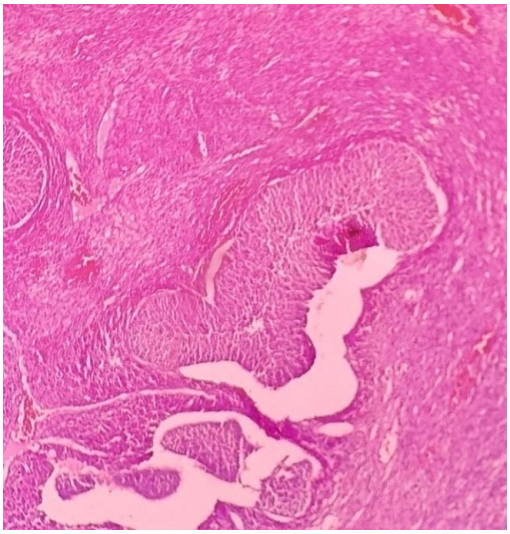


Fig-6: Brenner tumor showing well defined solid nests of transitional cells surrounded by dense fibrotic stroma (H&E x400)

GERM CELL TUMORS

Germ cell tumors constitute 15 to 20% of all the ovarian tumors. Most of them are benign cystic teratomas, found mostly in children and adults [9]. In our study, we found 8 cases of mature cystic teratoma or dermoid cyst in the age group of 15-35years. Grossly, these tumors were unilocular cysts containing tuft of hair and sebaceous material. Some of them also showed areas of calcification, and these were mostly enclosed within an opaque, gray-white wrinkled epidermis. Microscopy shows the cyst wall is lined by stratified squamous epithelium and with underlying sebaceous gland, hair follicles, calcifications etc (Figure-7). These are predominantly benign tumors with a very rare incidence (1%) of undergoing malignant transformation [10].

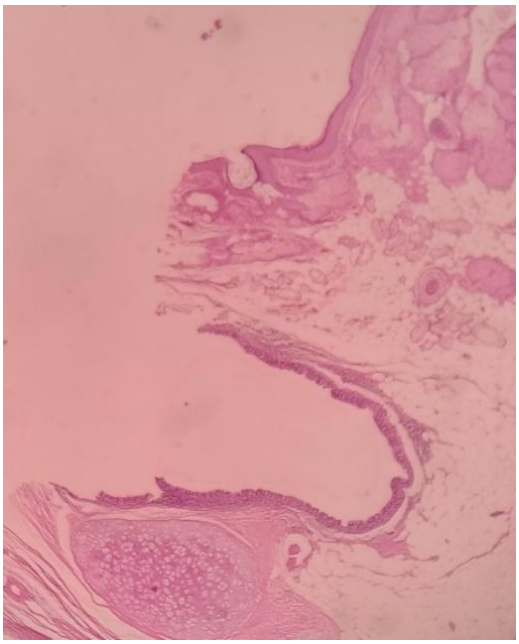


Fig-7: Teratoma showing all three germ cell derivatives (H&E, x40)

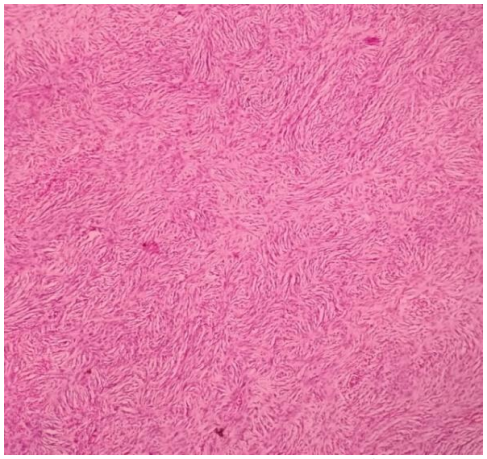
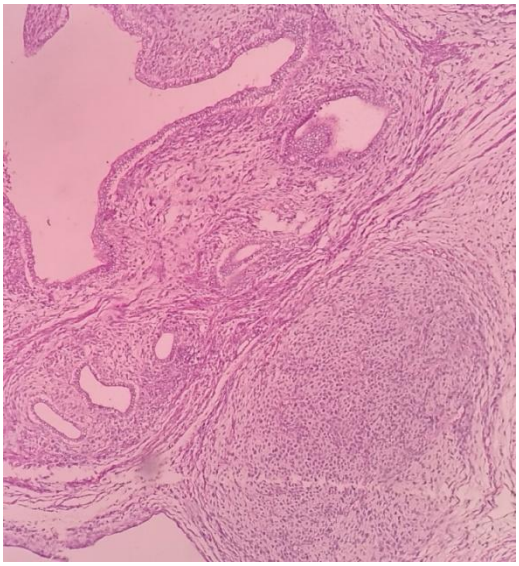


Fig-8: Fibroma showing intersecting bundles of spindle cells in a storiform pattern (H&E, x400)

MIXED GERM CELL TUMOR

During our study period, we found one case of mixed germ cell tumor, in a 40-year-old patient presented with abdominal pain and rapidly growing mass. The gross specimen was 10 X 8 X 6cms in size, smooth and glistening external surface, cystic and solid areas on cut surface with hemorrhage and necrosis. Microscopy shows dysgerminoma and yolk sac tumor as its component. Dysgerminoma componenet shows tumor cells were present in sheets separated by scant fibrous stroma which were infiltrated by lymphocytes [9]. The cells were large, vesicular having a clear cytoplasm, well-defined cell boundary and centrally placed nucleoli. Yolk sac tumor component shows pathognomonic Schiller Duval bodies were seen, which is a glomerulus-like structure composed of a central blood vessel enveloped by tumor cells within a space that is also lined by tumor cells (Figure 9 & 10).



Fig– 9: Mixed Germ Cell Tumor (H&E, X100)

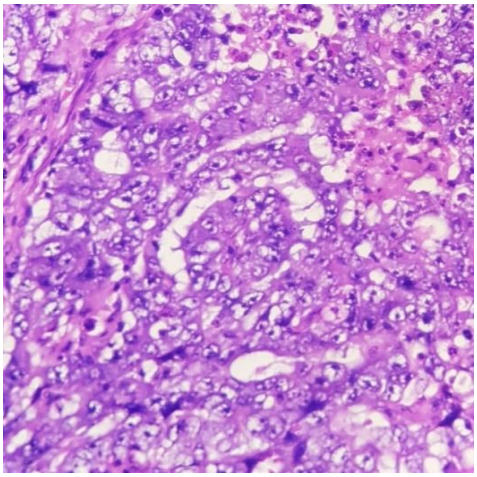


Fig-10: Mixed Germ Cell Tumor Showing Schiller-Duval Body (H&E, X400)

SEX CORD-STROMAL TUMORS

These ovarian neoplasms are derived from the ovarian stroma, which in turn is derived from the sex cords of the embryonic gonad [4]. In our study, we encountered 8 such cases, 5 cases of Fibroma and 3 cases of Granulosa cell tumor were seen.

Fibroma

They normally account for 4% of all ovarian tumors. In the present study 5 cases of Fibroma were reported in the females of average age group of 50 years. Grossly tumors are solid with cutsection showing white or tan yellow appearance. Microscopy shows spindle cells arranged in whorls and fascicles. Nuclei are bland, wavy with moderate amount of eosinophilic cytoplasm (Figure-8).

Granulosa Cell Tumor

In our study, we found three cases of granulosa cell tumor in a elderly female who presented with postmenopausal bleeding and abdominal pain. Microscopically, there were small, cuboidal to polygonal cells growing in anastomosing cords and sheets. There was also the presence of characteristic Call-Exner bodies, which are gland-like structures filled with acidophilic material (Figure-11).

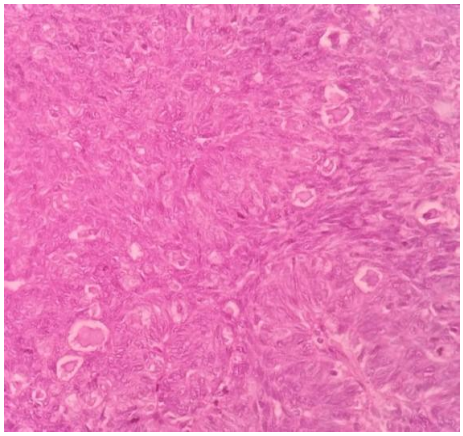


Fig-11: Granulosa cell tumor showing Call-Exner Bodies and nuclear grooving (H&E, X400)

CONCLUSION

Ovary is a common site of neoplasia in the female genital tract and usually presents with a variety of clinicomorphological and histological features. However, benign tumors are far more common than their malignant counterparts, with epithelial tumors being the commonest, followed by germ cell tumors. Present study shows increased incidence of malignancy in our set up because patients usually present in advanced stages of the disease, and this is an alarming finding. Based on the results of this study, it is evident that early diagnosis is very crucial to help in decreasing morbidity and mortality among these patients.

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