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Study of Various Gross And Histological Patterns of Ovarian Tumors

Dr.S.Selvi[1], Dr.J.Sahayaraj[2], Dr.B.Pushpa[3], Dr.R.Geetha[4]
[1]*(Assistant professor, Department Of Pathology, Kilpauk Medical College, The Tamilnadu Dr.MGR Medical University, India)*
[2]*(Professor, Department Of Pathology, Kilpauk Medical College, The Tamilnadu Dr.MGR Medical University, India)*
[3]*(Professor, Department Of Pathology, Kilpauk Medical College, The Tamilnadu Dr.MGR Medical University, India)*
[4]*(Professor and HOD, Department Of Pathology, Kilpauk Medical College, The Tamilnadu Dr.MGR Medical University, India)*

Abstract
Objective: *Ovary is a structure with an embryological, anatomic and functional complexity. Ovaries are resistant to diseases, still can be the seat of neoplastic lesions such as benign, malignant , primary, secondary and can be solid and cystic and exhibit mixed patterns with wide spectrum of histological types.*
Methods: *Retrospective study of ovary was done for period of one year at Department of Pathology, Kilpauk Medical College, Chennai. We studied 83 cases of ovarian tumors received in formalin, were subjected to histopathological examination. Immunohistochemistry was used as and when required.*
Results: *In total, 83 ovarian tumor specimens were examined. Out of which 74 cases (62%) were benign,3 cases (2.5%) borderline and 6 cases (5%) were malignant. Most common histological type was surface epithelial tumors (76%) followed by germ cell tumors (18%).*
Conclusion: *Epithelial tumors are the commonest variety of ovarian tumors. Our study is focused on incidence, bilaterality and age distribution of ovarian neoplasms. Spectrum of ovarian neoplasm is wide with harmless simple cystic lesions and fatal aggressive malignant lesions. The present study is aimed to observe the incident rates and distribution of the various neoplastic lesions of the ovary.*
Keywords: *ovary, tumor, gross, histological types.*

I. Introduction

Ovarian cancer is the second most common gynecological malignancy with the highest mortality rate of all gynecological malignancies and overall 5-year survival rate is around 46%. An important cause for this high mortality is the extensive disease at the time of diagnosis which makes it important to characterize these lesions early in its course. Detectionof various histological patterns of ovarian tumors are very important in diagnosis, prognosis as well as treatment of ovarian tumors. Prognosis of the tumors can also be predicted from the degree of differentiation of the tumors. Primary tumors are classified into surface epithelial tumors, germ cell tumors, sex cord stromal tumors, and miscellaneous tumors. Of the three main types, surface epithelial tumors are the most common .[1]

The present study comprised of 120 Ovarian lesions, received in the department of Pathology, Kilpauk Medical College, Chennai during one year period of study. Out of 120 ovarian lesions Studied, 83 lesions are observed as neoplastic lesions (69%). Incidence of bilateral lesions was 7.2% and unilateral incidence was 92.7%. Age of the patients varied from 13yrs to 64yrs with a peak incidence between 30yrs to 50yrs age group (72%). More than 80% of the lesions were in 20yrs to 50yrs age group. Age incidence of the benign lesion is earlier (13yrs to 50yrs) when compared to the incidence of the malignant lesions (35yrs to 66yrs). In the neoplastic lesions, surface epithelial tumors have the major percentage in both benign and malignant classifications. Serous cystadenomas are the commonly reported benign lesions (57%). Similarly the most common malignant lesions are serous cystadeno carcinomas (50%). Remaining 37 ovarian lesions showed features of cystic follicle, follicular cyst and endometriotic cyst.

Among all the ovarian tumors about 80% are benign, of which 55-65% occur in women less than 40 years of age. Parous women have lower risk as compared to nulliparous women. Etiology is not fully understood although both epidemiological and genetic association has been found. Borderline tumors constitute 10-15% of all malignant ovarian tumors, but they are enigmatic neoplasms that have caused confusion and apprehension, disproportionate to their incidence.[2] The studies on various tumor markers have contributed significantly for their role in helping in diagnosis, early detection, monitoring and management of radiotherapy, surgery and chemotherapy and also in predicting prognosis. The diagnostic

efficacy of tumor markers depends on the various factors such as sensitivity, specificity, positive predictive value and negative predictive value.[3]

The current study revealed the age incidence, distribution of various types of neoplastic ovarian lesions and the incidence of the common and rare types of the lesions of the ovary, reported in the department of Pathology, Kilpauk Medical College, Chennai during the study period.

II . Materials and Methods

This is a retrospective study of 83 ovarian tumors received in the department of Pathology for a period of one year (74benign, 3borderline and 6 malignant) received at histopathology section. All the specimens were fixed in 10% formalin for histopathological examination. Nature of specimens included in the study were unilateral and bilateral oophorectomy and pan hysterectomy specimens. Along with these, other tissues like omentum, peritoneal, pelvic and para-aortic lymph nodes were also received in some malignant lesions. Relevant clinical data i.e., clinical symptoms, examination findings, ultrasonographic findings, tumor marker levels were obtained from the requisition forms sent along with the specimens and also from the record book of the patients. Appropriate grossing of the ovarian masses was done on the basis of the correct dimensions, weight of the mass and the examination of the external findings and study of cut surface of the mass. The sections were taken from each 1cm of the maximum diameter of the tumor. In cystic lesions all the locules whether unilocular and multilocular were opened and examined. Sections were taken from cyst walls, solid and papillary areas, and any unusual areas (hemorrhagic, calcified areas etc). Also sections from uterus, cervix, fallopian tubes, omentum and lymph nodes were taken. Paraffin blocks were prepared, cut and stained with routine Hematoxylin and Eosin stain. Special stains like reticulin, PAS etc., were used wherever required.[4] They were examined grossly according to the standard guidelines, with special emphasis to the size of tumor and presence of capsular breach. Then paraffin embedded tumor section were made in usual manner and thin sections of 5 microns cut by microtome and sections were stained by haematoxylin and eosin stain.

Patients with pelvic or pelviabdominal masses diagnosed as primary ovarian masses by clinical data and USG findings were included in this study. Ovarian masses with GIT lesions, endometrial carcinoma, and cervical carcinoma were excluded from the study. Finally a detailed study of ovarian lesions was done over a period of one year taking into account the following details of general incidence of ovarian lesions, Age incidence, Unilaterality (right or left) or bilaterality, gross appearances and histopathological features and also about common and rare lesions.

III. Observation

During the study period of one year, 700 gynaecolgical specimens were received in the department of Pathology, Kilpauk Medical College, Chennai for histopathological examination. In the present study of 120 ovarian lesions, 83 were neoplastic lesions (69%). Out of this benign lesions were 74(89%), 3 borderline lesions (2.5%) and malignant lesions were 6 (5%) of all ovarian lesion as shown in [Table 1].

In this part, salient features of the present study are discussed and compared with the other similar studies. [5,6]. In the present study, neoplastic lesions are recorded in the range of 13 to 66 years agegroup. Peak incidence is between 30 to 50 yrs age group, covering 67% of the lesions. Ganga S. Pilli et al (2002) [6] reported the peak incidence of ovarian tumors in the 3rd and 4th decades accounting 55.7%. Bhattacharya MM et al (1980) reported that the 2/3rd of the benign tumors were seen between 20 to 40 yrs and 2/3rd of the malignant tumors were seen after the age of 40 yrs. Present study correlates with the above studies. In neoplastic lesions, benign lesions are more unilateral when compared to malignant lesions. Out of 74 benign lesions, 69 lesions are unilateral (93.24%) and remaining 5 lesions are bilateral (6.75%). In 6 cases of malignant lesions 5 are unilateral lesions (83.33%) and bilateral are 1 lesion (16.67%) Ganga S. Pilli et al reported 92.2% of the benign lesions are unilateral and 74.2% of the malignant lesions are unilateral [6] which are correlated with the present study.

IV. Discussion

Ovarian tumors may remain unnoticed for a long period of time because of their anatomical location. These tumors cause abdominal pain and abdominal distension in majority of the cases. [7] Ultrasonography has demonstrated usefulness in the detection of ovarian cancer in asymptomatic women, but its value for the detection of early-stage epithelial ovarian cancer in women of increased risk is uncertain. Histopathology plays an important role to diagnose various patterns of ovarian tumors.

The commonest histopathological category of the ovarian tumors observed in our study was epithelial tumor followed by germ cell tumors.[Table 2] The most common benign tumor was serous cyst

adenoma followed by mature cystic teratoma. Serous tumors were found to be more common than mucinous . Similar results were submitted by Prabhakar et al. in which serous tumors were the commonest followed by mucinous tumors. [8] The study in Belgium by Pilli et al explored epithelial tumors to be the commonest variety constituting 70.9% of all the ovarian tumors. Second most common to be the germ cell tumors (21.2%) followed by sex cord stromal tumors (6.7%) and metastatic tumors (0.7%). [9] Surface Epithelial tumors account for about 60% of all true ovarian neoplasms. One third of all ovarian tumors are serous, and two thirds of these serous tumors are benign. By definition, serous tumors are characterized by a proliferation of epithelium resembling that lining the fallopian tubes. They are virtually all cystic, are most commonly seen in women in their 30yrs and 50yrs of age.

A. Benign lesions

Nearly half of the benign tumors come under the group of surface epithelial tumors which include surface epithelial serous, mucinous and rarely seromucinous tumors.

Distribution of benign lesions

1. Surface epithelial serous tumors :

In the present study, out of 74 benign lesions 44 cases are reported as surface epithelial serous tumors (59.45% of the benign lesions) and it is also a major part of overall neoplasms (44%). Age of the patients varied from 13yrs to 66yrs, with a peak incidence in 3rd and 4th decades. Unilateralism is observed in 41 cases (93.18%) and in 3 cases(6.81%) bilaterality was observed. Most of the tumors were of more than 10 cms in diameter. In a 60yrs old postmenopausal woman, a lesion of 15cms diameter was noted. Its surface was smooth and prominent vascular markings were noted. Grossly it was multiloculated and filled with serous fluid. Focal solid gray white areas were observed. Microscopy gave the picture suggestive of serous cystadenofibroma.

2. Surface epithelial mucinous tumors:

These have lower incidence rate when compared to serous type of surface epithelial tumors. In our study, only 12 lesions were reported as mucinous type (16.21%) of 74 benign lesions. 11 lesions are unilateral and 1bilateral lesion observed in the age of 20 to 40 yrs.

Already cut opened ovarian specimen received from a patient of 20 yrs age and other specimen is from 35 yrs aged woman. Grossly both were multilocular with mucoid material on their inner surfaces and no solid areas were found.[10] Microscopy showed the mucinous columnar epithelium confirming it as mucinous tumor. [11] The sections studied also showed the focal areas of calcification.

3. Mature cystic teratoma:

Out of 74 benign lesions of the present study, 15 lesions were reported as mature cystic teratomas (20.27%of the benign lesions) and this is 15% of overall neoplasms. Of 15 lesions, 13 were unilateral and the remaining 2 were bilateral. Age distribution is from 22yrs to 57yrs and had a peak in 3rd decade. In general these tumors were observed as globular masses, varying in sizes from 4cms in diameter to 13x9x6cms sized. On cut section, almost all the tumors showed the pultaceous material and tufts of hair. One lesion showed yellow greasy material in addition and the other lesion showed myxoid areas. Dark brown areas were also found in two lesions. Histology predominantly showed the ectodermal elements like squamous epithelial lining, hair follicles and other subepithelial adnexae. Myxoid areas in the gross were seen as cartilage microscopically and yellow areas were observed as adipose tissue, both were components of mesoderm. Incidence of the present study is 15% and comparable with theabove studies of Bhattacharya MM et al and Ganga S. Pilli et al. [5,6]

4. Struma ovarii:

Present study included 1 lesion reported as struma ovarii (1.35% of the benign lesions) which was unilateral and observed in 4th decade. Struma ovarii was observed as globular, firm and nodular masses of 2cms and 4 cms in diameter. Cut section showed solid gray white appearance with focal brown areas with partial cystic changes. Microscopically thyroid tissue was demonstrated as follicles along with normal ovarian structures.[12] Thyroid follicles filled with colloid and separated by thin fibrous septae were observed.

5. Fibrothecoma:

These are common in postmenopausal women. Only 5% are bilateral. In our study, 2 lesions were observed as fibrothecomas (2.70% of benign). All are unilateral and the age ranging from 20yrs to 40yrs. One lesion in 27yrs old patient was found as small as 6x5x3cms sized and the other lesion in 38yrs aged patient was as large as 13x10x8cms. Small lesions on cut section were solid gray white with focal yellow areas.

The larger lesions predominantly showed cystic areas with focal solid areas which are gray white. Consistency was variable with soft to firm. Microscopy showed thecoma cells with pale vacuolated lipid rich cytoplasm and bland oval nuclei. Spindle cells were also seen. Leutinized thecoma showed lutein cells individually and in nests.

B. Borderline lesions:

Borderline ovarian tumours are of low malignant potential having favorable prognosis and relatively of early age onset.[13] They comprise 4%–14% of all epithelial ovarian neoplasm's. In our study, all 3 lesions were reported as borderline serous tumours. Age groups ranged from 30-40yrs.Gross features with size ranging from 8cms to 12cm size,cut surface showed cystic locules with watery or mucinous cyst fluid with papillary projections .Microscopy showed broad, branching papillae (hierarchical branching) focally lined by stratified epithelium .Some cells appear free floating as an artefact of sectioning. Intracystic spaces were clear or contained mucin. There was no stromal invasion.

C. .Malignant lesions

Present study consisted of 6 malignant lesions (7.22% of neoplastic and 5% of overall ovarian lesions). Unilateralism wss observed in 5 lesions and remaining 1 lesion showed bilaterality. Age group ranged from 37yrs to 66yrs, seen in later age group than the benign lesions. Epithelial ovarian cancer is the fourth most frequent cause of death in women. Epithelial tumors are the most prevalent of the ovarian tumors, accounting for 90% of all ovarian malignancies. In the present study, all 6 were the primary malignancies and the epithelial malignancies were 4 in number comprising 60% of the primary malignancies. The epithelial malignancies in the present study included 3 serous malignancies, 1 mucinous cystadenocarcinoma as shown in [Table 3].

1.Serous cystadenocarcinoma:

3 lesions in present study were reported as serous cystadenocarcinomas (50% of malignant and 3.61% of neoplasms). These were observed in 40yrs to 60yrs age group. 1 lesion showed bilaterality. Boththe lesions were large masses. The size of the lesions varied from 5x3x3cms to 13x12x8cms. All the lesions were multi loculated on cut section and two lesions showed papillary excrescences on inner surface. [Fig.1] All the lesions were partly cystic and partly solid. The solid areas in three lesions showed gray brown areas. Inner surface of one lesion was observed as ragged. Capsular breach was observed in one case. Histology showed the epithelium resembling the fallopian tube epithelium with stromal invasion and cytological atypia.[14] Papillary tufting [Fig 2&3] was seen in two cases. Extensive areas of necrosis and congested blood vessels were observed in almost all the lesions.

2 .Mucinous cystadenocarcinoma:

One lesion in present study was reported as mucinous cystadenocarcinoma (16% of malignant lesions). This was unilaterally present in a patient of 66yrs old. The size of the lesion was 15x10x8cms. Cut section showed multilocular cysts . Mass was filled with mucinous material and the inner surface showed the papillary excrescences. The other lesion was also a multiloculated cystic lesion, filled with mucus and papillary excrescences were observed. Microscopically endocervical type of epithelium was found with malignant features. Omentum showed secondary deposits of the tumor. Fallopian tube showed changes of hydrosalphingitis.

3. Granulosa cell tumor:

Two out of 6 malignant lesions were reported as Granulosa cell tumors (33.33% of malignant lesions), seen in 37yrs and 42yrs aged patients as unilateral lesions with size of 3x2x2cms and 13x9x6cms respectively. Grossly they were solid gray white with cystic areas. [15] The opposite ovary was apparently normal in both the cases. Microscopically both the lesions showed the tumor cells arranged in sheets and trabecular forms with characteristic focal Call-Exner bodies (small cavities filled with eosinophilic material) and nuclei showing longitudinal grooves ("coffee bean").

The incidence, clinical appearance and the behavior of the different types of ovarian tumors was extremely variable. It is generally impossible to diagnose the nature of the ovarian tumor preoperatively just by clinical examination and even on exploration, though certain investigations like peritoneal fluid cytology, estimation of serum lactic dehydrogenase, fibrin degradation products and immunological tests have been reported to be of some help in predicting the nature of the pathology. Hence one has to depend on the microscopic appearance of the tumor for management of the ovarian neoplasms .[5]

V. Conclusion

Ovarian lesions are one of the common types of lesions found in the women of reproductive age group. Accurate diagnosis and typing according to recent and standard classifications like WHO Classification is helpful in the development of specific therapies, possibly including targeted therapies, for management of the various types of ovarian cancer. An attempt was made to study the age incidence, prevalence, morphological patterns and histological variants among various neoplastic lesions that occur in ovary. The results of the study are comparable with other similar studies and standard books substantiating the findings of the study.

Benign ovarian neoplasms are more common than malignant ones. The most common benign ovarian neoplasm is serous cystadenoma and the commonest malignant neoplasm is serous cystadenocarcinoma. The prevalence of malignant ovarian neoplasm increases with advancing age.

Early diagnosis and treatment can reduce the morbidity and mortality of the patient.

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Table 1:

Gross findings of Ovarian Tumors	
a) Size of the tumors	No of cases
<5cm	24
>5cm	59
b) laterality	
Unilateral	77
Bilateral	6
c) Cystic/Solid	
Unilocular cyst	14
Multilocular cyst	13
Solid and cystic	4
d) Cyst with Papillary Excrescences	
Benign lesions	8 (Serous cystadenoma)
Malignant lesions	4 (Papillary Serous cystadenoca-3,Papillary mucinous cystadenoca-1)

Table 2:

Distribution of ovarian neoplasms according to histological type		
Type	Number	Percentage
Surface epithelial tumors	63	76
Germ cell tumors	15	18
Sex cord stromal tumors	5	6
Total	83	100

Table 3:

Distribution of surface epithelial tumours		
Type of tumour	Number	Percentage
Serous tumours	48	79
Benign	42	87
Borderline	3	6
Malignant	3	6
Mucinous tumours	13	21
Benign	12	92
Borderline	0	0
Malignant	1	8
Total	61	

Gross Pictures

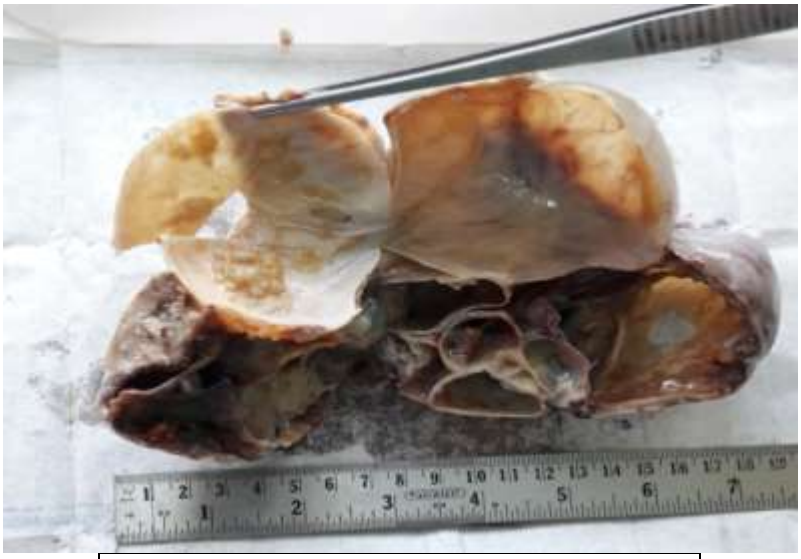

Fig 1: Grossly - Solid and cystic papillary lesion

Histopathology Pictures

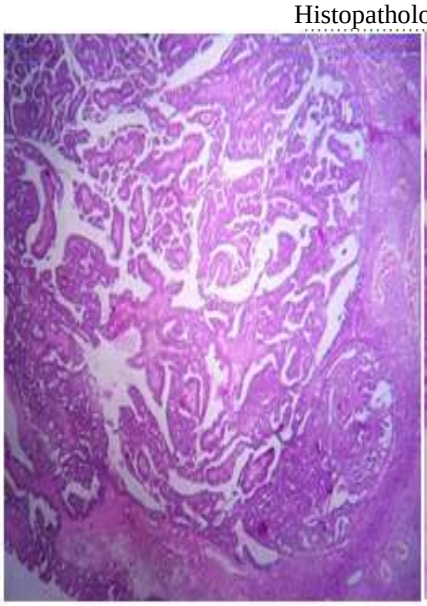

Fig:2-HPE X10 –Serous papillary cystadenocarcinoma

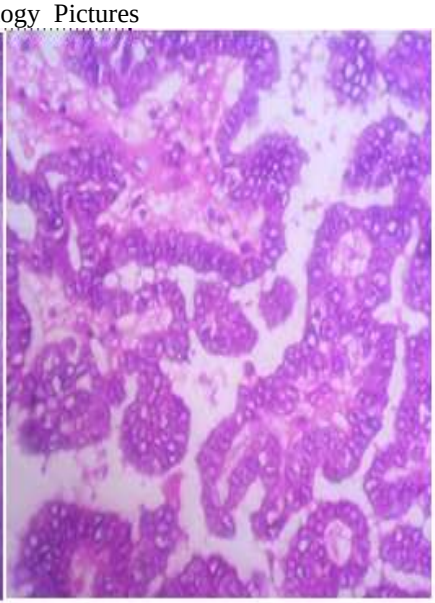

Fig 3: HPEX40- Serous papillary cystadenocarcinoma