Evaluation of the histomorphological diversity of various neoplasms of ovary

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Abstract

Introduction: Diagnosis of ovarian tumors depends basically on histopathological examination of samples. Morphological diversity of ovarian tumors poses many challenges. Awareness of occurrence and frequency of these patterns and cell types in various tumor and tumor like lesions is of paramount diagnostic importance.

Objectives: To evaluate the histopathology of lesions of ovary with regard to the standard classification of ovarian tumors and to determine the relative incidence of these histomorphological patterns among different age groups of patients

Materials and Method: Present study was retrospective and prospective study carried out at SVS Medical College, Mahabubnagar. A Total of 7 years study was undertaken out of which 5 years of retrospective and 2 years of prospective study was carried out. Sections were stained with H & E and special stains were done wherever necessary.

Results: Out of total 330 lesions, benign ovarian tumors constituted 81.2% while malignant ovarian tumors were 16.4%. Most common benign tumor was Serous Cyst adenoma and malignant tumor was Serous Cystadenocarcinoma.

Conclusion: The Diversity of neoplasms makes it mandatory to classify the tumors accurately by histomorphological features following universally accepted classification.

Keywords: Ovarian Tumors; Microscopy; WHO Classification of Ovarian Tumors.

Introduction

Ovary is unique in the variety of lesions that can arise from it. The anatomy of ovary is complex. Also its physiology is unique. There are cyclical changes taking place constantly and this can be the reason for the formation of tumors in the ovary.[1] This morphological diversity of ovarian tumors poses many challenges in diagnosis for both gynecologists and pathologists. The ovary is an exception to the Virchow's dictum. The primary and secondary malignancies of the ovary are common and also they show a variety of pathologic patterns.[2] The ovary accounts for 30% of all cancers of the genital tract in females and primary cancers are also common.[3] But mortality rate exceeds the combined mortality of both endometrium and cervical neoplasm. This is because malignant potential of primary ovarian tumor is inversely proportional to symptomatology. Menstrual disturbance are infrequent and acute pain is rare unless torsion occurs. Consequently many of the malignant ovarian tumors have had variable periods of time to grow and often involve the adjacent organs before any symptoms develop or recognition takes place. No age is exempt from these tumors; different tumors involve different age group.[2]

The objective is to differentiate the ovarian neoplasms from the non-neoplastic lesions which are often associated with abnormal hormonal manifestation, thus potentially mimicking ovarian neoplasm. Proper diagnosis is required in guiding therapy.[1] Despite the new techniques in imaging and genetics, the diagnosis of ovarian tumors is primarily dependent upon histopathological examination. Morphological diversity of ovarian tumors poses many challenges. Awareness of occurrence and frequency of these patterns and cell types in various tumor and tumor like lesions is of paramount diagnostic importance. Finally, clinical data, operative findings and gross histopathology of lesions may provide important and at times decisive diagnostic clues.[4] Hence present study was aimed to study the histo-pathological patterns of the ovary tumors in this part of region and thus offering a specific diagnosis which is paramount clinical significance.

Materials and Method

Present study was a retrospective and prospective study carried out for a period of 7 years, which included 2 years of prospective study from Aug 2010 to Aug 2012 and 5 years (Jun 2005 to Jul 2010) of retrospective study. Total of 330 cases inclusive of retrospective and prospective cases were studied. Hospitals registers of past 5 years were used as source of data for retrospective study. For prospective study, specimen received at the department of Pathology during two years of study was included.

The data related to each specimen was entered in the pre designed questionnaire.

The specimen was examined carefully. The gross pathological features of the specimen were noted and entered. The specimen was cut into layers and fixed with the help of 10% formalin. After 24 to 48 hours of fixing, from the specimen, multiple bits were taken.

Using standard protocol and procedures, the histo-pathological examination was carried out.

World Health Organization classification was used to classify the tumors.

Data was entered in the Microsoft Excel Worksheet and analyzed using appropriate statistical tests.

Results

Table 1: Distribution of Ovarian Tumors

Tumor	No. of Cases	Percentage (%)
Benign	268	81.2
Borderline	8	2.4
Malignant	54	16.4
Total	330	100

There were 268 cases (81.2%) of benign and 8 cases (2.4%) of borderline neoplasms. Malignant tumors constituted 16.4% of cases.

Table 2: Histological classification

Tumors	No. of cases	Percentage (%)
Serous cystadenoma	132	39.7
Borderline serous cystadenoma	6	1.9
Serous cystadeno-carcinoma	21	6.5
Mucinous cystadenoma	66	20
Borderline Mucinous cystadenoma	2	0.6
Mucinous cystadenocarcinoma	12	3.6
Brenner's tumor	6	1.8
Cystadenofibroma	4	1.2
Benign cystic teratoma	41	13
Fibroma	14	4.2
Fibrothecoma	2	0.6
Leiomyoma	1	0.3
Hemangioma	1	0.3
Malignant Mullerian tumor	1	0.3
Granulosa cell tumor	1	0.3
Sclerosing stromal tumor	1	0.3
Endodermal sinus tumor	3	0.9
Endometrioid carcinoma	5	1.5
Malignant mixed germ cell tumor	3	0.9
Dysgerminoma	6	1.5
Krukenberg tumor	2	0.6
Total	330	100

The commonest ovarian tumor was serous cystadenoma constituting 39.7% (132) cases. Mucinous cystadenoma was the second most common tumor.

Table 3: Variation in size among ovarian tumors

Size in cm	Number of cases	Percentage (%)
< 10	206	62.4
11-20	110	33.3
21 - 30	14	4.2
Total	330	100

The smallest tumor was of size of 2×1×1 cm and diagnosed as cystadenofibroma. The largest tumor was of the size of 22× 19×10 cm in a 14 year old girl which was diagnosed as mixed germ cell tumor.

Table 4: Consistency of neoplastic lesions

Consistency	Number of cases	Percentage
Cystic	233	70.5
Solid	28	8.5
Solid & cystic	69	21
Total	330	100

Among 330 ovarian tumors, 233 cases (70.5%) were cystic tumors, 28 cases (8.5%) were solid tumors and 69 cases (21%) showed both solid and cystic tumors.

Table 5: Percentage distribution of surface epithelial tumors

Type	No. of cases	Percentage
Serous tumors	163	64
Mucinous tumors	80	31.4
Endometrioid tumor	6	2.3
Brenner tumor	6	2.3
Total	255	100

Among the surface epithelial tumors, the most common presentation was found to be serous tumors (64%) followed by Mucinous tumors in 31.4% of cases.

Table 6: Showing the distribution of number of cases and percentage of serous tumors in present study

Type	No. of cases	Percentage
Serous cystadenoma	118	72.4
Papillary serous cystadenoma	14	8.6
Serous cystadenofibroma	4	2.5
Serous borderline tumor	6	3.7
serous cystadenocarcinoma	21	12.8
Total	163	100

Among the total 163 serous tumors, most common was serous cystadenoma in 72.4% followed by papillary serous cystadenoma in 8.6%.

Table 7: Showing number of cases and percentage distribution of Mucinous tumors

Type	No. of cases	Percentage
Mucinous cystadenoma	66	82.5
Mucinous borderline tumor	2	2.5
Mucinous cystadenocarcinoma	12	15
Total	80	100

These constituted the second commonest tumors and included 80 cases of these 66 (82.5%) were benign 2 were of borderline malignancy and 12 showed malignant invasive Mucinous carcinomas.
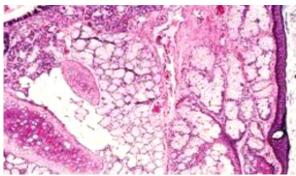

Fig. 1: Mature cystic teratoma producing skin, sebaceous glands, bronchial mucosa and cartilage.(H&E 40 x)

Fig. 2: Sclerosing stromal tumor Low power field show a pseudolobular appearance composed of cellular nodules separated by edematous hypocellular fibrous tissue. (H&E stain 10 x)
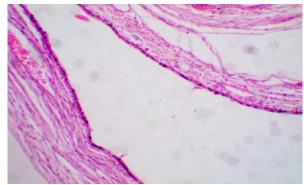

Fig. 3: Serous Cystadenoma showing cuboidal epithelium lining and the stroma contains fibroblasts and collagen.(H&E 10 x)
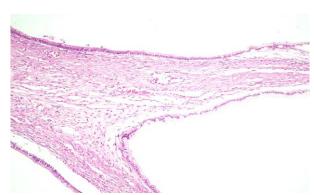

Fig. 4: Mucinous Cystadenoma showing lining of columnar cells with mucin (H&E stain 10 x)
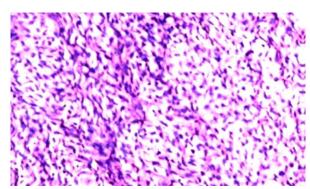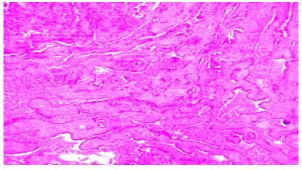

Fig. 5: Fibrothecoma showing oval to spindle shaped cells with round nuclei and vacuolated cytoplasm (H&E stain 40 x)
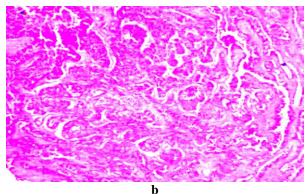

a

b

Fig. 6a, b: Serous Cystadenocarcinoma (H&E stain 10 x & 40 x)
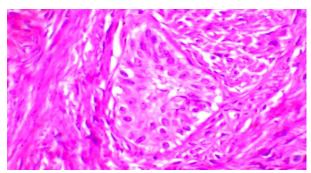

Fig. 7: Brenner's tumor showing solid nest of tumor cells with coffee bean appearance of nuclei (H & E 40 X)
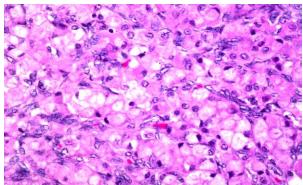

Fig. 9: Krukenberg tumor of ovary showing Signet ring cells.(H &E 40x)

Discussion

Total of 330 cases of ovarian tumors were studied in the department of Pathology, SVS Medical College and Hospital over a period of 7 years including 2 years(Aug 2010 to Aug 2012) of prospective and 5 years (June 2005 to July 2010) of retrospective study.

Out of 300 cases of neoplastic lesions, 81.2% were benign lesions, 2.4% were borderline lesions and 16.4% were malignant lesions. Other studies also found finding matching with present study.[5,6,7,3] The tumors of ovary can occur even in children and in old age. Maximum cases in the present study were seen in 2nd to 4th decade. Similar findings were reported by Pilli et

al,[7] Ramchandran et al.[8] High incidence in the fourth decade was observed by Kar et al.[9] We found majority of malignant tumors in fourth decade which is in concordance with Ramachandran G et al.[8]

In the present study we found that 50% of patients had abdominal pain, mass in abdomen, ascites along with menstrual irregularities. Pain in abdomen was the most common symptom. Similar finding was reported by Pilli et al[7] who also observed that abdominal pain was common. But, cases presenting as mass per abdomen were less in the present study as related to other studies.[5,6]

World Health Organization classification was used to histologically classify 330 neoplastic ovarian tumors. Similar findings were observed by Kar et al,[9] Pilli et al,[7] and Nalina et al[11] but the study results of Gupta SC et al[10] showed more incidence comparatively.

Serous cyst adenoma was the most common individual tumor (39.7), followed by Mucinous Cystadenoma (20%). Among malignant tumors Serous Cystadenocarcinoma (6. 5%) was found in majority followed by Mucinous cystadenocarcinoma (3.6%). Endometrioid carcinoma (1.5%) was the third most common malignant epithelial tumor. Gupta SC et al[10] also found similar findings. Among 54 cases of Germ cell tumors, mature cystic teratoma was seen in 13% of cases. Among malignant lesions Dysgerminoma was commonest accounting for 15%. Misra RK et al,[10] Prabhakar BR et al[1] and Gupta SC et al noted similar observations. In present study, 3 cases of Malignant Mixed Germ cell tumors has been studied out of which one case presented with a rare combination of Immature teratoma with Yolk sac tumor. New cases of sex cord stromal tumor were less in the present study, only 1.2% and similar observations was reported by other authors also.[3,12,1] Incidence of Metastatic tumors was less accounting for 0.6% of total neoplastic lesions having two cases of Krukenberg tumor. Incidence of Krukenberg tumor is consistent with other studies.[5,1,12]

After study of laterality of tumors, it was observed that majority tumors were unilateral i.e. 306 and remaining were bilateral. Similar findings were reported by other authors also in their studies.[12,1,5] But Kar et al[9] found opposite finding that in their study, the bilateral tumors were more. We found that 81.2% of benign tumors were unilateral. Similar finding was reported by other studies as well.[9,1]

Surface epithelial tumors: serous cystadenoma: Accounted for 132 cases (39.7%). Maheshwari V et al[6] and Misra RK et al[12] found 49% and 46.01% of incidence respectively.

In the present study, age range was seen between 30 to 50 years. 14 cases showed many papillary processes covered by single layer of cells. Six cases of benign serous tumors showed hemorrhagic infarction; which were clinically diagnosed as torsion. Similar findings were seen in study by Gupta SC[10] et al. Study

by Maheshwari et al[6] showed 1 case in her study. And we found four cases of serous cystadenoma.

6 cases (1.9%) of Serous Cystadenoma are seen by us. All the tumors were unilateral. Majority were cystic and the rest with mixed consistency. Microscopically epithelial stratification and nuclear atypia have been observed but stromal invasion was absent. Pilli et al[7] and Gupta SC[10] reported an incidence of Borderline Serous tumors 3% and 1% of respectively. 21 cases of serous cystadenocarcinoma accounting for 6.5% of all ovarian tumors have been observed in present study. 12% incidence was found by Randhawa et al[13] and 10.3% by Pilli et al.[8]

Mucinous tumors were second commonest group among surface epithelial ovarian tumors. 80 cases of this type were encountered and of these 82.5% were benign, 2.5% of borderline malignancy and 15% malignant in the present study. Krigman H et al[14] observed corresponding percentages of 81%, 14% and 5% respectively. Mucinous cystadenoma comprised 66 cases (20%) out of 330 cases of neoplastic lesions. Similar observations were noted by other authors also.[1,6] In Borderline malignancy, the tumor showed atypical cells with stratification of < 3 cell thickness without foci of stromal invasion. The mitosis was common. 12 cases (3.6%) of Mucinous Cystadeno-carcinoma were reported in our study.

Present study shows a great deal of diversity in the size, histological types and a lot other variations in the ovarian tumors. Thakkar NN et al[15] also concluded that due to its complex structure, primary ovarian neoplasms are of diverse histological types. Certain neoplastic lesions of the ovary frequently form a pelvic mass and potentially mimic on ovarian neoplasm. Their proper recognition is therefore important to allow appropriate therapy.

Benign tumors were more found to be more common than malignant tumors. Similar findings were reported by Modi D et al[16] and Thakkar NN et al,[15] Yogambal M et al.[17]

Conclusion

Majority of ovarian tumors were benign and very few i.e. less than 17% were malignant. On histological examination, a lot of diversity was found. The most common benign tumor was serous cystadenoma and the most common malignant tumor was serous cystadenocarcinoma. There was a lot of variation in the size also. Neoplastic lesions also were showing a lot of variation. Thus the ovarian tumors had shown a great deal of diversity in the present study. The Diversity of neoplasms makes it mandatory to classify the tumors accurately by histomorphological features following universally accepted classification.

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