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Study of histopathologic patterns of borderline and malignant ovarian tumor

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Abstract
Introduction: Ovarian cancer is the cause of a high case-fatality ratio, and most of the cases are diagnosed in late stages.
Aims and objectives: To find the frequency of different types of histomorphological types and their correlation with age, side and size distribution and how it helps in managements of these lesions.
Methodology: A retrospective analysis of all malignant ovarian tumours received and processed at the Pathology Department of Hassan institute of medical sciences.
Results: The ovarian tumours included 22 borderline and malignant cases. Surface epithelial tumours (Borderline and malignant tumours) was the most common accounting for 56.6%. Next common group was Sex cord stromal tumours constituting 26.1% followed by Germ cell tumours accounting for 17.3%.
Conclusion: There was single case of Tertoma, Endometrioid carcinoma and Malignant mixed germ cell tumour constituting 4.3%. Maximum number of cases occurred in 4th decade of life.

Keywords: Malignant, ovary, surface epithelium, tumors

Introduction
Ovarian cancers are a heterogeneous group of malignancies that arise from the various cell types that comprise the organ, including epithelial, germ cell and sex cord-stromal ovarian cancers [1]. They impose a great clinical challenge because most patients are asymptomatic until the disease has metastasized [2]. The increased risk of ovarian cancer particularly of surface epithelial tumors (SETs) is associated with use of hormone replacement therapy (HRT), tobacco consumption, family history of ovarian cancer and breast cancer and mutation of BRCA1 and/or BRCA2 [3]. This study was carried out to find the frequency of different types of histomorphological types of malignant tumours and their correlation with age, side and size distribution.
Malignant ovarian germ cell tumours however representing 20.3% of the cases while Burkitt's are most common in the first two decades of lymphoma and metastatic tumours represented life [4].
In more recent times the concept of 3 (2.8%) and 5(4.6%) cases respectively.
Ovarian Intra-epithelial neoplasia (OIN) has been Serous cystadenocarcinoma was the most gaining increasing consideration. This concept is frequent malignant histological subtype similar to the precursor lesions seen in the representing 31.5% of all the malignant vagina, cervix and prostate, and is based on the tumours, with a modal age range in the fifth observation that in patients that have ovarian decade, but no statistically significant laterality. cancer, tissues adjacent to the cancer or from the contralateral ovary often show areas of cellular These tumours were followed in frequency by and / or nuclear atypia believed to represent granulosa cell tumours, a subtype of sex-cord precursor lesions [5]

Materials and methods
This was a retrospective analysis of all malignant ovarian cancer cases, who underwent primary surgery at Hassan Institute of Medical sciences, from January 2013 to December 2017.
All case sheets were analyzed regarding patient age, histopathology and stage of disease. Histopathologic diagnosis was retrieved from the department of Pathology. WHO Classification of ovarian tumour is used in this study for classification.

Inclusion criteria

All cases of primary and metastatic malignant ovarian tumors which were diagnosed on clinical, radiological findings and confirmed by histopathologic findings were included in the study.

Exclusion criteria

All benign neoplasms of ovary are excluded from the study.

This retrospective study comprised all cases of borderline, malignant and metastatic ovarian tumours recorded in the Department of Pathology between January 2013 to December 2017. Relevant information such as as age and laterality of the neoplasms were obtained from accompanying pathology request cards followed by retrieval of the Haematoxylin and Eosin stained slides which had been produced from the biopsies of these cases. The slides were then reviewed and subsequently classified into major histogenetic groups based on the 2002 World Health Organization International Classification of Diseases-Oncology (WHO ICD-O) protocol. Results were analyzed according to SPSS 17 software.

Results

Twenty-two cases of borderline and malignant tumours were recorded in the study period and these represented 11.1% cases and each constituted 1.9% and 9.2% respectively of all the ovarian tumors(n=206) received. In this retrospective study majority of the patients were in 4th decade of life constituting 27%. The ages ranged from 11 to 70 years. The mean age is 38.31 years.

Table1. shows the histogenetic and age distribution of the various histogenetic classification. Surface epithelial tumours (Borderline and malignant tumours) was the most common accounting for 56.6%. Next common group was Sex cord stromal tumours constituting 26.1% followed by Germ cell tumours accounting for 17.3%.

Granulosa cell tumour was the most frequent malignant histologic subtype representing 26.1% with a modal age range 3rd to 5th decade of life. Regarding laterality of the tumour no significant difference was found as about 10 cases had right laterality and 09 cases had left laterality. Two cases had bilateral lesion composed of Brenners tumour of right ovary and borderline mucinous tumour of left ovary and other case had bilateral papillary mucinous cystadenocarcinoma.

Next in frequency was Brenner's tumour (17.4%) followed by serous cystadenocarcinoma (13.1%). Other cases include mucinous cystadenocarcinoma and dysgerminoma both accosting for 8.7% along with 4.3% each represented by endometroid carcinoma, immature teratoma and malignant mixed germ cell tumour (Embryonal and yolk sac tumour)

Among borderline tumour, only borderline mucinous cystadenoma was found constituting 13.1% occurring commonly in 2nd decade of life.

Table 1: Histogenetic classification and age distribution of borderline and malignant ovarian tumour

AGE		0-9	11-20	21-30	31-40	41-50	51-60	61-70	Total	%
Histogenetic classification										
Surface epithelial tumours	SCA			01			01	01	03	13.1
	MCA					01		01	02	8.7
	Borderline Mucinous Cystadenoma			02		01			03	13.1
	END CA							01	01	4.3
	BT			01		03			04	17.4
Germ cell tumours	IMT				01				01	4.3
	DYSG		02						02	8.7
	Malignant MGCT		01						01	4.3
Sex cord stromal tumours	GCT				02	02		02	06	26.1
Total			03	04	03	07	01	05	23	100%

SCA- Serous cystadenocarcinoma, MCA-Mucinous cystadenocarcinoma, END CA-Endometrioid Carcinoma, BT-Brenners tumour, IMT-Immature teratoma, DYSG- Dysgernminoma, MGCT- Malignant Germ Cell tumour, GCT- Granulosa cell tumour.

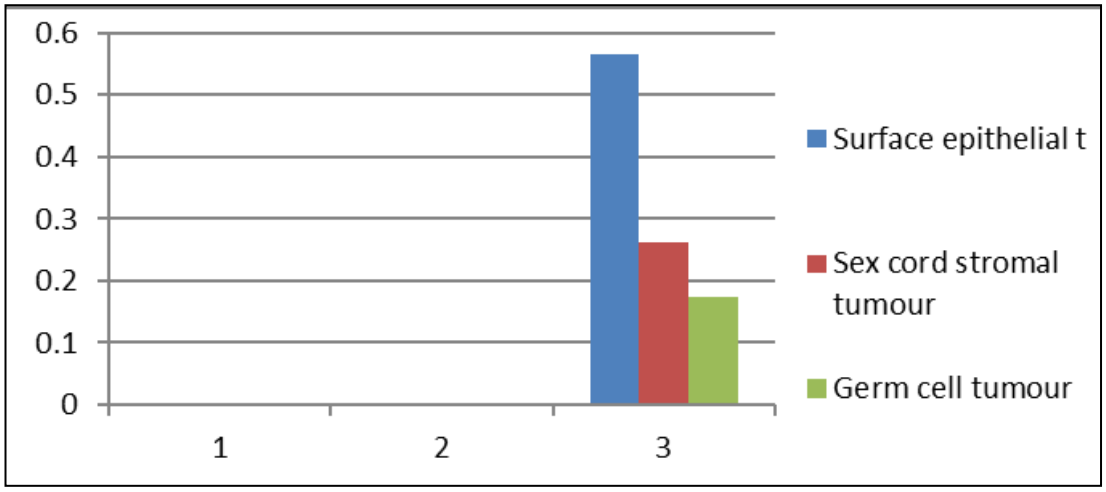

Fig 1: Diagrammatic representation of incidence of ovarian neoplasms.

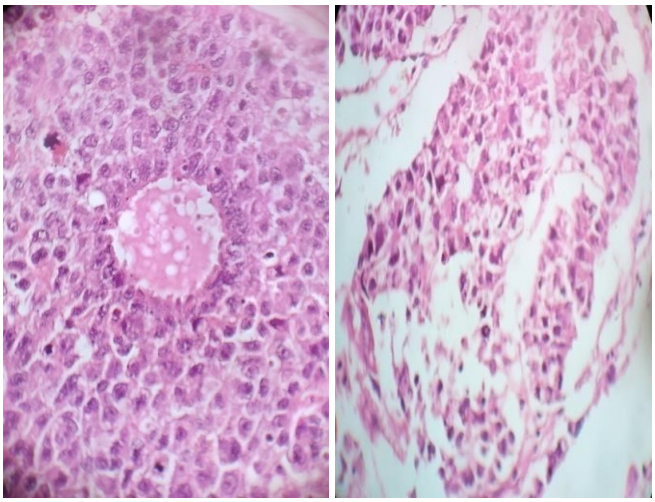

Fig 2: Malignant Mixed Germ cell tumour (Yolk sac tumour and Embryonal carcinoma)

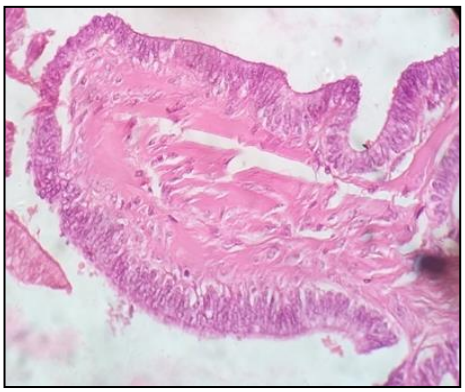

Fig 3: Papillary serous cystadenocarcinoma

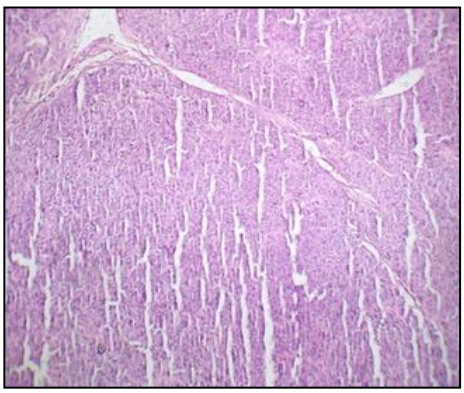

Fig 4: Granulosa cell tumour

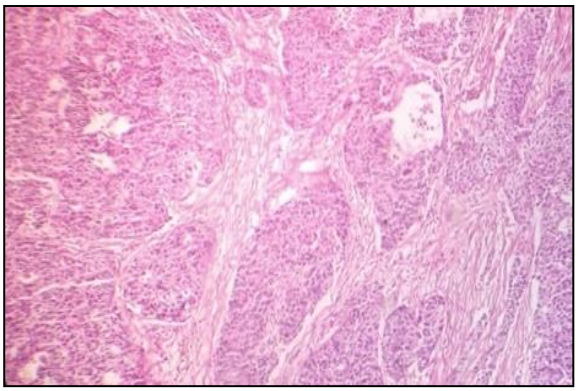

Fig 5: Malignant Brenners tumour

Discussion

Ovarian tumors constitute a major portion of all gynecological tumors. Ovarian cancer is the leading cause of death in females despite advances in diagnostic approaches and management protocols. Due to a variety of pathologic conditions of ovary having same clinical and radiologic findings as those of its tumors, the diagnosis of ovarian tumors may be difficult. Therefore accurate and timely diagnosis in such cases by a histopathologist, after studying their biopsy specimens, is very important to avoid complications and to save life of the patient at large [6].

WHO classification of ovarian tumours is based on the tissue of origin of the tumours which have been found to arise from one of three ovarian components: (1) surface epithelium (2) the germ cells and (3) the stroma of the ovary. Of the three main groups, epithelial tumours are the most common with serous and mucinous cystadenomas being the commonest epithelial tumours.

Histomorphological classification of ovarian tumours forms an integral part of the evaluation of the neoplasms [7].

In our study incidence of malignant ovarian tumours accounted for 9.2% which is in comparable with study done by Bashir S *et al.* in which incidence was reported to be 10% [8].

Surface epithelial tumours of the ovary were the commonly encountered tumors the study of Pilli *et al*. [9] and Gupta *et al.* [10] comparable to our study.

Another study done by Ahmed *et al.* also showed that surface epithelial tumours (63.5%) was the most common malignant ovarian tumour which is similar to our study (56.6%). In the same study germ cell tumours (27.13%) was the next common type followed by sex cord stromal tumour (5.84%) which was different from our study in which sex cord stromal cell tumour (26.1%) was the second most common type and germ cell tumour (17.3%) was the next common type [11].

In a similar study done by Atanda AT [12] results were comparable with our study results which showed most common tumour was surface epithelial tumour (44.5%) and second most common type was sex cord stromal tumour (27.8%) which is similar to our study.

For many years, it was assumed that the serous tumors are arising from ovarian surface epithelium (OSE) which is the part of the pelvic peritoneum overlies the ovary and lines the epithelial inclusion cyst. But in recent years, a new hypothesis of tubal fimbrial origin for serous carcinoma was given by many authors. Piek *et al*. found the dysplastic (termed as tubal intraepithelial carcinoma [TIC]) and hyperplastic lesions on fimbriae of 11 out of 12 prophylactic salpingo-oophorectomy specimens removed from BRCA mutations carriers, and showed increased proliferation and over-expression of p53 similar to the high grade serous ovarian tumors which also showed p53 mutation [13].

This hypothesis later supported by many authors [14].

Malignant germ cell tumours were the least frequent histogenetic group and constituted 17.4% of all ovarian neoplasms seen over the study period. This is in consistent with observations in the literature that have documented the incidence to be about 35% [15].

We reported two cases with bilateral ovarian lesion constituting for 9%, comprising of bilateral papillary mucinous cystadenocarcinoma and two different lesions comprising of Brenners of Right ovary and Borderline

mucinous tumor. Micii *et al*. stated that Bilateral carcinomas of the ovary vary in frequency depending on which tumor type is involved but can be found in roughly 25% of all ovarian cancer cases [16]

In the present study, the patient's age ranged from 11 years to 70 years and this was supported by the study done by GG Swamy *et al.* [17] where the youngest patient was 12 years old and the oldest was 70 years old.

Conclusion

Ovarian malignancy is the second most common cancer of the female reproductive system. Although the most common age group for malignant ovarian tumors is 51–60 years, significant number of tumors occurs between 41 and 50 years of age. Though surface epithelial tumours was the most frequently occurring group of tumours but granulose cell tumour was the most common tumour seen in present study. Occurrence of malignant epithelial tumours in younger age groups was also noted warranting larger population-based studies to verify the above findings and also define risk factors and identify the etiological factors.

There is also a need for establishment of immunohistochemical techniques in hospital laboratories.

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