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Original Research Article

A study of histological pattern of ovarian carcinoma in tertiary care Hospital Punjab

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Abstract

Background: ovarian cancers have become major health concern for women all over the world. It is the second most common cancer of female reproductive system and is the fourth leading cause of death from gynecologic malignancies.
Aim of the study: To find the incidence of ovarian carcinoma and their histological patterns in Punjabi population.
Material and methods: A retrospective study was done on 75 ovarian cancers received over a period of three years i.e. from June 2014 to June 2017in Government Medical College/ Rajindra Hospital, Patiala. The specimens were in the form of oophorectomies and pan abdominal hysterectomies.
 Results: in this study, maximum numbers of cancers were seen in 5th to 6th decade of life. Majority of them presented with mass and pain abdomen. Most of the carcinomas were less than 10 cm of size. 80% carcinomas were unilateral and remaining 20% were bilateral. Out of 75 cases, 77.3% were surface epithelial tumors, 10.7% were sex cord stromal tumors, 6.7% were germ cell tumors and 5.3% were metastatic.
Conclusion: Histomorphologically, majority of ovarian carcinomas were originating from surface epithelium. Serous cystadenocarcinoma was the most common. A very extensive sampling and careful histopathological examination should be done to rule out borderline cases. Histological typing is very important in management and knowing the prognosis of the patient.

Keywords: ovarian carcinoma, histological pattern

Introduction

Ovarian cancers have become major health concern for women all over the world.[1] It is the sixth most common cancer in females and the seventh most common cause of cancer death. It constitutes 3% of all cancers in women.[2] Ovarian cancers account 15% to 25% of all the primary malignancies in female genital tract.[3] It is the second most common cancer of female reproductive system and is the fourth leading cause of death from gynecologic malignancies.[4,5]

Knowledge of histological patterns of ovarian malignancies is important in diagnosis, treatment and its prognosis. Nulliparity and family history are considered as the risk factors for ovarian carcinoma. It may be seen in married women with low parity. Japan on the other hand has exception with low parity and low rate of ovarian cancer. A female's risk of having ovarian tumor at any time in her life is 6% to 7%, of having ovarian cancer is 1.5% and dying from ovarian cancer is almost 1%.[6]

Due to anatomical location of ovaries, they are difficult to access. Ovarian tumors are not detected until they have reached clinically in advanced stage or have attained a considerable large size to cause symptoms. Hence the precursor lesions are not recognized in ovarian tumors. They commonly present with abdominal pain, a lump or menstrual irregularities. [7] About 75-80% tumors are benign and seen mostly in young women between the age of 20 and 45 years.

The malignant tumors are more common in older females between 40 and 65 years of age. [8] Surface epithelial tumors account for 50-55% of all ovarian tumors, out of which malignant surface epithelial tumors constitute 90% of ovarian cancers in western world. Serous tumors are uncommon in 1st two decades. Mucinous tumors are seen mostly between 4th and 6th decade. They account for 12-15% of all ovarian tumors in western world. This figure is 20-23% for Japan. Germ cell tumors (GCT) account for 30 % of primary ovarian tumors and malignant germ cell tumors 3%. They are seen in 60% of cases under 21 years of age.

Ovarian cancer rate increases with age. In the United States, the annual incidence steadily increases from less than 3 per 100,000 women in age less than 30 and plateaus at 54 per 100,000 in the 75-79 year age group.[9] Determining the various histological pattern, stage and laterality is important not only for diagnosis, but also for prognosis. In this study we highlight the histomorphological patterns and clinical presentation of patients with ovarian cancers in a tertiary care hospital in Punjab.

Aim of the study

The aim of this study was to find the incidence of ovarian carcinoma and there histological patterns in the patients treated in Government Medical College/ Rajindra Hospital, Patiala.

Materials and Methods

This retrospective study included 75 cases of ovarian cancers studied over a period of 3 years i.e. from June 2014 to June 2017. The specimens were received from the department of Obstetrics and Gynecology, Rajindra Hospital / Government Medical College, Patiala. The specimens were in the form of oophorectomy specimen and pan abdominal hysterectomies with attached or separately lying adnexa. The data of brief clinical history with age, CR number, histopathological number, presenting signs and symptoms were recorded. FNAC findings of available cases were collected from cytology department. Routine hematological and biochemical investigations were recorded.

Ovarian markers like CA -125, AFP and beta-HCG values were obtained in certain numbers of cases. According to the standard grossing procedure, specimens were examined for size, color, external surface and areas of necrosis, hemorrhage and teratogenous structures on cut section. The tissues were processed and stained with Haematoxylin and Eosin. Other additional stains like PAS and mucicarmine were studied wherever necessary. The patients were divided into groups based on WHO classification of ovarian tumors and we studied correlation of histopathological patterns with age, bilaterality and grading of the tumor.

Observations and Results

In the time period of 3 years i.e. from June 2014 to June 2017, 75 cases of ovarian carcinoma were recorded. Age of the patients and their histopathological diagnosis were recorded. Patients were divided into seven age groups, with a difference of 10 years in each group.

Table1: Age wise distribution of ovarian carcinoma (n=75)

Age Group	No. of Cases	Percentage (%)
11-20	04	5.3
21-30	04	5.3
31-40	09	12
41-50	27	36
51-60	23	30.7
61-70	07	9.3
71-80	01	1.3
Total	**75**	**100**

In this study, the maximum incidence of ovarian carcinoma was seen in the age group of 41 to 50 years i.e. 27 cases accounting to 36%, followed by age group from 51-60 years i.e. 23 cases (30.7%). Minimum number of cases was seen below 30 years and over 70 years of age. The youngest patient was 19 years old and the oldest was 78 years old. (Table 1)

Table 2: Mode of presentation of ovarian carcinoma

Mode Of Presentation	Number Of Cases	Percentage (%)
Abdominal Pain	23	30.6
Mass Abdomen	19	25.3
Pain Abdomen With Mass	25	33.3
Menstrual Irregularities	05	6.6
Ascitis	02	2.6
Infertility	01	1.3
Lymphadenopathy	00	00
Total	**75**	**100**

Majority of the cases presented with pain and mass abdomen (25 cases; 33.3%) followed by abdominal pain (23 cases; 30.6%). Abdominal mass was seen in 19 cases (25.3%). Menstrual irregularities were seen in 5 cases (6.6%). Few cases presented with ascites (2 cases; 2.6%) and infertility (1 case; 1.3%). (Table 2)

Table 3: Size distribution of ovarian carcinoma

Size Range (Cm)	Number Of Cases	Percentage (%)
1-10	59	78.7
11-20	16	21.3
TOTAL	**75**	**100**

Majority of the cases (59) ranged from 1 to 10 cm and accounted for 78.7%. Rest of the cases (16) was in the range of 11 to 20 cm and accounted for 21.3%. Size of the largest tumor found was 19.5 X 19 X11.5 cms. (Table 3)

Table 4: Laterality of ovarian carcinoma

Laterality	Number Of Cases	Percentage (%)
Unilateral	60	80
Bilateral	15	20
Total	**75**	**100**

Majority of the cases were unilateral (80%) and bilateral cases accounted for 20%. (Table 4)

Table 5: Histological type of ovarian carcinoma

| Histological Type	Number Of Cases	Percentage (%)
Surface Epithelial Tumors	58	77.3
Germ Cell Tumors	05	6.7
Sex Cord Stromal Tumors	08	10.7
Metastatic	04	5.3
Total	**75**	**100**

Among 75 cases, maximum number of cases were of surface epithelial tumor (58 cases) and accounted for 77.3%, followed by 8 cases of sex cord stromal tumors (10.7%), 5 cases of germ cell tumors (6.7%) and 4 cases of metastatic deposits (5.3%).(Table 5)

Among 75 cases, 23 cases were of high grade serous carcinoma (30.7%), followed by 21 cases of serous cystadenocarcinoma (28%), 12 cases of mucinous cystadenocarcinoma (16%), 8 cases of granulosa cell tumor (10.7%), 3 cases each of mixed germ cell tumor and metastatic deposits from other sites of primary (4%).Rest included single case each of dysgerminoma, Brenner tumor, yolk sac tumor, Krukenberg tumor and invasive micropapillary serous carcinoma (1.3%).(Table 6)

**Table 6: Histological diagnosis of ovarian carcinoma**

| Histological Diagnosis	Number Of Cases	Percentage (%)
High Grade Serous Carcinoma	23	30.7
Serous Cystadenocarcinoma	21	28
Invasive Micropapillary Serous Carcinoma	01	1.3
Mucinous Cystadenocarcinoma	12	16
Brenner Tumor (Malignant)	01	1.3
Mixed Germ Cell Tumor	03	4
Dysgerminoma	01	1.3
Yolk Sac Tumor	01	1.3
Granulosa Cell Tumor	08	10.7
Metastasis	03	4
Krukenberg Tumor	01	1.3
Total	**75**	**100**
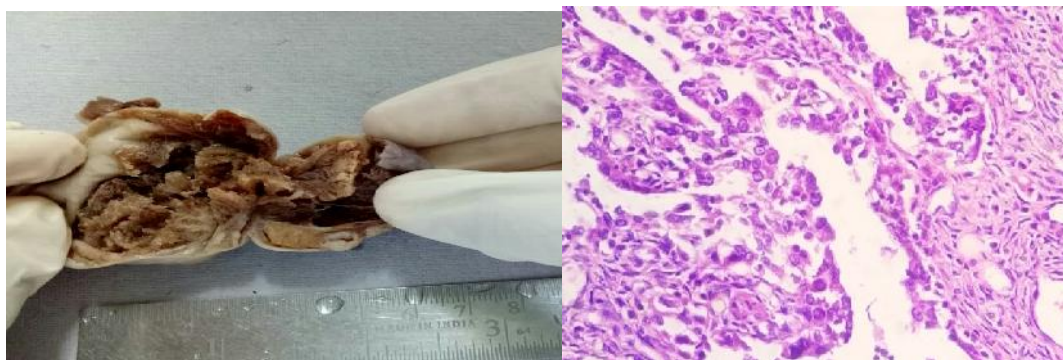
Fig 1.Serous cystadenocarcinoma: a) Grossly cut surface shows a cystic tumor with few solid areas.
Papillary excrescences also seen. b) On histology, moderately differentiated tumor composed of Papillae lined by pleomorphic cells.
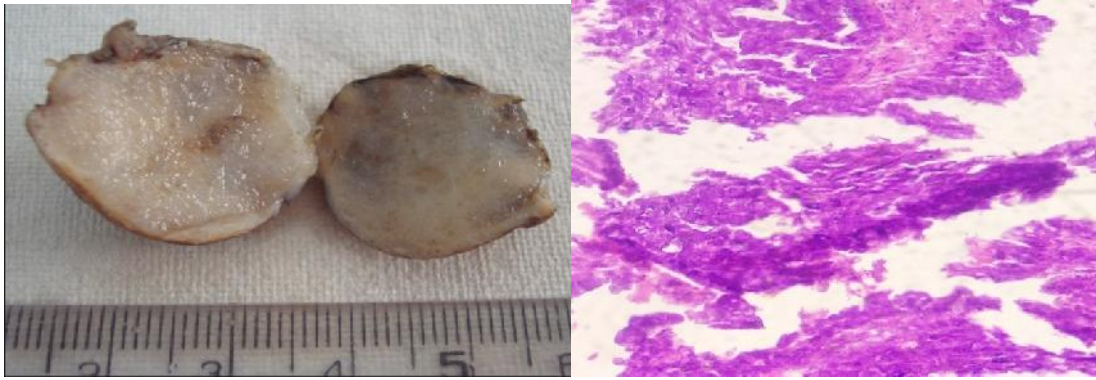
Fig 2.Mucinous cystadenocarcinoma: a) Grossly cut section show grey white glistening mucinous surface b) On histology, complex architecture and obvious nuclear atypia.
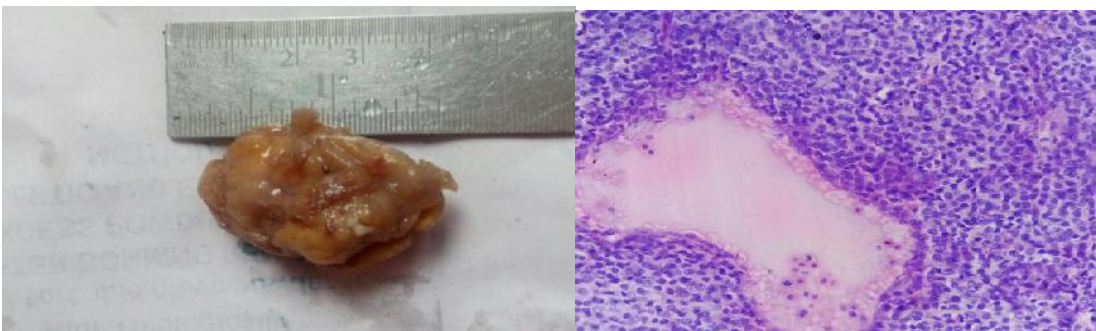
Fig 3.Granulosa cell tumor: a) Grossly external surface is grey yellow, lobulated and smooth. b) On histology, tumor is composed of diffuse sheets of tumor cells with round to oval nuclei, nuclear grooves and inconspicuous nuclei.
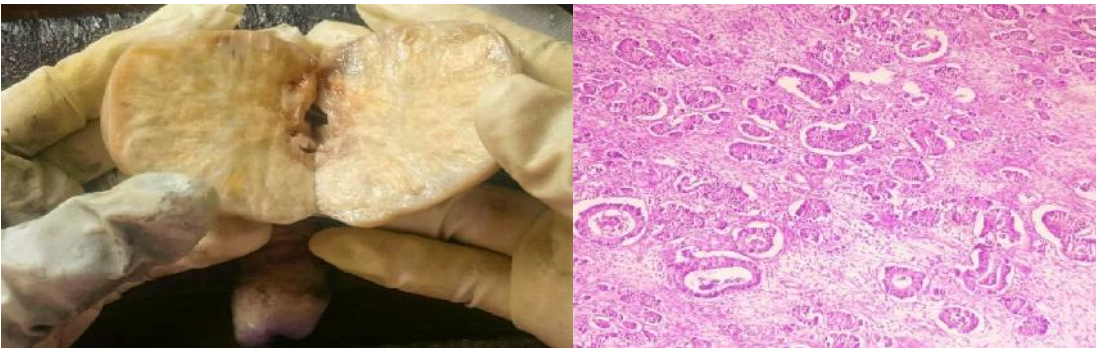
Fig 4.a) Metastatic deposits of adenocarcinoma in ovary: Grossly cut surface show multiple grey white areas (metastatic deposits) b) Microscopically, tumor is arranged in glandular pattern, lined by columnar epithelium. Tumor cells are pleomorphic, have high N: C ratio, hyperchromatic atypical nuclei and inconspicuous nucleoli.

Discussion

Like many cancers, ovarian cancer can be highly treatable if detected in early stages. However, many cases of ovarian cancer are not diagnosed until advanced stage, because the symptoms of ovarian cancer can be very subtle or unnoticeable until the disease has progressed significantly. They need extensive sampling while doing grossing because tumors with epithelial origin especially serous and mucinous tumors may include benign and borderline components in one area and malignant counterpart in other area. Extensive sampling includes up to 1 histological section per 1-2 cm of tumor diameter along with sections from suspicious areas.

Sometime it is difficult to differentiate primary tumor from metastatic carcinoma for e.g. from appendix, large intestine, stomach, pancreas or cervix. In such cases immunohistochemistry (CK-7 and CK-20) along with detailed clinical information is necessary to determine the origin of the cancer. [10,11] Because most ovarian cancers have spread beyond the ovary by the time of diagnosis, they account for a disproportionate number of deaths from cancer of the female genital tract.[12]

Table 7: Comparison of distribution of ovarian carcinoma in different age groups with other studies

Age Group	Jagadeeshwari N *et al.* (1971)[13]	Verma & Bhatia *et al.* (1981)[14]	Present Study
	Number Of Cases	Number Of Cases	Number Of Cases
1-10	-	04	-
11-20	10	13	04
21-30	25	23	04
31-40	28	36	09
41-50	20	29	27
51-60	09	22	23
61-70	03	04	07
>70	-	02	01
Total	**95**	**133**	**75**

In the present study, maximum number of cases of ovarian carcinoma were observed in 5th and 6th decade, while in the other studies conducted by Jagadeshwari *et al.*[13] in 1971 and Verma and Bhatia *et al.*[14] in 1981, it was observed that most common age group affected by ovarian carcinoma is 4th and 5th decade of life.(Table.7) In latest studies, malignant neoplasms especially surface epithelial adenocarcinomas were seen at the age <30 years. It can be due to environmental factors and life style changes adopted by younger population.[15]

Table 8: Comparison of size range with other studies

Size In Cm	Okugawa *et al.* (%) (2001)[16]	Manoja *et al.* (%) (2017) [17]	Present study (%)
1 To 10	46	70	78.7
11 To 20	35.74	25	21.3
>20	9.22	05	-

In the present study, maximum cases were in the size range of 1 to 10 cm which is in accordance with the study conducted by Manoja *et al.*[17] The largest tumor encountered in present study was a mucinous cystadenocarcinoma measuring 19.5X19X11.5 cms in size. (Table.8)

Table 9: Comparison of laterality in ovarian neoplasms with other studies

Study	Unilateral (%)	Bilateral (%)
Prabhakar and Maingi (1989)[18]	78.10	21.9
Misra *et al.* (1991) [19]	82.98	17.02
Couto *et al.* (1993) [20]	72.4	27.6
Kuladeepa *et al.* (2011) [21]	68.42	31.58
Manoja *et al.* (2017) [17]	75	25
Present study	80	20

In the present study, bilateral cases accounted for 20% (15 cases). Similar observations were made in the studies conducted by Prabhakar and Maingi *et al.*[18], Misra RK *et al.*[19], Couto *et al.*[20], Kuladeepa *et al.*[21] and Manoja *et al.*[17](Table.9)

W.H.O classification of ovarian tumors is based on the tissue of origin and either arises from surface epithelium, germ cells or stroma of ovary. [22]

Table 10: Comparison of histological types of ovarian carcinoma with other studies.

Types	Jha and Karki *et al.* (2008)[23]	Swamy & Satyanarayana *et al.* (2010) [24]	Manoja *et al.* (2017)[17]	Present study
Surface Epithelial Tumors	82.2%	61.6%	84.2%	77.3%
Germ Cell Tumors	3.1%	11.7%	10%	6.7%
Sex Cord Stromal Tumors	42.2%	21.7%	4.2%	10.7%
Metastatic	2.4%	05%	0.8%	5.3%
Miscellaneous	-	-	0.8%	-

Surface epithelial carcinomas constituted the majority of cases and accounted for 77.3%. Similar observations were made in the studies conducted by Jha and Karki [23] and Manoja *et al*.[17] Germ cell tumors accounted for 6.7% of all ovarian carcinomas and similar findings were seen in studies conducted by Jha and Karki[23], Swamy and Satyanarayana[24] and Manoja *et al*.[17] Sex cord stromal tumors accounted for 10.7% and similar finding was observed in a study conducted by Manoja et al.[17] In this study metastatic tumors accounted for 5.3% which was higher than other similar studies.(Table.10)

Conclusion

Histomorphologically majority of ovarian carcinomas are originating from surface epithelium. Serous cyst adenocarcinoma was the most common. In our study maximum number of carcinomas was seen in 5th to 6th decade. Awareness about ovarian cancers is essential in doctors for early detection and treatment. Although ovarian tumors can be diagnosed clinically and radiologically, a through histopathological examination is mandatory to find out origin and type of tumor. With the help of specialized methods like special stains, IHC markers, ultra structural studies and cytogenetic, there is vast scope for reaching specific and reliable diagnosis. The management and prognosis of patient is largely dependent on histological type, apart from stage and grade of the tumor. The present study gives the most comprehensive picture of the current state of ovarian cancer incidence and histopathological pattern in Punjab for planning a strategy for early diagnosis and management.

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