OVARIAN NEOPLASMS—A STUDY OF 903 CASES

by

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Ovary is one of the common sites for neoplasms in the female. Ovarian cancer is now the leading cause of death from gynaecological malignancy and ovarian tumours comprise about 1% of all new growths in paediatric gynaecology. (Barber 1969). Being an organ with a complex structure, attempts at classification of tumours of the ovary, both by pathologists and gynaecologists, have not yielded satisfactory results so far. This paper presents a study of 903 ovarian neoplasms recorded in the department of Pathology, Medical College, Trivandrum, during a 13 year period. Non-neoplastic cysts of the ovary were excluded.

Analysis

Out of 903 ovarian neoplasms, 622 (68.98%) were benign and 281 (31.02%) were malignant. Among the benign neoplasms there were 59 cases diagnosed as haemorrhagic cysts where the primary nature of the cyst could not be made out. Table I to III gives the histological types of tumours and their age incidence.

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The common presenting complaint in these cases was mass in the abdomen. In many it was associated with pain. Dysuria and menstrual irregularities were the additional symptoms. It is interesting to note that 6 out of 25 cases of granulosa cell tumour occurred in postmenopausal women and the presenting symptom was bleeding.

Ascites was noted in 3 cases of fibroma and in one case of anaplastic carcinoma. Pleural effusion with ascites was present in one case of granulosa cell tumour and one case of papillary cystadenocarcinoma. One case of mucinous cystadenocarcinoma was associated with pseudomyxoma peritonii.

The side affected was not known in all the cases. Of 278 cases in which it was known, 128 (46.04%) involved the right ovary, 107 (38.5%) affected the left ovary and in 43 cases (15-46%) it was bilateral.

The size of the tumour varied from 3-36 cms. The maximum size was noted in a mucinous cystadenoma and the maximum weight noted was in a malignant teratoma which weighed 7 kg. Mucinous cystadenomas weighed from 0.5 to 6 kg. The maximum weight noted in a granulosa cell tumour was 6 kg., in a serous cystadenoma 4.5 kg., mucinous cystadenocarcinoma 4 kg. and dysgerminoma 1.5 kg. The single case of arrheno-

TABLE I

Histological Classification of 903 Ovarian Neoplasms with their Percentage Incidence

Histological type		Number of cases	Percentage
BENIGN			
Cystadenomas —	Mucinous	165	18.27
	Serous	150	16.60
	Papillary serous	31	3.43
Teratomas —	Benign cystic	124	13.73
	Benign solid	24	2.77
	Struma ovarii	5	0.55
	Struma with teratoma	1	0.11
	Struma with mucinous cystadenoma	1	0.11
	Teratoma with mucinous cystadenoma	2	0.22
Fibroma		22	2.44
Cystadenofibroma		18	1.99
Adenofibroma		3	0.33
Thecoma		6	0.67
Brenner tumour		8	0.89
Brenner with mucinous cystadenoma		3	0.33
Haemorrhagic cysts		59	6.54
	Total	622	68.98
MALIGNANT			
Primary			
Cystadenocarcinoma—Papillary serous		64	7.09
Mucinous		22	2.44
Papillary adenocarcinoma		61	6.76
Adenocarcinoma		14	1.55
Adenocarcinoma with dermoid		1	0.11
Epidermoid carcinoma with dermoid		3	0.33
Anaplastic carcinoma		26	2.87
Malignant teratoma		10	1.11
Carcino-sarcoma		2	0.22
Dysgerminoma		36	3.99
Granulosa cell carcinoma		25	2.77
Arrhenoblastoma		1	0.11
Fibrosarcoma		3	0.33
Mesonephroma		2	0.22
Lymphosarcoma		1	0.11
Secondary			
Kruckenberg tumour		1	0.11
Secondary from adenocarcinoma		8	0.89
Secondary from leiomyosarcoma		1	0.11
Total		281	31.12

TABLE II

Age Incidence of 622 Benign Neoplasms

Type of Neoplasms	Less than 10	11-20	21-30	31-40	41-50	51-60	61-70	Above 70	Unknown
Mucinous cystadenoma	—	20	46	24	33	27	8	2	5
Serous cystadenoma	—	11	43	43	31	14	4	3	1
Papillary serous cystadenoma	—	5	5	5	10	3	2	1	—
Benign cystic teratoma	—	13	48	34	21	6	2	—	—
Benign solid teratoma	2	5	10	5	2	—	—	—	—
Struma ovarii	—	—	1	1	2	1	—	—	—
Struma with teratoma	—	—	1	—	—	—	—	—	—
Struma with mucinous Cystadenoma	—	—	—	1	—	—	—	—	—
Teratoma with mucinous cystadenoma	—	—	1	—	—	—	1	—	—
Cyst adenofibroma	—	—	5	2	6	3	3	—	—
Adenofibroma	—	—	—	1	2	—	—	—	—
Fibroma	—	2	3	4	9	2	2	—	—
Thecoma	—	1	2	—	2	1	—	—	—
Brenner tumour	—	—	2	—	1	1	4	—	—
Brenner with mucinous cystadenoma	—	—	—	—	—	2	1	—	—
Haemorrhagic cyst	—	4	24	17	8	3	—	2	1
Total	2	61	191	137	127	63	26	8	7

blastoma weighed 0.5 kg. and measured 25 cms in size.

In a few cases histologically different tumours were noted in the same specimen. The combinations noted were, mucinous cystadenoma with teratoma, papillary cystadenoma with adenofibroma, papillary serous cystadenoma with pseudomucinous cystadenoma.

In 8 cases of papillary cystadenocarcinoma and one case of granulosa cell tumour, metastasis were present. The usual sites of metastasis were cervix, bladder, endometrium, omentum and lymph nodes which included iliac, paraaortic, inguinal and supraclavicular.

Discussion

The ovary is complex in its embryology, histology, steroidogenesis, and potential for malignancy. It is made up of germ cells, follicular cells, and mesenchymal tissue, each with its own potential to form tumour. The reported incidence of the different types of ovarian tumours varies widely. (Gault 1954; Agarwal 1962; Philips 1965; Tyagi *et al* 1967; Vora *et al* 1969).

TABLE III

Age Incidence of 281 Malignant Neoplasms

Type of Neoplasms	Less than 10	11-20	21-30	31-40	41-50	51-60	61-70	Above 70	Unknown
Papillary serous carcinoma	—	4	8	16	19	14	2	—	1
Mucinous carcinoma	—	4	4	7	4	3	—	—	—
Papillary adenocarcinoma	1	2	6	12	20	16	4	—	—
Adenocarcinoma	1	—	2	1	6	3	—	—	1
Adenocarcinoma with dermoid	—	—	—	—	1	—	—	—	—
Epidermoid carcinoma with dermoid	—	—	—	1	2	—	—	—	—
Malignant teratoma	—	1	4	3	1	1	—	—	—
Anaplastic carcinoma	—	2	5	3	10	6	—	—	—
Carcino sarcoma	—	—	1	1	—	—	—	—	—
Dysgerminoma	1	23	6	5	—	1	—	—	—
Granulosa cell Tumour	—	1	8	3	9	2	1	—	1
Arrhenoblastoma	—	—	1	—	—	—	—	—	—
Mesonephroma	—	—	—	—	1	—	—	—	1
Fibrosarcoma		1	—	1	1	—	—	—	—
Lymphosarcoma		1	—	—	—	—	—	—	—
Krukerberg tumour		—	1	—	—	—	—	—	—
Secondary from Adeno-carcinoma	—	—	—	3	3	2	—	—	—
Secondary from leiomyosarcoma	—	—	—	—	1	—	—	—	—
Total	3	39	46	56	78	48	7	—	4

The commonest ovarian tumour encountered is the cystadenoma which forms more than 1/3rd of the total ovarian neoplasms. (345 out of 903). The serous type shows the highest incidence i.e. 20.03% of total, followed by mucinous type 18.27%. Gault *et al* (1954) and Tyagi *et al* (1967) also observed that serous cystadenomas was the commesest ovarian tumour.

70.3% of the ovarian neoplasms occurred in the reproductive period i.e. 21-50 years, with the maximum incidence in the second decade. The youngest patient in this series was 9 years old and the oldest 77 years of age. Borges (1955) reported an age range of 14-80. In the series reported by Vora *et al* (1969) the youngest was 10 years and the oldest 65 years. Benign neoplasms showed a higher incidence in the younger age group i.e. 21-30, as compared to the high incidence of malignant neoplasms in the 41-50 age group.

Among the benign neoplasms, the common tumours were serous cystadenomas

32.1% mucinous cystadenomas 29.3% and benign teratomas 28%. The incidence of mucinous cystadenoma is comparatively less in this series (18.27% of the total) as compared to 28.3% reported by Agarwal *et al* (1962).

There were 157 cases of benign teratomas forming 17.59% of the total ovarian neoplasms. Tyagi *et al* (1967) noted an incidence of 12.83%. There were 2 cases of mucinous cystadenoma with teratoma, 5 cases of struma ovarii and one each of struma with teratoma and struma with mucinous cystadenoma. Gault *et al* (1964) found 1 case of struma ovarii in 317 ovarian neoplasms and Philips (1965) noted 2 cases in a study of 426 ovarian tumours. Combination of teratomatous elements along with struma and mucinous cystadenoma favours a common histogenesis for these as one sided development of a teratoma where one particular teratomatous element overshadows all others to form a separate tumour of its own.

Fibromas formed 3.9% of the benign neoplasms and 2.44% of the total. Tyagi *et al* (1967) reported a 5% incidence and Vora *et al* (1969) noted 3 cases out 188 benign neoplasms. There were 18 cases of cystadenofibromas and 3 cases of adenofibroma in this series. Gault *et al* (1964) noted 9 cases out of 317 ovarian neoplasms.

There were 11 cases of Brenner tumour (19%) and in 3 of these it was associated with pseudomucinous cystadenoma. Tyagi *et al* (1967) had only one case in their series of 120 cases, and this occurred in a 13 year old girl. The age range for Brenner tumour in this series is from 21-70 with 4 cases in the 61-70 age group. Cases of Brenner tumour with mucinous cystadenoma occurred in the older age group 51-70. Vora *et al* (1956) state that the large Brenner tumours are associated with mucinous cystadenoma. However, in this series, no such association has been noted.

Incidence of malignancy in the present series was 31.12%. Table IV shows the reported incidence of malignancy. The incidence of malignancy in our series is higher than most of the reported series, except that of Patel *et al* (1964).

TABLE IV

Incidence of Malignancy in the Reported Series of Ovarian Tumours as Compared with the Present Series

Year	Author	Percentage incidence of Malignancy
1931	Mayer	14.9%
1949	Allen and Hertig	15.2%
1955	Purandare	23%
1957	Chitkara and Sharma	28%
1962	Agarwal and Saxena	22.97%
1964	Mehta and Purandare	28.1%
1964	Patil et al	42.0%
1967	Tyagi et al	24.17%
1969	Vora and Bhargava	19.01%
1971	Present series	31.12%

Carcinoma is the most common primary malignant tumour of the ovary. In the present series, there were 190 cases of primary carcinoma of the ovary among 281 malignant neoplasms which forms 21.05% of total ovarian neoplasms. Of these 7.09% were serous cystadenocarcinomas and 2.44% mucinous cystadenocarcinomas.

Of the 190 primary carcinomas of the ovary, 100 were solid tumours. This forms 11.08% of the total ovarian neoplasms. Patel *et al* (1964) have reported a similar incidence (12.2%) in a study of 147 ovarian tumours. But lower incidence has been reported by Agarwal *et al* (1962)

Mehta *et al* (1964) and Tyagi *et al* (1967). Among the solid tumours, 61 were papillary, 25 anaplastic and 14 adenocarcinomas. Meyer (1932) and Tyagi *et al* (1967) have reported that papillary carcinomas have a lower incidence than non-papillary type but in the present series papillary type was more common.

Malignancy in dermoid is rare. Meyer (1932) has noted 1.71% in 1268 cases of dermoid. The present series showed an incidence of 3.12% in 182 cases of dermoid. The common malignant change reported is epidermoid carcinoma. An adenocarcinoma arising from dermoid is a rarity. One such case was noted in this series.

There were 36 cases of dysgerminoma, forming 3.99% of total ovarian neoplasms and 12.8% of ovarian malignancy. This is quite high when compared to 4.5% reported by Muller *et al* (1950) and 3.5% by Morris and Scully (1958) and 4.3% by Kapas (1969). Vora and Bhargava (1969) noted 10.2% in 49 malignant neoplasms. However Gault *et al* (1954) had only an incidence of 1.8% in their series.

Granulosa cell tumours comprised 8-9% of malignant ovarian neoplasms in the present series. Vora and Bhargawa (1969) noted an incidence of 18.9%. In the series reported by Tyagi *et al* (1967) these formed 3.33% of total ovarian neoplasms, while in the present series it was only 2.77%. Most of the cases occurred in childbearing period, but 6 cases were seen in postmenopausal period and these presented with symptoms of bleeding. Hyperplasia of endometrium was seen in one case. One case showed evidence of secondaries and had associated pleural effusion.

Rare neoplasms of the ovary like fibrosarcoma mesonephroma and lymphosarcoma were also seen in this series. Fibrosarcomas formed .33% of total neoplasms and 3.11% of ovarian malignancy. Two of these occurred in 30-50 age group and 1 case was in a 19 years old woman.

Mesoneophroma of the ovary is an uncommon malignant tumour arising from mesometanephric rests. Two cases were diagnosed as mesonephroma in this series. These showed the typical histological appearance of tubular pattern formed by flattened or cuboidal cells with scanty clear cystoplasm and oval nuclei.

The single case of primary lymphoma of the ovary in a 17 year old girl has been reported elsewhere (Ramachandran and Gracy 1970).

Summary

The commonest ovarian neoplasm encountered in the series was cystadenoma.

70.3% of the neoplasms occurred in the reproductive period with the maximum incidence in the second decade.

The percentage incidence of malignancy observed was 31.14%.

The incidence of various neoplasms are compared with the reported series.

Rare primary ovarian neoplasms like fibrosarcoma, mesonephroma and lymphosarcoma were also observed in this series.

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