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CLINICO-PATHOLOGICAL STUDY OF 149 CASES
OF OVARIAN NEOPLASMS

by

RAJNI C. MEHTA,* M.D., D.G.O.

and

B. N. PURANDARE,** M.D., F.R.C.S.E., F.R.C.O.G., F.C.P.S., F.I.C.S.

Introduction

Peculiar behaviour of some of the ovarian neoplasms, as regards the clinical course and prognosis, has prompted a detailed study of 149 cases of ovarian tumours, included in the present series. Particular attention is paid to 42 cases of malignant neoplasms, as the survival rate from cancer of the ovary has not been much improved over the past two or three decades. There are many reasons for this lack of progress. The insidious onset of the disease makes it very difficult to recognise the condition by the patient and the tumour has already spread and metastasised when the patient comes with symptoms. It is often not recognised by the medical

practitioner. The site of the tumour renders it to be inaccessible to simple methods of anatomical and histological diagnosis, such as smears, biopsy and curettage. Therefore it behoves us to be aware of ovarian neoplasms whether benign or malignant. It would seem that an occasional finding of a symptomless ovarian cancer would justify periodical pelvic examinations of all the women over the age of 35 years. However, such a thing, though ideal is difficult to practise to-day.

Material and Methods of Study

During the seven years' time, from 1st January 1955 to 31st December 1961, there were 149 cases of neoplastic tumours of the ovary operated in the gynaecological department of K.E.M. Hospital, Bombay. The total number of admissions in the gynaecological department during the said period was 10,654, thus ovarian tumours constitute 1.3 per cent of all

* *Obstetric & Gynaec. Registrar.*

** *Director of Obstetrics & Gynaecology, K. E. M. Hospital, Parel, Bombay-12.*

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the admissions. The total number of gynaecological laparotomies performed during the same period was 1540, 0.96 per cent of all the laparotomies being performed for ovarian neoplasms.

Out of these 149 cases, 107 patients had benign tumours and 42 cases had malignant neoplasms, thus giving an incidence of malignancy as 28.1 per cent. All these 149 cases were operated upon and the specimens were examined macroscopically as well as microscopically. In 5 cases in which the malignant tumours had metastasised extensively, only biopsies were taken. Table 1 gives the in-

TABLE I

Incidence of Different Types of Tumours

Benign tumours	Number	Percent-ages
Serous cystadenoma	62	41.6
(a) Simple	57	
(b) Papillary	5	
Pseudomucinous cystadenoma	18	12.0
Dermoid cysts	18	12.0
Unclassified cystadenoma	9	6.0
Malignant tumours		
Serous cystadenocarcinoma	8	5.3
Teratoma	8	5.3
Primary solid carcinoma	7	4.69
Pseudomucinous cystadenocarcinoma	6	4.02
Granulosa-theca cell tumours	6	4.02
Dysgerminoma	5	3.35
Malignant change in a dermoid	1	0.67
Metastases from sigmoid cancer	1	0.67
Total	149	

cidence of various types of tumours. Serous cystadenoma was found to be the most common tumour in the present series, constituting 41.6 per cent of all the tumours. Pseudomucinous cystadenomas and dermoids constitute 12 per cent each. Among the malignant tumours cystadenocarcinoma and teratoma give an identical incidence of 5.3 per cent. Table 1-A

TABLE I-A

Author	Incidence of benign serous tumours	Ratio of benign serous to benign pseudomucinous tumours
Dockerty	15.0%	3 : 4
Chitkara and Sharma	33.0%	2.5 : 1
Novak		1 : 1
Present series	41.6%	3.4 : 1

gives the incidence of benign serous tumours and the ratio of benign serous to benign pseudomucinous tumours reported by different authors. Both these values are found to be higher in the present series as compared to other authors' figures. The incidence of malignancy given by different authors is shown in Table 1-B. Marked variation in the incidence of malignancy is due to the

TABLE I-B

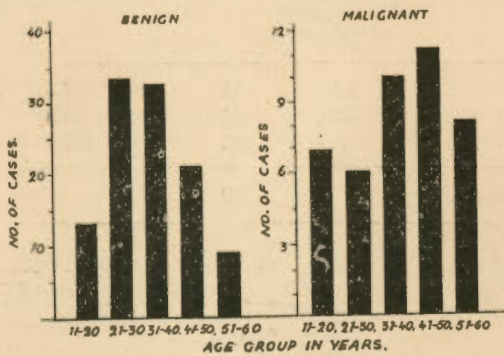
Incidence of Malignant Tumours

Author	Incidence of malignancy
Meyer	14.9%
Allan and Hertig	15.2%
Barzila	21.0%
Goldsmith	24.0%
Chitkara and Sharma	28.0%
Present series	28.1%

difficult histopathological interpretations in some of the ovarian neoplasms. Allan and Hertig give the incidence of malignancy among the serous cystadenomas as 1:3 and that in pseudomucinous cystadenomas as 1:8. Similar figures in the present series are 1:11.4 and 1:4 respectively. This ratio of the malignant pseudomucinous to benign tumours is much greater than Novak's experience of 1:20. Graph 1 shows the incidence of

cystadenocarcinoma did not show much difference in age distribution from those having pseudomucinous cystadenocarcinoma. The dysgerminoma is thought to be a tumour of the second and third decades. This tallies with our present series except that only one case was found to be in the fourth decade. Graph 2 shows

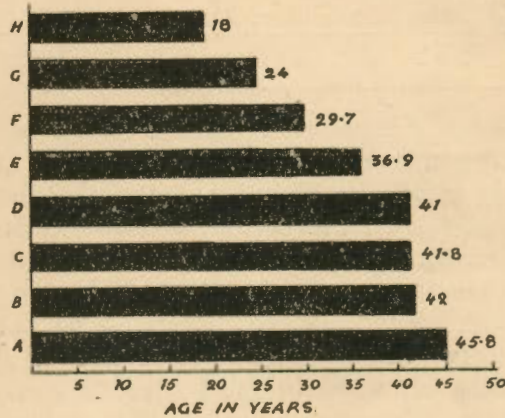
GRAPH I
FREQUENCY OF BENIGN AND MALIGNANT TUMOURS IN VARIOUS AGE GROUPS.



ovarian tumours in various age groups. About 60.7 per cent of the benign tumours occur between the ages of 21 and 40 years. Nearly 50 per cent of the malignant tumours were found to be in the age group of 31 to 50 years, the maximum incidence being in the fifth decade. Similar incidence is found in cases reported by Chitkara and Sharma, B. N. Purandare and Patwardhan. Allan and Hertig found maximum incidence of malignancy in the age group of 41 to 60 years. Most malignancies occur a decade earlier in our people as compared to the western people. The youngest patient was 8 years old and the oldest 65 years old in the present series. The patients having serous

GRAPH II
AVERAGE AGE FOR VARIOUS TUMOURS.

- A. GRANULOSA THECA CELL TUMOUR
- B. PSEUDOMUCINOUS CYSTADENOCARCINOMA
- C. PSEUDOMUCINOUS CYSTADENOMA
- D. SEROUS CYSTADENOCARCINOMA
- E. SEROUS CYSTADENOMA
- F. DERMOID
- G. DYSGERMINOMA
- H. TERATOMA



the average age for different tumours. Both the serous and pseudomucinous cystadenomas occur in the child-bearing age but the pseudomucinous are more common in the latter part. Dysgerminoma and teratoma are found in the younger age groups while serous and pseudomucinous cystadenocarcinomas are found in the latter age groups. Granulosa cell tumours have no particular age distribution being found between 30 and 60 years of age in the present series.

TABLE 2
Relation to Epochs of Life

Epochs of life	Benign tumours		Malignant tumours		Total	
	No.	Percentage of benign tumours	No.	Percentage of malignant tumours	No.	Percentage
Prepubertal ..	—	—	3	7.0	3	2.0
Child-bearing ..	84	78.5	21	50.0	105	73.9
Post-menopausal ..	23	21.5	18	42.9	41	24.1

TABLE 3
Relation to Marital Status and Parity

	Benign		Malignant		Total	
	No.	Percentage of benign tumours	No.	Percentage of malignant tumours	No.	Percentage
Single ..	7	6.5	6	14.2	13	8.6
Nulliparous ..	31	28.9	11	26.1	42	30.8
Parous ..	69	64.6	25	59.7	94	69.2
Total	107		42		149	

Table 2 gives the relation of the occurrence of the ovarian tumours to the epochs of life; 78.5 per cent of the patients in the benign group and 50 per cent of the patients in the malignant group were in the childbearing age. Allan and Hertig found 61 per cent of the total number of malignant tumours to be in the postmenopausal age. This can be explained by earlier occurrence of malignancy and shorter average life-span in our country. Table 3 gives the relation of the occurrence of ovarian tumours to marital status and parity; 93.5 per cent of the benign tumours and 85.7 per cent of the malignant tumours were found to be in married women. According to Burnstein and Geist 76 per cent of the ovarian neoplasms were found to be in married women. This can be due to the fact that married women constitute a large

group of the female population. Table 4 shows that the incidence of

TABLE 4
Incidence of Sterility in Malignant Tumours

Author	Incidence
Helsel	41%
Dockerty	40%
Lynch	31%
Pemberton	25%
Purandare and Patwardhan ..	13%
Montgomery	11.4%
Present series	30.8%

infertility is higher in patients with ovarian neoplasms than that found in the general population. The findings of this table though thought-provoking remain unexplained. Wharton states that about 10 per cent of married couples are sterile. Lorimer and Tietze state that about 10 to 20 per cent of the married couples have in-

voluntary sterility. The various symptoms with which the patients presented are given in Table 5, gnant ovarian cyst, 1 patient had ruptured teratoma, 1 patient had acute intestinal obstruction due to wide-

TABLE 5
Symptomatology

Symptoms	Benign tumours		Malignant tumours	
	No.	Percentage of benign tumours	No.	Percentage of malignant tumours
Abdominal enlargement	55	51.4	34	80.9
Chronic pain in abdomen	41	38.3	16	38.0
Acute pain in abdomen	12	11.2	5	11.9
Abnormal vaginal bleeding	16	14.9	10	23.8
Sterility	17	15.8	7	16.6
Urinary symptoms	5	4.6	3	7.1
Genital prolapse	2	1.8	2	4.7
Leucorrhoea and backache	10	9.0	2	4.7
Loss of appetite and weight	2	1.8	8	18.8
Total	107		42	

Abdominal enlargement was found in 80.9 per cent of the patients having malignant neoplasms and in only 51.4 per cent of the patients with benign tumours. This can be explained by the rapid growth of the malignant tumours or the presence of associated ascites. The incidence of acute pain in abdomen was almost the same in the patients having benign or malignant tumours, though it is likely to be more common with benign tumours which are comparatively more mobile and hence more likely to undergo the complication of torsion. Out of the 12 cases in the benign group, 10 patients had a twisted ovarian tumour, 1 patient had a burst dermoid cyst and 1 patient had an associated ectopic pregnancy. Out of the 5 patients in the malignant group, 1 patient had a twisted dysgerminoma, 1 patient had a ruptured mali-

spread metastases, while the fifth patient had rapidly developing ascites causing severe discomfort.

Irregular vaginal bleeding was found in 23.8 per cent of patients with malignant neoplasms while only 14.9 per cent of the patients with benign tumours presented with the same symptom. This can be due to the presence of granulosa-theca-cell tumours in the malignant group. In the patients with benign tumours and vaginal bleeding, the endometrium was found to be in the proliferative phase in 6 patients, in the secretory phase in 2 patients, and the uterus was not removed in the remaining 8 patients. In 3 patients with granulosa-cell tumours and vaginal bleeding the endometrium was found to be in the proliferative phase with benign endometrial polyp in one of them. The endometrial report was available

in 16 cases with malignant neoplasms but association of endometrial cancer was not found in a single case.

As expected, the incidence of loss of appetite and weight was higher in patients with malignant neoplasms as compared to those having benign ones. Table 6 shows that the in-

could not be found out in the present series. In about 83.3 per cent of the patients in the malignant group, the tumour mass was found reaching up to the umbilicus or even beyond it, thus showing that the patients come when the disease was far advanced. Clinically demonstrable free fluid

TABLE 6
Relation of Duration of Symptoms to Metastases

Duration	No. of cases	Percentage of malignant tumours	No. of patients with metastases	Percentage of cases in column (1)
Up to 3 months ..	14	33.3	8	57.1
4 to 6 months ..	8	19.0	2	25.0
7 to 12 months ..	4	9.5	1	25.0
More than 1 year ..	16	38.0	2	12.5
Total	42		13	

cidence of metastases was higher in the patients having shorter duration of symptoms. In 3 patients with pelvic metastases and 4 patients with metastases in the whole peritoneal cavity, the duration of symptoms was from 1 to 3 months. In only 1 patient with pelvic metastases, 1 case with metastases in the uterus and 1 case with generalised peritoneal metastases, the duration was from 4 to 6 months. In 1 patient with pelvic metastases and 2 patients with omental metastases, the duration was more than 6 months. Allan and Hertig found that the incidence of metastases was higher and 5 year survival rate was low in patients with shorter duration of symptoms. This can be due to higher degree of malignancy in the tumours with shorter duration of symptoms. As a thorough follow-up of the patients was not possible, the relation between the duration of symptoms and 5-year survival rate

was not found in a single case in the benign group while it was present in 9 cases in the malignant group. At the operation table 2 serous cystadenomas and 18 malignant tumours were found to be associated with ascites. The fluid was straw-coloured in all the cases.

Bilateral oedema of the feet was present in 4 cases in the malignant group while it was not found in a single patient with benign tumour. Tables 7-A and 7-B show the clinical

TABLE 7-A
Clinical Diagnosis in Benign Tumours

Diagnosis	Number	Percentage
Ovarian neoplasm ..	96	89.7
Tubo-ovarian masses ..	9	8.4
Acute abdomen ..	2	1.9
Total	107	

TABLE 7-B
Diagnosis in Malignant Tumours

Diagnosis	Number	Percentage
Suspected malignant tumours	24	57.1
Diagnosed benign	16	38.0
Acute abdomen	2	4.7
Total	42	

diagnosis made pre-operatively in the patients in the present series. In the benign group, the diagnosis of an ovarian neoplasm was made in all the cases except 11 patients; in 9 of which

ed in only 57.1 per cent of the cases, 16 patients were diagnosed as having benign tumours, while a diagnosis of acute abdomen was made in 2 cases, due to rupture of a malignant ovarian cyst in one case and a ruptured teratoma in another. From the above table it is imperative that the suspicion of malignancy in ovarian tumours should arise more frequently than diagnosing them merely as benign. This precaution would offer them a better chance for a longer survival, in view of carrying out complete surgery followed by chemotherapy if necessary. Table 8 shows

TABLE 8
Operative Treatment

Nature of operation	Benign tumours		Malignant tumours	
	No.	Percentage of benign tumours	No.	Percentage of malignant tumours
Unilateral ovariectomy	27	25.2	8	18.8
Unilateral salpingo-oophorectomy	20	18.6	8	18.8
Ovarian cystectomy	13	12.0	3	7.1
Abdominal hysterectomy + bilateral salpingo-oophorectomy	30	28.0	17	40.4
Total hysterectomy + unilateral salpingo-oophorectomy	7	6.5	—	—
Salpingo-oophorectomy + salpingectomy	6	5.6	—	—
Bilateral ovariectomy	—	—	1	2.3
Inoperable cases	—	—	5	11.99
Total	107		42	

a diagnosis of bilateral tubo-ovarian masses was made, and the remaining two cases were diagnosed as having acute abdomen. In one of them rupture of an infected dermoid and in the other an associated ectopic pregnancy were found.

In the patients having malignant neoplasms, malignancy was suspect-

the *operative treatment* carried out in the present series. In a young patient conservation of the ovarian tissue is a rule as far as the tumour does not appear to be malignant on gross examination.

Complete surgery (i.e. hysterectomy with bilateral salpingo-oophorectomy) was undertaken in 40.4 per

cent of patients with malignant tumours and in only 28 per cent of patients with benign tumours. In the benign group all the patients in whom complete surgery was carried out, were above the age of 40 years except 6 patients, 3 of whom had associated bilateral tubo-ovarian masses, 1 patient had bilateral cysts with marked adhesions, 1 patient had infected dermoid cyst with adhesions and 1 patient had an associated adenomyosis.

Conservative surgery was carried out in 20 cases in the malignant group. In 4 cases of teratoma and 3 patients with dysgerminoma the tumour was well-capsulated and the patients were under the age of 25 years. In 2 cases of pseudomucinous cystadenocarcinoma, 1 case of granulosa-cell tumour, and 2 cases of adenocarcinoma, the tumour was not suspected to be malignant on operation table, so only conservative surgery was carried out. In 3 cases of papillary cystadenocarcinoma, 1 case of pseudomucinous cystadenocarcinoma, 1 case of primary carcinoma and 1 case of teratoma the condition of the patient was too low for complete surgery. In 3 cases of papillary adenocarcinoma, 1 case of primary solid carcinoma and 1 case of granulosa-cell tumour there were widespread metastases, so only biopsy of the tumour was taken.

In the whole series only one patient having pseudomucinous cystadenocarcinoma expired within 4 hours after operation from post-operative shock, which had continued from shock on the operation table. The post-mortem examination revealed 400 c.c. of haemorrhagic fluid in the peritoneal cavity and oedema of both

the lungs. This gives an operative mortality of 0.67 per cent in the whole series and 2.3 per cent in the malignant group. Kent and Mackay report an operative mortality of 6 per cent and Allan and Hertig report 5.9 per cent in malignant ovarian neoplasms.

Post-operative deep x-ray therapy was given to 18 patients who had extension of the tumour either in the pelvis or in the whole peritoneal cavity. The treatment was started after the abdominal wound had healed well and continued till a total dosage of 2100 r was given through each of the two anterior and two posterior portals.

In one case of granulosa-cell tumour with widespread metastases, intravenous cyclophosphamide (*Endoxan*) was given post-operatively in a dosage of 200 mg. daily for 6 days. In this case it was not possible to remove the tumour completely. The abdominal masses reduced in size and the ascites became less after the administration of Endoxan. Table 9 shows that the incidence of bilateral tumours is higher in the malignant group as compared to that in the benign group. Allan and Hertig give an incidence of bilateral tumours as 32 per cent, Purandare and Patwardhan as 60 per cent and Montgomery as 70 per cent in malignant ovarian neoplasms. This variation in incidence can be explained on the basis whether bilateral tumours are considered on gross or microscopic pathology and also on advanced degree of malignancy in a particular series. Table 10 gives the incidence of malignant tumours in the present series according to Helsel's grouping.

TABLE 9
Incidence of Bilateral Tumours

Type of tumour	Benign		Malignant	
	No.	Percentage of the same type of tumour	No.	Percentage of the same type of tumour
Serous cystadenoma	6	10.5	3	42.8
Papilliferous serous cystadenoma	1	2.0	—	—
Pseudomucinous cystadenoma	2	11.1	1	16.6
Dermoid	4	22.2	—	—
Teratoma	—	—	2	25.0
Primary solid carcinoma	—	—	1	14.2
Secondary metastatic carcinoma	—	—	1	100.0
Total	13	12.0	8	18.8

TABLE 10
Hessel's Grouping of Malignant Tumours

Group	Number of cases	Percentage
I	22	52.3
II	11	26.1
III	6	14.2
IV	3	7.1
Total	42	

Hessel's classification depends on operative findings.

Group 1 includes completely removable tumours without extension.

Group II includes completely removable tumours despite local extension.

Group III consists of incompletely removable tumours due to local extension.

Group IV includes tumours with extreme extension or with distant metastases.

According to this classification 52.3 per cent of the patients were found to be in Group I, and only 7.1 per cent of the cases belonged to group IV. In 21.3 per cent of the cases it was not

possible to remove the tumours completely either due to local extension or distant metastases. Hessel found that 5-year survival rate was highest in group I. Due to unsatisfactory follow-up, it was not possible to find out 5-year survival rate in the present series but the prognosis was found to be better in group I. Table 11 shows

TABLE 11
Follow-up of Patients

	No. of cases	Percentage
Benign tumours ..	28	26.1
Malignant tumours ..	10	23.8
Total ..	38	25.5

the follow-up of the patients in the present series. As expected this was found to be unsatisfactory in spite of repeatedly calling the patients for follow-up.

Twelve patients in the malignant group and 29 cases having benign tumours were not traceable due to either change of address or the

patients going back to their native places after the operation. Thus it was possible to follow up only 23.8 per cent of patients with malignant tumours and 26.1 per cent of patients having benign neoplasms. Out of the 28 cases in the benign group, 21 had no particular complaint and abdominal and vaginal examinations did not reveal any abnormality. In two patients with pseudomucinous cystadenomas and one patient with twisted ovarian cyst who were having menstrual irregularities, the periods became regular after the removal of the cysts. One of them, a case of prolonged primary sterility conceived within a year after the operation and had a normal delivery. These may be just coincident findings.

One patient with serous cystadenoma who was 2½ months' pregnant at the time of the operation went to full-term and had a normal delivery.

Two patients with serous cystadenoma developed stress incontinence within one year after the operation and in one of them Marshall Marchetti Krantz operation was carried out for the same.

In one patient who had an infected cyst and in whom an abdominal hysterectomy was carried out, an incisional hernia was found on follow-up examination.

Out of the 10 cases in the malignant group which could be followed up, 7 were in group I, one was in group III and 2 patients were in the last group, one patient aged 16 years and having dysgerminoma with widespread metastases died 17 days after the operation and another patient aged 52 years having adenocarcinoma with omental metastases and ascites

died 1½ months after the operation due to intestinal obstruction. One patient aged 25 years in Group III had a teratoma with local metastases in the pelvis. She expired 3 years after the operation. Out of the seven cases in group I, 2 patients aged 18 and 19 years and having well-capsulated teratomas are alive and well 7 and 3 years after the operation respectively. Two other patients, aged 52 and 35 years, and having well capsulated granulosa-cell tumours, and one patient with well-capsulated adenocarcinoma are alive and well, 3, 2 and 6 years respectively after the operation. Another patient aged 55 years with well-capsulated pseudomucinous cystadenocarcinoma died 6 years after the operation due to an accidental fall. Only one patient in group I expired within 4 hours after the operation due to irreversible post-operative shock. Out of the 7 patients in group I, conservative surgery was carried out in 5 patients and complete surgery was carried out in 2 patients. This shows that the patients in group I showed comparatively a longer survival rate.

Summary and Conclusions

A detailed clinico-pathological study of 149 cases of ovarian tumours operated upon in gynaecological department of K.E.M. Hospital, Bombay, is carried out.

The incidence of malignant ovarian neoplasms was found to be 28.1 per cent.

The incidence of serous cystadenomas was found to be the highest in the whole series.

The average age incidence was found to be between 21 and 40 years

in the benign group and 31 to 50 years in the malignant group.

64.2 per cent of the patients were found to be in the child-bearing age.

The incidence of infertility was found to be higher in the patients with ovarian neoplasms.

The most common symptoms were found to be abdominal enlargement and/or pain in abdomen.

The diagnosis of an ovarian neoplasm was made in 91.2 per cent of the cases.

Complete surgery could be carried out in only 40.4 per cent of the malignant tumours due to various reasons given.

The incidence of bilateral tumours was found to be higher in the malignant group.

The follow-up of the patients showed a better survival rate in patients in Group I according to Helsel's classification.

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