GERM CELL NEOPLASMS OF THE OVARY

by

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SUMMARY

A total of one hundred and sixty two cases of germ cell tumours of the ovary were studied during the period from 1st January, 1953 through 31st December, 1980. Benign Cystic teratoma was found to be the commonest amongst the germ cell tumours 68.52% in present series, followed by Dysgerminoma 13.58%, Immature teratoma, 4.94% mixed germ cell tuomur 2.47%, Benign Cystic Teratoma with malignant change 1.85%, Endodermal sinus tumour 2.49% and Embryonal Carcinoma, 1.23%, Average age was 21 years. Predominating clinical features were, mass and pain in abdomen. Right ovarian involvement was in 46.91% and bilateral involvement in 11.73. Gross pathology showed majority (62.34%) of the tumours were of cystic type.

Introduction

Ovarian neoplasms of germ cell origin represent 15-20% of ovarian tumours (Secully, 1970). Of these 95% of the germ cell tumours are benign cystitc teratoma which present few problems in diagnosis and therapy. It is the 5% of germ cell tumour which are malignant and pose a problem in diagnosis, because of their varied and complex pattern (Kurman and Novis, 1978).

In this study emphasis is given to diagnostic criteria and behaviour with attention towards the histology of these tumours.

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Material and Methods

One hundred and sixty two cases of germ cell tumours of the ovary were studied during 28 years period (1st January, 1953 to 31st December, 1980) in the Department of Pathology, Govt. Medical College & Hospital, Nagpur. Slides were reviewed and classified as per W.H.O. (Serov *et al*, 1973) classification. Grading of the tumours, especially of immature teratoma, done with the criteria led down by Kurman and Norris, 1978. Special stains were done whenever necessary. Clinical data were obtained from the medical record section of this institute.

Observations and Results

Total number of cases of ovarian tumours — 870
Total number of germ cell tumours — 162
Incidence of germ cell tumours of the ovary — 18.62%

Discussion

Incidence of germ cell tumours of the ovary, out of the total ovarian tumours is 18.62%, duting 28 years period. Scully (1970) reported as 15-20%. Malignant germ cell tumours, constitute 26.54% of total germ cell tumour and 4.94% of total ovarian tumours. It is the malignant germ cell tumours which pose a problem, because of their varied and complex pattern (Kurman *et al*, 1978).

It is seen from (Table I) benign cystic teratoma represents 68.52% of germ cell tumours and is the most common germ cell tumour of the ovary. Although all ages are affected but majority (48.54%) occurred in 3rd decade (Table II). Predominently right ovary (49.54%) was involved and only 9.8% cases were bilateral. Grossly the tumours are usually smooth externally and, cystic internally containing characteristic sebaceous material, hair, bone and cartilage. Histologically ectodermal and mesodermal elements are invariably present, with endodermal derivatives occurring less commonly (Fig. I).

Immature teratoma constitute 4.94% of the germ cell tumours of the ovary. These are unilateral and large in size. External surface is smooth, cut surface is soft and fleshy gray to pink and has areas of necrosis and hemorrhage. Grumous material and bone or cartilage are visible in nearly all cases. Histologically, wide range of tissues having varying degree of maturity is present (Fig. 2).

The malignant change in benign cystic teratoma was observed in 1.85% of the cases. Fox and Langley (1975), Matz (1961), Climie and Heath (1968), Kelly and Scally (1961), reported malignant change in 1% of the cases, of which squamous cell carcinoma arising in epidermis, within the teratoma accounts for approximately 80%. In the present study, all the cases showed squamous cell carcinoma in teratomas. Typically a nodule or a mass may involve a portion of the

TABLE I

Frequency of the Various Histological Types of Germ Cell Tumour of the Ovary

Histological type	Total No. of cases	Incidence out of total (870) cases of ovarian tumours	Incidence out of total Germ cell tumour
Benign cystic teratoma	111	12.76%	68.52%
Immature teratoma	8	0.92%	4.94%
Benign cystic teratoma with malignant change	3	0.34%	1.85%
Struma ovarii	8	0.92%	4.94%
Endodermal Sinus tumour	4	0.46%	2.47%
Embryonal carcinoma	2	0.23%	1.23%
Dysgerminoma	22	2.53%	13.58%
Mixed germ cell tumour	4	0.46%	2.47%
	162	18.62%	100.00%

TABLE II
Age Distribution

Type of lesion	Total cases	Number of cases According to age							Mean age in years
		0-5	6-10	11-15	16-20	21-30	31-40	41-50	51-60	
Benign cystic teratoma	111	8	12	7	10	54	9	5	6	23.5
Immature teratoma	8	—	3	4	1	—	—	—	—	11.3
Benign cystic teratoma with malignant change	3	—	—	—	2	1	—	—	—	20.0
Sturma ovarii	8	—	—	—	3	3	2	—	—	24.7
Endodermal sinus tumour	4	—	1	1	—	2	—	—	—	17.5
Embryonal carcinoma	2	—	—	1	1	—	—	—	—	15.0
Dysgerminoma	22	—	5	6	8	3	—	—	—	14.9
Mixed germ cell tumour	4	—	2	1	1	—	—	—	—	11.2
Total	162	8	1	20	26	63	11	5	6	

cyst. Squamous cell carcinoma has a tendency to penetrate the wall of the teratoma and invade the contiguous structures—(Climie and Heath, 1968, Kelly and Scully, 1961). In nearly all instances there is a residual gross or microscopic evidence of pre-existing teratoma. Focal areas of necrosis in cystic teratomas should alert the surgeon to the possibility of malignant transformation.

The term struma ovarii is reserved for neoplasms in which thyroid tissue represents more than half of the tumour. In the present study, thyroid tissue was found in 6.7% of the benign cystic teratoma. Fox and Langley (1975), Caruzo *et al* (1971), Matz (1961), Bortalozzl (1967), Emge (1964), reported 5-15% of struma ovarii. Thyroid component is solid and brownish red and it has a general appearance of thyroid tissue. Histologically, follicles in struma ovarii are highly variable, they vary considerably in size and tend to form the pattern encountered in foetal adenoma of thyroid.

Endodermal sinus tumour is one of the most frequent germ cell tumours of the ovary, representing 22% of malignant germ cell tumours. As shown in (Table I) it represents 9.3% of the malignant germ cell tumours of the ovary. Grossly, tumour was solid with smooth external surface, cysts and hemorrhages, areas of necrosis are present. All the tumours were unilateral. Histologically, endodermal sinus tumour displays four basic interrelated patterns (Kurman and Norris, 1976; Telium, 1965). The most common is the reticular pattern characterized by loose meshwork of spaces and channels lined by flattened or vacuolated cells (Fig. 3). The least frequently encountered is the solid pattern, a relatively dense proliferation of undifferentiated cells. Periodic Acid Schiff (PAS) reaction is

TABLE III
Gross Pathology of Germ Cell Tumours of the Ovary

Type of lesion	Total cases	Ovarian Involvement			Gross Pathology		
		Right No. of cases	Left No. of cases	Bilateral No. of cases	Solid No. of cases	Cystic No. of cases	Mixed No. of cases
Benign cystic teratoma	111	55	44	12	—	89	22
Immature teratoma	8	3	5	—	—	6	2
Benign cystic teratoma with malignant change	3	1	2	—	—	2	1
Struma ovarii	8	2	3	3	—	4	4
Endodermal	4	2	2	—	4	—	—
Sinus tumour							
Embryonal carcinoma	2	1	1	—	—	—	2
Dysgerminoma	22	12	7	3	19	—	3
Mixed Germ cell tumours	4	—	3	1	2	—	2
Total	162	76	67	19	25	101	36

usually positive, non-glycogen hyaline droplets are also present in nearly all endodermal sinus tumours and represents a variety of proteins including AFP and Alpha 1-antitrypsin (Kurman and Norris, 1976; Palmer *et al*, 1976).

Embryonal carcinoma represents 4.65% of the malignant germ cell tumours of the ovary. Kurman and Norris (1978) reported as 5%. Both the cases occurred in second decade. An abdominal pelvic mass was present in all the cases. No abnormal hormonal manifestation observed in any of the cases studied. Grossly, the tumour has a smooth external surface and is soft with areas of hemorrhage and necrosis. Histologically, the tumour characterized by sheets of large primitive pleomorphic cells containing amphophilic vacuolated cytoplasm and vesicular nuclei with coarse nuclear membrane and one or more prominent nucleoli. Multinucleated giant cells are often seen either, scattered haphazardly at the periphery or with the masses of embryonal cells.

Dysgerminoma represents 13.58% of the total germ cell tumours of the ovary and 2.53% of the total ovarian tumours coinciding with the findings of Kurman and Norris (1978). Age range between 10-30 years. None of the case were of premenopausal or postmenopausal age. Majority of the tumours (86.36%) were solid, fleshy and had a smooth external surface, varied from pink to tan. Areas of necrosis and hemorrhages were minor components. Histologically, dysgerminoma is composed of large, round or polygonal cells with vesicular nuclei containing one or more nucleoli, clearly or lightly granular cytoplasm, abundant glycogen and a prominent cell membrane (Fig. 4). Tumour is often infiltrated by lymphocytes and in some have foreign body giant cells (Asadourian *et al*, 1967). These two

features may reflect an immune response and favourable survival

Mixed germ cell tumour, that contains more than one malignant germ cell pattern are referred to as mixed germ cell tumours (Kurman and Norris, (1978). It represents 2.47% of the total germ cell tumours of the ovary and 9.3% of the total malignant germ cell tumours. Age range 6-20 years. In AFIP files they represents 8% of the malignant ovarian germ cell tumour and age ranges from 5 to 33 years. Median diameter of the tumour were 12 C.M. external surface smooth but the cut surface was varied, solid fleshy tan areas in dysgerminomas, mucoid cystic areas in teratoma, hemorrhage and necrosis in case of endodermal sinus tumour and choriocarcinoma.

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See Figs. on Art Paper V