

Analysis of Germ Cell Tumors of Ovary in a Tertiary Care Hospital: A Two Year Retrospective Study

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Abstract

Background: Germ cell tumors of the ovary are a rare and complex group of heterogeneous neoplasm that comprises both benign and malignant histologies. A mixture of histologic subtypes may be present within any single germ cell tumor.

Aim: Aim of this study was to evaluate germ cell tumors in our institution.

Materials and Methods: All cases of ovarian tumors during the period from May 2013 to June 2015 were retrieved from the record files of the Department and germ cell tumors were selected for analysis.

Results: A total of 110 patients were included with a mean age of 28 years. Teratomas were most frequently found (mature: 98 cases, immature: 01 case), followed by dysgerminoma (05 cases), yolk sac tumor (02 cases), embryonal carcinoma (01 case), squamous carcinoma arising in mature teratoma (01 case), and mixed germ cell tumor (01 case). Abdominal mass (58 cases) and abdominal pain (35 cases) were most common presenting symptoms.

Conclusion: Mature teratoma is the most common germ cell tumor, most commonly occurring in the 3rd decade. Dysgerminoma is the most common malignant germ cell tumor occurring in the 11-20 years age group.

Key words: Dysgerminoma, Germ cell, Ovary, Teratoma

INTRODUCTION

Ovarian cancers are common among females comprising 30% of cancers of the female genital tract and 6% of all cancers in females.^{1,2} Germ cell tumors constitute 15-20% of all ovarian tumors. 95% of germ cell tumors are dermoid cysts (mature cystic teratomas), and most of the remainder are malignant.³ In children and adolescents, more than 60% of ovarian neoplasms are of germ cell origin and one-third are malignant.⁴ Germ cell tumors comprise 23% of ovarian tumors in East India.⁵ They account for two-thirds of the ovarian cancers during the first two decades of life.

Most subtypes occur in pure form, but approximately 10% are composed of two or more subtypes. Most malignant germ cell tumors are composed of premature elements; however, in the case of adults, they almost always develop in dermoid cysts and are encountered in older women. In the present study, we analyzed the germ cell tumors reported in our institute.

MATERIALS AND METHODS

The study was a hospital-based retrospective study carried out in the Department of Pathology, Gauhati Medical College & Hospital. All cases of ovarian tumors during the period from May 2013 to June 2015 were retrieved from the record files and analyzed. The study focuses on clinical presentation with respect to age, presenting complaints, gross features, and histologic types. The tissues were routinely fixed with 10% formalin, and the slides were stained with hematoxylin and eosin stain and also with special stains whenever required.

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RESULTS

A total of 365 cases of ovarian tumors have been reported in the same period and among them, 110 cases (30%) were germ cell origin. The age distribution has been calculated in Table 1. The age range in our series was 08-58 years with a mean age of 28 years. The most common age group affected was 21-30 years. Most of the malignant cases (11/12, 91.3%) were in women of <30 years. The most common presenting complaint was abdominal mass (58/110, 52.7%), followed by abdominal pain (35/110, 31.8%) (Table 2 and Figure 1). Out of 110 cases, all were unilateral except 02 cases of mature cystic teratoma. The size of the tumors ranged from 07 to 25 cm with an average size of 15.5 cm. All the malignant tumors were more than 12 cm in size.

Grossly, majority cases were cystic (65/110, 59.09%) followed by solid/cystic (35/110, 31.8%) and least frequent being solid tumors (Table 3 and Figure 2). Both sided ovaries were equally involved. The number and percentage of different types of germ cell tumors are shown in Tables 4 and 5. The most common germ cell tumor was mature cystic teratoma (98/110 cases) comprising 88.18% of all germ cell tumors. Malignant germ cell tumors comprised 10.9% of the cases (12/110). The most common malignant germ cell tumor was dysgerminoma (06/12). Others were yolk sac tumor (02 cases), one each of immature teratoma, embryonal carcinoma, squamous carcinoma arising in mature teratoma, and mixed germ cell tumors (mature teratoma + embryonal carcinoma).

DISCUSSION

Germ cell tumors are a heterogeneous group, majority originating at different stages of development of germ

cells.¹ Some are composed of undifferentiated cells (dysgerminoma, embryonal carcinoma) while in others there is differentiation toward embryonic (teratoma) or extraembryonic (choriocarcinoma, yolk sac tumor)

Table 1: Age distribution of the cases

Age (years)	Number of cases (110)	Percentage
1-10	1	0.9
11-20	18	16.36
21-30	52	47.27
31-40	22	20
41-50	11	10
51-60	6	5.45

Table 2: Presenting complaints in order of frequency and their percentage

Clinical symptom	Number of cases	Percentage
Abdominal mass	58	52.72
Abdominal pain	35	31.8
Irregular menstruation	5	4.54
GI disturbance	3	2.72
Urinary symptoms	4	3.64
Incidental findings	5	4.54

GI: Gastrointestinal

Table 3: Gross appearance of the tumors

Gross	Number of cases	Percentage
Cystic	65	59.09
Solid/cystic	35	31.8
Solid	10	9.09
Total	110	100

Table 4: Frequency and percentage of benign and malignant germ cell tumors

Tumors	Number of cases	Percentage
Benign	98	89
Malignant	12	11
Total	110	100

Table 5: Frequency and percentage of different types

Germ cell tumor	Incidence	Percentage
Benign	98	89.09
Mature cystic teratoma	98	89.09
Malignant	12	10.9
Dysgerminoma	6	8.18
Yolk sac tumor	2	1.81
Immature teratoma	1	0.9
Embryonal carcinoma	1	0.9
Squamous carcinoma arising in mature teratoma	1	0.9
Mixed germ cell tumor (mature teratoma+embryonal carcinoma)	1	0.9

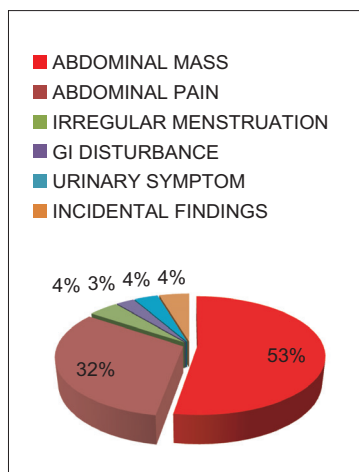


Figure 1: Presenting complaints in order of frequency and their percentage

structures.⁶ They account for 30% of all ovarian tumors.^{5,7} In the current study, they constituted 30% of all ovarian tumors.

Benign Germ Cell Tumors

Mature cystic teratoma is the most common germ cell tumor comprising more than 95% of all germ cell tumors.¹ Mondal *et al.*, and Jha and Karki have reported 68.9% and 95% of all germ cell tumors.^{4,8} In our study, (98/110, 89.09%) was mature cystic teratoma. Grossly, the tumors were unilocular cysts filled with hair and cheesy material. Microscopically, tumors showed a predominance of skin and its appendages. Glial tissue was seen in 04 cases. Choroid plexus was seen in one case and respiratory epithelium noted in 15 cases (Figures 3 and 4).

The majority of mature cystic teratomas are known to occur in <50 years with a peak incidence between 20 and 29 years.^{1,6} In our series, the majority were below 50 years of age (Figure 5).

All the cases were unilateral except 02 cases which showed the bilateral involvement of the ovaries. The size ranged from 07 to 25 cm with an average size of 12.5 cm.

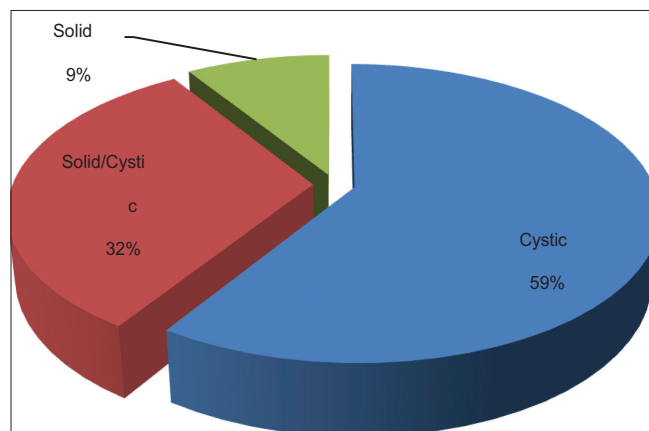


Figure 2 : Macroscopic/gross finding of the tumors

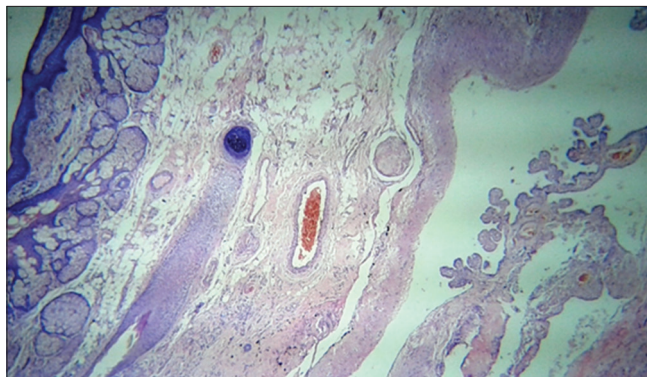


Figure 3: Lower power view of mature teratoma showing different elements derived from three germ layers

In contrast to primitive germ cell tumors, which are almost always encountered in girls and women of reproductive age group. The dermoid cyst is occasionally encountered in postmenopausal women, where ovaries no longer contain recognizable germ cells. This can be interpreted as indicative of leisurely growth of a tumor that originated years earlier.⁹

Malignant Germ Cell Tumor

Immature teratoma represents 03% of teratomas, 01% of all ovarian cancers, and 20% of malignant ovarian germ cell tumors.¹ They occur predominantly in children and young women, the average age at presentation being 20 yrs (Figure 5). In our study, one case of immature teratoma was seen in an 18 years female. A mixture of mature and immature components was seen including immature cartilage, immature mesenchyme, and primitive neuroepithelium. Based on the amount of neuroectodermal component, it was assigned as Grade 2 (Figures 6 and 7).

Approximately, 02% of dermoid cysts contain adult type malignant tumors, 80% of which are squamous cell carcinomas⁹ and are typically seen in postmenopausal women. In a study of 87 ovarian teratomas, Papadis *et al.*, reported 05% cases with malignant changes.¹⁰ We found one case of squamous cell carcinoma arising in a mature teratoma which comprised 0.9% of germ cell tumors of ovaries in our study.

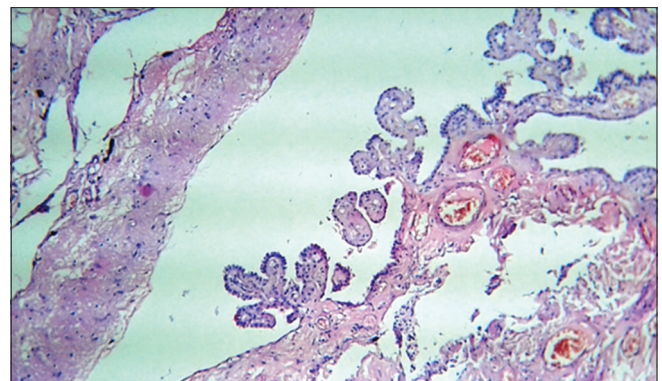


Figure 4: Low power view of mature teratoma showing glial tissue and choroid plexus

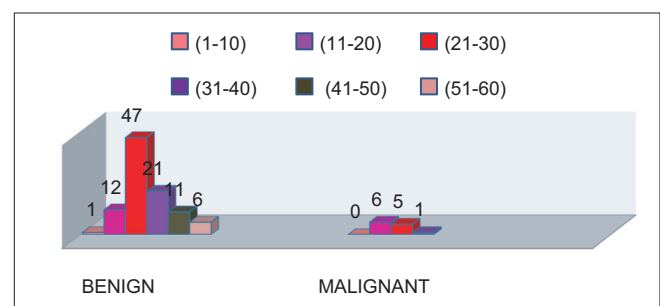


Figure 5: Age incidence in benign and malignant germ cell tumors

Dysgerminoma is the most common malignant germ cell tumor of ovary and account for nearly half of all such tumors.⁵ There were 06 cases of dysgerminoma out of total 12 malignant germ cell tumors in our study comprising 50% of malignant germ cell tumors and 5.5% of all germ cell tumors. All the cases were in 21-30 years age group (Figure 8). Microscopy showed the classical pattern of dysgerminoma.

Yolk sac tumors, also known as endodermal sinus tumor, is the second most common malignant germ cell tumors of the ovary.⁶ We found, 02 cases of yolk sac tumor where one was 17 years and other was 21-year-old (Figure 9). They showed the classical reticulocystic pattern and Schiller-Duval bodies (Figures 10 and 11). Characteristic hyaline globules were noted in both the cases.

Mixed germ cell tumors are composed of at least two different germ cell components, of which at least one is primitive.¹ The relatively frequent finding of different neoplastic germ cell elements in gonadal tumors of germ cell origin is considered a strong argument for common histogenesis of this group of neoplasms.¹¹ Histologically, the most common combination is the dysgerminoma and

yolk sac tumor accounting for one-third of cases.¹² We reported a case of mature cystic teratoma with embryonal carcinoma in a 27-year-old female (Figure 12). Embryonal carcinoma of the ovary is usually present along with other

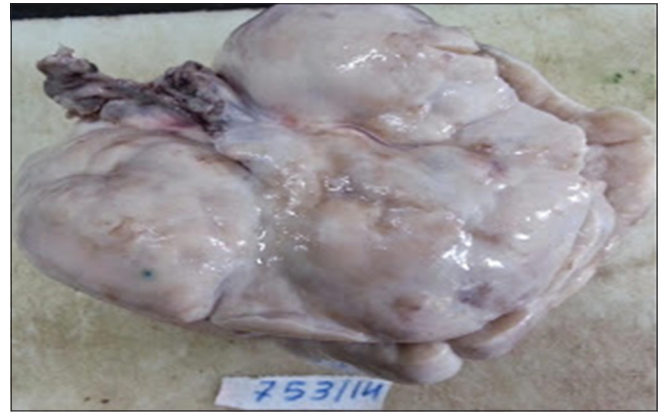


Figure 8: Specimen of dysgerminoma (solid tumor with lobulated surface)



Figure 9: Specimen of yolk sac tumor showing solid-cystic, friable with necrotic cut surface

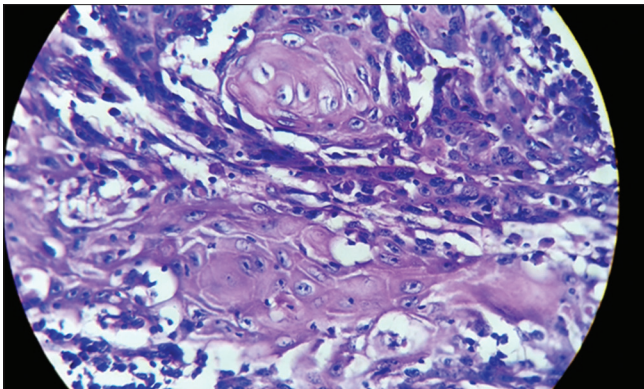


Figure 6: High power view of squamous cell carcinoma (in mature teratoma case)

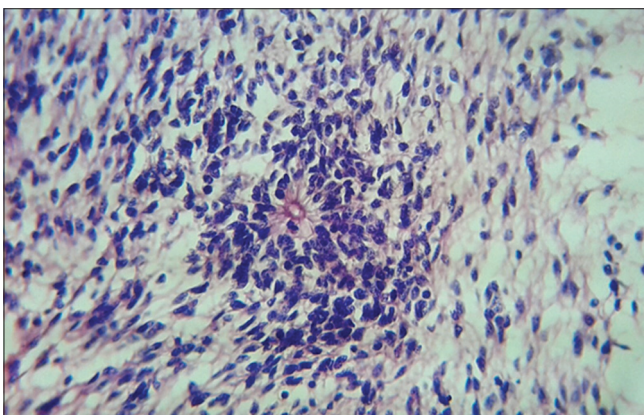


Figure 7: High power view of immature teratoma showing neuroepithelium

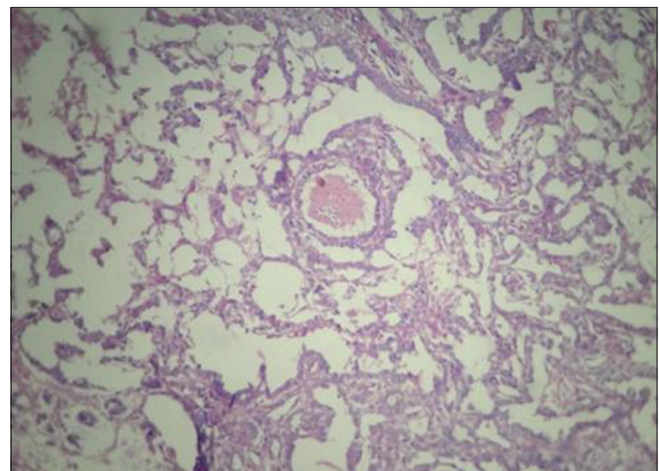


Figure 10: Low power view of yolk sac tumor showing reticular/microcystic pattern

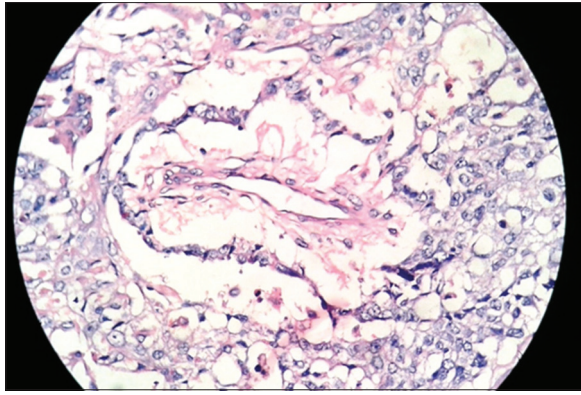


Figure 11: High power view of yolk sac tumor showing Schiller–Duval body

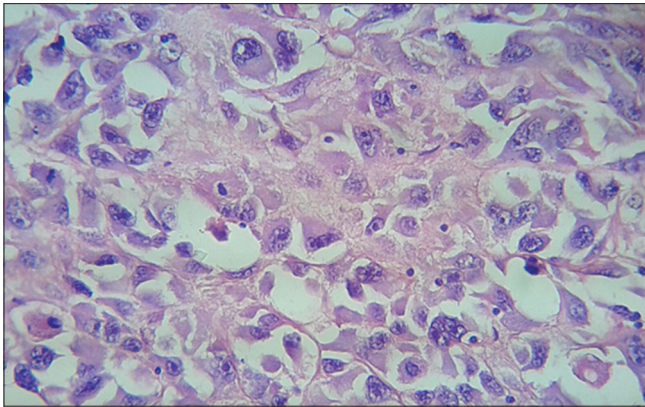


Figure 12: High power view of embryonal carcinoma

components. It may secrete estrogen and can present with precocious puberty or irregular vaginal bleeding.¹³ Extensive review of literature shows that the combination of mature with malignant germ cell elements is extremely rare with very few reported cases worldwide.¹⁴

CONCLUSION

Among ovarian neoplasms, germ cell tumors are relatively uncommon. Benign tumors were more commonly

encountered of which majority were mature cystic teratomas. Malignant Germ cell tumors were seen in younger age group, and most frequent type was dysgerminoma.

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