Clinico-pathologic Features of Germ Cell Tumours of the Ovary in Gombe, North-East Nigeria

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Abstract

Introduction: Germ cell tumours are a heterogeneous group of neoplasms derived from primitive germ cells of the embryonic gonads. They mainly affect the young, reproductive population, hence the need to report and state their characteristic features for a better understanding of this important disease entity. In this study, we describe the clinicopathologic features of these tumours in patients presenting to the Federal Teaching Hospital, Gombe.
Methodology: This was a 10-year retrospective descriptive study where clinicopathologic data on histologically diagnosed germ cell tumours were retrieved from the records of Department of Histopathology. They were classified according to the 2020 WHO classification of ovarian tumours.
Results: Germ cell tumours constitute 40.4% of all ovarian tumours. Benign cases represent 83.6%, while 16.4% were malignant. Mature cystic teratoma was the most common type, while dysgerminoma was the commonest malignant tumour. The modal age group was 21-30 years. These patients presented with varying symptomatology of unilateral tumours with different sizes.
Conclusion: Mature teratoma is the most common germ cell tumour while dysgerminoma is the most common malignant counterpart. Common clinical presentations are abdominal swelling and pain.

Caractéristiques clinico-pathologiques des tumeurs des cellules germinales de l'ovaire à Gombe, nord-est du Nigeria

Resume
Introduction: Les tumeurs germinales sont un groupe hétérogène de néoplasmes dérivés de cellules germinales primitives des gonades embryonnaires. Ils touchent principalement la population jeune et reproductrice, d'où la nécessité de signaler et de préciser leurs caractéristiques pour une meilleure compréhension de cette entité pathologique importante. Dans cette étude, nous décrivons les caractéristiques clinicopathologiques de ces tumeurs chez les patients se présentant à l'hôpital universitaire fédéral de Gombe.
Méthodologie: Il s'agissait d'une étude descriptive rétrospective de 10 ans dans laquelle des données clinicopathologiques sur les tumeurs germinales diagnostiquées histologiquement ont été extraites des dossiers du département d'histopathologie. Elles ont été classées selon la classification OMS 2020 des tumeurs ovariennes.
Résultats: Les tumeurs germinales constituent 40,4 % de toutes les tumeurs ovariennes. Les cas bénins représentent 83,6%, tandis que 16,4% étaient malins. Le tératome kystique mature était le type le plus courant, tandis que le dysgerminome était la tumeur maligne la plus courante. La tranche d'âge modale était de 21 à 30 ans. Ces patients présentaient une symptomatologie variable de tumeurs unilatérales de différentes tailles.
Conclusion: Le tératome mature est la tumeur germinale la plus courante, tandis que le dysgerminome est la tumeur maligne la plus courante. Les présentations cliniques courantes sont un gonflement et des douleurs abdominales.

INTRODUCTION

Germ cell tumours of the ovary are neoplastic lesions that mainly affect girls and young women and account for 20% to 30% of all ovarian neoplasms worldwide, and constitute the second largest group of ovarian tumours (1-3). In Asian and African countries, these tumours tend to be relatively more frequent as compared to the Western world (1-6). Like other ovarian neoplastic lesions, both benign and malignant germ cell tumours do occur; however, the benign ones form the majority of cases (1,4,6). In the pre-adolescent and adolescent age groups, more than 60% of ovarian neoplasms are germ cell tumours and one-third of the germ cell tumours are malignant (7). Ovarian germ cell tumours are derived from the primordial germ cells of the embryonal gonads and may undergo embryonic or germinomatous differentiation (7,8).

Across all age groups, more than 95% of germ cell tumours are benign and composed of predominantly mature cystic teratoma (1,3,4,6,9).

Malignant germ cell tumours are diverse histologically and histogenetically and represent 4 – 5% of the germ cell tumours (3,6-9). Common clinical presentations of germ cell tumours are abdominal swelling, abdominal pain, abnormal vaginal bleeding, infertility and vaginal discharge (4,10-13). The sizes of ovarian germ cell tumours range from a few centimetres to as large as 39 cm in diameter (5-7). Generally, benign tumours tend to be smaller than malignant lesions (3,6,11). Studies done at the University Maiduguri Teaching Hospital (UMTH) Maiduguri, Borno State Nigeria, on the ovarian neoplasms and germ cell tumours, have shown that germ cell tumours were the second most common ovarian neoplasm, mature cystic teratoma was the most common benign ovarian tumour and that malignant germ cell tumours accounted for more than 7% of germ cell tumours (5,14). When taking cognizance of the effects of these tumours on the young, reproductive age group, there is need to report and state their characteristic features for better understanding of this important cause of morbidity and mortality. This study aims to describe the clinico-pathological characteristics of ovarian germ cell tumours in Gombe, Northeastern Nigeria.

MATERIALS AND METHODS

This is a 10-year retrospective, descriptive hospital-based study conducted in the Department of Histopathology, Federal Teaching Hospital, Gombe. The Department provides diagnostic services to all the hospitals across the 11 Local Government Areas of Gombe and neighbouring states from Northeast, Nigeria. All the ovarian tumours of germ cell origin reported in the Department between 1st January 2013 and 31st December 2022 were retrieved and the data were analysed. The clinico-pathological information was extracted from the request cards in the archives of the department. The data extracted included age, clinical presentation, tumour size, tumour side and histological diagnosis. The reviewed cases of histopathological hematoxylin and eosin-stained slides were categorized according to the 2020 WHO classification of ovarian germ cell tumours (15).

The data collected was analysed using descriptive statistical method (SPSS™ 20.0) and results were displayed in frequency tables.

RESULTS

During the 10-year period of study, the age range of women diagnosed with germ cell tumours was 7 to 70 years with a modal age group of 21-30 years as shown in table 1. There were 159 cases (40.4%) of germ cell tumours out of the 394 reported cases of ovarian tumours. The total number of benign germ cell tumours was 133, while 26 cases were malignant germ cell tumours. Benign germ cell tumours accounted for 33.8% of all ovarian tumours and 83.6% of germ cell tumours. Almost all of the benign cases were mature cystic teratoma as shown in table 2. A solitary case of struma ovarii was also recorded. Most of the malignant cases (80.8%) were in women of less than 30 years. Regardless of tumour behaviour, no germ cell tumour was recorded in extreme ages of less than 10 years and greater than 70 years. Table 3 shows the clinical features of the patients who were diagnosed with ovarian germ cell tumours and included abdominal swelling, lower abdominal pain, irregular vaginal bleeding, infertility, vomiting, anorexia, weight loss and fever. The components of mature cystic teratoma included ectodermal derivative in 100% of cases, followed by mesodermal (52%) and endodermal (23%) elements. Malignant germ cell tumours constituted 6.6% and 16.4% of all ovarian tumours and germ cell tumours respectively. Among the 26 cases of malignant germ cell tumours, there were 8 cases (30.8%) of dysgerminoma, 7 cases (26.9%) of yolk sac tumour, 6 cases (23.1%) of immature teratoma, 3 cases (11.5%) of malignant mixed germ cell tumour and 1 case (3.8%) each of

choriocarcinoma and embryonal carcinoma.

The side of occurrence of the germ cell tumours included 129 cases unilateral (left-sided-67; right-sided-62) and 30 cases were bilateral. Most of the malignant germ cell tumours occur unilaterally (84.6%). The sizes of all different types of germ cell tumours were also recorded. The largest tumour was 42.0 cm in diameter and the smallest measured 4.0 cm, with average size of 13.0 cm in diameter. Fifty-four cases (34.0%) were in the category of 6-10 cm followed by 11-15 cm (23.9%). All the malignant cases of the tumours were more than 10 cm in diameter. Overall, only 5.7% of germ cell tumours were less than or equal to 5 cm in largest diameter.

DISCUSSION

Ovarian germ cell tumours are derived from the primitive germ cells of the embryonic gonads and are histologically diverse group of tumours (1,2,7). They represent up to 30% of primary ovarian neoplasms, and can occur at any age, although most germ cell tumours are encountered in the second and third decades of life (1,2,7). In this study, germ cell tumours constituted 40.4% of all ovarian neoplasms and mostly occurred in the reproductive third and fourth decades of life. There are observed variations between developed and developing countries regarding the incidence of germ cell tumours (4-7). Most studies from the developed nations indicated a lower incidence (20% to 25%) of germ cell tumours due to a relatively higher incidence of surface epithelial tumours (1,2,7-9). However, studies from African and Asian countries have shown relatively higher incidence of germ cell tumours which constituted 30% to 52.5% of primary ovarian neoplasms (3-6). The result of this study has further buttressed that observed difference due to the relative lower incidence of recorded surface epithelial tumours. The results of previous studies also reported the predominance of the age group affected similar to this study (3,4,5). These comparative findings only strengthened the fact that ovarian germ cell tumours predominantly occur in young women. Although not investigated in this study, risk factors associated with the development of ovarian germ cell tumours in the younger population include gonadal dysgenesis, gonadoblastoma, and maternal factors such as use of exogenous hormones and high body mass index (1,2,7,9,21).

Worldwide, mature cystic teratoma is overwhelmingly the most common benign ovarian germ cell tumour, and in most studies it is the single most common ovarian neoplasm (1-6,16-18). It accounts for 10-20% of all ovarian tumours and 95% of germ cell tumours (3,5,6,16-18). In this study, mature cystic teratoma represents 83.0% of cases of germ cell tumours and 33.5% of ovarian neoplasms. Despite its high frequent occurrence, the incidence of mature cystic teratoma as in this study, is however lower in Asia and Africa due to relative increase in malignant ovarian germ cell tumours (3-6). Also, the majority of mature cystic teratomas were seen in child-bearing age of 20-40 years, as reported in other studies (3-6,11). During the period of study, only one case of struma ovarii was reported. This rarity is consistent with findings in most studies, as struma ovarii is a rare germ cell tumour worldwide (3,4,6). Similar to observations in several studies that the most prevalent components of teratoma are derived from ectoderm, with variable proportions of mesodermal and endodermal derivatives (1,2,3,5,6,16,17), all of the diagnosed mature cystic teratomas in this study had ectodermal derivative, followed by mesodermal (52%) and endodermal (23%) elements.

Several studies especially in the Western world, have reported that malignant ovarian germ cell tumours represent 5% of ovarian germ cell tumours and mostly occur in adolescents (1,2,7,8,9). However, an interesting finding in this study was that malignant ovarian germ cell tumours accounted for 16.4% of germ cell tumours. This figure is quite high but is in keeping with the increasing trend of reported malignant germ cell tumours relative to mature cystic teratoma in developing countries (3-6,19,20). Malignant germ cell tumours are diverse and are histologically divided into dysgerminoma and non-dysgerminomatous tumours (1,2,7,21,22). The non-dysgerminomatous tumours include yolk sac tumours, immature teratoma, and mixed germ cell tumours, as well as the rare embryonal carcinoma, non-gestational choriocarcinoma and polyembryoma (1,2,7,8,9). The uncommon tumours such as embryonal carcinomas and polyembryomas rarely manifest in a pure form but are rather part of a mixed germ cell tumour (1,2,7). Most malignant germ cell tumours usually manifest as unilateral, large and rapidly progressive abdominal mass with an average size of 15 cm in diameter (5,6,12,21-24). In this study, there were 26 reported cases of malignant ovarian germ cell tumours which occurred mainly in the reproductive age group of 21 – 30 years and included dysgerminoma (5.0%), yolk sac tumour

(4.4%), immature teratoma (3.8%) and malignant mixed germ cell tumour (1.9%); while choriocarcinoma and embryonal carcinoma each accounted for 0.6% of total cases of ovarian germ cell tumours. They were mainly unilateral tumours and all of them were larger than 10 cm with an average size of 17.5 cm in diameter. The predominance of dysgerminoma as reported in this study is a global phenomenon as observed in several studies (4,10,20,21). Few other studies have reported that non-dygerminomatous tumours were more frequent than dysgerminoma (3,5,6). Other notable findings as mentioned above, were the representations of every malignant germ tumours in this study, except for the extremely rare polyembryoma. This observation could be due to the relative high number of the reported malignant ovarian germ cell tumours. The increasing trend of malignant ovarian germ cell tumours is quite worrisome as it occurs predominately in young, reproductive women. This concern is pertinent due to the significance of ensuring fertility-sparing and long-term survival rate in management of these patients.

CONCLUSION

Mature teratoma is the most common germ cell tumour while dysgerminoma is the most common malignant counterpart. Common clinical presentations are abdominal swelling and pain. The increasing incidence of malignant germ cell tumours in the younger, reproductive and productive women calls for concerted efforts in tackling this menace.

Contributions of authors: A.K. conceived the idea, designed the analysis and drafted the manuscript. A.I.L wrote the manuscript. H.F. and Y.M.A. helped supervise the project. All authors provided critical feedback and helped shape the research, analysis and manuscript. All authors discussed the results and contributed to the final manuscript.

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Conflict of Interest: None

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Table 1: **Age distribution of ovarian germ cell tumours**

Age group (years)	Number of cases	Percentage (%)
11 – 20	26	16.4
21 – 30	58	36.5
31 – 40	45	28.3
41 – 50	15	9,4
51 – 60	11	6.9
61 – 70	4	2.5
Total	159	100

Table 2: **Frequency distribution of ovarian germ cell tumours**

Germ cell tumour	Number of cases	Percentage (%)
Mature cystic teratoma	132	83.0
Struma ovarii	1	0.6
Dysgerminoma	8	5.0
Yolk sac tumor	7	4.4
Immature teratoma	6	3.8
Malignant mixed germ cell tumor	3	1.9
Choriocarcinoma	1	0.6
Embryonal carcinoma	1	0.6
Total	159	100

Table 3: **Clinical features of patients diagnosed with ovarian germ cell tumours (**This table allows multiple responses**)**

Clinical features	Number of patients	Percentage (%)
Abdominal swelling	127	79.9
Abdominal pain	62	39.0
Weight loss	29	18.2
Anorexia	23	14.5
Irregular vaginal bleeding	18	11.3
Fever	17	10.7
Vomiting	11	6.9
Infertility	9	5.7