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Epidemiological Trends, Clinical Characteristics and Outcomes of Ovarian Germ Cell Tumours at a Tertiary Hospital in Port Harcourt, Southern Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Ovarian germ cell tumours originate from the germ cell of the ovary. They are usually benign tumours, but occasionally can be malignant. The tumours are rare and commonly seen in young women.
Aim: To determine the prevalence of ovarian germ cell tumours at the University of Port Harcourt Teaching Hospital (UPTH).

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Materials and Methods: This was a retrospective study of all cases of ovarian germ cell tumours managed at UPTH from 1st January 2013 to 31st December 2022. The case notes of the patients were retrieved, and data on socio-demographic characteristics, surgical options and management outcome, and the histopathology report was extracted and analysed.
Results: There was a total of 5,322 gynaecological admissions over the study period, 515 of these admissions were ovarian tumours. There were 68 cases of ovarian germ cell tumours and of these, 61 patients' case records were retrieved, giving the case retrieval rate of 89.7%. The prevalence of ovarian germ cell tumour was 13.2% and accounted for 1.3% of all the gynaecological admissions. The mean age of the patients was 27.15±7.60 years and the peak age of the disease was between 20 and 29 years which was 26 (42.6%) of the cases. The disease was highest amongst nulliparous women, 44 (72.1%). The most frequent presenting complaints were abdominal pain, 28 (45.9%) and abdominal swelling, 23 (37.7%). The condition involved the left ovary in 21 (34.4%) cases and the right in 20 (32.8%) cases. Twenty (32.8%) of cases involved both ovaries. Only 5 (8.2%) cases were malignant, while mature cystic teratoma accounted for 56 (91.8%) cases. The malignant variants were the immature cystic teratoma and yolk sac tumour, which accounted for 4 (6.6%) and 1 (1.6%) respectively.
Conclusion: The mature cystic teratomas were the commonest germ cell tumour seen in our environment and the most frequent presenting complaint was abdominal pain. It is important to emphasize that doctors should have a very high index of suspicion, whenever women present with recurrent gastrointestinal symptoms.

Keywords: Germ cell tumours; ovary; Port Harcourt.

1. INTRODUCTION

The ovarian germ cell tumours are tumours that develop from the germ cells of the ovary. They are usually benign, but they can become malignant [1]. The germ cell tumours are histologically different group of tumours that share a joint origin with primitive germ cells of the embryonic gonads [2]. These tumours are more common in blacks than in whites. They are usually seen as unilateral, but may be seen bilaterally in about 4.3% of patients [3]. They make up approximately 20%–25% of all the ovarian neoplasms. About 5% of these germ cell tumours are malignant ovarian germ cell tumours (MOGCT) while the remaining 95% of them are benign (mature cystic teratomas) [4]. The aetiology of ovarian germ cell tumours is unknown but certain inherited genetic conditions may be implicated in increasing the risk of getting the disease. The tumour is usually seen in teenage girls and younger women more than in older women [5].

The MOGCT constitutes diverse diagnostic dilemmas for the pathologist but they are academically exciting because of the biological varieties they exhibit in the male and female gonads (testis and ovaries respectively). Making a correct diagnosis of these tumours mostly has essential therapeutic and prognostic implications [4]. The histologic subtypes of MOGCT include; dysgerminoma, yolk-sac tumours, embryonal carcinoma, polyembryoma and non-gestational carcinoma. Others include immature teratoma, monodermal tumours, malignant struma ovarii, malignant carcinoid tumour, neuro-ectodermal tumours and squamous cell carcinoma. The benign germ cell tumours include mature solid and cystic teratomas [6]. Benign germ cell tumours are the most common ovarian neoplasm in patients younger than 20 years. They account for about 10–20% of benign ovarian cysts. It usually has a bimodal form of age distribution, with cases occurring most commonly during the early reproductive years [7].

Malignant ovarian germ cell tumours constitute about 2.6% of malignant ovarian neoplasms, while ovarian epithelial tumours constitute about 95%. Malignant ovarian germ cell tumours occur in different age groups, with the highest incidence seen between 15 to 19 years old [8]. Over 60% of ovarian tumours are of germ cell derivative in the first 2 decades of life and less than one-third of them are malignant [9].

The MOGCTs are known to be large at the point of making the diagnosis and they advance more rapidly than the benign ovarian germ cell tumours [9,10]. Their common manifestation in adolescence is abdominal pain (87% of cases) and an abdominal mass in 85% of cases [10-14]. Approximately 10% of cases present with acute abdomen from ovarian torsion, haemorrhage, or tumour rupture which is commoner with yolk sac

tumours or mixed germ cell tumours [9,10]. Other less common symptoms are abdominal distension, fever and vaginal bleeding [9,10]. The duration of symptoms is usually short, with a median of 2-4 weeks with MOGCT while the benign types present with symptoms of longer duration [10,14].

Pre-surgery tests include; X-ray of the chest, abdomino-pelvic ultrasound scan, contrast enhanced computed tomography (CT) scan, magnetic resonance imaging (MRI), full blood count, renal function test and liver function test to assess critical organ functions. If the imaging suggests MOGCT, serum levels of alpha-fetoprotein (ὰ-FP) and human chorionic gonadotrophin (hCG) should be measured to determine women with germ cell tumours. The Royal College of Obstetricians and Gynaecologist green-top guideline recommends the determination of serum lactate dehydrogenase (LDH), ὰ-FP and hCG for ovarian masses in all premenopausal women under the age of 40 years [11,13].

There are different treatment options available to patients with ovarian germ cell tumours, these are based on the type, the grade, and stage of the germ cell tumour [11-13]. Staging of the disease is mostly done using the International Federation of Gynaecology and Obstetrics (FIGO) classification [12]. The final stage of the disease is assigned intra-operatively, where the tumour load in the abdomen is assessed in line with FIGO classification [13]. According to the disease stage, 5-year survival of 90% was recorded among patients on adjuvant bleomycin, etoposide and platinum-based drugs (BEP) regimen after surgery for stage I disease [14].

Surgery is the main stay of treatment for benign germ cell tumours [15]. The MOGCT requires both surgery and chemotherapy [14,16]. The chemotherapy involves the combination of Bleomycin, Etoposide and Platinum based drugs (BEP) [14]. Four courses of chemotherapy are given as standard regimen and this achieves a rate of survival of over 90% by 5 years, among patients on adjuvant BEP regimen after surgery for stage I disease and 70-85% in patients with metastatic disease (stages II-IV) [14,16].

There is no known specific aetiology for any of the histologic groups of germ cell tumours. However, the common risk factors include; increasing age, genetic predisposition, nulliparity, prolonged infertility, use of fertility agents, consumption of high animal fat and obesity. Others are endometriosis, polycystic ovarian syndrome (PCOS), previous history of malignancy, usage of hormone replacement therapy, pelvic inflammatory disease and smoking which may not relate to all the subtypes. Some factors like increasing parity, breast feeding, use of oral contraceptive pills, hysterectomy, tubal ligation and antioxidant use may vary in the level of protection they offer [17]. Despite the relative high frequency of occurrence of germ cell tumours, there is paucity of reported cases of ovarian germ cell tumour in Nigeria especially in Port Harcourt.

2. MATERIALS AND METHODS

This was a retrospective study of all cases of ovarian germ cell tumours managed at UPTH from 1st January 2013 to 31st December 2022. The case notes of patients who had histologically confirmed ovarian germ cell tumour at University of Port Harcourt Teaching Hospital, over the study period of 10 years retrieved and reviewed. Ethical approval was obtained to access patients records from the Gynaecological admissions register, the theatre and Histopathology Department register. The file number of all patients who had ovarian germ cell tumours were obtained and their case notes were retrieved from the medical record department and analysed. The analysis of the data collected was done using IBM Statistical Product and Service Solution (SPSS) version 25. The results were presented in simple frequency tables and percentages.

3. RESULTS

There was a total of 5,322 gynaecological admissions over the study period, 515 of these admissions were ovarian tumours. There were 68 cases of ovarian germ cell tumours identified from the admission records. Of these, 61 patients' case records were retrieved and studied, giving the case retrieval rate of 89.7%. The prevalence of ovarian germ cell tumour was 13.2% of all ovarian tumours seen in UPTH and accounted for 1.3% of all the gynaecological admissions over the period under review. On the basis of histological diagnosis, only 5 (8.2%) of the 61 cases were malignant, the rest 56 (91.8%) were mature cystic teratoma. The malignant variants were the immature cystic teratoma and yolk sac tumour, and they accounted for 4 (6.6%) and 1 (1.6%) respectively. The case of the yolk sac tumour was found in a 12-year old patient.

The malignant cases were treated with surgery and chemotherapy (BEP).

The patients ages ranged from 10 to 49 years and the mean age was 27.15±7.60 years. The patients mostly affected were between 20 and 29 years (42.6%). Most of them, 33 (54.1%) had secondary level of education, 22 (36.1%) had tertiary level of education, while 6 (9.8%) had primary level of education (Table 1). The parity of the study population ranged from para 0 to 7. Ovarian germ cell tumour was observed to be highest amongst nulliparous women which accounted for 44 (72.1%) cases, followed by 10 (16.4%) cases in multiparous, 4 (6.6%) cases in primiparous and 3 (4.9%) in grand-multiparous women respectively.

All the 61 patients were premenopausal. The most frequently presenting symptoms were abdominal pain in 28 (45.9%) cases, abdominal swelling in 23 (37.7%) cases and abdominal pain with abdominal mass in 10 (16.4%) of cases (Table 2). Most of the symptoms had lasted for up to 1 month to 3 or more years (Table 2) before the diagnosis was made, except five that were of malignant variant. Mature cystic teratoma was diagnosed in 56 (91.8%) of the cases, immature teratoma in 4 (6.6%) and yolk sac tumour in 1 (1.6%) of the cases. The occurrence of ovarian germ cell tumour was unilateral in 41 (67.2%) cases while 20 (32.8%) occurred bilaterally (Table 2). The mode of management of the benign germ cell tumours were surgery with exploratory laparotomy and right ovarian cystectomy in 20 (32.8%) of the cases, exploratory laparotomy and left ovarian cystectomy in 21 (34.4%) cases, exploratory laparotomy and bilateral salpingo-ovariectomy in 12 (19.7%) cases, exploratory laparotomy, total abdominal hysterectomy and bilateral salpingo-ovariectomy was done in 3 (4.9%), cases, while 5 (8.2%) of the patients had exploratory laparotomy, total abdominal hysterectomy and bilateral salpingo-ovariectomy followed by chemotherapy (Table 3). The surgeries were all done by consultant gynaecologist and not certified gynaecology oncologist. There were no postoperative complications. One mortality was recorded within 6 months of follow-up as the diagnosis was made at an advanced stage of the disease. Five patients had both surgery and chemotherapy. From the remaining Four patients of the malignant variant, no patient was lost to follow-up, as they were all discharged from the gynaecology clinic following the review of their histology reports, clinical improvement and non-detectable tumour markers.

Table 1. **Socio-demographic pattern of the patients with germ cell tumour**

Variable	Frequency (n=61)	Percent (%)
Age range (years)		
10 - 19	12	19.7
20 - 29	26	42.6
30 - 39	19	31.1
40 - 49	4	6.6
Mean S.D	27.15±7.60	
Parity		
Nullipara (0)	44	72.1
Primipara (1)	4	6.6
Multipara (2-4)	10	16.4
Grandmultipara (5 and above)	3	4.9
Level of education		
Primary education	6	9.8
Secondary education	33	54.1
Tertiary education	22	36.1
Occupation		
Student	21	34.4
Civil Servant	9	14.8
Trader	17	27.9
Housewife	7	11.5
Applicant	3	4.9
Public Servant	4	6.6

Table 2. Clinical features, duration of symptoms and tumour sites

Variable	Frequency(n=61)	Percent (%)
Clinical features		
Abdominal Pain	28	45.9
Abdominal Swelling	23	37.7
Abdominal Pain and Abdominal Mass	10	16.4
Duration of symptoms		
1 to 6 months	33	54.1
7 to 12 months	8	13.1
13 to 24 months	12	19.7
25 months and above	8	13.1
Tumour site		
Right Ovary	20	32.8
Left Ovary	21	34.4
Both Ovaries	20	32.8
Histological Types		
Matured cystic teratoma	56	91.8
Immature cystic teratoma	4	6.6
Yolk sac tumour	1	1.6

Table 3. Treatment options

Variable	Frequency (n=61)	Percent (%)
Exploratory laparotomy and right ovarian cystectomy	20	32.8
Exploratory laparotomy and left ovarian cystectomy	21	34.4
Exploratory laparotomy and Bilateral ovariectomy	12	19.7
Exploratory laparotomy, Total Abdominal Hysterectomy and Bilateral Salpingo-ovariectomy	3	4.9
Exploratory laparotomy, Total Abdominal Hysterectomy, Bilateral Salpingo-ovariectomy followed by Chemotherapy	5	8.2

4. DISCUSSION

Ovarian germ cell tumours which develop commonly in young women are a class of rare tumours, accounting for about 2% - 3% of all ovarian malignancies [18]. The median age of diagnosis is around 20 (range 6 - 40) years [18]. The prevalence of histologically diagnosed ovarian germ cell tumours from this study was 13.2% and it accounted for 1.3% of all gynaecological admissions during this period. This is as high as the incidence of 16% in a similar study in Enugu [19]. It was also high in a study done in Benin (33.5%) and Bayelsa (67.2%) [20,21]. These studies were carried out in tertiary health institutions which serve as referral centres and these areas are urban settlements that are densely populated. Patients presenting with ovarian germ cell tumours were younger compared to those reported in the developed world with rapid increase after age 50 years. The peak age of incidence was 20 to 29 years (42.6%) with the mean age of 27.15 ± 7.60 years. All the patients in this study were within the reproductive age group. However, the peak age for ovarian cancer in a study done at UPTH on appraisal of the pattern of gynaecological cancers reported that the mean age of occurrence of the tumour was 49.96±13.12 years [22]. The patients mostly affected in this study were nulliparous (72.1%), which was supported by a study done in Sweden that showed a decreased risk of having germ cell tumours with increased parity [23]. The patients studied mostly presented with abdominal pain (45.9%) followed by abdominal swelling (37.7%). This is also in keeping with the findings by Guo et al, and Kaur [24,25]. The presence of vaginal bleeding, massive ascites with respiratory distress, weight loss, bone pain and anaemia were not noted in the patients from this study. All these are symptoms and signs seen in late presentation which are also characteristics of the malignant variant. Most of the patients in this study rather had more of mature cystic teratoma of benign germ cell origin and did not show symptoms suggestive of malignancy except for the five malignant cases seen. The long durations of their

presentation were in months and years which was suggestive of non-aggressive disease in this population.

The frequency of occurrence in relation to the site was more on the left ovary in this study population. The occurrence on the left ovary was 34.4%, right ovary was 32.8% and that affecting both ovaries was 32.8%. A study done by Vecchia and his colleagues on ovarian germ cell tumours in childhood in Britain, showed a significant variation in the sites of occurrence which was accounted for by the germ cell tumours (80 on the right, 49 on the left, P=0.008) and other cell types occurring in similar proportions in the two gonads [19].

The mainstay of treatment for benign ovarian germ cell tumours remains surgery, as reported in other studies [17, 23-25]. Since approximately 67.2% of these tumours are restricted to one ovary at the time of surgery, exploratory laparotomy and unilateral ovarian cystectomy was done for those patients that desired fertility in the future. The disease involved both ovaries in the remaining 32.8% of the patients studied, so exploratory laparotomy and bilateral salpingo-ovariectomy (19.7%), and total abdominal hysterectomy with bilateral salpingo-ovariectomy (4.9%) were done for them, while chemotherapy was used in 8.2% of the patients after surgery. These were indicated mainly in women who had no need for fertility sparing surgery and also those with advanced form of the disease. However, efforts should be made to preserve fertility whenever possible, since these tumours are most commonly seen in patients of reproductive age group.

From this study, no intra-operative or post-operative complication was recorded. No patient was lost to follow up. A case mortality (1.6%) was recorded within 6 months of follow-up in the case of immature teratoma as the diagnosis was made in advanced stage of the disease. Other patients were discharged from gynaecology clinic following review of their histology reports and non-detectable tumour markers.

5. CONCLUSION

Ovarian germ cell tumour is one of the less common ovarian tumours and it affects mainly women of reproductive age. The commonest germ cell tumour seen in our environment is mature cystic teratoma as shown in this study. There was no obvious risk factor implicated and the commonest presenting symptom was abdominal pain. Patients who present with recurrent gastrointestinal symptoms should have regular screening for ovarian germ cell tumours following a high index of suspicion. This will enable early diagnosis and timely intervention.

CONSENT

It is not applicable.

ETHICAL APPROVAL

The Ethics committee of the University of Port Harcourt Teaching Hospital gave approval for the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Goyal LD, Kaur S, Kawatra K. Malignant mixed germ cell tumour of ovary-an unusual combination and review of literature. J Ovarian research. 2014;(1): 1-4.
2. Shaaban AM, Rezvani M, Elsayes KM, Baskin Jr H, Mourad A, Foster BR, et al. Ovarian malignant germ cell tumors: Cellular classification and clinical and imaging features. Radiographics. 2014;34 (3):777-801.
3. Torre LA, Trabert B, DeSantis CE, Miller KD, Samimi G, Runowicz CD, Gaudet MM, Jemal A, Siegel RL. Ovarian cancer statistics. CA: A cancer J Clini. 2018;68(4):284-296.
4. Kaur B. Pathology of malignant ovarian germ cell tumours. Diagnostic Histopathology. 2020;(6):289-297.
5. Mallen AR, Townsend MK, Tworoger SS. Risk factors for ovarian carcinoma. Hematology/Oncology Clinics. 2018;32(6): 891-902.
6. Nogales FF, Schuldt M. Germ cell tumors of the female genital tract. In: Nagoles FF and Jimenez RE (eds). Pathology and Biology of Human Germ Cell Tumors. 2017;195-266.
7. Farahani L, Datta S. Benign ovarian cysts. Obstet Gynaecol Rep Med. 2016; 26(9):271-275.
8. Wang Y, Yang JX, Yu M, Cao DY, Shen K. Malignant mixed ovarian germ cell tumor composed of immature teratoma, yolk sac tumor and embryonal carcinoma harboring

an EGFR mutation: a case report. Oncotargets and therapy. 2018;11: 6853.
9. Vaidya S, Sharma P, KC S, Vaidya SA. Spectrum of ovarian tumors in a referral hospital in Nepal. Journal of pathology of Nepal. 2014;4(7):539-543.
10. Shaaban AM, Rezvani M, Elsayes KM, Baskin Jr H, Mourad A, Foster BR, Jarboe EA, Menias CO. Ovarian malignant germ cell tumors: cellular classification and clinical and imaging features. Radiographics. 2014;34(3):777-801.
11. Green Top Guideline No. 62: Management of suspected ovarian masses in premenopausal women. RCOG/BSGE Joint Guideline; 2011.
12. Prat J, FIGO Committee on Gynecologic Oncology. Staging classification for cancer of the ovary, fallopian tube, and peritoneum: Abridged republication of guidelines from the International Federation of Gynecology and Obstetrics (FIGO). Obstet Gynecol. 2015;126(1):171-174.
13. Da Justa RF, De Mello RA. Ovarian Cancer. In International Manual of Oncology Practice. Springer, Cham. 2019;471-490.
14. Usmani AS, Yasin I, Asif RB, Kahlid N, Syed A. Incidence and Survival Rates for Female Malignant Germ Cell Tumors: An Institutional Review. Cureus. 2022;14(4): e24497.
DOI:10.7759/cureus.24497
15. Kamal NJ, Shami MR, Kamal J. Abdominal Teratoma, A Case Report and Review of Cases Reported from Saudi Arabia. The Egyptian J Hosp Med. 2018;71(3):2820-2825.
16. Veneris JT, Mahajan P, Frazier AL. Contemporary management of ovarian germ cell tumors and remaining controversies. Gynecologic Oncology. 2020; 158(2):467-75.
17. Marliyya S. Zayyan. Risk factors for ovarian cancer, Tumor Progression and Metastasis; 2020. Available:https://www.intechopen.com/chapters/70875
18. Matei D, Brown J, Frazier L. Updates in the management of ovarian germ cell tumors. American Society of Clinical Oncology Educational Book. 2013;33(1):e210-6.
19. Iyoke CA, Ugwu GO, Ezugwu EC, Onah N, Ugwu O, Okafor O. Incidence, pattern and management of ovarian cancer at a tertiary medical centre in Enugu, South East Nigeria. Ann Med Health Sci Res. 2013;3: 417-21.
20. Forae GD, Aligbe JU. A histopathological overview of ovarian lesions in Benin City, Nigeria: How common are the functional cysts? Int J Med Public Health 2014;4:265-8.
21. Patrick UE, Lucky KE. Benign ovarian tumours in a tertiary care hospital in Niger delta, Nigeria: a 10 year histopathological study. International Journal of Current Research and Review. 2015; 7(8):71.
22. Bassey G, Ozueh CO. An Appraisal of the Pattern of Gynaecological Cancers at The University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria. Orient J Med. 2022; 34.
23. Sköld C, Koliadi A, Enblad G, Stålberg K, Glimelius I. Parity is associated with better prognosis in ovarian germ cell tumors, but not in other ovarian cancer subtypes. Int. J. Cancer. 2021;1-9.
24. Guo H, Chen H, Wang W, Chen L. Clinicopathological features, prognostic factors, survival trends, and treatment of malignant ovarian germ cell tumors: A SEER Database Analysis. Oncology Research and Treatment. 2021;44(4):145-53.
25. Kaur B. Pathology of malignant ovarian germ cell tumours. Diagnostic Histopathology. 2020; 26(6):289-97.

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