Histopathological Pattern of Epithelial Ovarian Neoplasms among Sudanese Women in Khartoum State

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Abstract

Background: Ovarian cancer (OC) is a fatal disease with a mortality rate ranking the highest in all gynecological malignancies. It is considered the third most common cancer in the female reproductive system following the cancer of the uterine cervix and uterine corpus. It represents the eighth most common, annual cancer death among women all over the world: 290,000 morbidity and 180,000 mortality.

Objective: To study the histopathological pattern of epithelial ovarian neoplasms among Sudanese women in Khartoum State.

Materials and methods: This was a cross-sectional study investigating 210 cases of formalin-fixed paraffin-embedded (FFPE) tissue blocks previously diagnosed as ovarian tumors, and collected from different governmental hospitals in Khartoum State (Sudan), during the period 2013-2016. They were reviewed and their frequencies in different age groups were calculated.

Results: Age of patients ranged between 15-93 years (mean 44.49 years). Age groups were 52.4%, ≤ 45, 40.5%, > 45 and 7.1% age was unknown. According to the histopathological diagnosis, 114 cases (54.3%) were epithelial malignant neoplasm 76 cases (36.2%) were benign neoplasm, and 20 cases (9.5%) were classified as tumor-like conditions. We found significant association (p = 0.00) between the age incidence and the histopathological diagnosis.

Conclusion: There was a significant association between the age groups and the histopathological diagnosis.

Keywords: Histopathological pattern, Epithelial ovarian neoplasms, Sudanese women.

Introduction

The high mortality rate of ovarian cancer is due to the advanced stage at the time of diagnosis in most patients, and lack of a screening strategy to detect early-stages of the disease. In developing countries, ovarian cancer ranked the second most common gynecological cancer. In Sudan and

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According to previous reports (2009-2013), ovarian cancer was the third most frequent tumors among females after breast and cervical carcinomas.

The prevalence rate of ovarian cysts and tumor-like conditions has been reported to be between 2 to 4% among gynecological admissions. About 95% of these tumors have been found to be benign. Non neoplastic lesions of the ovary frequently form a pelvic mass and are often associated with abnormal hormonal manifestations. It may be a potential origin of epithelial ovarian tumor and has also been indicated to undergo metaplastic changes. Thus it potentially mimics an ovarian neoplasm on clinical examination, at operation, and on pathological examination.

Epithelial tumors derived from the epithelium usually cover the exterior surface of the ovary. Epithelial ovarian tumor (EOT) is classified according to its biological behavior to: benign, borderline, 'carcinoma of low malignant potential', and typical carcinoma. EOT are most common in post-menopausal women. Approximately 90% of ovarian cancers are malignant epithelial tumors. EOT consists of serous, mucinous, clear cell, endometrioid, and Brenner tumors. Each type is sub-classified into benign, borderline, or malignant.

These subtypes are defined according to the histological appearance of the epithelium in which serous tumor resemble the serous epithelium of the fallopian tube, mucinous tumor has mucin-containing cells, endometrioid tumor has an epithelium similar to the glands of the endometrium, clear cell tumors have cells with a clear cytoplasm and “hobnail” cells, and Brenner tumors have transitional cell aggregates.

The prevalence rate of ovarian neoplasms and their age distribution is not well-studied in Sudan. The present study was conducted to identify the frequency rate of ovarian neoplasms and their relation with age incidence of patients among Sudanese women attending different hospitals in Khartoum (Sudan).

Materials and methods

This was a cross-sectional study conducted to investigate formalin-fixed paraffin-embedded (FFPE) tissue blocks collected from different governmental hospitals in Khartoum State during the period from April 2013 to December 2016. The study was approved by the Scientific Research Committee of Alzaiem Alazhari University, Khartoum North, Sudan, and the Ethical Board of the Ministry of Health (Sudan). Data confidentiality was maintained, and the information collected from all specimens had not been used for any purpose other than this study. Permission to investigate the specimens was granted from hospital authorities in Khartoum State. Informed consent from patients has been waived by the ethical committees, since patients' identity was anonymized, and only laboratory numbers were used.

210 formalin-fixed and paraffin-embedded (FFPE) tissue blocks were investigated. The blocks included 114 tissue blocks diagnosed as epithelial ovarian cancer, and 76 blocks diagnosed as benign tumours, and 20 blocks diagnosed as tumor-like lesions. Clinical and demographical data were retrieved from the laboratory records, i.e. patient age and histopathological diagnosis. A 4 µm thickness section was cut from the original ovarian cancer blocks, stained with hematoxylin & eosin (H&E) for histopathological examination. The H&E sections were reviewed to confirm the diagnosis according to the 2014 World Health Organization (WHO)

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classification of ovarian tumors.
Statistical analysis was performed using the Statistical Package for Social Sciences (IBM SPSS), version 24. Pearson’s Chi-square test was used to determine the statistical significant association between histopathological diagnosis and age incidence. P-value < 0.05 was considered as statistically significant.

Results

A total of 210 paraffin blocks previously diagnosed as ovarian tumors were collected in the study. The age of patients ranged from 15 to 93 years, with a mean average of 44.49 years. According to the histopathological diagnosis and among 210 cases investigated, 114 cases (54.3%) were classified as epithelial malignant neoplasms, 76 cases (36.2%) were classified as benign neoplasms, and 20 cases (9.5%) were classified as tumor-like conditions.

Among 195 cases investigated, 110 cases (56.4%) were aged ≤ 45 years, 85 cases (43.6%) were aged > 45 years, and 15 cases (7.1%) were with missing age. The age of 62 cases (out of 110 malignant cases) was found more than 45 years (56.4%); and the age of 48 cases (out of 110 malignant cases) was found equal or less than 45 years (43.6%). While, the age of 46 cases (out of 67 benign cases) was found equal or less than 45 years (68.7%), and the age of 21 cases (out of 67 benign cases) was found more than 45 years (31.3%). Furthermore, the age of 16 cases (out of 18 tumor-like cases) was found equal or less than 45 years (88.9%); and the age of 2 cases (out of 18 cases) was found more than 45 years (11.1%). Thus there was a significant association between the age incidence of cases investigated and the histopathological features detected (p = 0.000). The major contributor to the significant association was related to the malignant tumors examined (Table 1).

Table 1: Association of the histopathological features with age incidence

<table>
<thead>
<tr>
<th>Age incidence</th>
<th>Malignant</th>
<th>Benign</th>
<th>Tumor-like cysts</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 45 years</td>
<td>48 (43.6%)</td>
<td>46 (68.7%)</td>
<td>16 (88.9%)</td>
<td>0.000</td>
</tr>
<tr>
<td>&gt; 45 years</td>
<td>62 (56.4%)</td>
<td>21 (31.3%)</td>
<td>2 (11.1%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>110 (100%)</td>
<td>67 (100%)</td>
<td>18 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

The 114 malignant ovarian tumours investigated were classified as high grade serous, low grade serous, mucinous carcinoma, endometroid carcinoma, clear-cell carcinoma, malignant Brenner tumor, and borderline line. The 76 benign tumors were classified as serous adenoma, mucinous adenoma, benign teratoma, and fibroma. The 20 tumor-like cysts were classified as follicular cysts, and luteal cysts. The high grade serous malignant tumour formed the highest number (54/25.7%) of tumours investigated; while the fibroma benign tumour formed the lowest number (2/0.9%) of tumours investigated (Table 2).

Discussion

In this study the mean age range of patients investigated was 44.49 years (age range 15-93 years). Among malignant neoplasms, the age of 62 cases (56.4%) was found less than 45 years;

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and 48 cases (43.6%) were more than 45 years. This difference was a statistically significant association between the age incidence and the histopathological diagnosis (p = 0.000). This finding was similar to the Sudanese study conducted by Adam and her colleagues (2017) who reported a 36.8% frequency rate among EOT cases with an age range less than 45 years. Adam and her co-authors (2015) had investigated 40 ovarian cancer cases and they reported

<table>
<thead>
<tr>
<th>Ovarian tumor</th>
<th>Subtypes</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malignant tumours (No. 114)</td>
<td>Borderline</td>
<td>6 (2.9%)</td>
</tr>
<tr>
<td></td>
<td>Brenner tumor</td>
<td>3 (1.4%)</td>
</tr>
<tr>
<td></td>
<td>Clear cell carcinoma</td>
<td>7 (6.6%)</td>
</tr>
<tr>
<td></td>
<td>Endometroid carcinoma</td>
<td>16 (14.4%)</td>
</tr>
<tr>
<td></td>
<td>Low grade serous</td>
<td>6 (5.4%)</td>
</tr>
<tr>
<td></td>
<td>Mucinous carcinoma</td>
<td>22 (19.1%)</td>
</tr>
<tr>
<td></td>
<td>High grade Serous</td>
<td>54 (47.3%)</td>
</tr>
<tr>
<td>Benign tumours (No. 76)</td>
<td>Serous adenoma</td>
<td>49 (31.6%)</td>
</tr>
<tr>
<td></td>
<td>Mucinous adenoma</td>
<td>20 (13.5%)</td>
</tr>
<tr>
<td></td>
<td>Benign teratoma</td>
<td>5 (3.5%)</td>
</tr>
<tr>
<td></td>
<td>Fibroma</td>
<td>2 (1.4%)</td>
</tr>
<tr>
<td>Tumor-like cysts (No. 20)</td>
<td>Follicular cysts</td>
<td>14 (9.3%)</td>
</tr>
<tr>
<td></td>
<td>Luteal cyst</td>
<td>6 (4.3%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>210 (100%)</td>
</tr>
</tbody>
</table>

a mean age of 41 years, and this age of cases showed the presence of ovarian tumor in younger age groups. Similarly the onset of cancer in young ages had been reported among women in other sub-saharan Africa.

Akakpo and his colleagues (2015) reported adenocarcinoma cases in Ghana with a mean age of 49 years. Also, Onyiaorah and his co-workers (2011) studied ovarian tumors in Lagos (Nigeria) and reported that adenocarcinoma occurred in the age range 20-69 years, with highest frequency rate in the age range 30-39 years.

Sueblinvong and his co-authors in Thailand (2007) found a mean age of 46.31 years with a range of 24-67 years. However, this finding was different from that reported by Kurman and his colleagues (2014) who stated that OC mainly develops in older women with a mean age of 60 years.

Marinas and his co-workers (2012) reported a mean age range in malignant cases of 55.4 years, and in benign tumors reported a mean age range of 47 years. This finding agreed with the findings of this study which reported a mean age range less than 45 years (68.7%) in benign tumors.

On the other hand, prevalence of OC was reported among younger ages in Sudan and African countries. However, this observation may be due to the difference in population age range; where Africa has, by far, the youngest population in the world. This younger age range in Africa may also be explained by the differences in genetic makeup between developed and developing

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countrines where the ovarian tumors have a high molecular heterogeneity. The clinicopathological characteristics of the EOC in this study, and the serous epithelial ovarian cancer exhibited a 52.6% frequency rate followed by the mucinous carcinoma (19.3%). This finding was consistent with other worldwide findings. Asadinejad and his co-authors (2018) found that the most prevalent tumor in their study was serous carcinoma (54%).

**Recommendations:** The small sample size of our study may not reflect the actual prevalence rate of these tumours in Sudan. Additional studies with a large sample size and more additional clinicopathological data (e.g. tumor stage, tumour grade, immunohistochemical markers, and metastasis) can probably verify the outcome of this study.

**Conclusion:** There was a significant association between the age groups and the histopathological diagnosis.

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**References**


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