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Clinicopathological Characteristics of high and low-grade Ovarian Serous Carcinoma

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Abstract

Ovarian cancer is the third most common gynecologic malignancy worldwide, after cervical cancer and endometrial cancer, but it has the highest mortality-to-incidence ratio of the three, indicating that it is fatal. Serous carcinoma is divided into two subtypes: low-grade serous carcinoma (LGSC) and high-grade serous carcinoma (HGSC). The purpose of this descriptive study is to determine the clinical characteristics of LGSC and HGSC patients based on five parameters: age, patient's chief complaint, tumor location, FIGO staging, and metastasis. For the period January 2017 to December 2021, 167 samples were collected based on histopathological data from three anatomical pathology laboratories in Makassar, consisting of 47 LGSC samples and 120 HGSC samples. The findings revealed that the most common age in LGSC and HGSC was 40-60 years (70.21% in LGSC and 70.83 percent in HGSC), and the most common chief complaint was abdominal enlargement (95.74% in LGSC and 94.17% in HGSC). LGSC is most commonly unilateral (53.20%), stage I-II (57.45%, and not metastatic (59.57%). In HGSC, it was most commonly bilateral (55%), 82 (68.33%) were diagnosed at stage III-IV, and most had metastases to the omentum (62.50%). In both types of tumors, the omentum is the most common site of tumor metastasis.

Keyword: serous carcinoma; ovary; characteristics; metastases.

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1. Introduction

Ovarian cancer is the third most common gynecologic malignancy worldwide, after cervical and endometrial cancer [1]. The prevalence of ovarian cancer worldwide is 10/100,000 population, with the number of new cases reaching 313,959 and a mortality rate of 207,252 [2]. After breast cancer and cervical cancer, ovarian cancer is the third most common malignancy in women in Indonesia. When compared to breast and cervical cancer, ovarian cancer has the highest mortality-to-incidence ratio, indicating that this cancer is fatal [3].

Ovarian carcinoma carcinogenesis is classified into two types based on histopathology, molecular biology, and genetics. Low-grade serous carcinoma (LGSC), mucinous carcinoma, endometrioid, clear cell, seromusinosum, and malignant Brenner tumor are all examples of type I cancer. High-grade serous carcinoma (HGSC), undifferentiated carcinoma, and carcinomasarcoma are the three subtypes of type II. HGSC account for approximately 75% of all type II carcinomas [4–6].

LGSC belongs to the type I tumor category, in which tumors are typically large, unilateral, indolent cysts that begin with benign lesions such as cystadenoma/adenofibroma and progress to atypical proliferative/borderline tumors and, eventually, carcinoma. This type of cancer is typically low-grade, confined to the ovaries at diagnosis, has a stable genome, and is not associated with a TP53 mutation [4,5,7,8].

HGSC belongs to the type II category, with high-grade characteristics, growing quickly and aggressively, and 75 percent of cases are detected when they have advanced. Tumors in this category are genetically unstable and, in 95 percent of cases, carry the TP53 mutation. Some evidence suggests that tumors in this category arise from the fallopian tube's fimbriae epithelium and/or the ovary's surface epithelium [4,7,8].

Based on the information provided above, we collected clinical and pathological data on LGSC and HGSC tumors from three laboratories in Makassar in order to determine the characteristics of LGSC and HGSC patients in Makassar.

2. Materials and Method

From 2017 to 2021, we collected 167 cases of ovarian serous carcinoma diagnosed histopathologically at Wahidin Sudirohusodo Hospital Makassar, Hasanuddin University Teaching Hospital, and Makassar Pathological Diagnostic Center Laboratory. We obtained these samples from pathological data that met the inclusion criteria and contained all of the required information. All of our samples were divided into two groups based on histopathological diagnosis: LGSC and HGSC. We assessed the following parameters for each sample group: 1) age (40, 40-60, and >60 years); 2) the main complaint of the patient seeking treatment (enlarged abdomen, abdominal pain, vaginal bleeding); 3) tumor location, involving one or both ovaries (unilateral or bilateral); 4) staging, using FIGO staging (I-II and III-IV); and 5) metastases, assessed through microscopic examination reports of tumor cell invasion in omental and/or lymph node (nonmetastatic, omental metastases, lymph node metastases). The SPSS 20 software for Windows was used to process all of the data.

3. Result

We collected a total of 167 samples, consisting of 47 LGSC samples and 120 HGSC samples, with the characteristics of each sample group shown in Table 1.

Table 1: Distribution of patient characteristics of LGSC and HGSC.

Characteristics	LGSC n = 47	HGSC n = 120
Age		
< 40	9 (19.15%)	16 (13.33%)
40-60	33 (70.21%)	85 (70.83%)
> 60	5 (10.64%)	19 (15.83%)
Main complaint		
Enlarged belly	45 (95.74%)	113 (94.17%)
Stomach pain	1 (2.13%)	5 (4.17%)
Vaginal bleeding	1(2.13%)	2 (1.66%)
Location		
Unilateral	25 (53.20%)	54 (45%)
Bilateral	22 (46.80%)	66 (55%)
FIGO Staging		
I-II	27 (57.45%)	38 (31.67%)
III-IV	20 (42.55%)	82 (68.33%)
Metastatic Occurrence		
Nonmetastatic	28 (59.57%)	41 (34.17%)
Omental metastases	18 (38.30%)	75 (62.50%)
Lymph node metastases	1 (2.13%)	4 (3.33%)

4. Discussion

This is a descriptive study that aims to assess the characteristics of LGSC and HGSC patients using five parameters: age, the primary reason for the patient seeking treatment, tumor location, FIGO staging, and the presence or absence of metastases.

The most common age range in both tumor groups (LGSC and HGSC) was 40-60 years, accounting for 70% of the total sample of each group. Ovarian carcinoma is a disease that is strongly linked to age. This cancer is most commonly found in postmenopausal women. The prevalence rises in women over the age of 65, with the median age at diagnosis ranging from 50 to 79 years. The worse the prognosis, the older the patient at the time of

diagnosis [1]. Younger age at diagnosis was more common in the LGSC group, with 19.15% of patients under 40 years old. In contrast, in the HGSC group, patients diagnosed at the age of >60 years showed a larger percentage, namely 15.83%. In contrast, in the HGSC group, patients diagnosed at the age of >60 years showed a larger percentage, namely 15.83%. According to the WHO Classification of Tumors, patients with high-grade serous carcinoma are older than those with low-grade serous carcinoma. LGSC patients are typically a decade younger than HGSC patients at the time of diagnosis [9]. Okoye and his colleagues discovered that the mean age of LGSC patients was 52 years, while HGSC patients were 62 years. Patients under the age of 40 were seen more commonly in the LGSC group (21.2%) than in the HGSC group (1.6%) [10].

More than 90% of patients in both tumor groups had an enlarged abdomen as their primary complaint. Okoye and his colleagues found similar results in a study of LGSC and HGSC patients, finding that the most common chief complaint was an enlarged abdomen, followed by pelvic pain, vaginal bleeding, and pleural effusion [10]. According to Torre and his colleagues ovarian cancer is frequently diagnosed late due to non-specific symptoms. Patients typically present with an enlarged abdomen due to ascites. Back pain, abdominal distension, pelvic or abdominal pain, early satiety, altered bowel habits, and frequent urination may have been experienced by the patient several months before the abdominal swelling became apparent [11]. We discovered that very few patients came in with complaints of abdominal pain (only 2.13% in the LGSC group and 4.17% in the HGSC group), indicating that patients generally seek help only when the abdomen has become noticeably enlarged. Patients who arrive late cause the tumor to be in an advanced stage when diagnosed, which contributes to the high mortality rate in serous ovarian carcinoma [11,12].

Unilateral tumor locations were more common in the LGSC group (53.20%), whereas bilateral tumor locations were more common in the HGSC group (55%). Our findings are consistent with Vang and his colleagues finding's that bilateral sites were more common in HGSC tumors (84%) than in LGSCs (74-77%) [13]. According to the literature, LGSCs are more frequently unilateral, whereas HGSCs have tumor sites that involve both ovaries more frequently [11,12]. In a study of LGSC, Ahn and his colleagues discovered that bilateral tumors were more common at a higher stage than unilateral tumors, with a significant difference [14].

According to the sample data we collected, 68.33% of patients in the HGSC group were diagnosed in stages III-IV, while in the LGSC group, the percentage of patients in stage I-II was higher (57.45% than stage III-IV 42.55%). This is consistent with the findings on metastatic parameters, where the percentage of tumors that did not metastasize (59.57%) was higher in the LGSC group than those that did. Contrasting results were obtained in the HGSC group, in which patients were generally diagnosed when the tumor had metastasized to the omentum (65.83%). The omentum was the most common site of metastasis in both tumors.

Several studies on HGSC found comparable results. Li and his colleagues studied 153 HGSC samples and discovered that the majority of the samples [117] were diagnosed at an advanced stage (III-IV) [15]. Okoye and his colleagues reported that 67% and 27% of HGSC patients were diagnosed at stage III and IV, respectively. Our findings contradict previous studies in the LGSC group. Okoye discovered that LGSC was more dominant at an advanced stage, with the cumulative percentage of stages III and IV reaching 94% and only 6% in stage I [10].

Ovarian cancers typically spread passively through the peritoneal cavity and reach the omentum. Metastases to the omentum are unique to ovarian tumors and are not common seen in other carcinomas [16,17]. More metastases and tumors diagnosed at an advanced stage indicate that HGSC is a more aggressive tumor than LGSC. This is consistent with the characteristics of HGSC, which are high-grade and aggressive since its early development. At the molecular level, 80% of these tumors have TP53 gene mutations and a high Ki67 proliferation index. LGSC, on the other hand, is pathogenesis categorized as type I ovarian carcinoma, is more genetically stable, develops gradually, and is indolent [8].

According to the literature, LGSC is a malignancy that develops from borderline serous tumors, has an indolent character, slows growth, metastasizes less frequently, and has a relatively better prognosis than the high-grade type [18]. HGSC, on the other hand, is very aggressive, grows quickly, and easily metastasizes; generally, patients are diagnosed when the cancer has progressed to an advanced stage, making the prognosis worse [19], with only 9% of patients surviving 5 years after diagnosis and the median mortality occurring at 1.7 years [20].

The advantage of this study is that we use quite large number of samples. The limitation of our study is that the histopathological diagnosis of LGSC and HGSC is base on the subjectivity of the examiner, diagnosis by immunohistochemical and molecular methods is still very limited.

5. Conclusion

Patients with serous type ovarian carcinoma are typically between the ages of 40 and 60, with an enlarged abdomen being the most common presenting complaint. LGSC tumors are typically unilateral, diagnosed at an early stage (I–II), and do not metastasize. HGSC is usually bilateral and is diagnosed at an advanced stage (III-IV) when the tumor has spread to the omentum. The omentum is the most common site of tumor metastasis in both types of tumors.

6. Suggestion

Further research is needed with a larger sample size and more diverse variables.

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