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Analysis of the Characteristics of Ovarian Tumors

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Abstract. *Ovarian tumor is a condition where the ovaries experience abnormal growth, disrupting their function as the site for follicles and the production and secretion of estrogen and progesterone, which regulate the menstrual process and women's hormones. This makes ovarian tumors highly dangerous. The purpose of this research is to understand the characteristics of ovarian tumor disease. This study is qualitative descriptive research using the literature study method through a review of literature from previous research journals. The results of this research explain that there are three types of ovarian tumors: benign tumors, borderline tumors, and malignant tumors. These tumors can develop into cancer in advanced stages, spreading to other organs, and their growth often goes unnoticed, earning them the nickname "silent killer." The characteristics of each tumor stage differ, emphasizing the need for exploration in patients affected by ovarian tumors. Based on the conducted research, it is recommended that further studies be conducted on the clinicopathological characteristics of ovarian tumors.*

Keywords: *Characteristics, Classification, Ovarian Tumor*.

INTRODUCTION

Ovarian tumor is a condition where the ovaries undergo abnormal growth, disrupting their function as the site for follicles and the production and secretion of estrogen and progesterone, which regulate the menstrual process, and women's hormonal balance is disturbed, making this tumor highly dangerous (Cahyani et al., 2022). Ovarian tumor malignancy is a leading cause of death worldwide in the field of gynecologic oncology. This occurs because ovarian cancer is often discovered in advanced stages, spreading to other organs, and its growth is asymptomatic, earning it the moniker "silent killer" (Arania & Windarti, 2015). There are three types of ovarian tumors: benign tumors, borderline tumors, and malignant tumors. Ovarian tumors account for an estimated 30% of all cancers in the female genital system. About 80% are benign tumors and are more commonly found in the age range of 20-45 years, while borderline tumors are found in older age groups, and malignant tumors typically occur between the ages of 45-65 years. According to the World Health Organization (WHO), based on histopathology and classification, malignant ovarian tumors are divided into three types: epithelial ovarian tumors, germinal ovarian tumors, and sex cord-stromal ovarian tumors (Wijaya et al., 2017). Approximately 90% of ovarian cancers are of the epithelial type. The hypothesis regarding the etiology of ovarian tumors, while not proven, suggests that ovarian cancer arises from inclusion cysts with epithelial cell layers on the surface of the ovaries. These cysts are nests of ovarian surface epithelium trapped in the ovarian stroma and become targets for the stimulative effects of stromal growth factors (Hunn & Rodriguez,

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2012). Several risk factors for ovarian tumors include increasing age, family history of the disease, mutations in BRCA1 or BRCA2, nulligravida, early menarche, late menopause, infertility, endometriosis, obesity, and smoking.

Ovarian tumors are a dangerous disease, as indicated by data on women with ovarian tumors. According to the Global Cancer Incidence, Mortality, and Prevalence (Globocan) data, ovarian cancer is the third most common cancer in Indonesian women, with 14,896 cases and 9,581 deaths in 2020. Ovarian cancer most often occurs in postmenopausal women aged 50-70 years. Ovarian cancer is the deadliest gynecological cancer, with a 5-year survival rate of approximately 43% (Kemenkes, 2022).

LITERATURE REVIEW

Ovarian tumors are typically detected at advanced stages and remain a significant cause of high mortality in gynecological malignancies. Ovarian cancer is the leading cause of death in women with gynecological malignancies, accounting for approximately 5% of all cancer-related deaths (Hennessy et al., 2009). This is because ovarian cancer is often discovered in advanced stages, spreading to other organs, and its growth is asymptomatic, earning it the moniker "silent killer" (Arania & Windarti, 2015).

Ovarian tumors are classified based on the World Health Organization (WHO) and the International Federation of Gynecology and Obstetrics (FIGO) criteria. According to the WHO criteria, ovarian tumors are differentiated into three main categories based on the anatomical structure from which they originate: 1) surface epithelial-stromal tumors (65%), 2) germ cell tumors (15%), 3) sex cord-stromal tumors (10%). Each category is further subdivided into several subtypes. They are referred to as mixed tumors when there is a combination of two or more subtypes (Clarke-Pearson, 2009).

Epithelial ovarian cancer originates from the malignant transformation of the surface epithelium of the ovaries adjacent to the peritoneal mesothelium. Almost 90% of ovarian cancer originates from the coelomic epithelium or mesothelium. These cells are products of the mesoderm that can undergo metaplasia (Clarke-Pearson, 2009).

RESEARCH METHOD(S)

This research is a qualitative descriptive study using the literature review method through a review of literature from previous research journals (Kurniawan, 2014) related to the title, as well as accessing data from websites as sources of information. Qualitative descriptive research can be interpreted as the researcher being the key instrument, where data collection techniques involve the merging and inductive analysis of data (Sugiyono, 2012). This approach results in the processing of descriptive data, such as narrating the outcomes of interviews and/or observations.

FINDINGS AND DUSCUSSION

The characteristics of serous tumors on examination are described with cystic lesions where papillary epithelium is contained within some fibrous-walled cysts (intracystic) or projected from the ovarian surface. Benign tumors typically show smooth, shiny cyst walls without thickening of the epithelium or with small papillary projections. Borderline tumors contain an increased number of papillary projections. The crucial aspect of serous borderline and malignant serous tumors involves (or originates from) the ovarian surface. In histological examination, the cysts are lined by columnar epithelium with numerous cilia in benign tumors. Microscopic papillae may be found. Serous borderline tumors exhibit increased complexity of papillae stroma, stratification of epithelium, and mild atypical nuclear features, but infiltrative destructive growth into the stroma is not observed. Epithelial proliferation may follow a papillary pattern called "micropapillary carcinoma," a precursor to low-grade serous carcinoma. The presence of solid masses or papillary tumor masses, irregular mass shapes, and capsule fixation or nodularity are indicators of possible malignancy. This is a characteristic of high-grade serous carcinoma, which microscopically shows a more complex growth pattern and stromal infiltration. Tumor cells in high-grade carcinoma depict nuclear atypia, pleomorphism, atypical mitotic figures, and multinucleation. Concentric calcifications (psammoma bodies) are characteristic of benign tumors but are not specific to neoplasia (Kumar et al., 2010; Berek & Hacker, 2010).

Mucinous tumors are characterized by rarely involving the surface and being seldom bilateral. Mucinous tumors produce large, multilocular cystic masses containing viscous, gelatin-rich fluid. In histological examination, benign mucinous tumors are lined by columnar epithelial cells with apical mucin and no cilia, similar to benign intestinal or cervical epithelia. Mucinous adenocarcinomas contain areas of solid growth with striking epithelial cell atypia

and stratification, loss of glandular architecture, and necrosis (Berek & Hacker, 2010; Gentry-Maharaj & Menon, 2012; Kumar et al., 2017).

Benign endometrioid tumors (endometrioid adenofibromas) and borderline endometrioid tumors account for approximately 20% of ovarian cancers. Endometrioid tumors are differentiated from serous and mucinous tumors by the presence of tubular glands closely resembling benign or malignant endometrial tissue. Endometrioid carcinoma shows a combination of cystic and solid components similar to mucinous adenocarcinoma. About 40% involve both ovaries and are usually bilateral (Berek & Hacker, 2010; Kumar et al., 2017).

Benign and borderline clear cell tumors are very rarely found, as is the carcinoma type. They present as large epithelial cells with abundant clear cytoplasm resembling hypersecretory gestational endometrium. As some of these tumors occur in association with endometriosis or ovarian endometrioid carcinoma and resemble clear cell carcinoma of the endometrium, they are said to originate from Müllerian and variant endometrioid adenocarcinoma. Ovarian clear cell tumors can be solid or cystic masses. In solid neoplasms, clear cells are arranged in sheets or tubules. In cystic types, neoplastic cells are arranged in rows (Berek & Hacker, 2010; Kumar et al., 2017).

Cyst adenofibroma is a variant where there is more proliferation of fibrous stroma lining the columnar epithelium. This benign tumor is usually small and multilocular, containing mucinous, serous, endometrioid, and transitional (Brenner tumor) epithelial components. Brenner tumors are classified as adenofibromas where the components consist of transitional epithelial cells resembling the layers of the bladder (Berek & Hacker, 2010; Kumar et al., 2017).

The ovarian cancer stage is determined based on findings during exploration. The classification of epithelial ovarian tumors can be seen in Table 1, and the ovarian cancer stage according to the International Federation of Gynecology and Obstetrics (FIGO) based on the results of surgery evaluation for primary ovarian tumors and the discovery of its spread can be seen in the following table:

Table 1. Ovarian Tumor Classification According to WHO

	Histological Type	Mobile Type
I	Serous	Endosalpingeal
	A. Benign	
	B. Borderline	
	C. Malignant	
II	Musinus	Endoservikal
	Benign	
	Borderline	
	Malignant	
III	Endometrioid	Endometrial
	Benign	
	Borderline	
	Malignant	
VI	Clear-cell mesonephroid	Mullerian
	Benign	
	Borderline	
	Malignant	
V	Brenner	Transitional
	Benign	
	Borderline	
	Malignant	
VI	Mixed epithelial	Mixed
	Benign	
	Borderline	
	Malignant	
VII	Undifferentiated	Anaplastic
VIII	Unclassified	Mesothelioma dll.

Source: (Novak, 2007)

Table 2. Ovarian Cancer Staging According to FIGO Criteria

Stadium	Criteria
I	Limited growth of the ovary
IA	Tumour growth was confined to one ovary, ascitic fluid did not contain no malignant cells, there is no tumour growth on the outer surface surface and the capsule intact
IB	Tumour growth was limited to both ovaries, ascitic fluid did not contain no malignant cells, there was no tumour growth on the outer surface outer surface and capsule intact
IC	The tumour is confined to one or both ovaries
IC1	Tumour rupture during surgery
IC2	Tumour capsule rupture prior to surgery or tumour on the surface of the ovary
IC3	Malignant cells present in ascitic fluid or peritoneal lavage fluid
II	Tumours in one or both ovaries, with extension to the pelvic wall (below the pelvic brim) or primary peritoneal cancer.
IIA	Expansion and or metastasis to the uterus and or fallopian tubes
IIB	Extension to other pelvic tissues
III	Tumours in one or both ovaries with cytology or histology implantation outside the peritoneal pelvis and or metastases to retroperitoneal lymph nodes.
IIIA	Spread to retroperitoneal lymph nodes and or microscopically metastases outside the pelvis
IIIA1 (1)	Spread to retroperitoneal lymph nodes only
IIIA2 (2)	Metastases ≤ 10 mm
IIIA2	Metastases ≥ 10 mm
IIIB	Microscopically, involving the extrapelvic peritoneum (above the brim) ± positive retroperitoneal lymph nodes
IIIC	Macroscopically, extrapelvic, peritoneal metastases ≤ 2 cm ± nodes positive retroperitoneal lymph nodes. Includes tumour extension to the liver/bile capsule.

IV	Macroscopically, extrapelvic, peritoneal metastases > 2 cm ± nodes positive retroperitoneal lymph nodes. Includes tumour extension to the capsule liver/bile
IVA	Distant metastases, excluding peritoneal metastases
IVB	Pleural effusion with positive cytology Hepatic metastases and or splenic parenchymal metastases, metastases to organs (including inguinal lymph nodes and lymph nodes outside the abdominal cavity).

Source: J Gynecol Oncol Vol. 26, No. 2:87-89, 2015

CONCLUSION AND RECOMMENDATION

There are three types of ovarian tumors: benign tumors, borderline tumors, and malignant tumors. These tumors can develop into cancer in advanced stages, spreading to other organs, and their growth often goes unnoticed, earning them the nickname "silent killer." The characteristics of each tumor stage differ, emphasizing the need for exploration in patients affected by ovarian tumors.

Based on the conducted research, it is recommended that further studies be conducted on the clinical-pathological characteristics of ovarian tumors.

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