

occur at slightly older ages. Malignant tumors are more common in older women, between the ages of 45 and 65 years. Ovarian cancer accounts for 3% of all cancers in females and is the fifth most common cause of death due to cancer in women in the United States. **Because most ovarian cancers have spread beyond the ovary by the time of diagnosis, they account for a disproportionate number of deaths from cancer of the female genital tract.**

Classification. The classification of ovarian tumors given in Table 22-5 is a simplified version of the World Health Organization Histological Classification, which separates ovarian neoplasms according to the most probable tissue of origin. It is now believed that most tumors of the ovary arise ultimately from one of three ovarian components:

Table 22-5 WHO Classification of Ovarian Neoplasms

Surface Epithelial-Stromal Tumors
Serous tumors
Benign (cystadenoma, cystadenofibroma)
Borderline (serous borderline tumor)
Malignant (low- and high-grade serous adenocarcinoma)
Mucinous tumors, endocervical-like and intestinal type
Benign (cystadenoma, cystadenofibroma)
Borderline (mucinous borderline tumor)
Malignant (mucinous adenocarcinoma)
Endometrioid tumors
Benign (cystadenoma, cystadenofibroma)
Borderline (endometrioid borderline tumor)
Malignant (endometrioid adenocarcinoma)
Clear cell tumors
Benign
Borderline
Malignant (clear cell adenocarcinoma)
Transitional cell tumors
Benign Brenner tumor
Brenner tumor of borderline malignancy
Malignant Brenner tumor
Epithelial-stromal
Adenosarcoma
Malignant mixed müllerian tumor
Sex Cord-Stromal Tumors
Granulosa tumors
Fibromas
Fibrothecomas
Thecomas
Sertoli-Leydig cell tumors
Steroid (lipid) cell tumors
Germ Cell Tumors
Teratoma
Immature
Mature
Solid
Cystic (dermoid cyst)
Monodermal (e.g., struma ovarii, carcinosarcoma)
Dysgerminoma
Yolk sac tumor
Mixed germ cell tumors
Metastatic Cancer From Non-ovarian Primary
Colonic, appendiceal
Gastric
Pancreaticobiliary
Breast

Table 22-6 Frequency of Major Ovarian Tumors

Type	Percentage of Malignant Ovarian Tumors	Percentage That Are Bilateral
Serous		
Benign (60%)		25
Borderline (15%)	47	30
Malignant (25%)		65
Mucinous		
Benign (80%)		5
Borderline (10%)	3	10
Malignant (10%)		<5
Endometrioid carcinoma	20	40
Undifferentiated carcinoma	10	—
Clear cell carcinoma	6	40
Granulosa cell tumor	5	5
Teratoma		15
Benign (96%)	1	Rare
Malignant (4%)		
Metastatic	5	>50
Others	3	—

- surface/fallopian tube epithelium and endometriosis
- germ cells, which migrate to the ovary from the yolk sac and are pluripotent
- stromal cells, including the sex cords, which are forerunners of the endocrine apparatus of the postnatal ovary

There is also a group of tumors that defy classification, and finally there are secondary or metastatic tumors to the ovary.

Although some of the specific tumors have distinctive features and are hormonally active, most are nonfunctional and tend to produce relatively mild symptoms until they reach a large size. Some of these tumors, principally epithelial tumors, tend to be bilateral. Table 22-6 lists the tumors and their subtypes. Abdominal pain and distention, urinary and gastrointestinal tract symptoms due to compression by the tumor or cancer invasion, and vaginal bleeding are the most common symptoms. The benign forms may be entirely asymptomatic and occasionally are found unexpectedly on abdominal or pelvic examination or during surgery.

Epithelial Tumors

Most primary ovarian neoplasms arise from müllerian epithelium. The classification of these tumors is based on both differentiation and extent of proliferation of the epithelium. There are three major histologic types based on the differentiation of the neoplastic epithelium: *serous*, *mucinous*, and *endometrioid tumors*. These epithelial proliferations are classified as benign, borderline, and malignant. The benign tumors are often further subclassified based on the components of the tumors, which may include cystic areas (cystadenomas), cystic and fibrous areas (cystadenofibromas), and predominantly fibrous areas (adenofibromas). The borderline tumors and the malignant tumors can also have a cystic component, and when malignant they are sometimes referred to as *cystadenocarcinomas*.