

TYPES OF OVARIAN CANCER

Understanding the Types of Ovarian Cancer for better Awareness

Ovarian cancer is the leading cause of death in patients with cancer. It has varied origins, which pose problems in diagnosis and management. It is broadly classified into three types: epithelial ovarian cancers, germ cell tumors, and stromal tumors.[1]

Epithelial Ovarian cancer accounts for about 90% of cases. Amongst those types of carcinoma are: High-grade serous, this means high-aggressiveness types where disease frequently reaches its last stage at diagnosis and low grade type as slow-growing which often happens before early stages. The remaining type includes endometrioid, clear cell, mucinous carcinoma, and carcinosarcoma that primarily derives from either the fallopian tube or peritoneum[6].

Germ cell tumors are more common in young women, mostly below 30 years. The germ cell tumors include dysgerminomas, immature teratomas, and yolk sac tumors that are malignant. They can be cured by surgery and chemotherapy.[7]

Stromal tumors are about 1% of ovarian cancers; they are those from the supportive tissue (stroma), some of which may be releasing hormones, resulting in abnormal menstrual periods among others. Stromal tumours include the granulosa cell tumor and Sertoli cell tumors. They tend to grow slowly in most cases.[8]

Therefore, each type of ovarian cancer requires a different kind of management including surgery, chemotherapy, molecular targeted therapies and hormone therapy among others; early diagnosis will significantly go along with treatment hence having better outcomes.

Let's uncover the three main types of ovarian cancer,

1. Epithelial Ovarian Cancer.

This is the most common form of ovarian cancer, accounting for about 90% of ovarian tumors. It arises from the epithelial tissue that covers the ovaries. Uncontrolled cell growth, usually due to genetic mutations, such as BRCA or DNA repair defects, can also spread to the fallopian tubes and peritoneum. Epithelial ovarian cancers are categorized into several subtypes depending on the histological characteristics like cell type: serous, endometrioid, clear cell, and mucinous and on their molecular characteristics including genetic mutations, such as BRCA mutations, or hormonal influences. [3]

Fig 2. Types of Epithelial Ovarian Cancer.

Types of epithelial ovarian cancer:

1. **Serous Carcinoma:** This is the most common type of epithelial ovarian cancer with high-grade (aggressive, often diagnosed at an advanced stage) and low-grade (slow-growing, generally diagnosed early) subtypes, often associated with BRCA mutations. [5]
2. **Endometrioid Carcinoma:** Similar to uterine cancer, often associated with endometriosis or abnormal uterine tissue growth, and can be aggressive in advanced stages.[5]
3. **Clear Cell Carcinoma:** A rare and aggressive ovarian cancer subtype, commonly linked to endometriosis, and tends to be resistant to standard chemotherapy treatments.[5]
4. **Mucinous Carcinoma:** This is a very rare ovarian cancer that produces mucin. Its cellular structure often makes it mimic gastrointestinal cancers, and it can be either primary ovarian cancer or metastasized from the digestive tract. [5]

Symptoms of Epithelial Ovarian Cancer

1. **Persistent Bloating or Distension:** Caused by fluid buildup (ascites) or tumor growth in the abdomen.[4]
2. **Pelvic or Abdominal Pain:** Results from tumor pressure, irritation, or inflammation in surrounding tissues.[4]
3. **Feeling Unusually Full After Eating Small Amounts:** Tumor pressure on the stomach reduces its capacity resulting in early satiety. [4]
4. **Urinary Symptoms (Urgency, Frequency):** Tumor pressure on the bladder causes irritation and reduced bladder capacity.[4]

2. Germ Cell Tumors

Ovarian germ cell tumors are tumors that arise from the germ cells of the ovary, which produce oocytes. Such tumors account for approximately 5–10% of all ovarian neoplasms and occur mainly in adolescents and younger women, typically less than 30 years old. [7]

Fig 3. Types of Germ Cell Tumors

Types of Germ Cell Tumors:

1. **Dysgerminomas:** A rare and slow-growing ovarian germ cell tumor that is less aggressive, typically found in young women, and has a favorable prognosis when detected early. [2]
2. **Immature Teratomas:** Malignant tumors made of undifferentiated embryonic-like tissues, often affecting younger women and requiring aggressive treatment due to their potential to spread.[2]
3. **Yolk Sac Tumors (Endodermal Sinus Tumors):** A rare and highly aggressive germ cell tumor that grows rapidly, typically affecting young women, and requires chemotherapy for treatment.[2]
4. **Choriocarcinomas:** Rare and aggressive ovarian cancer originating from placental or embryonic tissue, often found in young women, and treated with surgery and chemotherapy. [2]

Symptoms of Germ Cell Tumors:

1. **Sudden Severe Abdominal Pain:** Occurs when a tumor ruptures or causes ovarian torsion (twisting), leading to intense, sharp pain.[10]
2. **Noticeable Abdominal Lumps:** Tumors can cause visible or palpable lumps in the abdomen, often felt during a physical exam or imaging.[10]
3. **Irregular Menstrual Cycles:** Hormone-producing tumors can disrupt normal menstrual patterns, causing irregular or missed periods.[10]
4. **Bloating or Changes in Bowel Habits:** Tumors can cause abdominal swelling (bloating) and affect digestion, leading to constipation, diarrhea, or other gastrointestinal issues.[10]

3. Ovarian Stromal Tumors

A type of tumor that develops in the stroma of the ovary, which is the supportive tissue surrounding the ovarian follicles. The stroma is formed by cells that produce hormones and give structural support to the ovary. These can be benign or malignant. They are very common in women above the age of 50, but they can also appear at any age, such as ~5% in young girls. [8]

Types of Stromal Tumors:

1. **Granulosa Cell Tumors:** These tumors arise from the ovarian stroma and produce hormones like estrogen, leading to symptoms such as abnormal bleeding; they are typically slow-growing and can recur. [4]

2. **Sertoli Cell Tumors:** Rare tumors that produce male hormones (androgens), potentially causing symptoms like excess body hair, deepening voice, or other androgenic effects; they are typically slow-growing.[4]
3. **Thecomas/Fibromas:** Benign ovarian tumors, often producing hormones, especially estrogen, leading to symptoms like irregular bleeding; they are typically non-cancerous but can cause discomfort due to their size or hormone activity. [4]

Symptoms of Stromal Tumors:

1. **Abnormal Vaginal Bleeding:** Hormone-producing tumors can cause irregular bleeding or post-menopausal bleeding due to estrogen secretion.[11]
2. **Premature Breast Development:** Hormonal changes from ovarian tumors can lead to early onset of puberty, including breast development in young girls.[11]
3. **Excessive Facial/Body Hair Growth:** Androgen-producing tumors can cause masculinizing symptoms, such as increased facial/body hair and a deeper voice in women or girls.[11]
4. **Persistent Abdominal:** Hormonal tumors may cause ongoing discomfort or pain in the abdomen or pelvis due to tumor growth or hormonal effects on surrounding tissues.[11]

Comprehensive Treatment Approaches for Ovarian Cancer by Type and Subtype

Type	Subtype	Treatment Options
1. Epithelial Ovarian Cancer .[5]	Serous Carcinoma [5]	<ol style="list-style-type: none"> 1. Surgery: Tumor debulking (fertility-sparing in early stages) [5] 2. Chemotherapy: Carboplatin/Paclitaxel, 6 cycles [5] 3. Targeted Therapy: PARP inhibitors, bevacizumab [5] 4. Hormonal Therapy: Aromatase inhibitors (low-grade) [5] 5. Radiation: Rare, palliative [5]

	Endometrioid Carcinoma [5]	<ol style="list-style-type: none"> 1. Surgery: Total hysterectomy, salpingo-oophorectomy [5] 2. Chemotherapy: Carboplatin and paclitaxel [5] 3. Hormonal Therapy: Progestins or aromatase inhibitors [5] 4. Targeted Therapy: PARP inhibitors, immunotherapy for dMMR tumors [5] 5. Radiation: Localized or palliative [5]
	Clear Cell Carcinoma [5]	<ol style="list-style-type: none"> 1. Surgery: Total hysterectomy, bilateral salpingo-oophorectomy[5] 2. Chemotherapy: Carboplatin and paclitaxel [5] 3. Targeted Therapy: Bevacizumab, PARP inhibitors[5] 4. Radiation: Rare, for recurrences[5]
	Mucinous Ovarian Cancer [5]	<ol style="list-style-type: none"> 1. Surgery: Total hysterectomy, bilateral salpingo-oophorectomy [5] 2. Chemotherapy: Platinum-based regimens [5] 3. Targeted Therapy: Limited, investigational [5]
2. Ovarian Germ Cell Tumors [9]	Mature Teratomas [2]	<ol style="list-style-type: none"> 1. Surgery: Ovarian cystectomy or oophorectomy [9]
	Immature Teratomas [2]	<ol style="list-style-type: none"> 1. Surgery: Oophorectomy (Stage I) [9] 2. Chemotherapy: For advanced grades [9]
	Dysgerminomas [2]	<ol style="list-style-type: none"> 1. Surgery: Oophorectomy (Stage I) [9] 2. Chemotherapy/Radiation: For advanced stages [9]
	Yolk Sac Tumors [2]	<ol style="list-style-type: none"> 1. Surgery: Tumor removal [9] 2. Chemotherapy: Highly effective [9]

	Choriocarcinomas [2]	<ol style="list-style-type: none"> 1. Surgery: Tumor removal [9] 2. Chemotherapy: Targeted for placental/ovarian types [9]
3. Ovarian Stromal Tumors [4]	Granulosa Cell Tumors [4]	<ol style="list-style-type: none"> 1. Surgery: Unilateral salpingo-oophorectomy [4] 2. Chemotherapy: For advanced/recurrent cases [4] 3. Hormonal/Targeted Therapy: Aromatase inhibitors, tyrosine kinase inhibitors [4]
	Sertoli Cell Tumors [4]	<ol style="list-style-type: none"> 1. Surgery: Tumor and ovary removal [4] 2. Chemotherapy: Rarely used [4]

Staging and Spread Patterns of Ovarian Cancer Types:

Type	Stage	Description
Epithelial Ovarian Cancer [5]	Stage I	<p>Cancer is confined to one or both ovaries.</p> <p>Substages:</p> <p>IA - Limited to one ovary, no tumor on surface, capsule intact. [13]</p> <p>IB - Involves both ovaries, no surface tumor, capsule intact.[13]</p> <p>IC - Capsule ruptured or cancer cells in fluid.[13]</p>
	Stage II	<p>Cancer involves one or both ovaries and has spread to the pelvis.</p> <p>Substages:</p> <p>IIA - Spread to uterus or fallopian tubes.[13]</p> <p>IIB - Spread to other pelvic tissues. [13]</p>
	Stage III	<p>Cancer involves one or both ovaries and has spread beyond the pelvis to the abdominal cavity or lymph nodes.</p> <p>Substages:</p> <p>IIIA - Microscopic peritoneal metastasis [13].</p> <p>IIIB - Visible metastasis <2 cm. [13]</p> <p>IIIC - >2 cm or lymph node involvement.[13]</p>
	Stage IV	<p>Cancer has spread to distant organs outside the abdomen, such as the liver or lungs. [13]</p>

Ovarian Germ Cell Tumors [9]	Stage I	Cancer is confined to one or both ovaries.[13]
	Stage II	Spread to pelvic structures (uterus, fallopian tubes). [13]
	Stage III	Spread to the abdomen, including peritoneal surfaces and/or lymph nodes.[13]
	Stage IV	Distant metastasis outside the abdomen, such as the lungs or liver. [13]
Ovarian Stromal Tumors [4]	Stage I	Cancer confined to the ovary (unilateral or bilateral). [13]
	Stage II	Spread to pelvic organs (uterus, fallopian tubes). [13]
	Stage III	Spread beyond the pelvis to abdominal organs or lymph nodes.[13]
	Stage IV	Spread to distant organs outside the abdominal cavity, such as the lungs or liver.[13]

Reference

- [1]<https://www.cancer.org/cancer/types/ovarian-cancer.html>
- [2]<https://www.cancer.org/cancer/types/ovarian-cancer/about/what-is-ovarian-cancer.html>
- [3]<https://my.clevelandclinic.org/health/diseases/22250-epithelial-ovarian-cancer>
- [4]<https://ijgc.bmj.com/content/31/2/161>
- [5]<https://www.cancerresearchuk.org/about-cancer/ovarian-cancer/types/epithelial-ovarian-cancers/epithelial>
- [6]<https://www.cancer.org/cancer/types/ovarian-cancer/treating/by-stage.html>
- [7]<https://my.clevelandclinic.org/health/diseases/23505-germ-cell-tumor>
- [8]<https://www.cancerresearchuk.org/about-cancer/ovarian-cancer/types/sex-cord-stromal>
- [9]<https://www.cancer.gov/types/ovarian/hp/ovarian-germ-cell-treatment-pdq>

[10]<https://www.cancerresearchuk.org/about-cancer/ovarian-cancer/types/germ-cell>

[11]<https://www.mayoclinic.org/diseases-conditions/ovarian-cancer/symptoms-causes/syc-20375941>

[12]<https://www.cancer.org/cancer/types/ovarian-cancer/detection-diagnosis-staging/staging.html>

[13]<https://www.cancerresearchuk.org/about-cancer/ovarian-cancer/stages-grades>

Image section:

Fig 1.

<https://www.gardenobgyn.com/blog/ovarian-cancer-the-importance-of-recognizing-the-symptoms>

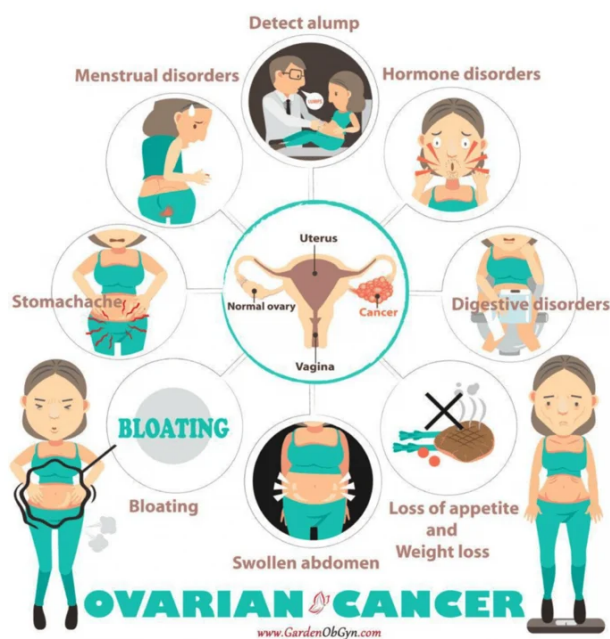


Fig 2.

https://www.researchgate.net/figure/Characteristics-of-histopathological-types-of-ovarian-cancer-Images-courtesy-by_fig1_369267382

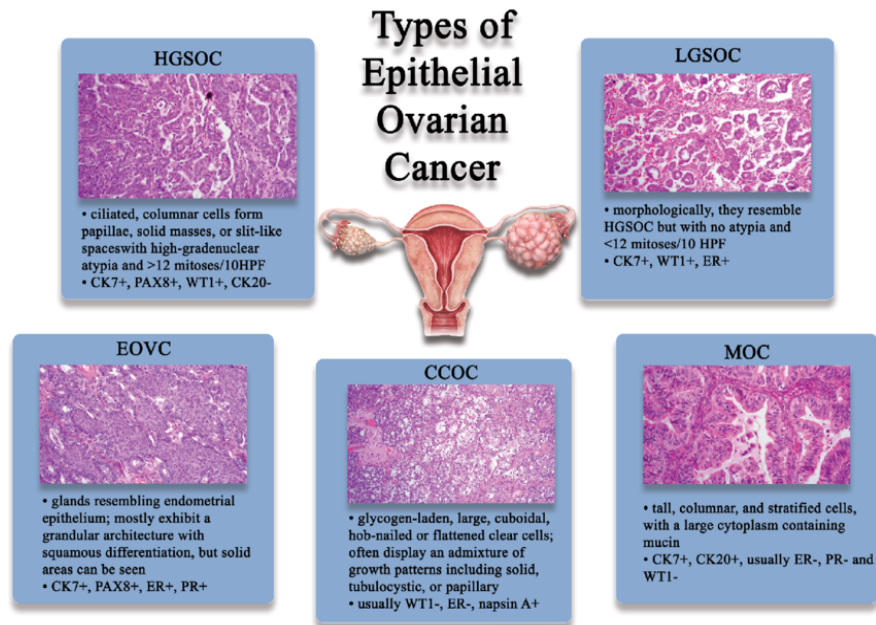


Fig 3.

<https://www.youtube.com/watch?v=-zmDII67fXo>

