

Ovarian cancer

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- Ovarian cancer starts in the ovaries.
- Ovaries are reproductive glands found only in females (women). They are also the main source of the female hormones estrogen and progesterone.
- One ovary is on each side of the uterus in the pelvis.

- An ovarian cyst is a collection of fluid inside an ovary. Most ovarian cysts occur as a normal part of the process of ovulation (egg release) these are called *functional cysts*.
- *These cysts usually go away within a few months without any treatment. If you develop a cyst, your doctor may want to check it again after your next cycle (period) to see if it has gotten smaller.*

- Even though most of these cysts are benign (not cancer), a small number of them could be cancer.
- Sometimes the only way to know for sure if the cyst is cancer is to take it out with surgery. Cysts that appear to be benign (based on how they look on imaging tests) can be observed (with repeated physical exams and imaging tests), or removed with surgery.

- The ovaries are made up of 3 main kinds of cells. Each type of cell can develop into a different type of tumor:
- Epithelial tumors start from the cells that cover the outer surface of the ovary. Most ovarian tumors are epithelial cell tumors.
- Germ cell tumors start from the cells that produce the eggs (ova).
- Stromal tumors start from structural tissue cells that hold the ovary together and produce the female hormones estrogen and progesterone.

Tumors of low malignant potential

- When looked at under the microscope, some ovarian epithelial tumors don't clearly appear to be cancerous.
- These are called tumors of *low malignant potential (LMP tumors)*.
- *They are also known as borderline epithelial ovarian cancer.*
- *LMP tumors tend to affect younger women than the typical ovarian cancers. These tumors grow slowly and are less life-threatening than most ovarian cancers*

Malignant epithelial ovarian tumors

- Cancerous epithelial tumors are called *carcinomas*.
- *About 85% to 90% of ovarian cancers are epithelial ovarian carcinomas. When someone says that they had ovarian cancer, they usually mean that they had this type of cancer.*
- *These tumor cells have several features (when viewed under a microscope) that can be used to classify epithelial ovarian carcinomas into different types.*

- The *serous type* is by far the most common, but there are other types like *mucinous, endometrioid, and clear cell*.
- *Other types :*
- Ovarian germ cell tumors , teratomas dysgerminomas.
- Ovarian stromal tumors

Causes

- Do we know what causes ovarian cancer? We don't yet know exactly what causes most ovarian cancers.
- For example, pregnancy and taking birth control pills both lower the risk of ovarian cancer.

Inherited genetic mutations

- A small portion of ovarian cancers occur in women with inherited gene mutations linked to an increased risk of ovarian cancer. These include mutations in the *BRCA1 and BRCA2 genes, as well as the genes related to other family cancer syndromes linked to an increased risk of ovarian cancer, such as PTEN (PTEN tumor hamartoma syndrome), STK11 (Peutz-Jeghers syndrome), MUTYH (MUTYH-associated polyposis, and the many genes that can cause hereditary nonpolyposis colon cancer*
- Genetic tests can detect gene mutations associated with these inherited syndromes. If you have a family history of cancers linked to these syndromes, such as breast and ovarian cancers, thyroid and ovarian cancer, and/or colorectal and endometrial (uterine) cancer, you might want to ask your doctor about genetic counseling and testing.

Acquired genetic changes

- Most ovarian cancers have several acquired gene mutations. Research has suggested that tests to identify acquired changes of certain genes in ovarian cancers, like the *TP53 tumor suppressor gene* or the *HER2 oncogene*, can help predict a woman's prognosis.
- *The role of these tests is still not certain, and more research is needed.*

Progression of ovarian cancer



Signs and symptoms of ovarian cancer

- Ovarian cancer may cause several signs and symptoms. Women are more likely to have symptoms if the disease has spread beyond the ovaries, but even early- stage ovarian cancer can cause them.
- Menstrual changes
- Abdominal swelling
- weight loss
- Bloating
- Pelvic or abdominal pain

How is ovarian cancer diagnosed?

- Physical exam : Your doctor (*A gynecologic oncologist is a gynecologist who is specially trained in treating cancers of the female reproductive system*) will first take your history and do a physical exam to look for signs of ovarian cancer. These include an enlarged ovary (on a pelvic exam) and signs of fluid in the abdomen (which is called *ascites*).
- *If there is reason to suspect you have ovarian cancer based on your symptoms and/or physical exam, your doctor will order some tests to check further.*
- Imaging tests: computed tomography (CT) scans, magnetic resonance imaging (MRI) scans, and ultrasound studies can confirm whether a pelvic mass is present but They cannot confirm that the mass is a cancer, but they may be useful.
- Chest x-ray: this procedure may be done to determine whether ovarian cancer has spread (metastasized) to the lungs.
- Positron emission tomography (PET): this test, radioactive glucose (sugar) is given to look for the cancer. Because cancers use glucose at a higher rate than normal tissues, the radioactivity will tend to concentrate in the cancer. A scanner can spot the radioactive deposits. This test can be helpful in spotting small collections of cancer cells scan can help find cancer when it has spread outside the ovaries and the pelvis.
- colonoscopy is a way to examine the inside of the large intestine (colon)

- Biopsy: The only way to determine if a tumor is cancer is to remove a sample of the growth from the suspicious area and examine it under a microscope. This procedure is called *biopsy*.
- *For ovarian cancer, the biopsy is most commonly done by removing the tumor.*
- in patients with ascites (fluid buildup inside the abdomen), samples of the fluid can also be used to diagnose the cancer. In this procedure, called *paracentesis* : *the skin of the abdomen is numbed and a needle attached to a syringe is passed through the abdominal wall into the fluid in the abdominal cavity. Ultrasound may be used to guide the needle. The fluid is sucked up into the syringe and then sent for analysis to see if it contains cancer cell.*

Blood tests

Your doctor will order some blood tests called tumor markers : the most common one is CA-125 test. CA 125 is usually high in most but not all patients with ovarian cancer and sometimes it might be high in some non cancerous lesions.

- Other tumor markers human chorionic gonadotropin (HCG), alpha-fetoprotein (AFP), and/or lactate dehydrogenase (LDH) may be checked if your doctor suspects that your ovarian tumor could be a germ cell tumor.

How is ovarian cancer staged

- Staging is the process of finding out how widespread a cancer is. Most ovarian cancers that are not obviously widespread are staged at surgery
- Ovarian and fallopian tube cancer is most often staged using the **FIGO** system. *This system relies on the results of surgery to determine the extent of the primary tumor (often described by the letter T), the absence or presence of metastasis to nearby lymph nodes (described by the letter N), and the absence or presence of distant metastasis (described by the letter M). This information is combined to determine the final stag*

- Stage I :The cancer is only within the ovary (or ovaries) or fallopian tube(s). It has not spread to organs and tissues in the abdomen or pelvis, lymph nodes, or to distant sites.
- Stage II: The cancer is in one or both ovaries or fallopian tubes and has spread to other organs (such as the uterus, fallopian tubes, bladder, the sigmoid colon, or the rectum) within the pelvis. It has not spread to lymph nodes or distant sites.

- Stage III: The cancer is in one or both ovaries or fallopian tubes, and one or both of the following are present: has spread beyond the pelvis to the lining of the abdomen or to lymph nodes in the back of the abdomen (retroperitoneal lymph nodes)
- Stage IV (any T, any N, M1): This is the most advanced stage of ovarian cancer. In this stage the cancer has spread to the inside of the spleen, liver, lungs, or other organs located outside the peritoneal cavity.

How is ovarian cancer treated?

- the diagnostic tests are done, your cancer care team will recommend 1 or more treatment options. The main treatments for ovarian cancer:
 - Surgery
 - Chemotherapy
 - Radiotherapy
 - Targeted therapy
- The choice of treatment depends largely on the type of cancer and the stage of the disease.

Surgery

- it is the main treatment for most ovarian cancers. How much surgery you have depends on how far your cancer has spread and on your general health.
- surgery has 2 main goals: staging and debulking. It's important that this surgery is done by someone who's experienced in ovarian cancer surgery (oncologic gynecologist).
- The first goal is to *stage the cancer – to see how far the cancer has spread from the ovary. Usually this means removing the uterus (this operation is called a hysterectomy), along with both ovaries and fallopian tubes (this is called a bilateral salpingo-oophorectomy or BSO). In addition, the omentum is also removed (an omentectomy). The omentum is a layer of fatty tissue that covers the abdominal contents like an apron, and ovarian cancer sometimes spreads to this tissue. Some lymph nodes in the pelvis and abdomen are biopsied (taken out to see if the cancer has spread from the ovary). If there is fluid in the pelvis or abdominal cavity, it will also be removed for analysis.*

Debulking ovarian cancer

- The other important goal of surgery is to remove as much of the tumor as possible – this is called *debulking*.
- *The aim of debulking surgery is to leave behind no tumors larger than 1 cm. Patients whose tumors have been optimally debulked, have a better outlook than those left with larger tumors after surgery (called sub-optimally debulked).*
- *Sometimes the surgeon will need to remove a piece of colon to debulk the cancer properly. In some cases, a piece of colon is removed and then the 2 ends that remain are sewn back together. In other cases, though, the ends can't be sewn back together right away. Instead, the top end of the colon is attached to an opening (stoma) in the skin of the abdomen to allow body wastes to get out. This is known as a colostomy. Most often, this is only temporary, and the ends of the colon can be reattached later in another operation.*

- Debulking surgery might also mean removing a piece of the bladder. If this occurs, a catheter (to empty the bladder) will be placed during surgery. This will be left in place until the bladder recovers enough to be able to empty on its own. Then, the catheter can be removed.
- Debulking may also require removing the spleen and/or the gallbladder, as well as part of the stomach, liver, and/or pancreas.
- If both ovaries and/or the uterus are removed, you will not be able to become pregnant. It also means that you will go into menopause if you haven't done so already. Most women will stay in the hospital for 3 to 7 days after the operation and can resume their usual activities within 4 to 6 weeks.

Chemotherapy

- Chemotherapy for ovarian cancer is most often a combination of 2 or more drugs, given IV every 3- to 4-weeks. Giving combinations of drugs rather than just one drug alone seems to be more effective in the initial treatment of ovarian cancer. The standard approach is the combination of a platinum compound, such as cisplatin or carboplatin, and a taxane, such as paclitaxel (Taxol[®]) or docetaxel (Taxotere[®]).
- typical course of chemo for epithelial ovarian cancer involves 3 to 6 cycles. A cycle is a schedule of regular doses of a drug, followed by a rest period. Different drugs have varying cycles; your doctor will let you know what schedule planned for your chemo.

What will happen after treatment for ovarian cancer?

- For some people with ovarian cancer, treatment may remove or destroy the cancer.
- for other people, the cancer never goes away completely. These women may be treated with chemotherapy on and off for years.
- **Follow up:**

When treatment ends, your doctors will still want to watch you closely.

After your cancer treatment is finished, you will probably need to still see your cancer doctor for many years. So, ask what kind of follow-up schedule you can expect.

It is very important to go to all of your follow-up appointments. During these visits, your doctors will ask questions about any problems you may have and may do exams and lab tests or x-rays and scans to look for signs of cancer or treatment side effects. Follow-up for ovarian cancer usually includes a careful general physical exam and blood tests for tumor markers that help recognize recurrence.

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