

## **TITLE: From Detection to Cure: The Journey Begins with Diagnosis**

### **Let's know about Ovarian Cancer:**

Ovarian cancer starts in the ovaries, which produce eggs and hormones like estrogen and progesterone. Recent studies suggest it may originate in the fallopian tubes, leading to preventive measures like removing the tubes in high-risk individuals.

Ovarian cancer is classified into three main types based on the type of cells in the ovaries [1]

1. **Epithelial Ovarian Cancer** (most common).
2. **Germ Cell Tumors** (start from egg-producing cells).
3. **Stromal Tumors** (from hormone-producing cells).

The symptoms of ovarian cancer, such as bloating, abdominal pain, and feeling full quickly, are unclear and can be mistaken for less serious issues. However, these symptoms last longer and worsen in cancer cases, making early diagnosis crucial.

The article emphasizes the importance of diagnosing ovarian cancer, particularly because its symptoms like bloating, abdominal pain, are often mistaken for less serious, non-cancerous conditions such as ovarian cysts or endometriosis. Early diagnosis is crucial because it significantly increases the chances of successful treatment and survival. Timely identification allows doctors to choose the most effective treatment plan and possibly avoid more invasive procedures like chemotherapy.

Doctors use several diagnostic tools to identify ovarian cancer and assess its spread. These include ultrasounds, blood tests (such as CA-125), CT scans, and biopsies. Blood tests help in detecting specific markers, while imaging techniques like ultrasounds and CT scans assist in locating the tumor and understanding its size and spread. A biopsy may be used to confirm the presence of cancerous cells.

The article focuses on how these diagnostic methods work together to detect ovarian cancer early, improving outcomes for patients by enabling more precise treatment plans tailored to individual cases.

Fig 1. A diagram illustrating the location of ovary and site of cancer

O Following are the diagnostic methods which are prescribed by the doctors and are effective in treating ovarian cancer.

## **Diagnostic methods of Ovarian Cancer:**

### **Imaging Techniques:**

Fig 2. A diagram giving a gist of diagnostic methods

#### **1.) Ultrasound (Ultrasonography)**

Ø Ultrasound is a non-invasive(**where no incision is required**) test using sound waves to create images of the ovaries. It is most commonly the first test performed when issues related to ovaries are suspected. It is done by two ways which are as follows:

**Abdominal Ultrasound:** In this method a gel is applied on the abdomen, and a device is moved over it to capture images using the sound waves.

**Transvaginal Ultrasound:** Here, a small probe is gently inserted into the vagina for distinct and more detailed images of the ovaries.

Ultrasound can be used to detect and locate the tumor, analyse the size and shape of the ovary . This helps the doctor to know whether the tumor/cysts appears concerning.

Ultrasound aids in detecting abnormalities early, which in turn helps in timely diagnosis of ovarian cancer and minimize the extent of painful treatments. For more details refer [2].

#### **2. Computed Tomography(CT-Scan)**

Ø CT scans are crucial in diagnosing ovarian cancer by detecting large tumors and assessing their spread to nearby organs or lymph nodes. They are essential for staging the cancer, planning treatment, and monitoring recurrence [3]. CT scans also play a vital role in determining if cancer has spread to nearby tissues or organs. In some cases, a **CT-guided needle biopsy** [4] is performed, where tissue samples are taken from suspected areas where cancer has spread to a greater extent, for further analysis.

#### **3. Magnetic Resonance Imaging (MRI) Scan**

Ø MRI uses strong magnets instead of X-rays to get clearer images of the inside of your body for this process a specialised liquid called **Gadolinium** is injected into the veins. It is important to note that while MRI scan is not the primary tool for diagnosis of Ovarian Cancer , it can be useful in providing additional details regarding the cancer/tumor. An MRI gives detailed pictures of organs and tissues inside the body. When a doctor finds a possibility of ovarian cancer, an MRI can help determine if a mass is cancerous(**Malignant**) or non-cancerous (**Benign**) and whether the cancer has spread to nearby tissues. To know more about how MRI is done and it's basics refer [5].

#### **4. Positron Emission Tomography (PET) Scan**

Ø For a PET scan a special camera is used to detect areas of radioactivity in the body. The cancer cells consume more glucose than normal cells and grow faster than normal cells,making them appear with higher levels of radioactivity on the scan. It is important to note that although PET scans are not as detailed as those from CT or MRI scans, they serve as a valuable asset in providing information, whether the abnormalities detected in the scans are likely to be cancer or not. PET scan is often used to check if cancer has spread to lymph nodes or other parts of the body , particularly when the location is unclear. The need for PET scan differs from person to person [6].

**O Once these imaging techniques help identify the possibility of an ovarian cancer, further tests are performed to confirm the diagnosis and determine the stage of cancer. Performing these tests is essential because imaging alone cannot provide concrete conclusions on whether the tumor is cancerous, its type, or how far it has spread. Accurate diagnosis is very important for selecting the best treatment options and improving outcomes.**

**To know more about Stages of ovarian cancer refer [7].**

#### **Additional Diagnostic Approach:**

##### **1. Biopsy**

Ø A biopsy is a test where a small piece of tissue is taken from the body to check for cancer. The type of biopsy depends on the location of the tumor (how easy it is to reach), the size of the tumor (whether it needs a fine needle or a larger sample), whether the cancer has spread to other areas, and the results from imaging tests like CT scans or ultrasound, which facilitates the procedure. These factors help doctors choose the best way to take the tissue sample and confirm the diagnosis.

For Ovarian Cancer , commonly **Surgical Biopsy** is performed where the tumor is removed during a surgery. Surgical biopsy is basically a procedure where the doctor removes a piece of tissue or sometimes the entire tumor from the body to check for cancer. This is done when other biopsy methods (like needle biopsies) are unable to reach the tumor or if more tissue is needed for a more distinct diagnosis. The surgery is done in an operating room, usually under anesthesia, so the patient does not feel pain during the procedure.

There are two main types of surgical biopsies:

**Excisional biopsy:** Here the **entire tumor** or a large part of it is removed.

**Incisional biopsy:** Here only a **small part of the tumor** is collected for analysis.

refer[8]

Ø In specific cases, where the Ovarian Cancer is of higher stage or the patient has any serious medical history only then **Needle Biopsy** which is a less invasive approach is performed where a needle is carefully inserted into the skin of abdomen through a small cut and the tumor sample is collected for further testing. This process is generally guided by an Ultrasound or CT scan to ensure that the needle reaches the tumor precisely[9] (Under **Ovarian cancer biopsy** section)

## 2. **Laparoscopy**

Ø This is a minimally invasive procedure wherein a small incision (Cut) is made in the lower abdomen and a thin, lighted tube is inserted to help doctors assess the ovaries and associated pelvic organs. This technique helps the doctor to confirm the stage of cancer (i.e. how far the tumor has spread) accordingly plan the surgery. Also, instruments can also be inserted through the tube to take biopsies for further testing. To gain detailed insights regarding laparoscopy you can refer [10].

Fig 3: Illustrates a visual representation of the laparoscopy

## 3. **Blood Tests**

Ø Blood tests are often prescribed by the doctors to check for abnormalities that may be an indication of Ovarian Cancer. The most common type of blood test for Ovarian Cancer is the Cancer Antigen 125 (**CA-125**) test, it is used to measure the levels of

CA125 a protein in the bloodstream. Increased level of this protein is an indication of Ovarian Cancer; however, it is important to note that elevated levels can also be seen in other non cancerous conditions. Blood test is majorly used as an assisting procedure with imaging techniques, as alone it is not a reliable procedure for diagnostic purposes. For more details, refer [11].

Fig 4. An image giving a gist of purpose of CA-125 test

### **Treatment:**

After the diagnosis what comes next is the treatment, Ovarian cancer treatment aims to remove as much cancer as possible. The main approach includes:

- **Surgery:** Removing the affected organs, either with small cuts (laparoscopy) or larger ones (laparotomy).
- **Chemotherapy:** Medicine given through a vein or by mouth to kill cancer cells.
- **Targeted therapy:** Drugs that focus on cancer cells and change how they grow.
- **Hormone therapy:** Stops hormones that help some cancers grow.
- **Radiation therapy:** Rarely used for ovarian cancer.

After treatment, regular check-ups and tests like CT scans are done to make sure the cancer hasn't come back.

To know more about treatment refer [12].

Ø Early and accurate diagnosis of ovarian cancer is essential for effective treatment and improved outcomes. Being vigilant about symptoms and prioritizing regular checkups can make all the difference in identifying the disease at a treatable stage. Your health is in your hands- take charge of it today for a happy tomorrow.

### **Reference:**

[1]<https://www.cancer.org/cancer/types/ovarian-cancer/about/what-is-ovarian-cancer.html>

- [2]<https://ovarian.org.uk/ovarian-cancer/ovarian-cancer-diagnosis/ultrasound-scans/>
- [3]<https://www.cancer.org/cancer/types/ovarian-cancer/detection-diagnosis-staging/how-diagnosed.html>
- [4]<https://www.cancer.org/cancer/types/ovarian-cancer/detection-diagnosis-staging/how-diagnosed.html>
- [5]<https://my.clevelandclinic.org/health/diagnostics/4876-magnetic-resonance-imaging-mri>
- [6]<https://www.cancer.org/cancer/types/ovarian-cancer/detection-diagnosis-staging/how-diagnosed.html>
- [7]<https://my.clevelandclinic.org/health/diseases/4447-ovarian-cancer>
- [8]<https://ocrahope.org/news/science-made-simple-about-biopsies/>
- [9]<https://www.medicinenet.com/health/checking-ovarian-cancer-screenings-test-options>
- [10]<https://ovarian.org.uk/ovarian-cancer/ovarian-cancer-diagnosis/keyhole-laparoscopy-and-open-surgery-laparotomy/>
- [11]<https://www.mayoclinic.org/tests-procedures/ca-125-test/about/pac-20393295>
- [12]<https://my.clevelandclinic.org/health/diseases/4447-ovarian-cancer>

## **Images Section:**

Fig 1. <https://my.clevelandclinic.org/health/diseases/4447-ovarian-cancer>

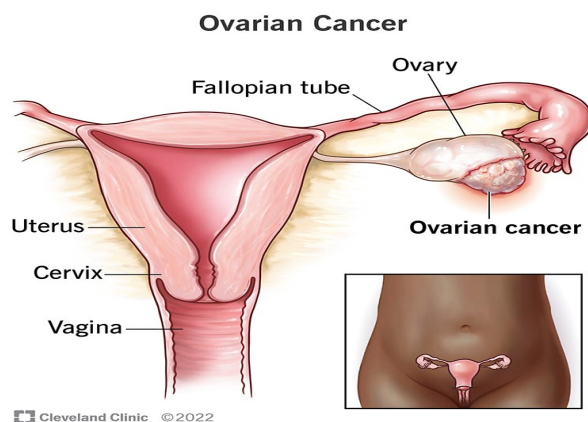


Fig 2. <https://ovarian.org/about-ovarian-cancer/ovarian-cancer-diagnosis/>

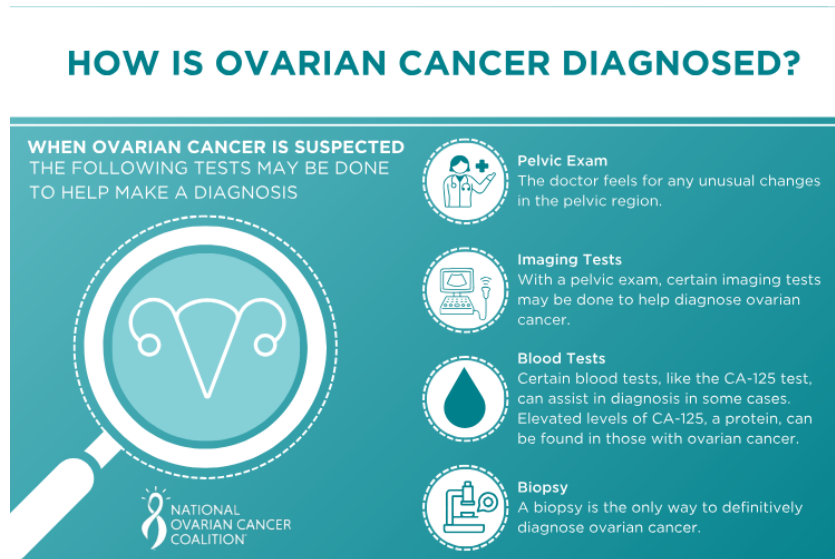


Fig 3. <https://www.indiamart.com/proddetail/laparoscopy-surgical-treatment-17452894312.html>



Fig 4. <https://bookmerilab.com/tests/blood-tests/ca-125-test/>

