



## Cervical Cancer Treatment

### Cervical cancer overview

Cervical cancer occurs in the cervix, the part of the female reproductive system that connects the vagina and uterus. Almost all cervical cancers are caused by human papillomavirus (HPV), a common virus that can be passed from one person to another during sex. While most HPV infections cause no symptoms and will go away without treatment, some cases will over time cause cervical cancer.

Cervical cancer results in more than 12,000 new cases and 4,000 deaths every year in the United States alone. It occurs most commonly in middle-aged women. The death rate from cervical cancer has dropped significantly in recent decades as a result of earlier detection through screening based on regular pap smears .

Risk factors for cervical cancer include smoking, infection with the human immunodeficiency virus (HIV), long-term use of birth control pills, having given birth to three or more children and having several sexual partners.

### What are my treatment options?

#### Treatment options overview

Common treatment options for cervical cancer include surgery, radiation therapy and chemotherapy, or often a combination thereof.

Surgical options for cervical cancer include radical hysterectomy, or removal of the uterus, cervix and part of the vagina. Women who undergo this procedure can no longer have children. Radical trachelectomy, or removal of the cervix, is a more conservative surgical option that helps preserve fertility. Precancerous cervical abnormalities can be treated with conization, or cone biopsy, a procedure that involves the removal of a cone-shaped wedge from the cervix.

Radiation therapy, which uses high energy x-rays to kill cancer cells, is a common treatment for cervical cancer. Treatment may involve external beam therapy (EBT) or brachytherapy, or a combination of the two.

- External beam therapy (EBT): a method for delivering a beam of high-energy x-rays or proton beams to the location of the tumor. The radiation beam is generated outside the patient (usually by

a linear accelerator for photon/x-ray and a cyclotron or synchrotron for proton beam) and is targeted at the tumor site. These radiation beams can destroy the cancer cells, and conformal treatment plans allow the surrounding normal tissues to be spared. See the External Beam Therapy page for more information.

- **Brachytherapy:** the temporary placement of radioactive source(s) within the body, usually employed to give an extra dose—or boost—of radiation to the area of the excision site or to any residual tumor. See the Brachytherapy page for more information.

EBT and brachytherapy are often used together to treat cervical cancer. Brachytherapy usually starts during the fourth or fifth week of the course of EBT.

Chemotherapy, or the use of drugs to stop or slow the growth of cancer cells, is often given with radiation therapy to treat cervical cancer. Research suggests that the addition of low-dose chemotherapy helps make the radiation work more effectively.

### **How can I choose from among the options?**

Treatment recommendations for cervical cancer are based primarily on the stage of the cancer. Other factors include your age, health, personal preferences and desire to have children. Your cancer care team, which might include a gynecologist, a radiation oncologist, a gynecologic oncologist or a medical oncologist, will discuss the options and provide recommendations.

### **If I choose surgery, will radiation treatment still be required?**

Radiation therapy may be necessary after surgery for cervical cancer to make sure that any cancer cells not removed during surgery are destroyed. Research has shown that radiation therapy after surgery improves outcomes in many patients. In more advanced stages of cervical cancer, radiation therapy may be used after surgery to ease pain and treat bleeding.

### **How effective is modern radiation treatment of cervical cancer?**

Radiation therapy works as well as surgery for treating early-stage cervical cancers. Advanced stages of cervical cancers are best treated with combined therapy using radiation, surgery and chemotherapy.

### **What happens during radiation therapy?**

Before beginning treatment, you will be scheduled for a simulation session to map out the treatment areas. The procedure involves a computed tomography (CT) scan of your pelvis. Your skin will be marked with a colored pen to help the radiation therapist prepare you for each treatment. Although the simulation is painless, you may have to lie on the CT table for at least an hour.

For each EBT treatment session, the patient is carefully positioned on the treatment couch using the alignment lasers and the marks placed on the patient during the simulation. The therapist goes outside the room and turns on the linear accelerator. Beams from one or more directions may be used, and the beam may be on for as long as several minutes for each field.

EBT is usually given in a series of daily outpatient sessions, Monday through Friday, for two to nine weeks. The treatment process can take one hour or less each day and most of the time is spent positioning and imaging the patient. The duration of treatment depends on the method of treatment delivery and the dose given.

Brachytherapy for cervical cancer is most commonly performed with a device called a tandem and ovoid applicator or a tandem and ring applicator. A tandem is a 10-inch-long, thin, hollow metal tube that is inserted through the cervix into the endometrial cavity or the central cavity in the uterus. The ovoids are hollow, metal capsules that are small enough to fit up against the cervix in the vagina. The ring is a hollow round-shaped tube that is always perpendicular to the tandem. Alternate applicators such as interstitial needles or a cylinder may be recommended depending on the location of the tumor.

Before the brachytherapy procedure begins, an intravenous line may be inserted into the arm or hand to deliver anesthesia. Depending on the site of the tumor and your physician's recommendations, you may receive general anesthesia and/or a sedative.

See the Anesthesia Safety page for more information.

Brachytherapy can be delivered at a low-dose rate (LDR) or a high-dose rate (HDR). LDR brachytherapy is an inpatient procedure in which implants are inserted through the vagina into the cervix and placed next to the tumor while the patient is under anesthesia. The applicators/implants remain in place while the radiation is delivered at a continuous rate over one to two days. Pulsed dose-rate (PDR) brachytherapy is delivered in a similar way, but the treatment occurs in periodic pulses (usually one per hour) rather than continuously.

The HDR procedure is done on an outpatient basis, though sedation is required. Once the applicators have been inserted and their accurate positioning has been verified, a radioactive source is positioned inside the applicators for a few minutes and then removed by a computer-controlled machine known as an after-loader. While the HDR treatment usually takes less than 30 minutes, the entire procedure, including placement of the applicators, may take up to several hours. When the treatment is completed, the applicators are removed from the patient. Patients may receive several separate HDR brachytherapy treatments over one or more weeks.

## What are possible side effects of radiation therapy?

Side effects of radiation treatment include problems that occur as a result of the treatment itself as well as from radiation damage to healthy cells in the treatment area.

The number and severity of side effects you experience will depend on the type of radiation and dosage you receive and the part of your body being treated. You should talk to your doctor and nurse about any side effects you experience so they can help you manage them.

Radiation therapy can cause early and late side effects. Early side effects occur during or immediately after treatment and are typically gone within a few weeks. Common early side effects of radiation therapy include tiredness or fatigue and skin problems. Skin in the treatment area may become more sensitive, red, irritated, or swollen. Other skin changes include dryness, itching, peeling and blistering.

Depending on the area being treated, other early side effects may include:

- hair loss in the treatment area
- mouth problems and difficulty swallowing
- eating and digestion problems
- diarrhea
- nausea and vomiting
- headaches
- soreness and swelling in the treatment area
- urinary and bladder changes

Late side effects, which are rare, occur months or years following treatment and are often permanent. They include:

- brain changes
- spinal cord changes
- lung changes
- kidney changes
- colon and rectal changes
- infertility
- joint changes
- lymphedema
- mouth changes
- secondary cancer

There is a slight risk of developing cancer from radiation therapy. Following radiation treatment for cancer, you should be checked on a regular basis by your radiation oncologist for recurring and new cancers.

## What kind of treatment follow-up should I expect?

Your physician may recommend a series of follow-up exams after your treatment is complete. Follow-up exams may include a physical check-up, imaging procedure(s) and blood or other lab tests.

Post-treatment visits are important because they help your physician determine if your condition is stable or has changed. These visits also give you the opportunity to discuss with your doctor any side effects you may be experiencing as a result of the treatment.

## Are there any new developments in treating my disease?

There have been a number of important advances in the diagnosis and treatment of cervical cancer in recent years, including:

- Sentinel lymph node biopsy, a diagnostic procedure used to check for cancer spread that requires the removal of fewer lymph nodes than in previous procedures.

- New vaccines that prevent infection with some of the HPV types associated with cervical cancer that are not controlled by existing vaccines.
- Experimental vaccines that can help women with advanced cervical cancer that has recurred or metastasized by producing an immune response to proteins in the virus that make the cervical cancer cells grow abnormally.
- Targeted drugs that provide the benefits of chemotherapy with less severe side effects.
- New anti-viral drugs that treat cervical pre-cancer.

## Clinical Trials

Many cervical cancer clinical trials are underway or in the planning stages. The National Cancer Institute has links to several resources on clinical trials, including results from recent trials, information on ongoing and upcoming trials and a guide for those interested in participating.

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