# Treating Eye Cancer

If you have been diagnosed with an eye cancer, your cancer care team will discuss your treatment options with you. It's important to think carefully about your choices. You will want to weigh the benefits of each treatment option against the possible risks and side effects.

**How is eye cancer treated?**

Depending on the type and stage of the cancer and other factors, treatment options for eye cancer might include:

- Surgery for Eye Cancer
- Radiation Therapy for Eye Cancer
- Laser Therapy for Eye Cancer
- Chemotherapy for Eye Cancer
- Immunotherapy and Targeted Drugs for Eye Cancer

**Common treatment approaches**

Sometimes, more than one of type of treatment is used. In choosing the best treatment plan for you, some important factors to consider include the location and stage of the cancer, your overall health, the chances of curing the disease, and the possible effect of the treatment on vision.

- Treating Eye Melanoma by Location and Size

**Who treats eye cancer?**

Based on your treatment options, you may have different types of doctors on your

treatment team. These doctors may include:

- An **ophthalmologist:** a doctor who specializes in treating diseases of the eye
- An **ocular oncologist:** a doctor (usually an ophthalmologist) who specializes in treating cancers of the eye
- A **radiation oncologist:** a doctor who treats cancer with radiation therapy
- A **medical oncologist:** a doctor who treats cancer with medicines such as chemotherapy and targeted therapy

Many other specialists may be involved in your care as well, including nurse practitioners, nurses, psychologists, social workers, rehabilitation specialists, and other health professionals.

- Health Professionals Associated with Cancer Care

**Making treatment decisions**

- Programs & Services

**Choosing to stop treatment or choosing no treatment at all**

# Surgery for Eye Cancer

The type of surgery depends on the location and size of the tumor, how far the tumor has spread, and a person's overall health. All of these operations are done while you are under general anesthesia (in a deep sleep). Most people will stay in the hospital 1 or 2 days afterward. The operations used to treat people with eye melanoma include:

- **Iridectomy:** Removal of part of the iris (the colored part of the eye). This might be an option for very small iris melanomas.
- **Iridotrabeculectomy:** Removal of part of the iris, plus a small piece of the outer part of the eyeball. This might also be an option for small iris melanomas.

Surgery on the eye can lead to the loss of some or all of the vision in that eye. Enucleation and orbital exenteration result in complete and immediate vision loss in the eye. Other surgeries can also cause problems leading to a loss of vision, which can occur later on. In some cases, vision may have already been damaged or lost because of the cancer.

Removal of the eyeball (enucleation) obviously can affect a person's appearance. As noted above, an artificial eye can be put in place to help minimize this.

## More information about Surgery

melanoma-treatment-pdq#link/_101_toc. Accessed August 24, 2018.

National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Uveal Melanoma. V.1.2018. Accessed at https://www.nccn.org/professionals/physician_gls/pdf/uveal.pdf on August 15, 2018.

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# Radiation Therapy for Eye Cancer



Radiation therapy uses high-energy x-rays to kill cancer cells. It is a common treatment for eye melanoma. Radiation therapy can often save some vision in the eye. Sometimes vision might be lost if the radiation damages other parts of the eye. An advantage over surgery is that the eye structure is preserved, which can result in a better appearance after treatment.

Different types of radiation therapy can be used to treat eye cancers.

## Brachytherapy (plaque therapy)

This form of radiation therapy might also be called **ocular brachytherapy** or **episcleral plaque therapy**. This has become the most common radiation treatment for most eye melanomas. Studies have shown that in many cases it is as effective as surgery to remove the eye (enucleation).

In this approach, a small carrier containing radioactive “seeds” (known as a *plaque*) is placed on the outside of the eyeball over where the tumor is. The plaque is typically shaped like a very small bottle cap and has gold or lead on the outside to shield nearby tissues from the radiation. The radiation travels a very short distance, so most of it will be focused only on the tumor.

The plaque is sewn in place on the eyeball with tiny stitches during a short operation.

This can sometimes be done with local anesthetic (numbing medicine) and sedation, although sometimes general anesthesia might be needed (where you are in a deep sleep). The plaque is usually left in place for at least a few days, although the exact amount of time depends on the size of the tumor and the strength of the radiation source. You will probably stay in the hospital during this time. Another surgery is then done to remove the plaque. You will probably be able to go home the same day.

The full effect of the radiation on the tumor is not usually seen for 3 to 6 months.

This treatment cures about 9 out of 10 small to medium size tumors and can preserve vision in some people, depending on what part of the eye the melanoma is in. The outlook for vision is not as good if the tumor is very close to the optic nerve, which carries visual images from the eye to the brain.

## External beam radiation therapy

In this approach, radiation from a source outside the body is focused on the cancer. For eye melanomas, the use of this type of radiation therapy is generally limited to newer methods that focus narrow beams of radiation on the tumor.

**Proton beam radiation therapy:** Instead of using x-rays as in standard radiation therapy, this approach aims proton beams toward the cancer. Unlike x-rays, which release energy both before and after they hit their target, protons cause little damage to tissues they pass through and release their energy only after traveling a certain distance. This means that proton beam radiation may be able to deliver more radiation to the tumor but do less damage to nearby normal tissues. This type of radiation treatment is used more often for larger tumors and for tumors that are closer to the optic nerve.

Getting treatment is much like getting an x-ray, but the dose of radiation is much higher. In most cases, the total dose of radiation is divided into daily fractions (usually given Monday thru Friday) over several weeks. The treatment is typically not painful.

The specialized machines needed to make protons are only found in certain centers in the United States at this time.

**Stereotactic radiosurgery:** Despite the name, there is no actual surgery involved in this treatment. The term "surgery" is used to describe the accurate nature of the radiation beams. This type of treatment delivers a large, precise radiation dose to the

deliver radiation in one of two ways:

- A *Gamma Knife* stays in one place and focuses radiation beams from hundreds of different angles at the tumor all at once for a short period of time in one treatment session.
- Several machines, such as *CyberKnife*® or *Clinac*® use a computer to control a radiation machine that moves in a circular motion (180 degrees) over the tumor to deliver individual radiation beams at separate times from many different angles. These treatments are done over multiple days.

## Possible side effects of radiation therapy

The main concern with radiation therapy is damage to parts of the eye, leading to problems such as blurry vision, dry eye, cataracts, retinal detachment, glaucoma (increased pressure inside the eye), loss of eye lashes, problems with tear ducts, or bleeding into the eye. Some of these treatments can result in partial or complete loss of vision or other problems, which might not happen right away and may worsen with time. The risk depends on the size and location of the tumor.

Because the radiation is focused only on the affected eye, it is not likely to affect vision in the other eye or to cause other side effects sometimes linked with radiation therapy, such as hair loss or nausea.

## More information about radiation therapy

To learn more about how radiation is used to treat cancer, see Radiation Therapy[1].

To learn about some of the side effects listed here and how to manage them, see Managing Cancer-related Side Effects[2].

## Hyperlinks

1. www.cancer.org/cancer/managing-cancer/treatment-types/radiation.html
2. www.cancer.org/cancer/managing-cancer/side-effects.html

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# Laser Therapy for Eye Cancer



Laser therapy is sometimes used to treat eye melanoma, especially when surgery or radiation are not possible.

## Transpupillary thermotherapy (TTT)

This is the most common type of laser treatment for eye melanoma. It uses infrared light to heat and kill the tumor.

TTT alone is mainly used to treat very small eye melanomas because of side effects like bleeding, retinal detachment and blockage of blood vessels in the eye, as well as a high risk of recurrence[1] (cancer coming back). More recently, TTT may be used as an adjuvant (additional) treatment after brachytherapy (plaque radiotherapy) to lower the risk of recurrence.

### Laser photocoagulation

This treatment uses highly focused, high-energy light beams to burn tissue. It is rarely used now to treat eye melanoma because of side effects and a high risk of recurrence, but it can be effective for very small melanomas.

### Possible side effects of laser therapy

As with radiation therapy, the main concern with laser therapy is damage to parts of the eye that could result in loss of vision. The risk depends on the size and location of the tumor.

## Hyperlinks

1. www.cancer.org/cancer/survivorship/long-term-health-concerns/recurrence.html

#### References

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# Chemotherapy for Eye Cancer



Chemotherapy (chemo) is the use of drugs to treat cancer. The drugs can be injected into a certain part of the body (such as the liver), or they can be injected into a vein (through an IV line) or taken by mouth (as a pill) to reach most of the body, making this treatment very useful for many types of cancer that have spread. Unfortunately, chemo is usually not as helpful for melanoma as it is for some other types of cancer, but it can shrink tumors in some people.

Chemo might be an option if uveal (eye) melanoma has spread to other parts of the body, although other treatments such as immunotherapy or targeted drugs might be tried first. If chemo is an option, the drugs used are generally the same as for melanoma of the skin. For more information, see Chemotherapy for Melanoma Skin Cancer[1].

For uveal melanoma that has spread to the liver and can't be removed with surgery, your doctor may suggest that you get chemo directly into your liver through a main artery in the liver, called the hepatic artery. An example of chemo that can be given this way is melphalan. This type of treatment, called “liver-directed” treatment, is usually only an option if the cancer affects less than half of the liver and there are no other places of cancer in the body (or if there are, those areas can be treated with either surgery or radiation).

## Possible side effects of chemo

Chemo drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body such as those in the bone marrow (where new blood cells are made), the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are likely to be affected by chemo, which can lead to side effects.

The side effects of chemo depend on the type and dose of drugs given, how they are given, and the length of time they are taken. The side effects of systemic chemo can include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea or constipation
- Increased chance of infections (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- Fatigue (from having too few red blood cells)

These side effects usually go away after treatment is finished. There are often ways to lessen these side effects. For example, there are drugs to help prevent or reduce nausea and vomiting. Some drugs may also have specific side effects not listed above. Be sure to ask your doctor or nurse about medicines to help reduce side effects, and let them know when you do have side effects so they can be managed.

## More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see Chemotherapy[2].

To learn about some of the side effects listed here and how to manage them, see Managing Cancer-related Side Effects[3].

## Hyperlinks

1. www.cancer.org/cancer/types/melanoma-skin-cancer/treating/chemotherapy.html
2. www.cancer.org/cancer/managing-cancer/treatment-types/chemotherapy.html
3. www.cancer.org/cancer/managing-cancer/side-effects.html

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# Immunotherapy and Targeted Drugs for Eye Cancer



Uveal (eye) melanoma that has spread outside of the eye can be hard to treat, and

unfortunately standard chemotherapy drugs often are not very helpful.

In recent years, researchers have developed newer types of drugs to treat advanced melanomas. Several of these drugs are now used to treat melanomas of the skin, and some of them might be helpful in treating uveal melanomas as well. These newer drugs generally fall into 2 groups: immunotherapy and targeted drugs.

## Immunotherapy

Immunotherapy drugs work to stimulate the body's own immune system to help it recognize and attack cancer cells more effectively.

in the body release chemicals (cytokines) that ramp up the immune system. This happens most often within the first day after the infusion, and it can be life-threatening. Symptoms can include:

- High fever and chills
- Severe nausea and vomiting
- Trouble breathing
- Feeling very tired
- Feeling dizzy or lightheaded
- Headache

Your health care team will watch you closely for possible signs of CRS, especially during and after the first few infusions. Be sure to contact your health care team right away if you have any symptoms that might be from CRS.

### Immune checkpoint inhibitors

Some immune cells have ‘checkpoint’ proteins that need to be turned on (or off) to start an immune response.  Melanoma cells sometimes use these checkpoints to avoid being attacked by the immune system. Drugs that target these checkpoint proteins can help restore the immune response, and some of these have been shown to be helpful in treating melanomas of the skin. Examples of immune checkpoint inhibitors include:

- **Pembrolizumab (Keytruda)**
- **Nivolumab (Opdivo)**
- **Ipilimumab (Yervoy)**

These drugs haven’t been shown to be quite as effective in treating uveal melanoma, but they might be helpful for some people.

For more on these medicines, see Immunotherapy for Melanoma Skin Cancer[2].

## Targeted drugs

Some newer drugs target parts of melanoma cells that make them different from normal cells. For example, about half of all skin melanomas have a change (mutation) in a gene called *BRAF*, and several drugs that target this gene change are now available to treat these cancers. (See Targeted Therapy for Melanoma Skin Cancer[3].) This mutation isn't common in uveal melanomas, but in people whose cancer cells have it, these drugs

might be helpful.

Drugs targeting other gene changes are also being studied.

For more information on some of these newer drugs, see What's New in Eye Cancer Research?[4]

## Hyperlinks

# Treating Eye Melanoma by Location and Size

- Choroidal melanomas
- Iris melanomas
- Ciliary body melanomas
- Conjunctival melanomas
- Advanced and recurrent melanomas

The main factors in deciding on treatment for eye melanoma include the location and size of the cancer, as well as the likelihood of saving vision in the eye. There is not much advantage in saving an eye if a small melanoma in a crucial place has already destroyed vision in the eye. On the other hand, doctors will not necessarily want to remove an eye that functions normally even if the tumor is large. Because of this, your treatment plan will depend on your situation, and could be different than what's described here.

It’s important to keep in mind that outcomes and quality of life both tend to be similar over time for people who have had an eye removed (enucleation) and those who have had radiation therapy. Radiation therapy is more likely to preserve some vision in the eye, especially during the first few years after treatment, but studies have found that people who have had radiation therapy are also more likely to be more anxious about the chance of the cancer coming back. Be sure to talk with your doctor before treatment about what is mo tsut669 gs (Choroidal melanomas)Tj 0 ore treatment

Cancer that comes back after treatment is called *recurrent*. Recurrence can be local (in or near the same place it started) or distant (spread to organs such as the lungs or liver).Treating melanomas that come back depends on many factors, including where the cancer recurs and what type of treatment was used initially.

Cancers that recur within the eye (intraocular recurrence) are usually treated by removing the eye (enucleation).

When melanoma recurs outside the eye (called *extraocular recurrence*), it most often

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