

# Types of Cancers Treated with PROTON THERAPY



An innovative treatment that results in fewer side effects and higher quality of life during treatment and throughout survivorship.

Proton therapy is a life-changing radiation treatment that offers significant benefits for many disease sites. This advanced therapy has proven effective in the treatment of brain tumors, prostate cancer, pediatric cancers, and more. With its precision, reduced side effects, and ability to deliver higher radiation doses, proton therapy is revolutionizing cancer care across diverse disease sites.

## **BRAIN, SPINE & OTHER CENTRAL NERVOUS SYSTEM CANCERS**

When treating brain and other central nervous system cancers, it is important to limit radiation doses to other critical structures such as the brain stem, spinal cord, and healthy brain tissue that control important body functions. Proton therapy is the most advanced radiation treatment technology available that can limit unnecessary radiation to these structures.

## **BREAST CANCER**

Because the breast is located in close proximity to the heart and lungs, proton therapy holds distinct advantages over standard radiation therapy due to the ability to limit the radiation dose to the breast tissue. Standard radiation therapy deposits radiation into both the heart and lung increasing the chance for short and long term side effects including secondary cancers later in life.

## **ESOPHAGEAL CANCER**

The esophagus is located adjacent to many critical organs and structures including the heart, lungs, trachea, and major blood vessels. Protection of these organs and structures is important in order to prevent significant side effects such as heart disease and radiation pneumonitis. Due to its precision and clinical advantages, proton therapy is ideally suited to reduce the risk of these side effects while delivering a curative dose to the tumor.

## **GYNECOLOGIC CANCER**

Proton therapy may be a more precise radiation option for treatment of gynecologic cancers to help protect the function of important nearby organs like the bowels, bladder, and genitals, as well as reducing the risk of developing a future cancer.

## **HEAD & NECK CANCERS**

Many critical structures are located in the head and neck area including the brain stem, spinal cord, and salivary glands. When treating in this area with high doses of radiation, significant side effects can occur including the inability to speak, swallow, and the loss of saliva production. Proton therapy can help reduce the risk of experiencing these side effects by limiting radiation dose to these structures.

## **LIVER CANCERS**

The liver serves the critical function of filtering the bloodstream which often results in cancers originating in other areas of the body spreading to this critical organ. In addition, hepatocellular and intrahepatic cholangiocarcinoma (bile duct cancer) can originate in the liver. Recent studies have demonstrated that proton therapy patient's overall survival rates are higher than standard radiation therapy patients when treating these indications.



## LUNG CANCER

Like other cancers that occur in the chest area, there are many critical structures and organs that lie close to the lungs including adjacent healthy lung tissue. Because of the clinical advantages of proton therapy, radiation doses to critical organs such as the heart and healthy lung tissue can be limited resulting in decreased lung complications such as radiation pneumonitis and heart disease.

## LYMPHOMAS

Lymphomas can occur in many different areas of the body often adjacent to critical structures and organs including the heart, lungs, kidneys, spinal cord, esophagus, bone marrow, stomach, and salivary glands. For this reason, proton therapy is advantageous by limiting the amount of radiation that is delivered to these critical structures and organs while delivering a curative dose to achieve tumor control.

## OCULAR CANCERS & OTHER EYE CONDITIONS

Due to the unique physical characteristics of proton beams, proton therapy is clinically advantageous compared to standard radiation therapy when treating ocular cancers. Because of the location of the eye in relation to the optic nerve and surrounding brain tissue, proton therapy can limit harmful radiation doses to these critical structures and organs.

## PEDIATRIC CANCERS

Pediatric cancer survival rates have increased significantly over the last decades from 10% to nearly 90% today. Proton therapy can limit radiation doses to healthy, developing tissues while delivering curative doses to the tumor which reduces pediatric cancer patients' risk of experiencing long-term side effects.

## PANCREATIC CANCER

The pancreas is located in the mid-abdominal area surrounded by several critical organs including the liver, kidneys, stomach, and the small and large intestines. Due to this critical location and the radiation sensitivities of these organs, it is imperative to keep radiation doses to these organs limited to prevent nausea, vomiting and to preserve organ function. For these reasons, proton therapy is highly indicated to deliver a curative dose to the tumor and limit dose to these surrounding organs.

## PROSTATE CANCER

The prostate is a walnut-shaped organ surrounded by the bladder and rectum that sits deep in the male pelvis. For this reason, these organs as well as the adjacent intestines and bony structures often receive unnecessary doses of radiation when treating the prostate for cancer. This can result in increased side effects both short and long term. Proton therapy can limit unnecessary radiation doses to these tissues when treating the prostate reducing debilitating side effects such as rectal urgency and frequency. Additionally, some studies have demonstrated increased survival rates for proton therapy patients when compared to patients treated with standard radiation therapy.

## SARCOMAS

Sarcomas can occur in bone and soft tissue in many different areas of the body. These types of tumors require high radiation doses to achieve a cure. For this reason, when they occur adjacent to critical structures and organs, proton therapy is advantageous because it can limit the amount of unnecessary radiation resulting in fewer and less severe short and long term side effects.

## SKULL-BASED CANCERS

Cancers that occur in the skull base are difficult to treat due to the close proximity of the brain stem, spinal cord and healthy brain tissue. Proton therapy has proven to be beneficial in delivering a curative dose to these tumors while limiting radiation to these critical structures and organs resulting in reduced short and long term side effects in these areas.

**The National Association for Proton Therapy (NAPT) and its members support cancer research and treatment innovation and are committed to raising awareness about the value of proton therapy among policymakers, insurers, caregivers and patients to ensure that this advanced treatment modality is affordable and available in communities across the country.**

**LEARN MORE: [PROTON-THERAPY.ORG](http://PROTON-THERAPY.ORG)**



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