

# PROTON THERAPY FOR CANCER

*BECAUSE A CURE IS NOT ENOUGH*

## Proton Therapy Reduces Severe Side Effects

Proton therapy results in fewer side effects than traditional X-Ray radiation therapy according to a study led by the Washington University School of Medicine in St. Louis and the Perelman School of Medicine at University of Pennsylvania.<sup>1</sup> Along with reduced side effects, proton therapy resulted in cure rates similar to those of advanced X-ray radiation therapy.

The study, published in 2019, includes almost 1,500 patients receiving combined chemotherapy and radiation therapy for **lung, brain, head and neck, gastrointestinal and gynecologic cancers.**

"While there have been other studies suggesting that proton therapy may have fewer side effects, we were somewhat surprised by the large magnitude of the benefit," said Dr. Brian C. Baumann, a radiation oncologist at Washington University School of Medicine. Baumann noted that patients in the proton group had fewer side effects despite the fact that they were older (average age of 66) than patients in the X-ray radiation therapy group (average age of 61.)

The researchers found that **patients receiving proton therapy experienced a two-thirds reduction in the relative risk of severe side effects** within 90 days of treatment compared with patients receiving X-ray radiation therapy. 27.6 percent of patients receiving X-ray radiation suffered a severe side effect (Grade 3 or higher) in the 90-day time frame, while only 11.5 percent of patients receiving proton therapy suffered a severe side effect.

The researchers also found no differences between the two groups in survival, showing that proton therapy was just as effective in treating the cancer while causing fewer side effects. Overall survival at one year for the proton therapy group was 83 percent versus 81 percent for the X-ray radiation therapy group. All data was collected prospectively on patients as they underwent treatment and were followed afterwards.

1) Baumann BC, Mitra N, Harton JG, Xiao Y, Wojcieszynski AP, Gabriel PE, Zhong H, Geng H, Doucette A, Wei J, O'Dwyer PJ, Bekelman JE, Metz JM. Comparative effectiveness of proton therapy versus photon therapy as part of concurrent chemo-radiotherapy for locally advanced cancer. American Society of Clinical Oncology poster session. June 1, 2019.

2) Chung CS, Yock TI, Nelson K, Xu Y, Keating NL, Tarbell NJ. Incidence of second malignancies among patients treated with proton versus photon radiation. Int J Radiat Oncol Biol Phys (2013) 87(1):46-52.10.1016/j.ijrobp.2013.04.030

## Proton Therapy Reduces Second Cancers

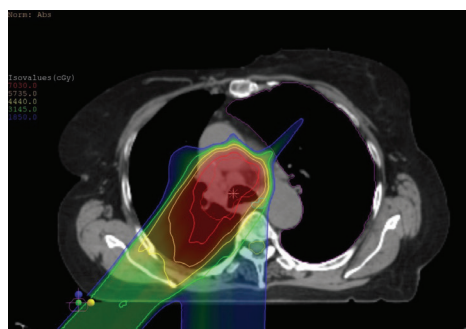
Another study, published by researchers from Harvard Medical School, shows that **proton therapy reduces the risk of a patient developing a second tumor by nearly half** as compared with conventional radiation (X-ray) therapy.<sup>2</sup> The study compared the frequency of second cancers in 558 patients treated with proton therapy versus 558 patients treated photon radiation. Patients were matched by age, sex, year of treatment, type of cancer and cancer site.

"We wanted to look at this issue and settle it," said Torunn I. Yock, M.D., associate professor at Harvard Medical School. "That's why we embarked on this study."

## The Physical Advantages of Protons

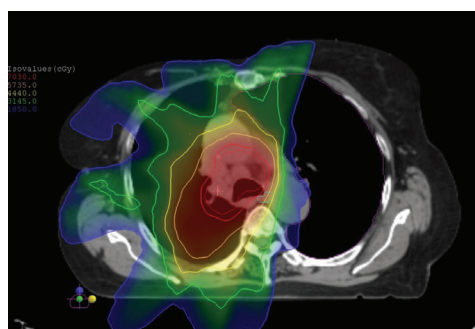
The unique physical properties of protons – a positive charge and mass – allow doctors to stop them inside of tumors where most of the radiation is deposited. X-rays, conversely, are chargeless and massless and cannot be stopped inside tumors thus exposing healthy tissue and organs around tumors to unnecessary radiation. An example of the difference can be seen below in treatment plans for a lung cancer patient.

### PROTON THERAPY



Grey/white area indicates no radiation exposure.

### CONVENTIONAL X-RAY RADIATION



Colored area indicates radiation exposure

# FREQUENTLY ASKED QUESTIONS ABOUT PROTON THERAPY

## What is the difference between Proton Therapy and other forms of radiation treatment?

Proton therapy and x-ray radiation therapy (such as IMRT, TomoTherapy, or Cyberknife) can both kill cancer cells, but unlike x-rays, protons go directly into the tumor and then stop. This allows protons to target the tumor while reducing damage to surrounding healthy tissue.

## Is Proton Therapy proven?

The first cancer patient was treated with proton therapy in 1954 and nearly 200,000 patients have been treated worldwide. There are over 300 research papers outlining the clinical benefits of proton therapy. Many of the world's top cancer centers use protons to treat cancer and leading industry groups such as American Society for Radiation Oncology (ASTRO) and the National Comprehensive Cancer Network (NCCN) recommend the use of protons for many different cancers.

## Is Proton Therapy covered by insurance?

Proton Therapy is covered by Medicare and most private insurance plans. The Oklahoma Proton Center has financial counselors who will guide you through the insurance process. Please contact us if you have questions about your insurance coverage.

## Can Proton Therapy be used with other treatments?

Proton Therapy can be used in conjunction with other treatments such as chemotherapy, surgery, or immunotherapy. The doctors at Oklahoma Proton Center work closely with specialists at other facilities to help coordinate these treatments.

## How do I know if I am a candidate for Proton Therapy?

Most patients with solid tumors can benefit from proton therapy's ability to deliver more radiation to the tumor and less radiation to healthy tissue. The doctors at Oklahoma Proton Center have many years of experience treating with all types of radiation and will carefully consider the best option for each patient at consult. It is important to speak with a radiation oncologist who actively treats with proton therapy to get the most complete information about its use for your particular cancer.

## What services are available if I have to travel from out of town?

We have a dedicated concierge team that can help coordinate travel arrangements for out of town patients. We have partnerships with a number of hotels and extended stays in Oklahoma City with preferred rates, and we also partner with American Cancer Society to assist with accommodations for patients who may have financial hardship.

## ABOUT OKLAHOMA PROTON CENTER

The Oklahoma Proton Center was the 6th proton center in the U.S. when it opened. It remains one of 30 centers in the country and one of just 5 in the Southwest. The clinical team is one of the most experienced in the country having successfully treated thousands of patients from across the U.S. over the past decade. Many of the techniques used today in other proton centers were developed at the Oklahoma Proton Center.

The facility is adjacent to the INTEGRIS Cancer Institute (ICI), one of the preeminent cancer centers in the region. The doctors at Oklahoma Proton Center work closely with their colleagues at ICI to provide a multi-disciplinary team approach to care. Patients often receive services at both facilities which are coordinated by the Oklahoma Proton Center.

Our goal is to provide great care focused on a patient's overall well-being throughout their cancer journey. We offer a number of services and activities besides the proton therapy treatment itself designed to maximize the healing process. These include patient lunches, group chat sessions, social events, support from former patients, educational seminars, nutritional and wellness counseling and more.

## LEADERS IN CANCER CARE

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