

# Using Proton Therapy to Treat Liver Cancer

## Overview

Proton therapy is a powerful treatment tool for fighting liver cancer, and it is available to patients at the Maryland Proton Treatment Center (MPTC). Physicians at MPTC use the latest pencil-beam scanning (PBS)/intensity modulated proton therapy (IMPT) to target tumors and deliver high doses of radiation with unmatched precision.

Proton therapy reduces radiation exposure to surrounding healthy tissue and organs, which are highly sensitive and can make traditional radiation treatment more challenging. As a result, proton therapy helps minimize the risks of side effects in the stomach, bowel, kidneys and other nearby organs.

### **Proton therapy is likely to benefit patient subgroups, including the following:**

- **Patients who have had prior radiation therapy:** When any part of the body is radiated a second time, the risks of short- and long-term side effects increases. For this reason, patients with a new or recurrent liver cancer who have received prior radiation therapy are often good candidates for proton therapy's precision targeting.
- **Patients with disease recurrence:** Proton therapy can aim a higher dose of radiation at the site of the recurrence after surgery or other systemic or local therapies, potentially leading to improved outcomes. Proton therapy's precision can reduce the radiation dose that surrounding normal tissues receive.

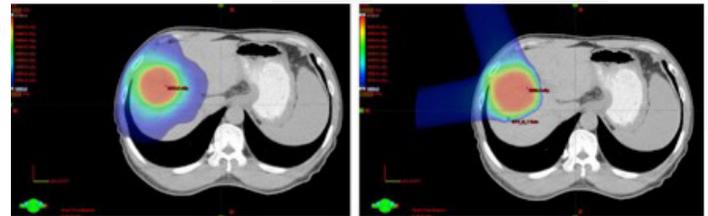


## For more information

on our currently available clinical trials, please call our research department at **410-369-5353**.

## Proton Therapy Versus Photon Therapy

Because of the physics of proton particles, proton radiation goes to the site of the tumor and stops. This means that proton therapy allows for higher doses of radiation to be delivered to the tumor without damaging surrounding healthy tissue and organs. The image below shows the areas surrounding the tumor exposed to radiation (dose delivered to tumor and surrounding tissue shown in color) during treatment. The proton therapy (right) delivers significantly less radiation to the surrounding areas than the photon treatment (left).



Photon therapy

Proton therapy

## MPTC-Specific Clinical Trial Offerings

MPTC is dedicated to advancing scientific knowledge about the role of proton therapy in the treatment of liver cancer. All patients treated at the center have access to a wide range of clinical trials available through the Maryland Proton Alliance. Plans are also underway at MPTC to open in-house clinical trials in addition to multi-institutional and cooperative group trials.

### **Clinical trials at MPTC include:**

- NCT01255748: Evaluation Tracking Project: A Prospective Chart Review of Patients Treated with Radiation Therapy

## Outcomes

Your patients may be hesitant to explore different treatment options and may pose questions related to side effects and outcomes. Proton therapy is an effective, noninvasive, low-risk treatment option that can improve the quality of life for cancer patients and survivors. Studies are ongoing, and early results confirm this treatment's power and precision.

Proton therapy's unique properties can improve outcomes for many liver cancer patients.



Maryland Proton Alliance to bring the latest research and clinical trials to patients and physicians. We have taken a leadership role in the industry by offering proton therapy at the same cost as IMRT.

MPTC provides a unique level of proton therapy experience and expertise. Our University of Maryland Department of Radiation Oncology physicians have a combined 20-plus years of proton therapy experience. Associate Professor and MPTC Medical Director Charles Simone has more than 5 years of experience from the University of Pennsylvania Proton Therapy Center; Professor Robert Malyapa has more than 12 years of experience from the Paul Scherrer Institute, which is world renown as a key innovator of proton therapy, and University of Florida Proton Therapy Institute; Assistant Professor Adeel Kaiser has three years of experience from the Loma Linda Proton Therapy Center and Assistant Professor Shahed Badiyan trained at the Paul Scherrer Institute.

A 2016 study from University of Maryland Associate Professor of Radiation Oncology and MPTC Medical Director Charles B. Simone, II, MD, suggests that proton therapy offers the potential to achieve significant reduction in treatment-related toxicities without compromising survival or local control for multiple gastrointestinal malignancies.<sup>1</sup>

According to another 2016 study, proton therapy showed favorable long-term efficacies with limited toxicities, and it can be an alternative treatment for localized hepatocellular carcinoma (HCC) especially when accompanied with tumor thrombi.<sup>2</sup>

In a 2016 study of patients with hepatocellular carcinoma, researchers found survival rates after proton therapy to be similar to those after transarterial chemoembolization. The study noted “a trend toward improved local tumor control and progression-free survival with proton beam” and also found that patients spent “significantly fewer” days in the hospital after proton therapy.<sup>3</sup>



## About the Maryland Proton Treatment Center

The Maryland Proton Treatment Center is affiliated with the University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center, an NCI-designated comprehensive cancer center. MPTC is focused on clinical excellence, affordability, accessibility, as well as comfort and convenience for your patients. In addition, our team has initiated the

## Contact Information

To refer a patient or to discuss treatment options with one of our physicians, please call **410-369-5200** or email us at **[info@mdproton.com](mailto:info@mdproton.com)**.

Maryland Proton Treatment Center  
850 West Baltimore Street  
Baltimore, MD 21201  
410-369-5200  
[mdproton.com](http://mdproton.com)

<sup>1</sup>Simone CB 2nd et al. “Clinical outcomes and toxicities of proton radiotherapy for gastrointestinal neoplasms: a systematic review.” J Gastrointest Oncol. 2016 Aug;7(4):644-64.

<sup>2</sup>“Long-term outcomes of proton beam therapy in patients with previously untreated hepatocellular carcinoma.” Cancer Sci. 2016 Dec 23.

<sup>3</sup>“Randomized Clinical Trial Comparing Proton Beam Radiation Therapy with Transarterial Chemoembolization for Hepatocellular Carcinoma: Results of an Interim Analysis.” Int J Radiat Oncol Biol Phys. 2016 May 1;95(1):477-482.