Proton beam therapy for bone cancer spares surrounding tissue

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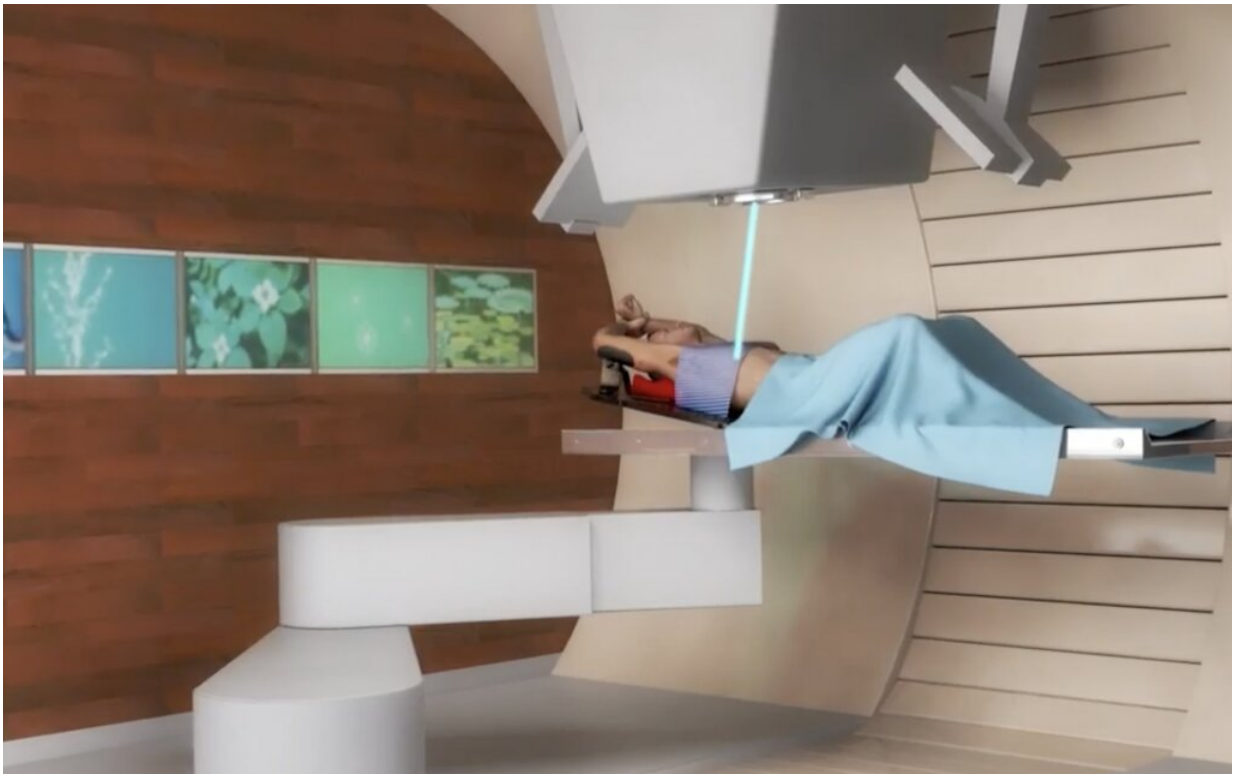

Credit: Mayo Clinic

July is Sarcoma Awareness Month, bringing attention to a group of cancers that begin in the bones or soft tissues of the body. There are more than 70 types of sarcoma, including bone cancer. Treatments for bone cancer include surgery, chemotherapy, radiation, or proton beam

therapy that targets the cancer.

Proton beam therapy is a type of radiation therapy that is more precise than traditional X-ray treatment that delivers radiation to everything in its path. Proton beam therapy uses charged particles in an atom—protons—that release their energy within the tumor. Because proton beams can be much more finely controlled, specialists can use proton beam therapy to safely deliver higher doses of radiation to tumors. This is especially important for bone cancers.

"Bone tumors need much higher doses of radiation than a sarcoma that arises purely in the muscle, which we call a soft tissue sarcoma," says Safia Ahmed, M.D., a radiation oncologist at Mayo Clinic. "These high doses of radiation often exceed what the normal tissues around the area can tolerate. Proton therapy allows us to give this high dose of radiation while protecting the normal tissues."

Bone cancer is rare, accounting for just 0.2% of all cancers. Some types of bone cancer occur mainly in children, while others affect mostly adults. Common bone cancers include Ewing's sarcoma, osteosarcoma, chordoma and chondrosarcoma. The most common sites include the pelvis, spine and base of the skull.

Whether a patient with bone cancer is a candidate for proton beam therapy depends on several factors, Dr. Ahmed says. The care team considers the patient's overall treatment plan, age, location of the cancer, the tissue surrounding the cancer, and potential benefits and risks from a high dose of radiation.

Proton beam therapy has side effects. Some are acute, such as fatigue, changes in the skin and pain if the tumor swells and presses on nerves. Long-term side effects include permanent damage to nerves or nearby organs, bone fractures, or the possibility of developing another cancer.

Before getting proton beam therapy, patients go through a simulation, which is essentially a dress rehearsal of how the radiation will go. The purpose is to identify the proper treatment position for the therapy since the radiation is so focused and precise, Dr. Ahmed says. The team uses custom immobilization devices, getting CT scans and MRI images as they develop the patient's radiation plan. Patients also received a small blue tattoo—about the size of a small mole—on the area of the tumor to help with positioning.

"We are very meticulous about it because we want to come up with the best radiation plan that is safe and effective for patients," Dr. Ahmed says. "Once that process is done and the patient is ready to start, they come in daily for treatments. It's all about precision."

Patients typically undergo proton beam therapy five days per week for several weeks, with several more weeks of recovery. The care team continues to monitor the patients who receive regular scans.

"Unfortunately, there's always concern about the cancer returning," Dr. Ahmed says. "But we've made so much progress with all of our treatments. Our survival outcomes and efficacy have improved and continue to improve."

Provided by Mayo Clinic