CANCER

A Treatment Not All Can Get

Proton beam therapy spreads amid dilemmas over availability

By Adam Voiland

There's plenty of time for patients to mingle in the waiting room of the $125 million Proton Therapy Center in Houston. In one corner, Alexander Glaros, a 16-year-old with Ewing's sarcoma, plays cards with his mom. In another, a prostate cancer patient in his 60s entertains a toddler who is awaiting treatment for the tumor in her brain. Nearby, a middle-aged woman with lung cancer pages through a newspaper. While they have different types of cancer, all are counting on the same technology, a high-tech radiation treatment called proton beam therapy.

In an ideal world, some oncologists say, most cancer patients would get this rare type of treatment, in which doctors use nuclear technology and magnets to fire protons into tumors at about two thirds the speed of light. But just five medical facilities currently offer the therapy, including the one in Houston, which is part of the University of Texas M.D. Anderson Cancer Center. Even with eight more of the expensive facilities planned, there will be nowhere near the number of centers needed to treat every patient who might benefit, proponents of the technology say. ProCure Treatment Centers, a company that partners with hospitals to plan, install, and run the complex facilities, estimates that proton therapy could help a quarter of a million patients. Nationwide, however, only about 6,000 treatment slots are available each year. As a result, doctors face agonizing decisions about whom to treat—and some patients are lucky if they're in a waiting room rather than on a waiting list.

Proton therapy's promise lies in its ability to destroy cancerous cells while sparing healthy cells half a millimeter away, reducing side effects. It also allows doctors to ramp up the radiation dose, theoretically improving cure rates. The precise targeting is possible because the subatomic particles release the bulk of their destructive energy beneath the skin, at the tumor's depth, rather than near the surface, as X-rays do. (Doctors set that depth by controlling the speed at which a proton is blasted at the skin.) And while standard radiation tends to cause damage to healthy tissues on the far side of tumor, protons slow and stop as they release their energy pulse, eliminating a harmful exit dose.

Children are among those who stand to reap the greatest benefits from protons. In pediatric patients, whose bodies are growing, conventional radiation can sow the seeds of secondary cancers and cause a variety of deformities. Proton therapy offers significant benefits for certain adult patients as well: The technology, first tested on patients in the 1950s at experimental nuclear physics labs, is recognized as the most viable way to treat certain rare tumors in sensitive locations, such as the eye, base of the skull, and spinal cord, where even a bit of misplaced radiation can have disastrous results. And current research might even expand its use against various common tumors, including lung and breast cancer.

Heartbreaking choices. Already, the most vexing problem with proton therapy is its limited availability. At Massachusetts General Hospital in Boston, for example, only a fifth of patients who are referred for the treatment end up getting it, and at the proton center at Loma Linda University Medical Center in Southern California, a prostate patient's wait is sometimes measured in months. Choosing who gets treatment and who doesn't can be heartbreaking, says Jay Loeffler, the chief of radiation oncology at Mass General. "You have to pick patients who get the biggest bang for the buck," he says. "You choose a child with a brain tumor you could potentially cure instead of a 50-year-old with metastatic kidney cancer, even though you know you could probably help both."

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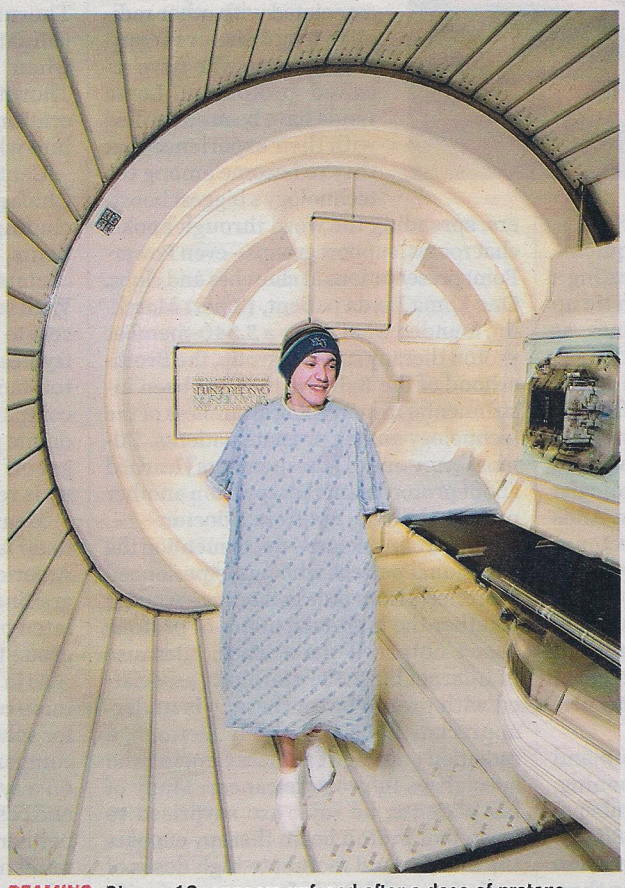

BEAMING. Glaros, 16, appears unfazed after a dose of protons.

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Competition for precious treatment slots isn't the only obstacle that patients face in getting proton therapy. Many must travel hundreds or thousands of miles and stay near a treatment center for weeks while receiving brief daily doses of radiation. Glaros and his parents, for example, came 781 miles from their home in Overland Park, Kan., for treatment in Houston for the tumor that began as an excruciating pain in his hip and has now spread to his lungs. He isn't supposed to miss even a day of treatment, his mother says, so getting home to apply for his driver's license has morphed into a logistical nightmare.

The dearth of proton facilities is largely due to their high upfront cost. It can easily take $100 million or more to construct the football field-size building needed to house a particle accelerator, the multistory rotating machinery that sur-