

Kharghar centre to offer patients subsidised high-end cancer therapy

MORE PRECISE, LESS HARMFUL

What is a proton?

It is a positively charged particle with high energy that can destroy cancer cells

What is proton therapy?

It is a kind of radiation therapy

PHYSICS BEHIND PROTON BEAM

Proton therapy systems are huge—a few storeys tall. Most of the machinery is built behind walls and not visible to the patient entering the treatment room, which is like any CT, MRI or PET scan unit

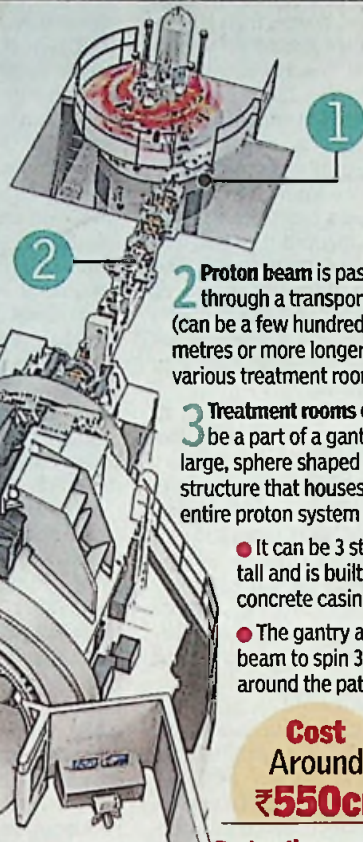
1 At the heart of proton ensemble is **cyclotron**, a particle accelerator, which accelerate protons up to 2/3rd the speed of light—all in fractions of a second

DIFFERENCE BETWEEN PROTON AND STANDARD RADIATION THERAPY



● Standard radiation therapy uses X-rays (photons) which deliver radiation not only to the targeted tumour but even to healthy tissues beyond

● Proton beams, on the other hand, can be adjusted to deliver most of their energy to a particular point



(Sizes of human and machine are in proportion)

2 Proton beam is passed through a transport line (can be a few hundreds of metres or more longer) to various treatment rooms

3 Treatment rooms could be a part of a gantry—a large, sphere shaped structure that houses the entire proton system

- It can be 3 storeys tall and is built into a concrete casing
- The gantry allows beam to spin 360° around the patient

Cost Around ₹550cr

Proton therapy for cancers of Skull base, liver, spine, brain, liver, lung, head and neck, breast, lymphomas, esophagus, pancreatic, paediatric, prostate, gastrointestinal, bone, head and neck

● Proton therapy may also be used for tumors that recur in areas that have previously been treated with standard radiation therapy

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Mumbai: After Apollo Cancer Centre in Chennai, Kharghar's Tata Memorial Centre will be second to offer proton beam therapy—one of the world's most sophisticated cancer treatment—in the country and the entire South-east Asia region.

Dr Rakesh Jalali, who heads the Apollo centre, said, "The proton beam can be regulated in such a way that the proton energy burst occurs at the precise site of the cancer, minimizing damage to surrounding healthy tissues." The first proton beam therapy machine located in Apollo Cancer Centre crossed a landmark recently: treating 100 patients from across the country and abroad, including the US and Saudi Arabia, over the last 11 months.

The proton beam has been around for over four decades, but the buzz around it is louder now because of a new pencil-beam variant that gives sub-millimetre precision in killing microscopic cancer cells. The number of centres across the world have almost doubled to over 120 in the last few years.

"Over the next five years, image-guided proton pencil beam therapy will be useful for 25% of all patients needing radiation," added Dr Jalali. The doctor, who has used proton beam for hard-to-reach brain cancers, especially among children, has published over nine studies in the last 11 months to show that this therapy has worked for all his patients so far.

Dr Jayashree Upadhye, a gynecologist from Nagpur whose brain tumour recurred after almost seven years, was among the first few patients in the country to undergo proton therapy. "I was almost bed-ridden and couldn't even move my fingers, but I am back at work after undergoing month-long proton therapy in February," she said.

The proton therapy has its downsides. The proton ensemble costs Rs 550 crore, meaning the therapy is expensive. At Apollo's Chennai centre, patients shell out between Rs 20 lakh and Rs 30 lakh for the entire course. "Many cancer therapies, especially the new ones, are expensive," said Dr Jalali. Bone marrow transplants for blood cancer patients cost between Rs 11 lakh and Rs 50 lakh depending on the genetic mutations and hospitals. Immunotherapy costs lakhs per month and CAR-T cell therapy can cost crores.

However, as Tata Memorial Centre works under the Department of Atomic Energy, it plans to subsidise proton beam therapy for patients. "Half the patients who need it will pay between Rs 10 lakh and Rs 12 lakh, while the remaining who have no economic means will get it free," said Dr Laskar.

The proton therapy isn't suitable to fight all cancers (see box). However, experts say beneficiaries can increase after extensive patients studies are carried out. As of now, there are few trained professionals to handle the technology.