Study shows how technology may improve treatment for children with brain cancer

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A study presented today at the 52nd Annual Meeting of the American Association of Physicists in Medicine (AAPM) shows that children with brain tumors who undergo radiation therapy (the application of X-rays to kill cancerous cells and shrink tumors) may benefit from a technique known as "intensity modulated arc therapy" or IMAT.

This technique relies upon new features on the latest generation of X-ray therapy equipment that allow X-ray sources to be continuously rotated in any direction around a patient during treatment, potentially increasing the number of directions that the beams come from.

The study, which was conducted by medical physicists at St. Jude Children's Hospital in Memphis, TN, compared different treatment strategies including IMAT for nine children treated with radiation therapy for brain tumors. It showed that IMAT could irradiate these tumors effectively while overall reducing the exposure to the surrounding tissue.

"Anything we can do to reduce that dose is obviously better," says St. Jude's Chris Beltran, who is presenting the study today in Philadelphia.

Treating cancer through radiation therapy can be complicated for certain types of tumors that are surrounded by sensitive tissue. Many brain tumors, for instance, are deep inside the skull and may require the X-rays to pass through critical structures -- the eyes, the ears, and parts of the brain itself.

The X-rays have the potential to damage these structures, which can lead to lasting side-effects from the treatment. Sending X-rays through the ear may damage the cochlea and lead to permanent hearing loss. Likewise, exposing the brain's temporal lobes to ionizing X-ray radiation can cause loss of mental acuity.

Because modern equipment for radiation therapy allows the source of X-rays to continuously move around the patient, says Beltran, "It gives you the freedom to choose where the beams come from."

In his study he showed that a treatment plan incorporating IMAT would help spare the sensitive surrounding tissues. Using common measures that relate radiation dosage to tissue damage, he predicts that the IMAT plan would cause less hearing loss and damage to the temporal lobes as compared to other treatment plans.

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