

# Researchers identify more accurate treatment delivery for robotic radiosurgery system

October 2 2011

---

– Radiosurgery is a non-invasive medical procedure in which focused beams of high-energy X-rays target tumors and other abnormalities in the body. A single large dose of radiation is capable of ablating a lesion that might not be amenable to surgical removal. However, some radiosurgery systems, such as the CyberKnife (CK), can be relatively time-consuming because the treatment planning requires the delivery of up to several hundred cone-shaped beams to adequately cover an irregularly shaped tumor. But a new study from Fox Chase Cancer Center now reports that there is an alternative to the conventional CyberKnife treatment delivery system. This new technique uses a multileaf collimator (MLC) and can flexibly sculpt a single radiation beam to match the exact contour of a tumor—significantly reducing the treatment time and minimizing the amount of radiation to the neighboring tissues.

Jiajin Fan, Ph.D., a radiation oncology physicist at Fox Chase, will present the study at the 2011 American Society for Radiation Oncology Annual Meeting on Sunday, October 2.

In the study, Fan and his team compared [treatment](#) plans created with the CyberKnife MLC (CK-MLC) delivery device to the original IRIS cone collimator device, and to Intensity-Modulated Radiation Therapy (IMRT) plans, which also precisely shapes radiation beams to conform to the shape of a tumor. When these techniques were applied for five

patients with various tumors, all of them had good target dose coverage. However, radiation doses fell off most sharply in the CK-MLC plan, which was associated with the greatest sparing of the surrounding structures, such as the rectum and bladder for a prostate cancer patient compared to the IRIS plan. In addition, the delivery of the CK-MLC treatment plan took only 10 minutes which is about 10 percent of the total IRIS plan treatment time. This is primarily because the number of beams required is significantly less with the CK-MLC technique.

"Using the MLC plan, we can deliver [radiation](#) therapy much faster compared to the current CyberKnife technique, and we can achieve much better target coverage and a much sharper dose fall off than a regular IMRT plan," Fan says. "Basically, we can spare the critical structures around tumors much better, providing the ability to treat the tumor to a higher dose without increasing the normal tissue toxicity. Consequently, we can achieve better tumor control with less damage to the patient's body." The advantages associated with the CK-MLC plan offer great potential for the widespread clinical application of robotic radiotherapy, Fan adds.

Provided by Fox Chase Cancer Center

Citation: Researchers identify more accurate treatment delivery for robotic radiosurgery system (2011, October 2) retrieved 19 April 2024 from <https://medicalxpress.com/news/2011-10-identify-accurate-treatment-delivery-robotic.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--