

Improved radiotherapy for developing countries

The German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) and Precisis AG jointly present a prototype of a mechanical radiation collimator which will make it possible, for the first time, to use the cobalt machines commonly found in developing countries for precision radiotherapy of cancer. The collimator precisely adjusts the radiation beam to the shape of the tumor to make sure that the surrounding normal tissue is spared.

In Germany, as in other industrialized countries, radiation therapy is a high-tech procedure: The radiation beam is produced by a linear accelerator that moves with utmost precision around the patient. Special software ensures that the right dosage is delivered and computer-controlled collimator systems automatically shape the radiation beam to conform to the shape of the tumor.

However, such expensive linear accelerators rely on stable power supply and do not tolerate any voltage fluctuations. Therefore, it is often not possible to use them in countries of the third world. Instead, many hospitals there treat cancer patients using devices called cobalt machines delivering radiation from the radioactive isotope cobalt-60. These machines generate radiation beams of relatively large, invariable cross sections which could so far not be customized to the shape of the tumor.

At the annual convention of the American Association of Physicists in Medicine (AAPM) in Charlotte, USA, scientists from DKFZ and Precisis have now presented the prototype of a mechanical radiation collimator that makes it possible, for the first time, to precisely customize the beam to the tumor shape even in cobalt machines. The novel collimator called CobRaLeaf* consists of many closely arranged, moveable metal leaves and can be mounted on existing cobalt machines. The leaves form a radiation window that is exactly adjusted to the target area. The goal of any precision radiotherapy of cancer is to deliver the highest possible radiation dose to the tumor while sparing the surrounding normal tissue.

“So far, such radiation collimators were available only for linear accelerators,” says Prof. Wolfgang Schlegel of DKFZ. “With CobRaLeaf, the shape of the leaves is adjusted manually. But this is a great advancement over previously used rectangular radiation beams.”

“Progress in medicine does not necessarily have to be expensive. On the contrary, widespread use of economically reasonable treatment devices may save more lives than isolated high-end devices,” says Dr. Angela Liedler, president of Precisis. Approximately 2,000 hospitals in the third world use cobalt-60 machines and could benefit from CobRaLeaf. Series production of the collimator will start in 2013.

*CobRa stands for cobalt and radiation.

The German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) with its more than 2,500 employees is the largest biomedical research institute in Germany. At DKFZ, more than 1,000 scientists investigate how cancer develops, identify cancer risk factors and endeavor to find new strategies to prevent people from getting cancer. They develop novel approaches to make tumor diagnosis more precise and treatment of cancer patients more successful. Jointly with Heidelberg University Hospital, DKFZ has established the National Center for Tumor Diseases (NCT) Heidelberg where promising approaches from cancer research are translated into the clinic. The staff of the Cancer Information Service (KID) offers information about the widespread disease of cancer for patients, their families, and the general public. The center is a member of the

Helmholtz Association of National Research Centers. Ninety percent of its funding comes from the German Federal Ministry of Education and Research and the remaining ten percent from the State of Baden-Württemberg.

Precis AG perceives itself as an innovative solution provider for stereotactic neurosurgery and radiation therapy. Alongside the enhancement of precision software systems that are already established in the market such as PraezisPlus® and Virtuos®, the Heidelberg-based medical technology provider also works to advance the use of cranial brachytherapy. Its team of ten employees is led by company president Dr. Angela Liedler, who is also a founding member of the association "Healthcare-Frauen e.V." where she acts as a mentor to support career development of young women in healthcare.

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