The ViewRay™ System for MRI-guided radiotherapy

TECHNOLOGY

The ViewRay™ System, in development by ViewRay Incorporated, is a device that combines magnetic resonance imaging (MRI) and radiation therapy delivery for the treatment of cancer. It is intended to provide stereotactic radiosurgery and image-guided Intensity Modulated Radiation Therapy (IMRT) and 3D conformal treatments anywhere in the body where radiation treatment is indicated.

ViewRay™ uses a cobalt-60 radiation delivery system and captures a continuous stream of high contrast images while the radiation beam is on. The system automatically pauses the beam if the target tissue is out of place, allowing clinicians to accurately target the tumour and adjust to changes in the patient's anatomy e.g. with breathing in real time.

The system’s MRI is also used for pre-treatment imaging to assist with patient positioning and the identification of targets and surrounding tissues. The system also uses the pre-treatment images to predict the radiation dose to be delivered to the tumour. Clinicians can use this to determine if changes in the patient’s anatomy may result in suboptimal treatment. If the predicted dose does not match the prescription criteria, the system allows clinicians to quickly adjust the dose while the patient is on the treatment table.

The company anticipate a CE mark in mid-2014 and plan to launch ViewRay™ in the UK in 2015. The ViewRay™ system is FDA 510k cleared for sale in the US.

POTENTIAL FOR IMPACT

Current radiotherapy treatment positioning and planning is usually based on x-rays and computerised tomography (CT) scans taken prior to treatment. Unlike these imaging systems, the MRI-based ViewRay™ System does not expose the patient to additional ionising radiation, reducing the risk of inducing secondary cancers. ViewRay™ also enables adaptive planning of treatment with its dose prediction capabilities, more effective control of...
radiation dose delivery, and allows for real time monitoring of the tumour’s position during treatment.

The company state that as ViewRay™ only delivers radiotherapy when the target tissue is within the target area, this ensures that the intended dose of radiation is delivered to the tumour and that normal tissues and other critical structures such as the spinal cord, are avoided. The company report that the device also records the stream of MR images and beam control information during every treatment, providing quantitative evidence to the clinician and patient that the treatment was performed correctly. Improved accuracy of treatment delivery may improve patient outcomes by increasing cure rates and decreasing side effects associated with radiotherapy.

The company also suggest that the data collected throughout the treatment process on delivered dose and organ motion can be used to further personalise treatments and to support research to better understand the effects of motion.

**EVIDENCE**

**PUBLISHED PAPERS AND ABSTRACTS**


**INFORMATION FROM**

This Alert is based on information from the company and a time-limited internet search.