International Geriatric Radiotherapy Group

Principles of image-guided radiotherapy IGRT

IGRT allows visualization and computer localization of the tumor either directly or indirectly with metallic markers inside the tumor before radiation treatment is given. When the tumor shrinks during the treatment regimen or the patient's anatomy changes because of weight loss, re-planning may be necessary to avoid excessive irradiation outside the smaller tumor.

Visualization of the tumor is performed with daily computed tomography (CT) scan, magnetic resonance imaging (MRI), or ultrasound (US). The tumor may also be tracked continuously during radiation treatment with repeated X-rays showing the position of the metallic markers inserted inside the tumor or with detectors inside the treatment room if the markers emit electromagnetic waves. Many linear accelerators are now adapted for daily visualization of the tumors either directly (Varian, Electa, Tomotherapy, and Siemens) or indirectly (Cyberknife or Novalis). The tumor can even be tracked continuously during radiation treatment to ensure that the tumor stays inside the beams.

The choice of the linear accelerator depends on each patient's volume and anatomy, the types, locations, and sizes of tumors treated in each clinic, and the expertise of the radiation oncologists. As the IGRG membership spans across different continents, each of our centers is equipped with linear accelerators capable to deliver this state of the art cancer treatment that can improve patients' quality of life and chances for cure.