Editorial

Radiotherapy, Rapidly Evolving Techniques in Treating Cancer

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Cancer is the second leading cause of death globally, and is responsible for an estimated 9.6 million deaths in 2018. Globally, about 1 in 6 deaths is due to cancer.
Approximately 70% of deaths from cancer occur in low- and middle-income countries (WHO).
Radiation therapy remains an important component of cancer treatment with approximately 50% of all cancer patients receiving radiation therapy during their course of illness [1]; it contributes towards 40% of curative treatment for cancer.
The main goal of radiation therapy is to deprive cancer cells of their multiplication (cell division) potential[2].
In recent years, a large body of evidence has emerged on the availability and needs of radiotherapy. In contrast to common expectations, considerable gaps in access to radiotherapy have not only been observed in low- and middle-income countries (LMICs), but also in most European countries. Although the latter region is typically considered a high-income region where resources and access consequently should be optimal, important variations have been observed in available human and capital resources, translating into variable gaps in radiotherapy provision [3], [4].
Qualified manpower beside new versions of linear accelerator are main components to establish new treatment techniques like IMRT (intensity Modulated Radiation Therapy),
IMAT (Intensity Modulated Arch Therapy),
IGRT (Image Guided Radiotherapy)
& SBRT (Stereotactic Body Radiotherapy).

Organ Preservation

It has been estimated that 40% of all patients with invasive cancer could be treated by the appropriate biopsy technique only without radical surgery and radiation therapy with the involved organ preserved intact.
Larynx, breast, urinary bladder, prostate , cervix, anus, esophagus and choroidal melanoma with other organs can be safely now preserved without compromising survival by treating them with radiotherapy.
Nowadays new techniques in radiation are the standard of care to achieve such results.

What's IMRT?

Intensity-Modulated Radiation Therapy (IMRT) is an advanced mode of high-precision radiotherapy that uses computer-controlled linear accelerators to deliver precise radiation doses to a malignant tumor or specific areas within the tumor. IMRT allows for the radiation dose to conform more precisely to the three-dimensional (3-D) shape of the tumor by modulating - or controlling- the intensity of the radiation beam in multiple small volumes. IMRT also allows higher radiation doses to be focused on the tumor while minimizing the dose to surrounding normal critical structures. Treatment is carefully planned by using 3-D computed tomography (CT) or magnetic resonance (MRI) images of the patient in conjunction with computerized dose calculations to determine the dose intensity pattern that will best conform to the tumor shape. Typically, combinations of multiple intensity-modulated fields coming from different beam directions produce a customized radiation dose that maximizes tumor dose while also minimizing the dose to adjacent normal tissues.
Because the ratio of normal tissue dose to tumor dose is reduced to a minimum with the IMRT approach, higher and more effective radiation doses can safely be delivered to tumors with fewer side effects compared with conventional radiotherapy techniques. IMRT also has the potential to reduce treatment toxicity, even when doses are not increased. Due to its complexity, IMRT does require slightly longer daily treatment times and additional planning and safety checks before the patient can start the treatment when compared with conventional radiotherapy.

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