David Huang, J Cancer Sci Ther 2016, 8:10(Suppl)
http://dx.doi.org/10.4172/1948-5956.C1.093

Recent advances in radiotherapy treatment techniques

David Huang
Duke Kunshan University, China

It is well accepted that local tumor control and normal tissue complications have sigmoidally shaped dose-response curves. The success of radiotherapy highly depends on the radiosensitivity of the particular tumor being treated relative to that of the surrounding normal tissues. For tumor sites where the tumor control curve is less steep than the normal tissue complication curve, the high doses required for tumor cure may cause unacceptable normal tissue complications. The goal of radiotherapy is to sufficiently separate the dose-response curves of local tumor control and normal tissues complication, and also the total volume of normal tissue irradiated. During the past three decades, advances in radiological imaging and computer technology have significantly enhanced our ability to achieve this goal through the development of three-dimensional image-based conformal therapy (3DCRT). Intensity-modulated radiation therapy (IMRT) is an especially advanced method of 3DCRT that utilizes sophisticated computer controlled radiation beam delivery to improve the conformality of the dose distribution to the shape of the tumor. This is achieved by varying beam intensities within each beam portal, as opposed to uniform beam intensities as in conventional 3DCRT. Both 3DCRT and IMRT utilize sophisticated strategies for patient immobilization and positioning, image-guided treatment planning, computer enhanced treatment verification, and image-guided treatment delivery (IGRT). In the heart of these techniques is advanced computer technology and 3D patient imaging with CT, MR and/or PET. Besides the advances in external beam treatment, there are also new developments in stereotactic body radiotherapy fields. Also, the proton and heavy charged particle treatment open another door for radiotherapy with promising results. All these advances in radiotherapy improve the outcome for the cancer treatment; increase tumor control rate while minimizing the side effect. Furthermore, combination of chemotherapy and radiotherapy and new fractionation scheme make the cancer treatment to another new era. In my talks, I will share with you few clinical examples to illustrate the powerful IMRT, IGRT, Proton therapy, and SBRT techniques applied in nowadays cancer managements.

Biography

David Huang, upon completion of his PhD in Particle Physics, was trained at Medical Physics Residency Program at UC San Francisco, San Francisco. Then he worked at Memorial Sloan-Kettering Cancer Center, New York as a Faculty Physicist before moving to Long Island Jewish Medical Center, New York as Senior Medical Physicist. In 1995, he went back to Taiwan to help in establishing the first cancer center there for 7 years as Chairman of Medical Physics Department at Sun Yat-Sen Cancer Center in Taipei. In 2002, he went back to Memorial Sloan-Kettering Cancer Center as Associate Attending and Chief Physicist/Radiation Safety Officer at Rockville Centre Site. In 2014 summer, he retired from Memorial Sloan-Kettering Cancer Center and accepted offer from Duke University as Professor and Director at Medical Physics Graduate Program at Duke Kunshan University, China. Besides the clinical experiences, he is also a Professor at Young-Ming University, Taiwan and Central Taiwan Technology University, Taiwan, a Visiting Professor at Beijing University, School of Oncology, China and at Tsing-Hwa University, China and Adjunct Professor at University of Missouri, USA.

yh126@duke.edu

Notes: