Tuesday, March 6, 2007 2:30PM - 5:30PM –
Session L6 COM: Minorities in Medical Physics  Colorado Convention Center 207

2:30PM L6.00001 Building a new Radiation Oncology Department  ALBINO GONZALEZ, AAPM — This presentation will consist of a description of some of the steps followed to organize a new radiation oncology department in a medium size community hospital. In our hospital, the duties and involvement of the medical physicist at the different stages of the project are explained. Also some of the new techniques such as Intensity Modulated Radiation Therapy, Image Guided Therapy with Cone Beam CT and Respiratory Gating now implemented in the new department will be briefly presented along with our personal experience.

3:06PM L6.00003 Methods to Differentiate Radiation Necrosis and Recurrent Disease in Gliomas  LARS EWELL, University of Arizona Department of Radiation Oncology — Given the difficulty in differentiating Radiation Induced Necrosis (RIN) and recurrent disease in glioma patients using conventional techniques (CT scans, MRI scans), researchers have looked for different imaging modalities. Among these different modalities are Diffusion Weighted Magnetic Resonance Imaging (DWMRI) and Magnetic Resonance Spectroscopy (MRS). In DWMRI, an Apparent Diffusion Coefficient (ADC) is calculated for a Region Of Interest (ROI), and then monitored over time (longitudinally). In the brain, different anatomical features can complicate the interpretation of ADCs. In particular, the density and spatial variation of the cerebral spinal fluid filled fissures known as sulci can influence how a change in an ADC is explained. We have used the covariance of pixel intensity in T1 weighted MRI scans to study how intra-patient and inter-patient sulci density varies, and will present these results. MRS uses the shift in the MR signal due to the local chemical environment to determine the concentration of brain metabolites like choline and creatin. The ratio of metabolites such as these has been shown to have the power to discriminate between RIN and recurrent disease in glioma patients. At our institution, we have initiated a protocol whereby we will use DWMRI and MRS to study how best to utilize these complimentary forms of imaging.

3:06PM L6.00004 Methods to Differentiate Radiation Necrosis and Recurrent Disease in Gliomas  LARS EWELL, University of Arizona Department of Radiation Oncology — Given the difficulty in differentiating Radiation Induced Necrosis (RIN) and recurrent disease in glioma patients using conventional techniques (CT scans, MRI scans), researchers have looked for different imaging modalities. Among these different modalities are Diffusion Weighted Magnetic Resonance Imaging (DWMRI) and Magnetic Resonance Spectroscopy (MRS). In DWMRI, an Apparent Diffusion Coefficient (ADC) is calculated for a Region Of Interest (ROI), and then monitored over time (longitudinally). In the brain, different anatomical features can complicate the interpretation of ADCs. In particular, the density and spatial variation of the cerebral spinal fluid filled fissures known as sulci can influence how a change in an ADC is explained. We have used the covariance of pixel intensity in T1 weighted MRI scans to study how intra-patient and inter-patient sulci density varies, and will present these results. MRS uses the shift in the MR signal due to the local chemical environment to determine the concentration of brain metabolites like choline and creatin. The ratio of metabolites such as these has been shown to have the power to discriminate between RIN and recurrent disease in glioma patients. At our institution, we have initiated a protocol whereby we will use DWMRI and MRS to study how best to utilize these complimentary forms of imaging.

3:42PM L6.00005 A journey into medical physics as viewed by a physicist  PAUL GUEYE, Hampton University — The world of physics is usually linked to a large variety of subjects spanning from astrophysics, nuclear/high energy physics, materials and optical sciences, plasma physics etc. Lesser is known about the exciting world of medical physics that includes radiation therapy physics, medical diagnostic and imaging physics, nuclear medicine physics, and medical radiation safety. These physicists are typically based in hospital departments of radiation oncology or radiology, and provide technical support for patient diagnosis and treatment in a clinical environment. This talk will focus on providing a bridge between selected areas of physics and their medical applications. The journey will first start from our understanding of high energy beam production and transport beamlines for external beam treatment of diseases (e.g., electron, gamma, X-ray and proton machines) as they relate to accelerator physics. We will then embrace the world of nuclear/high energy physics where detectors development provide a unique tool for understanding low energy beam distribution emitted from radioactive sources used in Brachytherapy treatment modality. Because the ultimate goal of radiation based therapy is its killing power on tumor cells, the next topic will be microdosimetry where responses of biological systems can be studied via electromagnetic systems. Finally, the impact on the imaging world will be embraced using tools heavily used in plasma physics, fluid mechanics and Monte Carlo simulations. These various scientific areas provide unique opportunities for faculty and students at universities, as well as for staff from research centers and laboratories to contribute in this field. We will conclude with the educational training related to medical physics programs.

4:18PM L6.00006 The Future of Radiation Therapy?  STEVEN AVERY, University of Pennsylvania — Cancer is the 2nd highest cause of death in the United States. The challenges of controlling this disease remain more difficult as the population lives longer. Proton therapy offers another choice in the management of cancer care. Proton therapy has existed since the late 1950s and the first hospital based center in the United States opened in 1990. Since that time four hospital based proton centers are treating patients with other centers either under construction or under consideration. This talk will focus on an introduction to proton therapy: its medical advantages over current treatment modalities, accelerators and beam delivery systems, applications to clinical radiation oncology and the future outlook for proton therapy.

4:54PM L6.00007 The Roles and Responsibilities of a Medical Physicist  MARLENE MCKETTY, Howard University Hospital — Since the discovery of x-rays in 1895, they have played a very important role in medicine. As the use and need for x-rays and radioactive material in medicine has progressed, the role of the medical physicist has also expanded. Imaging in the diagnosis of disease continues to change as new modalities e.g., magnetic resonance imaging become available and as the modalities improve with advances in technology. Similarly, the treatment of disease with radiation has improved with new developments. The role of the medical physicist will be discussed especially as it relates to the changes in technology.