Quality Assurance in Radiation Therapy

N Suntharalingam

Department of Radiation Oncology
Thomas Jefferson University, Philadelphia
Pennsylvania, USA

Modern day radiation therapy practices worldwide have seen the impact of high technology resulting in the use of more sophisticated computer augmented treatment delivery systems, treatment planning procedures and multiple imaging modalities. The process of radiotherapeutic management of a cancer patient, usually can be subdivided into the following steps:

• Diagnostic information gathering
• Target volume and normal tissue definition
• Planning of Treatment radiation dose distribution calculation
• Treatment simulation
• Treatment delivery
• Treatment verification

Quality assurance programs need to be comprehensive, even when only addressing the physical and technical aspects, and should consider carefully each and every step. The planning and delivery of radiation treatments in an accurate and consistent manner require the careful attention of many team players. The physician, physicist, dosimetrist, technologist (radiographer) together with other para-medical members of the treatment team, should or each treatment facility, assemble together a written QA program. The program should provide the organizational structure, identify areas of responsibilities, document processes and procedures and allow adequate resources to assure a high standard of patient care.

This review course will emphasize the physical aspects of Quality Assurance within the framework of a more comprehensive QA program for the radiation treatment management of the cancer patient. The procedures and tools used in assessing, at some recommended frequency, each component of the total radiotherapy program will be presented. Emphasis will be placed on reviewing typical acceptable QA programs for modern day linear accelerators, simulators and CT based treatment planning and dose calculation computer systems. The roles and responsibilities of the radiation oncology medical physicist in implementing a successful QA program will also be outlined.