AN EVALUATION OF THE RECOMMENDATIONS OF THE AAPM TG51 PROTOCOL: PHOTON BEAM CALIBRATION AND COMPARISON WITH THE TG21 PROTOCOL.

Task Group 51 of the AAPM Radiation Therapy Committee has recently developed a new protocol for the calibration of high-energy photon and electron beams based on standards of absorbed dose to water. The recommended dosimetry procedures in this protocol are based on the use of an ionization chamber calibrated in terms of absorbed dose to water in a standards laboratory's ^{60}Co beam. This is different from the recommendations given in the TG21 protocol, which are based upon an exposure calibration factor of an ionization chamber in a ^{60}Co beam. The purpose of this work is to compare the recommendations of the two protocols using two widely used Farmer type ionization chambers: PTW N30001 (PMMA wall) and NEL 2571 (Graphite wall). This was accomplished by determining absorbed-dose-to-water with both chambers irradiated in a water phantom using 6 and 25 MV photon beams. Ratios of TG51 to TG21 doses were found to be 1.006 and 1.007 at 6 and 25 MV respectively when the PTW chamber is used; 1.010 and 1.011 when the NEL chamber is used. When the recommendations of TG51 are followed the dose determined by the NEL chamber is found to be higher than that of the PTW chamber by 1.6% at 6 MV and 1.8% at 25 MV. The corresponding results for the TG21 protocol are 1.2% at 6 MV and 1.4% at 25 MV respectively.