LEADED PHANTOM FOR FILM DOSIMETRY OF PHOTON BEAMS

Successful radiotherapy relies on accurate dose measurement. Traditional dosimeters such as ion chambers, TLD, and diodes have disadvantages such as relatively long measurement time and poor spatial resolution. These drawbacks become more serious problems for the measurement of dynamic beams (i.e. the use of dynamic wedge or even intensity modulation technique). X-ray film, an integrating dosimeter, may not be associated with the above disadvantages and problems. However, x-ray film overresponds to low-energy photons (energies below 400 keV), and thus generates unacceptably inaccurate dosimetric data compared with ion-chamber data. This paper introduces a new phantom which was developed to improve x-ray film dosimetry. The phantom was fabricated from base material of polymer resin, mixed gradually with lead powder. This amount of added lead was determined by monte carlo simulation. The role of lead was to filter out low-energy photons and keep them from entering the film. This phantom was extensively tested for various beam energies in this study. The test result indicates that in-phantom dose distributions based on the x-ray film and the new phantom agrees well with those measured by ion chambers for various beam energies.