

조사면내 공동의 존재에 따른 선량분포의 변화측정

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= Abstract =

The Measurement of Dose Distribution in the Presence of Air Cavity
and Underdosing Effect Result from Lack of Electronic Equilibrium

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When high energy photon beam is incident upon an air cavity interface the effect of ionization build-up observed. This phenomenon is resulting from the surface layers of the lesions are significant deficiency of electrons reaching the layers because of the replacement of solid scattering material by the air cavity, that is lack of electronic equilibrium.

Measurement have been made in an acrylic phantom with a parallel plate chamber and high energy photon beams, CO-60, 4MV, 6MV and 10MV X-rays have been investigated. The result of our study show that a significant effect was measured and was determined to be very dependent on field size, air cavity dimension and photon energy.

The reductions were much larger for 10MV beam, underdosage at the interface was 12, 12.2, 16.9 and 20.6% for the CO-60, 4MV, 6MV and 10MV, respectively. It was found that this non-equilibrium effect at the interface is more severe for the higher energy beams than that of lower energy beams and the larger cavity dimensions the larger beam reductions occur. This problem is of clinical concern when lesions such as carcinoma beyond air cavities are irradiated, such as larynx, glottic and the patients with maxillectomy and ethmoidectomy and so forth.

Key words: Electronic equilibrium, Air cavity, Dose distribution, Build-up.