

A of Radiation Field with a Developed EPID

Y.H. Ji¹ · D.H. Lee¹ · D.H. Lee¹ · Y.K. Oh¹ · Y.J. Kim³
C.K.Cho² · M.S.Kim² · H.J.Yoo² · K.M.Yang² · S.Y. Yoo²

¹Lab. of radiation effect, Korea Institute of Radiological and Medical Sciences, Seoul, Korea

²Dept. of Radiation Oncology, Korea Cancer Center Hospital, Seoul, Korea

³Dept. of Electronic Eng. Inha University, Incheon, Korea

It is crucial to minimize setup errors of a cancer treatment machine using a high energy and to perform precise radiation therapy. Usually, portal film has been used for verifying errors. The Korea Cancer Center Hospital (KCCCH) has manufactured digital electronic portal imaging device (EPID) system to verify treatment machine errors as a Quality Assurance (Q.A) tool. This EPID was consisted of a metal/fluorescent screen, 45°mirror, a camera and an image grabber and could display the portal image with near real time

KIRAMS has also made the acrylic phantom that has lead line of 1mm width for light/radiation field congruence verification and reference points phantom for using as an isocenter on portal image. We acquired portal images of 10x10cm field size with this phantom by EPID and portal film rotating treatment head by 0.3°, 0.6° and 0.9°. To check field size, we acquired portal images with 18x18cm, 19x19cm and 20x20cm field size with collimator angle 0° and 0.5° individually.

We have performed Flatness comparison by displaying the line intensity from EPID and film images. The 0.6°shift of collimator angle was easily observed by edge detection of irradiated field size on EPID image. To the extent of one pixel (0.76mm) difference could be detected.

We also have measured field size by finding optimal threshold value, finding isocenter, finding field edge and gauging distance between isocenter and edge.

This EPID system could be used as a Q.A tool for checking field size, light/radiation congruence and flatness with a developed video based EPID.