AbstractID: 9185 Title: Determination of proton stopping power using MV CT, KV CT & Proton Radiographic images

The most of radiotherapy planning systems are operated with the calibration curves of KV CT (Kilo-Voltage Computational Tomography) images. However, the proton stopping power curve used in proton radiation treatment planning system is optimized for organic materials rather than for metals and other inorganic matter, since the proton stopping power curves obtained with a KV X-ray beam don't provide one-to-one corresponding relation between HU number and Proton stopping power of general materials.

At Proton Therapy Center, National Cancer Center(NCC) in Korea, proton treatments started on March 19, 2007. This proton treatment facility is equipped with a cyclotron (Proteus235,IBA). The Proton Therapy Center also has a Tomotherapy machine, 4 LINACs, 2 CT simulator, a conventional simulator.

MV CT(Mega-Voltage Computational Tomography) images provided by the Tomotherpay machine, conventional KV-CT images taken with conventional CT's and proton radiographic images with Proteus235 have been used to obtain the general proton stopping power relation. We have taken the radiographic images of GAMMAX and CRIS CT calibration phantoms, contrast agents, metals and plastics using various beams.

Specially designed Beam Current Modulation of the proton beam provides the beam eye's view of proton. We can use the special beam condition to verify the CT calibration of the Radiation Treatment Planning system and to examine the proton stopping power of various materials for example, a aperture structure, specially, a compensator.