racy and patient comfort. Int J Radiat Oncol Biol Phys 1998; 41: 997-1003.
6. Rosenman J, Sailer SL, Sherouse GW, Chaney EL, Tepper JE: Virtual simulation: initial clinical results. Int J Radiat Oncol Biol Phys 1991; 20: 843-851.

CRANIOSPINAL AXIS IRRADIATION IN CHILDREN BY COMPUTED TOMOGRAPHY SIMULATION

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Purpose : An important issue for cancer patients, who are destined to receive craniospinal irradiation (CSI), is how to reduce the overall time needed for simulation. Furthermore, it is necessary that more accurate tools are designed and adapted so that there is increased accuracy in the determination of the optimal irradiation position and field. This will increase the level of confidence of radiation oncologists with respect to these factors. In this study, we investigated and evaluated simulation techniques that utilize computed tomography (CT) for simulation of craniospinal irradiation.

Material and Methods : A PQ5000 computed tomography simulator (CT-sim) has been available since 2000 at the Department of Radiation Oncology of Linkou Chang-Gung Memorial Hospital. The VOXEL Q treatment planning system and the ACQ-sim virtual simulation software were employed to access images for processing to allow the reconstruction of three-dimensional images and the accurate identification of the location and size of the tumor. Subsequently, the treatment-related parameters such as field size, the angles of gantry and collimator, and the customized block could be decided.

Result : Conventional CSI simulation, which is similar to traditional X-ray simulation, is rather time-consuming, requiring thirty to fifty minutes to accomplish all the processes. In addition, the patient must assume an uncomfortable prone position during which the chin and nose inevitably has to bear the weight of the head. In CT-sim, the patient adopts a supine position for CSI. With this simulation technique and position, not only does the patient feels much more comfortable as well as the simulation time needed being reduced to ten to fifteen minutes, but it also seems to be a more accurate method for determining the treatment parameters.

Discussion : The benefits of CT-sim, when utilized for CSI, include a reduction in the simulation time to only one third of that needed for conventional X-ray simulation, an increased level of confidence for the radiation oncologist with respect to the determination of the radiation beam and field size and, most important of all, a decrease in treatment errors caused by patient motion during the simulation.

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