

Purpose:The patient treatment data were collected, and skin entrance doses were estimated retrospectively using the preliminary exposure measurements.

Methods:Forty-one brain cases, 21 thorax cases, 16 spine cases, and 13 abdomen/pelvis cases were treated by CyberKnife irradiation from July, 2009, to February, 2011. The preliminary exposure measurements were performed with a 6 cc RadCal ion chamber at the iso-center, whose distance was 230 cm from the focal spot of each X-ray tube. Exposure measurements were made over ranges of 80 kV to 150 kV, 50 mA to 320 mA, and 50 msec to 640 msec. The total number of X-ray images associated with each CyberKnife treatment was retrieved. Then, the skin entrance doses from imaging were estimated to the different anatomic treatment regions, such as brain, thorax, spine, and abdomen/pelvis, using the exposure measurements.

Results:The average skin entrance dose for the brain region treatment was 17cGy (range of 3cGy to 53 cGy); for the thorax region treatment, 53cGy (range of 23 cGy to 112 cGy); for the abdomen and pelvis region treatment, 41cGy (range of 17 cGy to 111 cGy); and for the spine region treatment, 28cGy (range of 6 cGy to 68 cGy).

Conclusions:The estimated average additional skin entrance dose from imaging delivered to the patients was 1.2% of the prescription treatment dose (range 0.2% to 4.6%).