CHARACTERISTICS, ADVANTAGES AND LIMITATIONS OF A TREATMENT PLANNING SYSTEM FOR GAMMA KNIFE RADIOSURGERY

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Stereotactic radiosurgery refers to the use of small, well-collimated beams of ionizing radiation to ablate intracranial lesions. In our hospital radiosurgery with the Leksell Gamma Knife was used to treat AVM, acoustic neuroma, meningioma, glioma and other benign or malignant brain tumors. To deal with 201 cobalt-60 sources of the Gamma Knife, the complex dosimetry was performed using specially developed computer software (KULA). The treatment planning with KULA for a recurrent nasopharyngeal cancer after external beam radiotherapy is presented. After initial rough planning with 12 shots to cover the tumor, repeated revisions of coordinates and weights of most shots resulted in a 50 % isodose curve matching the tumor contour in 3 dimensions. The possibility of neurological complication is low due to the relative low dose (<30 %) to the neighboring optic nerve and brain stem. Though the result of this laborious and prolonged treatment planning is good, the amenity and efficiency of using KULA are unsatisfactory for this large and irregular shaped tumor. When stacking of multiple isocenters or shots in 3 dimensions to fill the tumor volume, the melded isodose curves can be very differnt from the simple combination of individual curves and trials and errors are inevitable. For efficient planning of large and irregular shaped tumors with KULA, it is essential to be familiar with the principle of allocation and methods of fine adjustment of parameters of shots. [**Therapeut Radiol Oncol 1995; 2: 69-77**]

Key words: Radiosurgery, Gamma Knife, Treatment planning, KULA

INTRODUCTION

Stereotactic radiosurgery refers to the use of small, well-collimated beams of ionizing radiation to ablate intracranial lesions. The concept was introduced in 1951 by the neurosurgeon Lars Leksell of the Karolinska Hospital in Sweden[1]. Since then, multiple variations of this treatment have been

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