

In the stereotactic radiosurgery (SRS), finding a specific condition that includes the target in the prescription dose while sparing the critical organ is tedious, because there are many combinations of positions and collimator sizes for each isocenter. To automatically plan the SRS, a new planning method based on heuristic target shaping was developed in the previous study; 1) The dose distribution of one isocenter is modeled as a sphere. 2) The target was constructed by piling up cylinders along a virtual axis, which was the longest line in a given target. 3) Spheres were then packed in each cylinder according to the position and diameter of each cylinder in order to cover each target divided by the height of the cylinder. The results to apply the previous method to three imaginary targets were found to be satisfactory in terms of; target coverage, the reproducibility of the result, and the calculation time. The number of isocenters, however, was impractical. In this study, the new step was added between step 2) and 3) for reducing the number of isocenters; according to the diameter and position of each cylinder, each cylinder was combined with adjacent ones. The cylinders were more combined; the height of cylinder was longer, which resulted in a practical number of isocenters. The results of applying imaginary targets were satisfactory in terms of the number of isocenters; the isocenters reduced more than 25% with new method about identical target.