Purpose: Recently released Gamma Plan v.10 which is treatment panning software for Gamma Knife radiosurgery has some new advanced features like: 1) inverse planning, 2) improved TMR 10 algorithm, 3) convolution algorithm, and 4) DICOM export of the plan. Those new features were clinically tested at our Gamma Knife facility.

Methods and Materials: 10 plans were created with both inverse planning and forward planning methods and for both convolution and TMR 10 methods. The Pinnacle plan for the spine target in a very close vicinity of a clivus target was created and combined with the plan of the previously treated Gamma Knife target using the third party software. The workflow was created to fuse both CT sets using mutual information algorithm.

Results: The new inverse planning significantly decreased planning time for 30-40% even in most of analyzed cases the number of shots was higher than for the typical forward planning. The convolution method of computing the dose distributions showed not much difference closer to the center of a head but some differences were found for the shapes of isodose lines on interface regions with bone and air. In the cases of treating targets closer of the surface the TMR10 algorithm overestimated the treated volume compared with the convolution method. A composite plan was successfully created that summed the doses from the Gamma Plan and Pinnacle treatment planning systems and improved the interpretation of the boundary doses between two treatment plans.

Conclusion: New features of the Gamma Plan v.10 can significantly improve speed of the treatment planning, accuracy of the calculation especially for the interface regions and boundary regions combining two different targets treated with different treatment machines.

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