

Cardiac Treatment Planning Considerations for First-in-Man CyberHeart Treatment of Atrial Fibrillation

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Abstract

Objectives: The objective was to contrast and compare different treatment planning options and cardiac ablation volume contours, that would be able to be safely delivered, and still accomplish the goal of an effective arrhythmia ablation.

Methods: Following placement of a right atrial fiducial, a cardiac gated CT was obtained. Treatment planning used CardioPlan (CyberHeart) and MultiPlan. A decision was made to contour a target, using CardioPlan, (a modified 'box' lesion set).. The atrial tissue volume treated was 2.1 cm³, and the treatment took 2 hours. A single fraction dose of 25 Gy was prescribed, D max was 33.6 Gy.

Results: The patient tolerated the procedure well and required no anesthesia. There were no procedural complications or new arrhythmia. The 'modified box' ablation volume achieved the objectives of maintaining dose-volume constraints to thoracic organs, and ablation of sufficient atrial myocardium to isolate triggers of atrial fibrillation. The patient has had a reduction in symptomatic arrhythmia burden.

Conclusions: Consideration of different options to accomplish pulmonary vein isolation and treatment of maximal left atrial real estate to move toward a radiosurgical Maze Procedure were considered. A modification of a 'box lesion' set was used. The procedure is currently being evaluated in clinical trials for safety and efficacy signals.

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