CNS 2018 ANNUAL MEETING
HOUSTON, TEXAS
OCTOBER 6-10, 2018

Stereotactic Radiosurgical Capsulotomy for Obsessive-Compulsive Disorder: Initial Results Using a "Goldilocks" 5-Shot Radiosurgical Plan

Sameer A. Sheth MD, PhD; Yagna Pathak PhD; Ian Paddick; Deepti Anbarasan; Tony J. C. Wang; Antonio Lopes; Marcelo Q Hoexter; Benjamin Greenberg; Steve Rasmussen; Euripedes Miguel; Nicole McLaughlin; Garrett P. Banks BS MD

Introduction

OCD has a lifetime prevalence of ~2%, and many patients are refractory to conventional pharmacological and behavioral treatments. Neurosurgical options including stereotactic radiosurgical capsulotomy (SRSC) have been used for decades, with symptomatic response rates of 40-65%. The most significant adverse event from these procedures is radionecrotic cyst formation and frontal lobe edema causing a dysexecutive syndrome. We employed a radiosurgical plan with a novel 5-shot dose distribution, designed to be large enough to recapitulate the efficacy of earlier 2-shot procedures but conformal enough to reduce the chance of cyst/edema formation.

Methods

The radiosurgical plan consists of 5 4-mm shots per hemisphere, with 150 Gy maximum dose. The vertically stacked shot configuration uses sector blocking and weighting to produce a distribution elongated in the superior-inferior direction (Fig 1). The ventral-most shot is placed in the ventral portion of the anterior limb of the internal capsule bordering the ventral striatum in the coronal plane, and near the posterior putaminal border in the axial plane.

Learning Objectives

By the conclusion of this session, participants should be able to:

1)Describe the 5-shot SRS plan for OCD

2)Discuss how this plan compares to previous SRS plans for OCD

3)Discuss complication avoidance strategies for SRS for OCD

[Default Poster]

Results

Six OCD patients have undergone the 5-shot SRSC (Figure 1). Of the 4 patients who are >6 months out, all 4 are responders, with mean YBOCS reduction of 50% (range 36-68%) at mean follow-up interval of 9 months (range 7-13). Dose-volume histograms demonstrated conformality, and low volumes at mid-range doses (~0.6 cc at 60 Gy). Thus far, follow-up MRIs have demonstrated minimal edema and no cyst formation (Fig 2). Other than brief (~1 month) mild fatigue, no other adverse events have occurred.

Conclusions

SRSC strives to deliver the "just right" dose of radiation: enough to create an effective lesion, but not enough to cause adverse events. Our initial results show response rates at least as high as those produced using previous treatment plans with higher radiation dose. Longer follow-up interval in more patients will determine whether the adverse event profile is improved with this plan. SRSC remains an attractive neurosurgical option for refractory OCD.

Figure 1

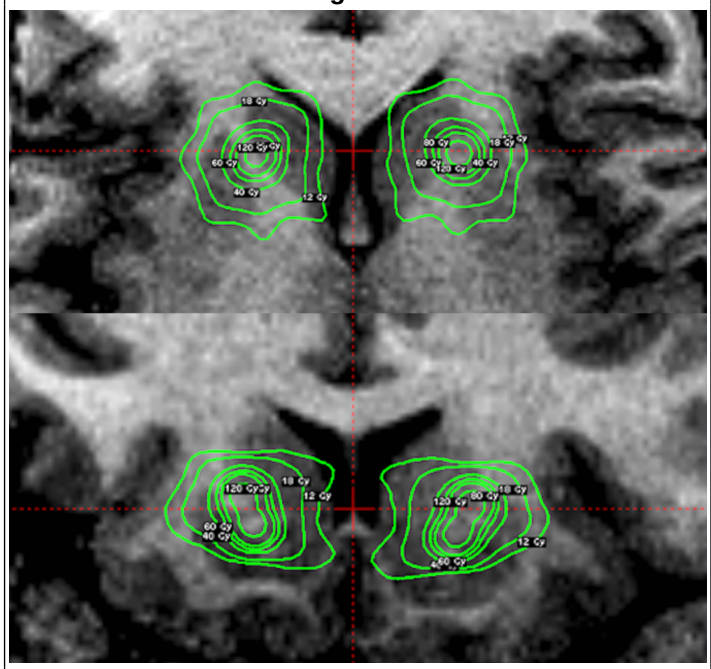

Figure 1: Example 5-shot showing isodoses from 120 Gy (smallest) to 12 Gy (largest).

Figure 2

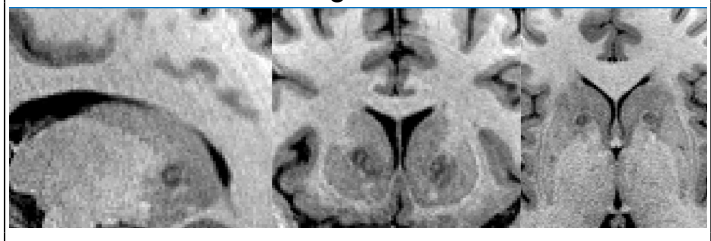

Figure 2: T1 non-contrast MRI at 3 months demonstrating a robust lesion in the desired location.