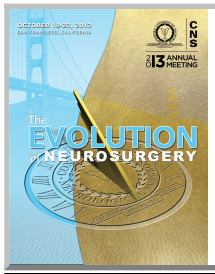

Effect of Brain Shift on Targeting During Intraoperative-MRI Guided GPi DBS Implantation

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Introduction

Brain shift is one factor that is reported to influence the accuracy of deep brain stimulator (DBS) implantation. Real-time MRI guided DBS allows a unique opportunity to assess the impact of brain shift on the stereotactic target. This study seeks to quantify the impact of brain shift on target selection during real-time MRI-guided globus pallidus internus (GPi) DBS implantation.

Learning Objectives

By the conclusion of the session, participants should be able to 1) describe the magnitude of brain shift effects on stereotactic GPi targeting 2) discuss in small groups the role of intraoperative MRI to guide target selection

Methods

A retrospective review was performed of all patients who underwent MRI-guided DBS implantation between November 2011 and March 2013. The initial stereotactic target for the GPi was determined from the stereotactic T1 and FLAIR MRI performed prior to burr hole creation. The revised target after dural opening, brain shift, and repeat stereotactic MRI was determined as well. The absolute distance in the x,y,z space between these two coordinates was calculated. The difference in the maximum orthogonal distance between the cortex and dura before and after brain shift was determined, and taken to represent the impact of brain shift at the cortical level.

Results

Six patients underwent 11 GPi electrode implantations during the study period. The mean absolute difference in target before and after brain shift was 1mm (range 0-3mm) in the X dimension, 0.4mm (range 0-0.5mm) in the Y dimension, and 0.2mm (range 0-1mm) in the Z dimension. The mean vector difference in the target was 1.2mm. The degree of brain shift at the cortical level ranged between 0mm and 15.4mm with a mean of 5mm.