

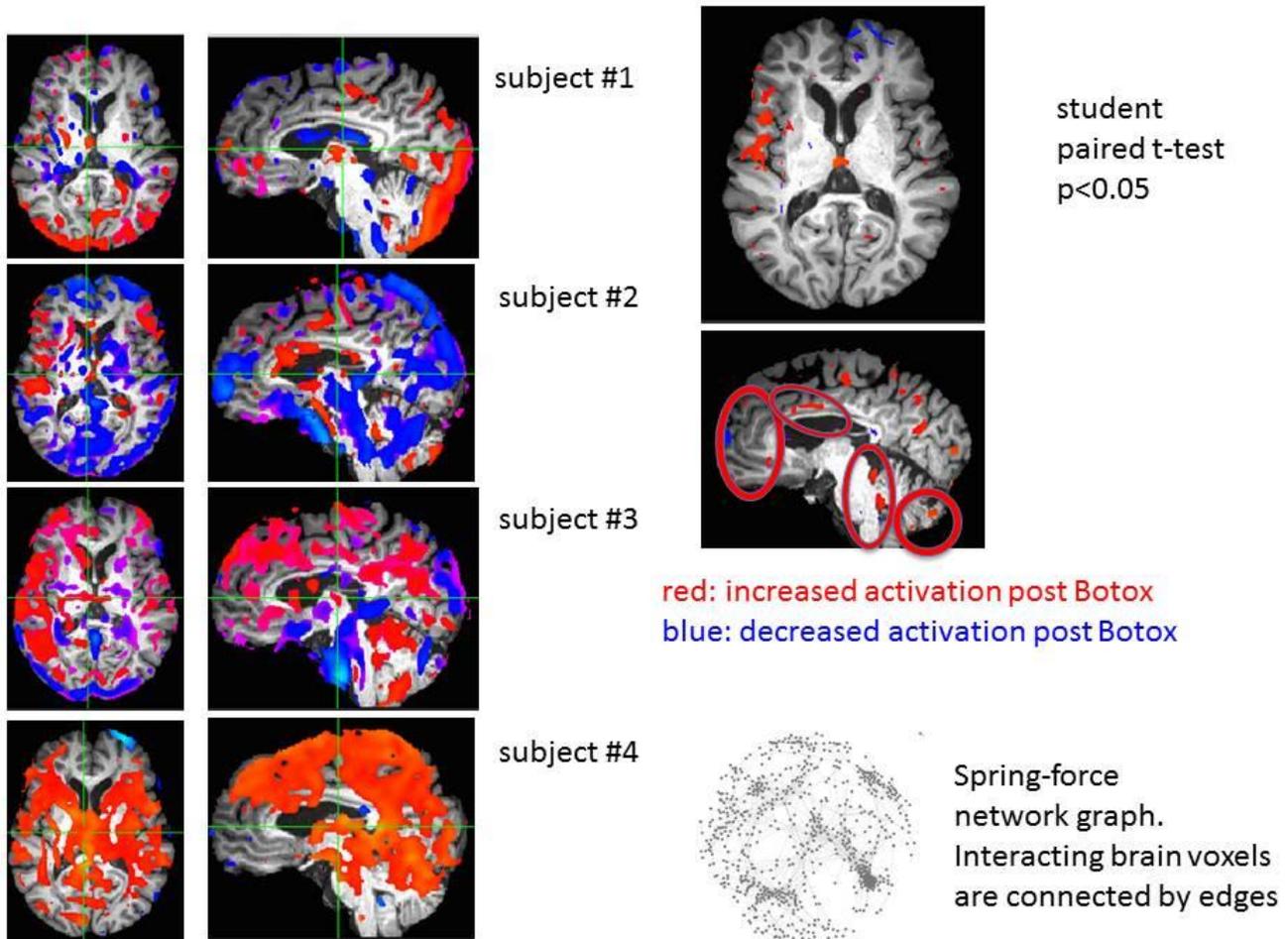
**HIGHER NEURAL CORRELATES FOLLOWING INTRAVESICAL BOTULINUM TOXIN- A IN MULTIPLE SCLEROSIS (MS) PATIENTS VIA CONCURRENT FUNCTIONAL MAGNETIC RESONANCE IMAGING (fMRI) AND URODYNAMIC STUDIES (UDS)**

Hypothesis / aims of study

Neurogenic bladder dysfunction is seen in 95% of multiple sclerosis patients and has a significant impact on their quality of life. Botulinum toxin A (BTX-A) is a well-described treatment for Neurogenic Detrusor Overactivity (NDO) and while its motor effects on detrusor muscle is extensively studied, its sensory effects is not. In this preliminary study, we evaluate the impact of BTX-A on bladder afferent responses in patients with NDO using concurrent fMRI and UDS pre and post treatment.

Study design, materials and methods

In this preliminary study, four ambulatory female patients with MS and NDO were recruited for this IRB approved study. Brain activity via fMRI with simultaneous UDS was recorded, including the pressure-flow voiding phase. After motion correction using Generalized Linear Model individual fMRI activation maps at full urge were created. This was performed prior to and 6-weeks following intravesical injection with BTX-A. A high-resolution structural scan of the brain was acquired for transformation of the individual fMRI activation maps into Talairach space. From these transformed datasets, an average fMRI activation map (student t-test) was created, from which areas of significant activation were identified (p<0.05).



Results

Group analyses of the patients yielded consistent areas of higher activation at full urge post-BTX in regions of primary motor (thalamus and cerebellum), emotion (cingulate gyrus, insula, amygdala), midbrain (PAG and PMC), and parietal lobe (precuneus). Regions of lower activation post-BTX included areas for executive function (frontal gyrus), recognition (middle temporal gyrus) and negative emotions (right amygdala). Network analysis demonstrated the interconnection between these activated brain regions at full urge.

Concluding message

This is the first study of its kind to evaluate the sensory effects of BTX-A at the brain level where sensory awareness is located. Clinical correlation studying patients with these chronic urologic problems and new discoveries at the level of CNS activity will

give us much better understanding of these disorders, leading to the development of more effective diagnostic and treatment modalities.

Disclosures

**Funding:** none. Departmental funding. **Clinical Trial:** Yes **Public Registry:** No **RCT:** No **Subjects:** HUMAN **Ethics Committee:** Methodist IRB **Helsinki:** Yes **Informed Consent:** Yes