The Impact of Vocal Folds Augmentation with Injection Laryngoplasty on Quality of Voice in Patients with Parkinson Disease: VoCAL PD

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Background

• Speech and voice problems are among the most disabling symptoms of idiopathic Parkinson disease (PD) impairing patient’s ability to communicate and affecting more than 90% of patients.1
• Hypophonia is the most common voice problem in PD.
• Vocal fold atrophy, common in PD causes glottic insufficiency, or inability for the vocal folds to fully approximate.2 (Fig. 1). This allows air escape during voicing, leading to decreased projection and a softer and quieter voice.3
• Voice and speech impairments do not always improve with pharmacologic and surgical Deep Brain Stimulation (DBS) treatment.4
• Vocal folds augmentation is a safe and proven treatment for vocal fold atrophy of various causes.5
• There are currently no studies that analyze voice changes after vocal fold augmentation in PD patients, using objective measures in a blinded fashion, and, therefore, this type of treatment is currently not widely used for treatment of hypophonia in PD.

Aim of Study

• Retrospective observational study of the effects of vocal folds augmentation with short-acting (carboxymethylcellulose gel) injections on voice and speech in patients with hypophonia secondary to PD.
• This will be the first study to perform systematic assessment of subjective and objective, quantitative and qualitative, and short and long outcomes of vocal folds augmentation in PD patients.

Hypothesis

• We postulate that vocal folds augmentation will improve glottic closure, hypophonia, and subsequently speech intelligibility and the quality of communication.

Methods

Inclusion criteria:
• Patients with PD with significant voice impairment
• Glottic insufficiency due to vocal fold atrophy on stroboscopic examination,
• No contra-indications to the procedure of vocal cord augmentation.

Procedure:
• Injections of short acting carboxymethylcellulose gel, expected to last up to 3 m
• The procedure is done as part of standard medical care by the laryngologist at the University of Colorado Hospital.

Data Points:
1. Screening visit
2. Baseline visit – after 1 m – internal control without intervention
3. Outcome visit – 1 m after intervention

Outcome measures:
• Subjective outcomes
  • Patient Clinical Global Impression (CGI)
  • Voice Handicap Index-10 (VHI-10) – validated 10-question tool of patient’s subjective perception of their voice
  • Eating Assessment Tool (EAT-10) - validated 10-question tool of patients’ subjective perception of their swallowing and eating abilities
• Objective qualitative outcome: Binary evaluation of de-identified pre-recorded voice samples by speech therapist, blinded to the state of treatment.
• Objective quantitative outcome: measure of the glottic closure during phonation on video stroboscopic recording.

Results

To date we identified 9 subjects who satisfied inclusion criteria and completed at least one evaluation after single short term injection

Results, cont.

• Although sample size is currently very small to achieve statistical significance, preliminary data demonstrated both subjective and objective improvement
• Further investigation is warranted.
• The proposed treatment had a potential to improve the quality of voice and speech, and, thus, quality of life of thousands of patients with PD.

Discussion

• We launched a prospective, single-blinded study of the effects of vocal fold augmentation with short-acting (carboxymethylcellulose gel) and long-acting (calcium hydroxyapatite paste) injections laryngoplasty on voice and speech in PD patients with hypophonia and vocal fold atrophy.

Future Directions

• Objective Quantitative Outcomes:
  • Vocal Sound Pressure Levels (SPL)
  • Structural and functional parameters of the larynx:
    • Glottic closure time, Supraglottic constrictions

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References

5. doi:10.1036/06842-19797(02)90210-3. (3)
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