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Improved coughing function after injection laryngoplasty in post-stroke dysphagia, case-series study

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Introduction

Vocal fold paralysis can be associated with a brainstem stroke, or lateral medullary syndrome (Wallenberg syndrome) in cerebrovascular accident and may result in dysphagia and increased risk of pulmonary complication. Injection laryngoplasty has been demonstrated to be effective means of reducing risk of aspiration and improving swallowing function in head and neck cancer patients with vocal fold immobility. However, the effect of injection laryngoplasty on stroke associated dysphagia is uncertain. These case series aimed to show that injection laryngoplasty may enhance swallowing and coughing force in post stroke dysphagia patients accompanied with glottic insufficiency.

Subjects and Methods

A retrospective chart review was performed of all injection laryngoplasty procedures from February 2015 to December 2017. Total of 6 patients with post stroke dysphagia who showed glottic gap associated with vocal cord palsy were included. Participants underwent quantification of peak airflow during maximal cough a week before the procedures and followed at 2 weeks after procedures. Glottal closure, represented by the peak airflow during cough, protects the airway from aspiration of respiratory secretions and bolus of foods, and provides adequately high expiratory flow to remove material from the airway. PAS and FOIS, the degree of dysphagia, were also confirmed by VFSS and/or FEES. Initial and follow-up times of VFSS and/or FEES were scheduled to be the same as those of the peak cough flow.

Results

Among all patients, peak airflow increased significantly from pre-procedure airflow with a median improvement of 73.75 L/min (p-value=.016). All participants showed improvement of PAS and FOIS and the improvements were statistically significant. Postoperative PAS decreased (6.00 ± 2.23 , $p=0.048$) and FOIS increased (5.00 ± 0.75 , $p=0.027$). (Table 1.) No complications were observed after the injections.

Conclusion

Injection laryngoplasty was associated with positive outcome in improving peak cough flow and improving swallowing ability in stroke patients who accompanied with vocal

cord paralysis. Conventional management of dysphagia includes modifying food and fluid, altering posture and changing swallowing strategies with some rehabilitative techniques. In addition to these rehabilitative techniques, injection laryngoplasty can be an effective and feasible treatment that leads to improved glottic closure, subsequently resulting in higher peak cough flow and improved airway closure to result in reduced aspiration and improved swallowing function. The results of these case series support the need to carry large scale prospective studies of this procedure in stroke patients who show insufficient glottic closure associated with vocal fold palsy.

Table1. Peak Airflow Measurements, FOIS and PAS score Before and After Injection Laryngoplasty *: Penetration aspiration scale, +: Functional oral intake sacle

| Sex | Age | Airflow Measurements, L/min | | PAS* | | FOIS+ | |
|---------|-----|-----------------------------|--------|------|-------|-------|-------|
| | | Pre | Post | Pre | Post | Pre | Post |
| M | 62 | 188.5 | 254.5 | 8 | 6 | 1 | 5 |
| M | 69 | 119 | 164.5 | 8 | 7 | 5 | 5 |
| M | 73 | 145.5 | 372 | 8 | 2 | 3 | 6 |
| M | 49 | 106 | 240.5 | 8 | 3 | 1 | 5 |
| M | 69 | 314 | 330.5 | 8 | 7 | 1 | 4 |
| M | 67 | 42.5 | 124 | 8 | 7 | 1 | 5 |
| Median | | 152.58 | 247.67 | 8.00 | 6.00 | 1.00 | 5.00 |
| SD | | 92.53 | 94.48 | 0.00 | 2.23 | 1.67 | 0.75 |
| P-value | | | 0.016 | | 0.017 | | 0.027 |

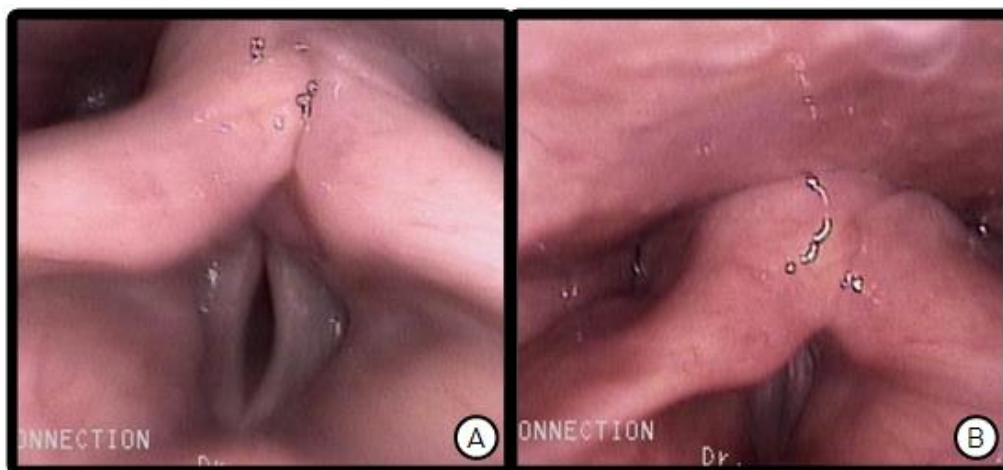


Figure1. FEES finding showing noticeable glottic gap associated with vocal cord palsy(A), and improved glottic closure post laryngoplasty (B).