Toward Improved Laryngoscopic Recognition of External Superior Laryngeal Nerve Paralysis

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Introduction

For over 100 years, a controversy has existed regarding the laryngoscopic signs that should be considered pathognomonic of unilateral ESLN paralysis. Myriad descriptions exist of the laryngeal behaviors ostensibly associated with unilateral ESLN denervation. To complicate matters, confusion surrounds whether voice and laryngeal manifestations reflect the pure effects of CT dysfunction, or alternatively, compensatory adjustments in response to prolonged denervation (and perhaps abnormal reinnervation). To date, no consensus exists regarding the laryngeal features of acute or chronic, unilateral ESLN denervation. Without improved recognition and differential diagnosis of unilateral ESLN denervation, it is impossible to discuss its prevalence, pathogenic effects, and treatment.

Objectives

To address this longstanding controversy, we pursued two investigations.

• Modeling of “in vivo” acute, unilateral ESLN denervation by temporarily blocking the R. ESLN using lidocaine HCL (verified selective blockade with hooked-wire LEMG).
• Review of 7 cases of suspected ESLN paralysis with comparison of laryngoscopic findings and LEMG.

Methods

• 10 young, healthy adult males (non singers), no history of past or present voice disorder underwent voice recording and flexible video-laryngostroboscopy, then had lidocaine block of the ESLN, then another voice recording and strobe during the block.
• Eleven blinded, expert judges rated randomized pre- versus during block recordings of 10 vocal tasks using standardized rating protocols.
• Clinical cases of EMG-confirmed ESLN paralysis were also reviewed.

Results

The upward glissando at normal volume task elicited the most difference between pre- and post-block conditions.

We found no evidence of hypomobility / sluggishness of the ipsilateral vocal fold, or a reliable pattern of axial rotation of the larynx during high pitch voice was observed. We also saw no evidence to support reduced vocal fold longitudinal tension/length, aryepiglottic fold length asymmetry, phase asymmetry, vocal fold plane differences, or glottic insufficiency, as diagnostic features of acute, unilateral CT dysfunction.

The analysis revealed a finding of deviation of the petiole of the epiglottis to the side of weakness (i.e., the right) in 60% of participants during a glissando up maneuver produced at normal volume.

Conclusions

On flexible video-laryngoscopy, deviation of the petiole of the epiglottis to the side of weakness during the glissando upward at normal volume vocal task may represent a useful diagnostic marker of unilateral ESLN denervation.

The biomechanics underlying this finding require further study.

Additional prospective studies are needed to formally assess the diagnostic precision of this marker in the common clinical scenarios of -
• isolated ESLN paralysis
• isolated unilateral RLN paresis / paralysis
• combined RLN / ESLN paralysis.

Case Examples EMG confirmed ESLN paralysis

normal pitch               glissando upward

Pre                            During Block

References


Acknowledgements

The University of Utah CRR Grant