

## A Laryngeal Hypersensitivity Scoring System in Patients with Refractory Chronic Cough

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**Introduction:** A number of studies have shown that irritable larynx syndrome, vocal cord dysfunction or muscle tension dysphonia have overlapping features with refractory chronic cough (RCC). Identifying laryngeal hypersensitivity can assist speech pathologists in developing targeted behavioral speech therapy (BST). A novel scoring system was created to quantify the severity of laryngeal hypersensitivity in RCC patients. This study was conducted to determine if a correlation existed between a composite laryngeal hypersensitivity score (LHS) and validated measures of cough severity. **Method:** A composite laryngeal hypersensitivity scoring system was created based on features of cough hypersensitivity, presence of laryngeal paresthesia, frequent throat clearing, voice problems, and upper airway dyspnea (Table 1). Cough hypersensitivity was based upon findings of allotussia (coughing in response to stimuli that typically do not lead to cough such as talking, cold air, changes in position, exertion etc.) and/or hypertussia (an exaggerated response to cough in response to typical stimuli at lower doses). Data from patients with RCC seen at the University of Utah multidisciplinary cough clinic in 2019 was analyzed to evaluate relationships between chronic cough and laryngeal hypersensitivity using this scoring system. **Results:** Data from 60 patients with RCC was analyzed. Composite LHS score was increased in all subjects with an average value of  $2.27 \pm 0.68$  (maximum value of 4) without any significant difference between different age groups (18-40, 41-70, >70 years) or sexes. Correlation between LHS score and cough severity (visual analog scale-VAS) or quality of life scores (Leicester Cough Questionnaire-LCQ) showed no association between LHS and VAS scores ( $r=0.133$ ,  $p\text{-value}=0.326$ ) but a significant negative association between LHS and total LCQ scores ( $r=-0.369$ ,  $p\text{-value}=0.005$ ). When adjusting for age, sex, BMI and duration of cough, this relationship persisted ( $p\text{-value}=0.355$  and  $0.003$ , respectively). Amongst the major categories of treatment strategies offered, there was no difference in LHS score of those groups responding to BST only as compared to BST with treatment for comorbid sleep apnea (mean LHS = 2.18 and 2.28 respectively,  $p=.66$ ). Due to few non-responders to BST, it was difficult to ascertain whether this LHS score could be utilized to predict response to BST in patient with RCC. **Conclusion:** A simple scoring system to assess for presence of laryngeal hypersensitivity shows a high correlation between cough intensity and cough-quality of life scores. Further studies to validate this score are required to assess its ability to diagnose laryngeal hypersensitivity in RCC and predict responsiveness to BST.

<b>Category</b>	<b>Scoring</b>
Laryngeal paresthesia (tickle, irritation, dryness, abnormal sensation etc.)	1 point
Frequent throat clearing	1 point
Voice Handicap Index (score greater than 20)	0.5 point
Dyspnea Index (score greater than 10)	0.5 point
Cough triggered by talking	0.5
Coughing induced by other triggers - Cold air or change in temperature, change in position, eating, strong smells or perfumes exertion, other mentioned by patient.	0.1 for each trigger up to a maximum of 0.5 point
<b>Composite maximum score</b>	<b>4 points</b>

Table 1: Laryngeal hypersensitivity composite scoring system

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