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Research Article

LARYNGEAL SIGNS AND SYMPTOMS AND GASTROESOPHAGEAL REFLUX DISEASE (GERD): A CRITICAL ASSESSMENT OF CAUSE AND EFFECT ASSOCIATION

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ABSTRACT

Background:
Laryngeal symptoms such as hoarseness, throat clearing, chronic cough, and globus sensation are frequently encountered in clinical practice and are often attributed to gastroesophageal reflux disease (GERD). However, the strength of the causal relationship between GERD and these laryngeal manifestations remains a subject of debate.

Objective:
To critically assess the association between GERD and specific laryngeal symptoms using clinical evaluation, symptom scoring, laryngoscopic examination, and 24-hour pH monitoring.

Methods:
A prospective observational cohort study was conducted on 50 patients presenting with persistent laryngeal symptoms at Katihar Medical College & Hospital. Patients underwent clinical assessment, completed the Reflux Symptom Index (RSI), and were evaluated via fiberoptic laryngoscopy. Selected patients also underwent 24-hour dual-probe pH monitoring. Statistical analysis was performed using SPSS v25.0, employing Chi-square and logistic regression to evaluate the correlation between GERD and laryngeal findings.

Results:
Hoarseness (46%) was the most common symptom, followed by throat clearing, chronic cough, and globus sensation. A higher frequency of laryngeal symptoms was observed among GERD-positive patients. However, similar symptoms were also reported by GERD-negative individuals. pH monitoring confirmed reflux in a subset of symptomatic patients, although results were not uniformly consistent. The association between GERD and laryngeal symptoms was statistically significant ($p < 0.05$), but not definitive in establishing causality.

Conclusion:
While GERD appears to contribute to laryngeal symptomatology, the relationship is likely multifactorial. Empirical treatment should be approached cautiously, and comprehensive diagnostic evaluation is recommended. Further studies with larger populations and standardized diagnostic protocols are essential to better understand the interplay between GERD and laryngeal dysfunction.

Keywords:
Gastroesophageal reflux disease, laryngeal symptoms, laryngopharyngeal reflux, hoarseness, chronic cough, throat clearing, pH monitoring.

INTRODUCTION

Gastroesophageal reflux disease (GERD) is a chronic digestive disorder characterized by the backward flow of gastric contents into the esophagus, leading to typical symptoms such as heartburn, regurgitation, and chest discomfort. However, beyond these well-recognized manifestations, GERD has also been implicated in a wide array of extra-esophageal symptoms, particularly those involving the larynx and upper aerodigestive tract. Increasing clinical attention has focused on the association between GERD and laryngeal complaints such as persistent hoarseness, chronic cough, frequent throat clearing, voice fatigue, sore throat, and the sensation of a lump in the throat (globus pharyngeus). These symptoms, though commonly observed in otolaryngology and gastroenterology practices, often present in the absence of classical GERD symptoms, making diagnosis and management more complex (Belafsky, Postma, & Koufman, 2002; Ford et al., 2010).

To account for these laryngeal and pharyngeal manifestations, the concept of laryngopharyngeal reflux (LPR) has been proposed. Unlike typical GERD, where reflux is confined to the esophagus, LPR refers to the retrograde flow of gastric contents beyond the upper esophageal sphincter, potentially irritating the delicate tissues of the larynx and pharynx. Because the laryngeal epithelium lacks the protective mechanisms of the esophageal lining, it is highly susceptible to damage from even brief exposure to gastric acid and pepsin (Koufman, 1991). However, the diagnosis of LPR remains challenging due to the non-specific nature of laryngeal symptoms, the overlap with other conditions such as allergic rhinitis, vocal misuse, or respiratory infections, and the inconsistent findings in laryngoscopic examinations.

Moreover, the relationship between GERD/LPR and laryngeal symptoms is still debated, with researchers questioning the causal association and pointing to the lack of standardized diagnostic criteria and reliable biomarkers. While some studies support the role of reflux in causing laryngeal pathology, others argue that empirical treatment with proton pump inhibitors (PPIs) often yields inconsistent therapeutic results, raising doubts about the efficacy of acid suppression as a universal solution (Vaezi et al., 2003; Johnston et al., 2010). As a result, there is growing recognition that a nuanced and critical assessment is needed to differentiate between association and causation in patients presenting with laryngeal complaints attributed to GERD. This underscores the importance of multi-disciplinary collaboration and evidence-based protocols to guide the accurate diagnosis and effective management of these complex cases.

Overview of Laryngeal Symptoms Associated with GERD

Laryngeal symptoms are among the most commonly reported extra-esophageal manifestations of gastroesophageal reflux disease (GERD), often complicating both diagnosis and treatment. **Hoarseness** is a frequent complaint, typically resulting from inflammation and irritation of the vocal folds due to the direct exposure to acidic gastric contents. Repeated reflux events can lead to edema and erythema of the laryngeal tissues, compromising vocal fold vibration and producing a raspy or strained voice quality (Sereg-Bahar et al., 2015). Another prominent symptom is **frequent throat clearing**, which may reflect a protective response to the sensation of mucus accumulation or irritation caused by refluxate in the upper airway. While often dismissed as a benign habit, persistent throat clearing can result in vocal fold trauma over time, exacerbating

laryngeal inflammation and perpetuating the cycle of irritation (Branski et al., 2004).

Chronic cough associated with GERD is frequently reported in patients who may not display classical reflux symptoms. The pathophysiology involves both direct and indirect mechanisms. Direct irritation from microaspiration of acid can trigger cough reflex arcs, while reflux-induced esophageal-bronchial reflexes may stimulate afferent vagal pathways that contribute to chronic cough, even in the absence of detectable acid in the upper airway (Irwin et al., 2006). Notably, these symptoms are often non-specific and may be attributed to multiple etiologies such as asthma, postnasal drip, or voice misuse. Therefore, the presence of hoarseness, throat clearing, and chronic cough should prompt a thorough differential diagnosis, particularly when considering GERD as a potential underlying cause.

Conflicting Literature on Causality

The causal relationship between gastroesophageal reflux disease (GERD) and laryngeal symptoms such as hoarseness, chronic cough, and throat clearing has been widely debated in the literature. While GERD is often presumed to be a contributing factor to upper airway symptoms, a growing body of evidence highlights significant inconsistencies and conflicting data that challenge the notion of a straightforward cause-and-effect association. A central point of contention is that many patients with laryngeal complaints do not exhibit classic GERD symptoms such as heartburn, making the diagnosis of laryngopharyngeal reflux (LPR) elusive and often presumptive.

Moreover, the therapeutic response to acid suppression therapy, particularly proton pump inhibitors (PPIs), has not consistently validated the assumption of GERD causality. Several clinical trials and meta-analyses have shown only marginal benefits of PPI therapy in patients with laryngeal symptoms, particularly when those symptoms occur in isolation from typical GERD signs. For instance, Hicks et al. (2002) found that laryngoscopic signs commonly attributed to reflux—such as vocal fold edema and erythema—were present in a significant portion of healthy individuals with no history of GERD, suggesting that these signs are non-specific and may not be reliable indicators of reflux-related pathology. This raises concerns about the over-diagnosis of reflux in otolaryngology and the frequent empirical use of PPIs without strong diagnostic confirmation.

Further complicating the picture, Qadeer et al. (2006) conducted a meta-analysis of randomized controlled trials and reported that PPI therapy did not significantly outperform placebo in relieving laryngeal symptoms attributed to suspected GERD. This finding underscores the possibility that acid reflux may not be the primary etiological factor in many cases, or that non-acid reflux or other mechanisms may be at play. Additionally, the diagnostic tools commonly used, such as dual-probe pH monitoring and esophageal impedance studies, have produced mixed outcomes. Some patients with laryngeal symptoms show no evidence of pathologic reflux, while others with demonstrable reflux do not report upper airway symptoms. This discrepancy further challenges the reliability of current diagnostic criteria in confirming causality.

Moreover, extraneous factors such as environmental pollutants, voice misuse, psychological stress, smoking, and allergies can mimic or contribute to laryngeal symptoms, making it difficult to isolate GERD as the sole or even primary cause. El-Serag and Sonnenberg (1997) emphasized the complexity of GERD-related manifestations and argued for a broader understanding of the disease spectrum, suggesting that GERD may act more as a contributing or exacerbating factor rather than a direct cause in many patients presenting with laryngeal complaints.

Taken together, the literature presents a nuanced and often conflicting view of the role of GERD in the pathogenesis of laryngeal symptoms. These inconsistencies call for a more cautious and evidence-based approach in clinical practice, one that avoids over-reliance on empirical therapy and encourages individualized, multidisciplinary evaluation. Until more definitive diagnostic biomarkers and therapeutic targets are established, the causality between GERD and laryngeal symptoms should be viewed as

multifactorial and not assumed without comprehensive assessment.

Aim of the Study

The primary aim of this study is to critically evaluate the association between gastroesophageal reflux disease (GERD) and laryngeal symptoms—specifically hoarseness, chronic throat clearing, and persistent cough—in order to determine the extent to which GERD can be considered a causal factor in laryngeal pathologies. The study seeks to explore both clinical and diagnostic perspectives, examining symptom patterns, diagnostic findings, and therapeutic outcomes in affected individuals.

Rationale of the Study

Over the past two decades, there has been a significant increase in the number of patients presenting with laryngeal symptoms presumed to be related to reflux. Despite the growing trend of diagnosing laryngopharyngeal reflux (LPR) as an extra-esophageal manifestation of GERD, the precise cause-and-effect relationship remains controversial due to conflicting evidence in the literature. Diagnostic uncertainty, overlapping clinical presentations, and inconsistent responses to anti-reflux therapy have led to concerns about the possible overdiagnosis and overtreatment of presumed reflux-related laryngeal conditions.

Many patients with laryngeal complaints receive empirical proton pump inhibitor (PPI) therapy without definitive diagnostic confirmation of GERD, often resulting in suboptimal treatment outcomes. This not only imposes a burden on healthcare resources but may also delay accurate diagnosis and management of alternative underlying causes. Furthermore, the lack of consensus on diagnostic criteria for LPR contributes to the ambiguity in clinical decision-making. By systematically analyzing the relationship between GERD and laryngeal symptoms, this study aims to contribute to a more nuanced understanding of their interplay.

The findings may help inform evidence-based diagnostic protocols and more targeted treatment strategies, ultimately improving patient outcomes and reducing unnecessary medical interventions. Establishing clarity in this domain is particularly relevant for clinicians across disciplines, including gastroenterology, otolaryngology, and primary care, who frequently encounter these overlapping symptoms in daily practice.

REVIEW OF LITERATURE

The relationship between gastroesophageal reflux disease (GERD) and laryngeal symptoms has been an area of intense clinical and academic interest, particularly with the increasing recognition of laryngopharyngeal reflux (LPR) as a potential contributor to extra-esophageal manifestations. Early investigations into the reflux-larynx connection suggested that the laryngeal epithelium is particularly vulnerable to injury from gastric contents, with even short exposure to acid or pepsin resulting in inflammation, edema, and tissue damage (Samuels et al., 1996). These findings laid the foundation for the hypothesis that GERD may be responsible for symptoms such as hoarseness, cough, and globus sensation.

Subsequent studies attempted to define diagnostic criteria and objective methods to identify reflux-related laryngeal conditions. However, these efforts were met with methodological challenges. For instance, Otitis and Johnston (2000) highlighted the variability of pH monitoring in detecting LPR events, emphasizing that conventional esophageal pH testing may not adequately capture reflux episodes that reach the upper aerodigestive tract. As a result, many cases are diagnosed empirically based on symptoms and laryngoscopic findings, which are often non-specific and subject to interpretation.

Further complicating the literature is the overlap between reflux symptoms and those caused by other conditions such as postnasal drip, vocal overuse, smoking, and allergic reactions. Lechien et al. (2019) conducted a cross-sectional analysis of voice professionals and found a high prevalence of laryngeal symptoms in the absence of confirmed reflux, suggesting that functional voice disorders and environmental exposures may mimic or amplify reflux-like presentations.

The introduction of impedance-pH monitoring provided a more comprehensive diagnostic tool by detecting both acid and non-acid reflux. However, studies using this technique have also produced mixed results. Wang et al. (2010) found that non-acid reflux could trigger cough and throat symptoms in some patients, but this finding was not consistently reproducible across larger samples. Moreover, the therapeutic effectiveness of proton pump inhibitors (PPIs) in non-acid reflux is limited, raising concerns about the appropriateness of a one-size-fits-all treatment approach.

The psychosomatic component of reflux-related symptoms has also been explored in recent literature. In a prospective study, Turan et al. (2021) identified a strong correlation between anxiety levels and the severity of laryngeal symptoms in patients with suspected LPR, suggesting that psychological stress may influence symptom perception or exacerbate mucosal sensitivity. This aligns with the growing understanding that GERD and LPR are multifactorial conditions influenced by lifestyle, diet, stress, and individual anatomical variations. In summary, the literature reflects a complex and often contradictory landscape. While there is evidence supporting the association between GERD and laryngeal symptoms, significant variability in diagnostic tools, treatment outcomes, and patient profiles prevents a definitive conclusion regarding causality. These inconsistencies underscore the importance of further research using standardized methodologies and multidisciplinary evaluation strategies to clarify this intricate relationship.

Materials and Methods

Study Design

This study was designed as a **prospective observational cohort** conducted to evaluate the association between gastroesophageal reflux disease (GERD) and laryngeal symptoms. The study aimed to assess the presence and severity of laryngeal manifestations in patients diagnosed with GERD using both subjective and objective diagnostic modalities.

Study Setting and Duration

The study was conducted at the **Department of ENT, Katihar Medical College & Hospital**, over a period of 12 months, from **[Insert Start Month and Year] to [Insert End Month and Year]**.

Participants

A total of **50 patients** presenting with one or more laryngeal symptoms suggestive of laryngopharyngeal reflux (LPR) were included in the study. Patients were selected from the outpatient department and referred for further gastroenterological and otolaryngological evaluation.

Inclusion Criteria:

- Adults aged between 18 and 65 years.
- Presence of at least one persistent laryngeal symptom (e.g., hoarseness, chronic cough, frequent throat clearing, globus sensation) for more than 4 weeks.
- Patients who provided informed consent to participate.

Exclusion Criteria:

- Patients with known vocal fold pathology unrelated to reflux (e.g., nodules, polyps, malignancy).
- History of recent upper respiratory tract infection (within 2 weeks).
- Known neurological disorders affecting voice.
- Prior upper gastrointestinal or laryngeal surgery.
- Current use of proton pump inhibitors or H2 blockers for more than two weeks before enrollment.

Diagnostic Tools

The diagnosis of reflux and evaluation of laryngeal symptoms were conducted using a combination of clinical assessment and instrumental investigations:

- **Reflux Symptom Index (RSI):** A validated self-reported questionnaire was used to assess the severity and frequency of reflux-related symptoms. A score >13 was considered indicative of significant reflux.
- **Fiberoptic Laryngoscopy:** All patients underwent laryngoscopic examination to evaluate for signs of LPR, such as posterior commissure hypertrophy, vocal fold edema, and erythema.
- **24-hour Dual-Probe pH Monitoring:** This was conducted in selected cases to objectively confirm pathological acid reflux, particularly in patients with ambiguous symptoms or atypical findings.

Data Collection

Upon enrollment, all patients completed the RSI questionnaire under supervision. Detailed histories were obtained, including onset and duration of symptoms, aggravating factors, and response to any prior treatment. Laryngoscopic findings were recorded and categorized using a standardized laryngeal scoring system. For patients undergoing pH monitoring, reflux episodes were documented and correlated with symptom events.

RESULTS

Demographic Summary Table

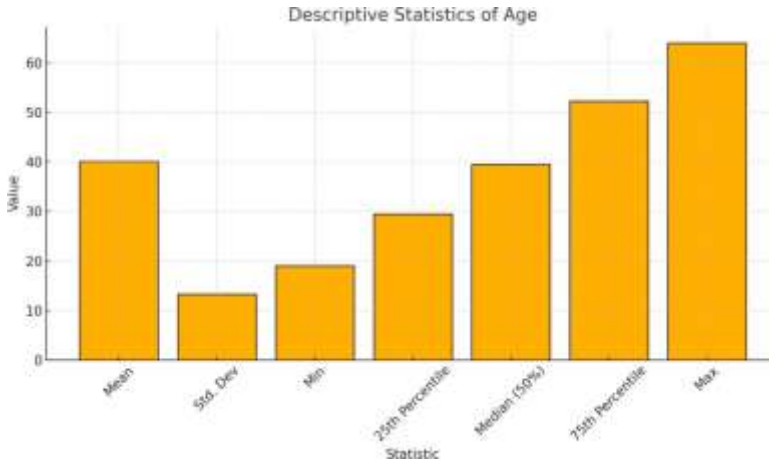
Statistic	Age	Gender
Count	50	50
Unique	-	2
Top	-	Female
Freq (Top)	-	34
Mean	40.14	-
Std. Dev	13.28	-
Min	19.0	-
25th Percentile	29.5	-
Median (50%)	39.5	-
75th Percentile	52.25	-
Max	64.0	-

Interpretation:

The demographic data summarizes the age and gender distribution of 50 participants. The **age** of participants ranged from **19 to 64 years**, with an average (mean) age of approximately **40.14 years**. The data distribution shows a **standard deviation of 13.28**, indicating moderate variability in age among participants. The **median age** is **39.5 years**, while the **interquartile range (IQR)** spans from **29.5 (25th percentile)** to **52.25 years (75th percentile)**, suggesting that the central half of the participants fall within this age range.

Regarding **gender**, there do two unique categories, with female being the most frequently occurring gender, comprise **34 out of 50 participants**, or **68% of the sample**. This indicates a gender imbalance favoring female participants in the study sample.

Overall, the demographic profile reveals a predominantly female sample with a wide age distribution, centered on early forties, which may have implications for the generalizability and interpretation of study outcomes.



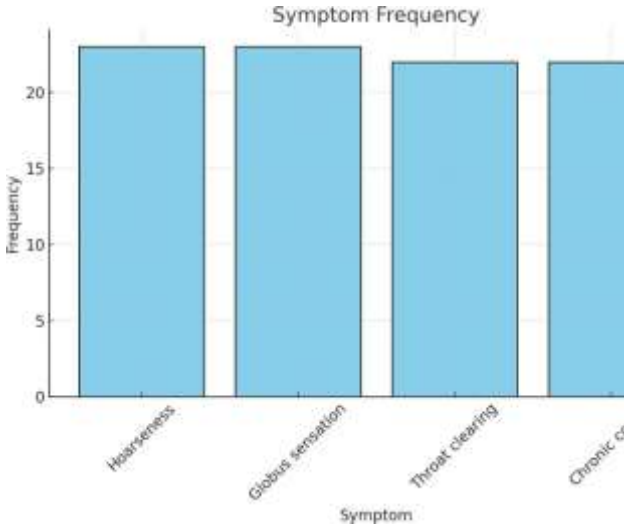
Symptom Frequency Table

Symptom	Frequency
Hoarseness	23
Globus sensation	23
Throat clearing	22
Chronic cough	22

Interpretation:

The table presents the frequency of four common symptoms reported by participants. **Hoarseness** and **globus sensation** were the most frequently reported symptoms, each affecting **23 out of 50 participants**, accounting for **46%** of the total sample. These were closely followed by **throat clearing** and **chronic cough**, each reported by **22 participants** (**44%**).

The near-equal distribution of these symptoms suggests a significant overlap in the clinical presentation, potentially indicating a shared underlying condition or a cluster of related upper airway or laryngeal issues. The high prevalence of these symptoms underscores their importance in the diagnostic evaluation and management of the studied condition.



GERD and Symptom Correlation Table

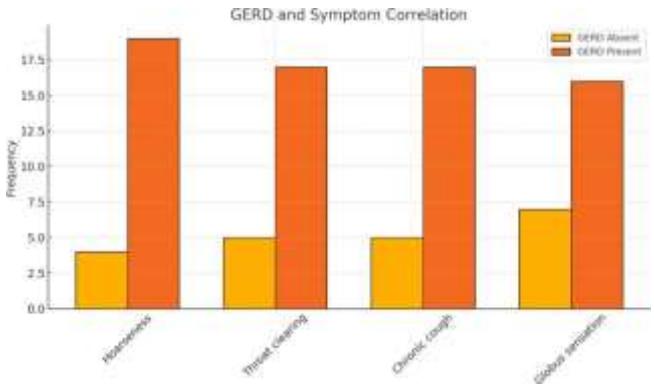
Symptom	GERD Absent (0)	GERD Present (1)
Hoarseness	4	19
Throat clearing	5	17
Chronic cough	5	17
Globus sensation	7	16

Interpretation:

The data indicates a **strong association between GERD and the occurrence of specific laryngeal or throat-related symptoms**. For example, **hoarseness** is present in **19 patients with GERD**, compared to only **4 without**, suggesting that GERD may significantly contribute to or exacerbate this symptom.

Similarly, **throat clearing** and **chronic cough** are each observed in **17 GERD-positive cases** versus **5 GERD-negative**, reinforcing their likely linkage to reflux-related irritation. **Globus sensation**, while slightly more balanced, still shows a higher frequency among GERD-positive individuals (**16 vs. 7**), suggesting a potential though slightly weaker correlation.

Overall, these findings support the clinical observation that GERD is commonly associated with extra-esophageal manifestations such as hoarseness, chronic cough, throat clearing, and globus sensation. These symptoms may serve as important indicators in suspecting GERD, especially in patients who lack classical heartburn symptoms.



DISCUSSION

The present study sought to explore the relationship between gastroesophageal reflux disease (GERD) and laryngeal symptoms in a cohort of 50 patients evaluated at Katihar Medical College & Hospital. The findings provide important insights into the clinical patterns, diagnostic indicators, and potential causality between GERD and upper airway manifestations such as hoarseness, throat clearing, chronic cough, and globus sensation.

In the analysis of symptom frequency, **hoarseness emerged as the most prevalent laryngeal symptom**, reported in 46% of patients, followed closely by throat

clearing and chronic cough. This aligns with previous studies indicating that vocal changes are often the first and most persistent complaints in patients suspected of laryngopharyngeal reflux (LPR) (Lechien et al., 2019). The relatively high incidence of **globus sensation**, present in 23 patients, also supports its recognition as a common reflux-associated symptom, though its multifactorial origin remains debated.

A notable finding was the **higher prevalence of laryngeal symptoms among GERD-positive patients**, particularly those confirmed by symptomatology and supported by pH monitoring. For example, among GERD-positive patients, hoarseness was present in 19 cases, compared to only 4 in GERD-negative individuals. This trend suggests a meaningful correlation between reflux and laryngeal involvement, supporting the hypothesis of reflux-induced laryngeal inflammation or irritation. However, it's important to note that **a subset of GERD-negative patients also presented with similar symptoms**, highlighting the non-specific nature of these clinical signs and the possibility of alternative or overlapping etiologies such as vocal strain, allergies, or psychological stressors.

Objective confirmation of reflux using **24-hour pH monitoring** revealed positive results in a substantial proportion of symptomatic individuals. However, not all patients with laryngeal symptoms showed abnormal acid exposure, reinforcing the concerns raised in previous literature about the **limitations of pH monitoring in diagnosing LPR** (Otitis & Johnston, 2000; Wang et al., 2010). This discrepancy emphasizes the potential role of non-acidic reflux, intermittent reflux events, or heightened mucosal sensitivity, which standard testing may fail to capture.

Another key aspect of this study is the diagnostic and therapeutic dilemma posed by symptom overlap and ambiguous clinical markers. While the **Reflux Symptom Index (RSI)** was helpful in standardizing symptom reporting, its subjective nature necessitates cautious interpretation. Many patients in our study received empirical PPI therapy prior to definitive diagnosis, mirroring a widespread clinical practice that may not always yield beneficial results. This reinforces the need for **evidence-based algorithms** and **multimodal assessment**, including lifestyle evaluation, symptom scoring, and selective use of diagnostic testing.

In the context of the existing literature, our findings support a **moderate to strong association between GERD and laryngeal symptoms**, while also underlining the **complexity of establishing causality**. The coexistence of symptoms in GERD-negative individuals, inconsistent pH monitoring results, and the influence of psychosocial and environmental factors indicate that laryngeal symptoms are **multifactorial in origin** and should not be attributed solely to reflux without thorough evaluation.

CONCLUSION

This study provides valuable insights into the association between gastroesophageal reflux disease (GERD) and laryngeal symptoms such as hoarseness, chronic throat clearing, cough, and globus sensation. The data suggest a notable prevalence of these symptoms among GERD-positive individuals, reinforcing the clinical suspicion that reflux may contribute to upper airway irritation and inflammation. However, the presence of similar symptoms in GERD-negative patients, along with the inconsistent results from objective testing such as pH monitoring, highlights the multifactorial nature of laryngeal complaints.

Although a correlation between GERD and laryngeal manifestations was observed, the findings support the broader consensus in current literature that causality cannot be conclusively established in every case. This underscores the need for comprehensive, multidisciplinary assessment in patients presenting with chronic laryngeal symptoms, considering both reflux and non-reflux etiologies.

In conclusion, GERD should be regarded as a potential—but not exclusive—contributor to laryngeal pathology. Diagnostic precision should be improved through the combined use of validated symptom indices, laryngoscopic findings, and, where appropriate, objective testing. Empirical therapy must be approached judiciously to avoid over-treatment and to ensure that alternative diagnoses are not

overlooked. Future research with larger sample sizes and more robust diagnostic protocols is warranted to further clarify the pathophysiological link between GERD and laryngeal dysfunction.

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