

Management of Laryngopharyngeal Reflux Disease in Singers: A Scoping Review

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Abstract

Singers are regarded as exceptional vocal performers. Vocal abnormalities in singers are not uncommon. Any disturbance in voice quality can negatively impact singers' professional careers and business profits. Voice change, voice fatigue, and difficulty in singing higher pitches are major complaints of singers. Many singers experienced laryngopharyngeal reflux disease (LPRD), muscle tension dysphonia, and chronic laryngitis. LPRD is a clinical condition associated with laryngeal inflammation leading to the onset of voice disorders. Professionals like singers are usually predisposed to the development of LPRD. The occurrence of LPRD in professionals like singers can have a profound impact on their professional lives. Vocal hygiene is considered an important part of vocal rehabilitation. In the case of professionals such as singers, it is imperative to provide awareness for proper vocal hygiene to prevent lifestyle changes such as abusive behaviors and other harmful habits that can result in functional vocal pathologies. To date, there are several controversies exist about diagnosis and treatment of LPRD. Proton pump inhibitors are prescribed to treat LPRD in combination with maintaining proper vocal hygiene. This review aims to discuss the current management of LPRD among singers.

Keywords: Laryngopharyngeal reflux disease, proton pump inhibitor, singers, vocal hygiene

INTRODUCTION

Laryngopharyngeal reflux disease (LPRD) is an inflammatory condition that impacts the tissues of the upper aerodigestive system. It results from the direct or indirect backflow of stomach or intestinal contents, causing changes to the mucosal lining of the upper aerodigestive tract.^[1] The voice of human beings is not only important for communication but also serves as the primary musical instrument. LPRD is a condition affecting the upper aerodigestive tract, caused by the direct or indirect influence of reflux from the stomach and duodenum.^[2] It presents with morphological and/or neurological changes in the upper aerodigestive tract.^[2] The gastroduodenal content in contact with vocal folds can result in several microscopic and macroscopic changes over time. Singers are frequently prone to vocal fold disorders due to factors such as vocal strain, late-night eating habits, as well as anxiety and stress.^[3] Although proton pump inhibitors (PPIs) have been thought to be an important treatment for LPRD for several years, the effectiveness of PPIs compared to a placebo remains a topic of debate.^[4] More than 40% of patients with LPRD have no or fewer clinical symptoms with the treatment by PPIs.^[5] The

objective of this review paper is to discuss the management of LPRD with its impact on the voices of professionals, particularly singers.

METHODS OF LITERATURE SEARCH

The search for recent research articles on the management of LPRD in singers. Initially, we searched the online databases PubMed, Scopus, Google Scholar, and Medline. Our search method was designed as per Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. The published works' abstracts were identified by our search method, although more research publications had to be manually located from the citations. A variety of study designs

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Submitted: 31-Dec-2024 Revised: 14-Feb-2025 Accepted: 15-Feb-2025 Published: 19-Jun-2026

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How to cite this article: Swain SK, Sethi DB. Management of laryngopharyngeal reflux disease in singers: A scoping review. *Mustansiriya Med J* 2026;24:39-43.

Access this article online

Quick Response Code:



Website:
<http://www.mmjonweb.org>

DOI:
10.4103/mj.mj_63_24

were looked at, such as case reports, case series, comparative studies, observational studies, and randomized controlled trials. There were 16 case reports, 18 case series, and 28 research papers in all [Figure 1]. This review article focuses only on the management of LPRD in singers. A better knowledge of the management of LPRD in singers is provided by this review analysis. It will also encourage further research and increased awareness about the management of LPRD among singers.

PREVALENCE

LPRD constitutes approximately 10% of outpatient patients of ear, nose, and throat.^[6] However, the true incidence and prevalence of LPRD are still unclear because of the absence of a gold standard diagnosis of LPRD and the absence of epidemiological trials conducted in the general population. In routine practice, LPRD constitutes about 50% of patients attending voice clinics across the United States.^[7] The occurrence of LPRD in singers can lead to a dramatic impact on daily life. There is a predominance of singers with complaints of symptoms due to LPRD due to faulty lifestyle and vocal behavior. One recent study showed that 54.3% of professional singers, 19.7% of amateurs, 14.4% of singing students, and 4.5% of singing teachers are diagnosed with LPRD.^[8]

PATHOLOGICAL CHANGES

Professionals, such as singers, have greater vocal demands than the general population. They frequently use their voices in unique ways to accommodate specific musical styles. The vocal fold of the larynx plays an important role in creating different styles of music. In singers, even minor changes to the vocal folds can lead to vocal limitations and performance challenges. The normal vocal folds of humans possess a highly specialized and distinctive laminar histological structure. Normally, there are three layers of connective tissue called lamina propria present under squamous epithelium.^[9] Singers are at high

risk for presenting LPRD due to intense use of abdominal muscles to provide essential air support, experiencing increased intra-abdominal pressure, heightened stress because of career demands and irregular work schedules, delayed meals before sleep, and a higher consumption of citrus, fatty, and spicy foods.^[10] Currently, the pathophysiology of the underlying development of hoarseness in LPRD is still a subject of controversy. LPRD can cause significant macroscopic and microscopic histological alterations in the mucosa along the vibratory edge of the vocal folds. Research suggests that singers are more sensitive to inflammatory alterations in the larynx and pharynx caused by laryngopharyngeal acid reflux. The acid pepsin adversely affects the expression of growth factors involved in wound healing, angiogenesis, and vasculogenesis, hindering mucosal healing and contributing to the continuation of the irritation process.^[11] The professionals like singers are prone to the lifestyle of late eating in the evening, which exacerbates reflux. LPRD is linked to microtrauma, epithelial cell separation, changes in Reinke's space, mucosal dryness, inflammatory infiltrates, and thickening of the vocal fold epithelium. These histopathological changes in the vocal folds of singers may alter the biomechanical properties of vocal folds, resulting in hoarseness. Singers are at high risk for LPRD due to the need for air support, which involves increased intra-abdominal pressure, as well as heightened stress from ambitions for professional growth and demanding schedules. Factors such as late meals before sleep, and poor dietary habits such as consuming citrus products, fatty foods, and spicy foods, also contribute. In addition, chronic alcohol consumption reduces the tone of the upper and lower sphincters of esophagus, leading to LPRD.^[12]

VOICE IN SINGERS

Popular song styles lack the technical standards as seen in classical music and can be learned informally through imitation of vocals, often encouraging vocal strain.^[13] This singing style is distinguished by two main features: the incorporation of electronic amplification and the adjustment of the voice to resemble spoken speech.^[14] The mechanisms involved in singing typically operate beyond the normal range of speaking voice function. Therefore, a singer's voice must be exceptionally healthy to meet the vocal demands of professional performance. Professional singers face a significant vocal strain because they must maintain phonation at different pitch levels and volumes.^[15] Singers frequently perform in challenging conditions, such as dusty theaters, outdoor settings, tight costumes, under intense lighting, and while dancing.^[15] Each singing style has its own unique set of requirements that result in vocal changes and affect the voice of singers. Chronic use of alcohol affects the larynx and voice quality. One epidemiological study revealed alcohol use is higher among males than females.^[16] However, there are no studies on singers. Factors such as vocal habits, career, age, workload, side jobs, and overall quality of life can negatively impact professional singers.^[17]

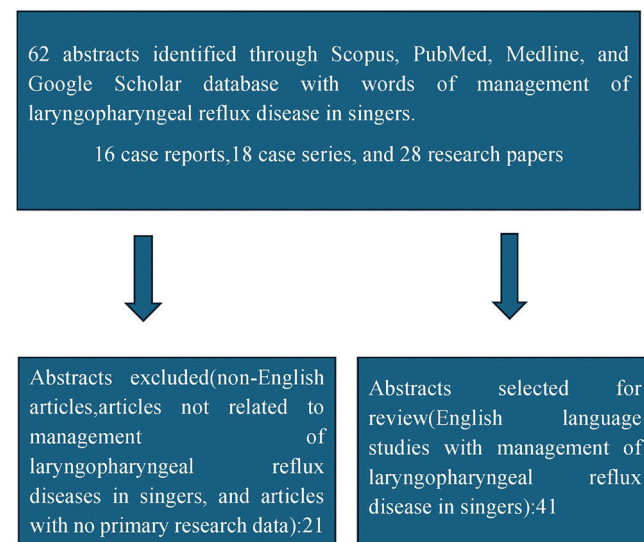


Figure 1: Method of literature search

PSYCHONEUROLOGICAL PART OF SINGERS

The psychoneurological part of the singers often affects directly the vocal mechanism. This phenomenon is often reflected in the autonomic nervous system, responsible for regulating mucosal secretions and other vital functions essential for voice production. The neurological system is vital to control the laryngeal muscles. Minor voice changes can occasionally be the initial indication of a serious neurological condition.^[18] The voice of the singers may be affected by anxiety. Singers are often naturally sensitive and expressive.^[18] If anxiety is the etiology of voice abnormalities, clinical should provide counseling and appropriate treatment to prevent such vocal dysfunction.^[18]

COMMON CLINICAL PRESENTATION OF SINGERS DUE TO LARYNGOPHARYNGEAL REFLUX DISEASE

The symptoms and signs of LPRD in singers are often nonspecific. Adult professional singers, especially women, are the most common.^[19] There are common complaints of respiratory issues, such as rhinitis, without other general health problems. Singers are often not addicted to alcohol or tobacco. Vocal tract discomfort, laryngopharyngeal reflux, and dysphonia are common complaints reported by amateur singers. The buildup of sticky mucus is linked to postnasal drip, the feeling of a lump in the throat (Globus sensation), and throat clearing, which can lead to coughing and choking (laryngospasm). This occurs due to heightened sensitivity in the sensory nerve endings of the larynx, which are stimulated by local inflammation.^[20] Other common symptoms include the feeling of a lump in the throat (globe sensation), throat clearing, thick mucus in the throat, sore or dry throat, and episodes of coughing and choking. The severity of these symptoms can be assessed using the reflux symptom index. Singers experiencing vocal wear and tear often report symptoms such as hoarseness, vocal fatigue, a reduced pitch range, and a feeling of tightness, discomfort, dryness, or pain in the throat.^[20] Other reported manifestations among singers include a strained voice, insufficient breath support, and a decrease in vocal flexibility or endurance.^[21] One study indicated that specific vocally abusive behaviors, such as excessive talking, speaking quickly, loudly, and/or in a low pitch, were significant, if not the main cause, of voice abnormalities in professional singers.^[22] Laryngo-stroboscopic findings show nonspecific laryngeal edema, laryngeal erythema, vocal folds erythema, vocal fold keratosis, thick endolaryngeal mucus, and in some cases, present vocal folds edema, granuloma, and laryngeal ulcers. The singer reflux symptom score includes hoarseness, voice breathiness, difficulty reaching high notes, additional efforts during singing, lack of power during singing, absence of vocal resistance and vocal fatigue, excess mucous in the throat, and dryness in the throat.^[23]

VOICE EVALUATIONS OF SINGERS

The evaluation of voice among singers needs certain important points such as singing style, vocal habits, professional

workloads, and personal goals of singer.^[24] Only a few music schools offer instruction in just two singing styles: classical and popular.^[25] The classical singing style refers to opera and demands intricate adjustments, including a rich vocal quality, precise control of articulation, and strong vocal projection. This singing style enables the voice to be heard over the orchestra without the need for electronic amplification, and it requires extensive training.^[26] The popular singing style lacks the technical standards found in classical singing. It is typically learned informally through vocal imitation, which can sometimes lead to improper use of the voice.^[27] The popular singing style has two main characteristics: Electronic amplification and vocal adjustments that are closer to the spoken voice.^[28] Several factors, such as the development of vocal quality throughout a career, vocal habits, the singer's age, workload, additional jobs, and overall quality of life, can be detrimental to professional singers.^[17] Singers may sometimes be unaware of harmful vocal habits, such as speaking loudly, arguing, coughing, clearing their throat, or whispering forcefully.^[29] There are a few addictions, such as tobacco intake, liquid caffeine intake, solid caffeine intake, and alcohol intake often harmful to the voice of the singers. Another harmful behavior of singers is talking or singing in noisy places.

MANAGEMENT

The singers require special care to keep the mind and body healthy, mostly the aspects related to voice.^[30] The initial treatment for singers experiencing symptoms of LPRD is the use of anti-reflux medications.^[31] The decision to start anti-reflux medications is done by the patient symptoms and features of LPR-related changes, such as erythema and edema in mucosa lining the larynx during laryngopharyngeal examination. However, a long-term use of anti-reflux medications has potentially negative effects.^[32]

Investigations

In majority of cases, LPRD has been a purely clinical diagnosis done at the outpatient department of otorhinolaryngology. The clinical diagnosis is done on the basis of patient's history and laryngeal endoscopy. There are features of laryngeal inflammation in endoscopic examination. There is often a bright red and slightly edematous appearance of the arytenoid mucosa during laryngeal endoscopy that helps to establish the diagnosis. If the symptoms of LPRD are not improved with anti-reflux treatment, the diagnosis is incorrect. High-resolution esophageal manometry is an invasive test and helpful for the diagnosis of this disease.^[4] It includes inserting a catheter through the nose into the esophagus and stomach. This test demonstrates esophageal dysmotility and also documents the function of the upper and lower sphincters of the esophagus. The gold standard test for detecting pathological reflux disease is 24-h dual-channel pH monitoring, with or without impedance measurement. Singers are typically advised to sing during the 24-h testing period and document the data.^[4] Pepsin testing is a noninvasive technique for detecting the presence

of pepsin, a gastric enzyme in pharyngeal secretions. The patient usually collects three samples using a special test kit, typically in the morning, 1 h after lunch, and again after the evening meal. For singers, the timing of sample collection can be adjusted to include a specimen taken after vocal activities. A positive result is observed in 80% of cases with significant LPRD.^[33] Pepsin testing is an affordable and noninvasive procedure commonly performed by singers. Singers are often hesitant to undergo invasive tests due to concerns about potential damage to their voice during the testing. The pepsin test is a very useful investigation for patients with throat symptoms who have significant LPRD. Barium swallow is a radiological investigation done while swallowing a contrast medium. Barium swallow is not an accurate investigation for diagnosis of LPRD.^[9]

Vocal hygiene for singers

There is a significant risk for vocal fatigue among singers because of their overuse of the voice. The singers need special care to the voice along with healthy mind and body, mainly in respect to phonation.^[34] In practice, singers with laryngopharyngeal reflux (LPR) may exhibit a normal or slightly altered speaking voice, but their singing voice could be affected, showing symptoms such as vocal fatigue, hoarseness, and a reduced vocal range. Among singers, voice is an important medium used for expressing the feelings that capture the audience. Each singing style has unique requirements, and any change in the vocal folds may hinder the singer's ability to meet the expectations of the audience. LPRD in singers leads to a compromised singing voice, resulting in vocal fatigue, hoarseness, and a reduced range. Singers should avoid smoking as it directly affects vocal folds and also aggravates the LPRD that causes posterior laryngitis. Spicy foods can also aggravate laryngopharyngeal reflux, so avoid optimally from the food. Alkaline, protein-rich, low-acid, and low-fat diets are beneficial for LPRD as they are easily digested and help decrease the frequency of transient relaxations of the esophageal sphincters, thereby reducing the occurrence of LPRD episodes.^[35] Professional singers should drink plenty of water, especially when exercising. The caffeinated beverages or alcohol should be avoided or balanced with plenty of water. The physical fatigue has a negative impact on the quality of voice. Regular exercises enhance the muscle tone and help to provide professional singers who should avoid overuse of his/her voice and also avoid singing during laryngitis. They also practice good breathing techniques when talking or singing. Singers should avoid vocal abuse, alcohol use, tobacco use, bad sleep patterns, poor eating habits, and exposure to noisy or smoky environments. Singers should drink plenty of water and avoid frequent tea and coffee. Other factors, including financial instability, stress, and irregular schedules, also affect singers' vocal health.^[36] A study suggests that singers often report frequent voice use and experiences of allergic reactions or attacks.^[37] A diet that is alkaline, high in protein, low in fat, and low in acid is advantageous as it is easy to digest. In addition,

it helps reduce the frequency of temporary relaxations of the esophageal sphincters, which in turn minimizes the occurrence of LPRD episodes.

Medical treatment

The most frequently used PPIs for LPRD include omeprazole, esomeprazole, rabeprazole, lansoprazole, and pantoprazole with a success rate of 18%–87%.^[38] Other composite medical treatments include PPIs, alginate, prokinetics, and H₂ receptor antagonists. Singers may present with laryngitis with nodules, which are called singer nodules, due to voice abuse. These patients usually present with hoarseness and vocal fatigue. Voice therapy should be tried in early vocal nodules or initial therapeutic modalities. Voice therapy will often cure the majority of patients. Sometimes, anxiety may be the cause of vocal dysfunction, where singers need appropriate counseling and tranquilizers.

Surgical treatment

In LPRD, when medical treatment therapy fails, laparoscopic fundoplication is an important surgical option.^[32] Robotic fundoplication can be done with better outcomes, however, the cost is higher than laparoscopic fundoplication. Anti-reflux surgery provides superior short-term symptom control and a higher quality of life in comparison to medical treatment.^[32]

CONCLUSION

The voice is the most sensitive and expressive aspect of the vocal mechanism, receiving the utmost attention from singers. Dietary and behavioral modifications are considered the primary therapeutic approach for managing LPRD in singers. Preventive vocal hygiene education is very effective for singers at risk of voice disorders. Singers should adopt healthy vocal behaviors such as restriction of voice use, loudness, and increased water intake. Most medical treatments for LPRD are empirical and typically rely on PPIs. However, the therapeutic trial with PPIs often yields uncertain results.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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