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Risk of fibromyalgia in patients with primary muscle tension dysphonia: a possible local manifestation of a musculoskeletal systemic disorder

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Main Article

Anthony Ghanem takes responsibility for the integrity of the content of the paper

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Abstract

Objective. To investigate the risk of fibromyalgia in patients with primary muscle tension dysphonia.

Methods. A retrospective review was conducted of patients with primary muscle tension dysphonia, diagnosed based on history of dysphonia with evidence of laryngeal muscle tension on examination. Fibromyalgia was assessed using the Fibromyalgia Rapid Screening Tool ('FiRST').

Results. Fifty patients were enrolled: 25 with primary muscle tension dysphonia (study group) and 25 matched controls. The mean age of the study group was 50.7 ± 15.2 years versus 49.5 ± 18.6 years for the controls, with a male to female ratio of 3:2 for both groups. Fifty-six per cent tested positive for fibromyalgia in the study group versus 4 per cent in the controls ($p < 0.001$). The mean Voice Handicap Index 10 score in the study group was significantly higher for those who screened positive for fibromyalgia compared to those who screened negative. There was a positive, strong point-biserial correlation between Fibromyalgia Rapid Screening Tool and Voice Handicap Index 10 scores ($r = 0.39$; $p = 0.09$).

Conclusion. These results suggest that fibromyalgia is a significant co-morbid condition in primary muscle tension dysphonia.

Introduction

Muscle tension dysphonia is a phonatory disorder characterised by an increase in laryngeal muscle tension. Patients invariably present with dysphonia, voice fatigue, globus sensation, throat clearing and dryness in the mouth.[1] The diagnosis of muscle tension dysphonia hinges on a thorough examination of the neck and laryngopharyngeal complex. A high positioned larynx, referred to as laryngeal rise, narrowing of the thyrohyoid space, and tension or stiffness in the paralaryngeal muscles, are common findings in affected patients. The most frequent sign on flexible nasopharyngoscopy is supraglottic constriction during phonation. Different laryngeal muscle tension patterns have been described by various authors.[2–4] Based on a review by Garaycochea *et al.*, medialisation of the false vocal folds and anteroposterior compression of the larynx are the most significant laryngeal findings, associated with alteration in mean subglottic pressure.[5] In the absence of a structural or neurological disorder, muscle tension dysphonia is referred to as primary muscle tension dysphonia. In the presence of a structural abnormality such as vocal fold mass, scarring and atrophy, or a neurological disorder such as vocal fold paresis or paralysis, muscle tension dysphonia is considered a secondary phonatory disorder.[1]

There are numerous studies on the pathophysiology of muscle tension dysphonia, with the consensus that high vocal loading and phonatory stress are the main precipitating factors. Co-morbid conditions associated with muscle tension dysphonia include personality disorders, mental illnesses, reflux disease and hormonal imbalance, among many others.[6–11] Fibromyalgia has scarcely been reported as a co-morbid condition in muscle tension dysphonia, although patients with muscle tension dysphonia suffer from paralaryngeal muscle pain and stiffness similar to that reported by patients with fibromyalgia but in peripheral muscles. In 2015, Craig *et al.* reported fibromyalgia and chronic pain in 8 per cent and 5.9 per cent of patients with muscle tension dysphonia, respectively.[12] Similarly, in 2018, McGarey *et al.*, in their study on co-morbid dysphagia and dyspnoea in muscle tension dysphonia patients, reported fibromyalgia as a co-morbid condition in 5.3 per cent of the cases.[13] In both studies, the history of fibromyalgia was retrieved from the patients' medical history database.

This investigation aimed to examine the risk of fibromyalgia in patients with primary muscle tension dysphonia. The impetus for this study is the growing evidence in the literature suggesting that muscle tension dysphonia is a systemic disorder amenable to physical therapy.[12] Neuroimaging studies have shown the presence of alteration in the central

laryngeal motor and sensory control areas related to phonation, findings suggestive of a central neurological disorder that also favour a systemic approach to the diagnosis and treatment of muscle tension dysphonia.[14]

Materials and methods

After obtaining institution review board approval, the medical records of all patients presenting to the voice and swallowing unit at a tertiary referral centre between June 2022 and November 2022, who were diagnosed with primary muscle tension dysphonia, were reviewed. The diagnosis of primary muscle tension dysphonia was based on a history of dysphonia, with evidence of laryngeal muscle tension on laryngeal examination, in the absence of a structural or neurological disorder. The risk of fibromyalgia was assessed by reviewing the Fibromyalgia Rapid Screening Tool ('FiRST') score, with a score above 5 considered positive[15] (refer to Appendix 1 for the detailed Fibromyalgia Rapid Screening Tool questionnaire). The Fibromyalgia Rapid Screening Tool is a six-question validated screening questionnaire; it has a sensitivity of 90.5 per cent, a specificity of 85.7 per cent, a positive predictive value of 89.5 per cent and a negative predictive value of 87.5 per cent, for scores of 5 or more.[15]

The demographic data collected included age, gender, history of smoking and history of professional voice use. The impact of dysphonia on quality of life was also analysed using the Voice Handicap Index 10 (VHI-10), as described by Rosen *et al.*[16]

A control group with no history of dysphonia was matched to patients in terms of age, gender, professional voice use and smoking status.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) software, version 24.0, was used for data analysis. Continuous variables were analysed using descriptive statistics (means and standard deviations). The chi-square test was used to determine the association between categorical variables. Statistical significance was set at a p-value of less than 0.05.

Results

Demographic data

A total of 50 patients were enrolled in this study: 25 patients diagnosed with primary muscle tension dysphonia were referred to as the 'study group', and 25 healthy subjects with no history of dysphonia were referred to as the 'control group'. The mean age of the study group was 50.7 ± 15.2 years and that of the control group was 49.5 ± 18.6 years.

Table 1. Demographics of study sample

Parameter	Cases*	Controls†
Age (mean ± SD; years)	50.7 ± 15.2	49.5 ± 18.6
Gender (*n* (%))		
– Males	15/25 (60)	15/25 (60)
– Females	10/25 (40)	10/25 (40)
Smoking status (*n* (%))		
– Yes	11/25 (44)	11/25 (44)
– No	14/25 (56)	14/25 (56)
Professional voice users? (*n* (%))		
– Yes	1/25 (4)	1/25 (4)
– No	24/25 (96)	24/25 (96)
VHI score ≥ 11 (*n* (%))		
– Fibromyalgia cases	11/14 (78.6)	
– Non-fibromyalgia cases	7/11 (63.6)	

*n = 25; †n = 25. SD = standard deviation; VHI = Voice Handicap Index

The male to female ratio was 3:2 for both groups. In each group, 44 per cent were smokers and 4 per cent had a history of professional voice use (Table 1).

Screening and Voice Handicap Index scores

Fifty-six per cent of the study group tested positive on the Fibromyalgia Rapid Screening Tool as compared to only 4 per cent in the control group. The difference between the two groups was statistically significant ($p < 0.001$) (Table 2).

Moreover, within the study group, the mean Voice Handicap Index 10 score was significantly higher in those who screened positive for fibromyalgia (22.86 ± 11.24) in comparison to those who screened negative (13.91 ± 11.23), with a one-tailed p-value of 0.045. There was a positive and strong point-biserial correlation between the Fibromyalgia Rapid Screening Tool score and the Voice Handicap Index 10 score (r = 0.39), but this did not reach statistical significance ($p = 0.09$).

Discussion

Fibromyalgia is a syndrome characterised by multi-focal pain and stiffness, the severity of which varies with the patients' morbidity and the disease course. Other symptoms include body fatigue, cognitive dysfunction and sleep disturbance.[17–21] Fibromyalgia has been described in association with infectious, inflammatory and autoimmune diseases, with no clear consensus on its pathophysiology. The clinical presentation is often

Table 2. Characteristics of study subjects

	Cases		Controls		
Parameter	Fibromyalgia	No fibromyalgia	Fibromyalgia	No fibromyalgia	*p*-value
Subjects (*n* (%))	14/25 (56)	11/25 (44)	1/25 (4)	24/25 (96)	<0.001
Gender (*n* (%))					
– Males	9/14 (64.3)	6/11 (54.5)	1/1 (100)	14/24 (58.3)	
– Females	5/14 (35.7)	5/11 (45.5)	0/1 (0)	10/24 (41.7)	

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misleading, with no rigid criteria for diagnosis or treatment. A main diagnostic feature set by the American College of Rheumatology is body pain, in addition to increased sensitivity to pressure at specific points in the body.[22] Nevertheless, fibromyalgia is often considered a mysterious syndrome as it does not fit the traditional definition of a disease.

In this investigation, 56 per cent of patients with primary muscle tension dysphonia screened positive for fibromyalgia using the Fibromyalgia Rapid Screening Tool. This percentage is higher than that reported by previous studies, probably because a fibromyalgia screening questionnaire was used, rather than a review of patients' medical history. The results of this study indicate a strong correlation between Fibromyalgia Rapid Screening Tool scores and Voice Handicap Index 10 scores, suggesting that patients with dysphonia and systemic complaints such as pain and fatigue had a worse quality of life than those with dysphonia alone.

The findings of this investigation are not surprising given the central aetiology of fibromyalgia.[23–26] Fibromyalgia is no longer referred to as a peripheral inflammatory disorder, 'fibrositis', but rather a disorder of central origin. Neuroimaging studies of affected patients have shown alterations in the descending inhibitory pain pathways and abnormal function in the ascending pathways that facilitate pain. As a result, there is a decrease in the pain threshold, resulting in hyperalgesia and tenderness.[27–31] To that end, fibromyalgia is considered by many to be a 'central sensitivity syndrome'.[32] Central sensitivity syndrome is an umbrella term that includes myofascial pain, temporomandibular joint dysfunction and many other musculoskeletal pain disorders.[33] There is also growing evidence in the literature to suggest that muscle tension dysphonia can be due to a central neurological dysfunction. Kryshtopava *et al.* investigated the brain activity of 10 women with muscle tension dysphonia using functional magnetic resonance imaging, and showed a decrease in activity in sensory control related areas and an increase in activity in the laryngeal motor control related areas.[14] The authors suggested that muscle tension dysphonia can be a disease of abnormal sensory processing that leads to alterations in motor control and descending motor cortical signals, resulting in excessive laryngeal tension and dysphonia.[14]

- Muscle tension dysphonia is a phonatory disorder characterised by increased laryngeal muscle tension, with dysphonia, voice fatigue, globus sensation, throat clearing and mouth dryness
- Studies on the pathophysiology of muscle tension dysphonia agree that high vocal loading and phonatory stress are the main precipitating factors
- Co-morbid conditions associated with muscle tension dysphonia include personality disorders, mental illnesses, reflux disease and hormonal imbalance
- Fibromyalgia has been scarcely reported as a co-morbid condition in patients with muscle tension dysphonia
- This investigation indicated that patients with primary muscle tension dysphonia are at high risk of having fibromyalgia
- Primary muscle tension dysphonia may have a systemic nature, highlighting the need for a systemic approach when managing affected patients

Another factor that can explain the high risk of fibromyalgia in patients with muscle tension dysphonia is the significant overlap in the demographic characteristics and medical history of patients with muscle tension dysphonia and fibromyalgia. Both muscle tension dysphonia and fibromyalgia are more common in women in middle age, with a female-to-male ratio of 2:1 being reported in fibromyalgia cases.[34] Mental illnesses and personality disorders are also common in a large percentage of patients. A common personality trait in muscle tension dysphonia patients is introversion, and a significant subset of affected patients exhibit high levels of anxiety and depression. This has led many investigators to consider 'personality disorders' as a characteristic diagnostic feature of muscle tension dysphonia that needs to be addressed in the management strategy.[7,8,35] Similar to muscle tension dysphonia, fibromyalgia is also associated with mental illnesses.[36] Although there is no clear consensus on the aetiology of fibromyalgia, what is indisputable is its strong association with affective disorders; this has led many authors to attribute the musculoskeletal symptoms in affected patients to stress, anxiety and depression.[37–39]

This study highlights a strong link between fibromyalgia and muscle tension dysphonia, an interesting fact that warrants further investigation. Nevertheless, this study has its limitations. One limitation is the small number of subjects in our cohort. Another limitation is the lack of physical examination or objective testing such as inflammatory markers to confirm the diagnosis of fibromyalgia.

Conclusion

The results of this investigation indicate that patients with primary muscle tension dysphonia are at a high risk of having fibromyalgia. A large percentage of affected patients exhibit pain and fatigue in other sites of the body aside from the laryngo-pharyngeal complex. These findings allude to the possible systemic nature of primary muscle tension dysphonia, and hence the need for a systemic approach in the management of affected patients. Similar to fibromyalgia patients who benefit from myofascial release to reduce pain, and connective tissue massage to improve depression,[40] muscle tension dysphonia patients may also benefit from adjunctive treatment modalities that include conventional laryngeal manual therapy and circumlaryngeal massage.

Competing interests. None declared

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Appendix A – Fibromyalgia Rapid Screening Tool

You have been suffering from joint, muscle or tendon pain for the past **3 months** at least.

Please fill in this questionnaire by answering either yes or no (only 1 answer: YES or NO) to each of the following statements. Put a cross in the box that corresponds to your answer.

	Yes	No
1. I have pain all over my body		
2. My pain is accompanied by a continuous and very unpleasant general fatigue		
3. My pain feels like burns, electric shocks or cramps		
4. My pain is accompanied by other unusual sensations throughout my body, such as pins and needles, tingling or numbness		
5. My pain is accompanied by other health problems such as digestive problems, urinary problems, headaches or restless legs		
6. My pain has a significant impact on my life, particularly on my sleep and my ability to concentrate, making me feel slower generally		

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