ABSTRACT

Purpose: To illustrate the importance of proper diagnosis, and clinical communication for people dealing with the difficult diagnosis of paradoxical vocal fold motion (PVFM). Method: In this case report, the authors hope to review PVFM causes and differential diagnosis and discuss the clinical treatment methods. Results: The patient had significant complaints with regards to throat tightening and difficulty breathing, and was misdiagnosed with anaphylaxis and temporomandibular disorder. She was seen by a physical therapist who suspected a condition other than what was diagnosed and suggested an evaluation by a speech language pathologist. After a thorough history and examination, the patient was diagnosed with PVFM disorder. Though having this condition for over a year, her complaints were resolved after 4 sessions of care and she returned to normal functioning. A 12-month follow-up revealed the patient without complaints. Conclusion: Paradoxical vocal fold motion is often difficult to properly diagnose. Having close and clear communication between colleagues in the rehabilitation setting is vital for proper diagnosis and treatment of uncommon and challenging medical conditions. An interdisciplinary approach will likely lead to better patient outcomes with conditions such as PVFM.

Key Words: stridor, vocal cord dysfunction, speech therapy, physical therapy

INTRODUCTION

Diagnosis is defined as “the use of scientific and skillful methods to establish the cause and nature of a sick person’s disease. The value of establishing a diagnosis is to provide a logical basis for treatment and prognosis.”1 Unfortunately, often the source of a person’s complaints cannot be established with complete certainty. It is estimated that upwards of 110,000 malpractice claims are filed each year in the United States2 due to misdiagnosis or failure to diagnose. The causes of these errors can be due to the condition being rare, with symptoms being suggestive of many other conditions, or the patient having a rare presentation.3 Adding to the confusion is that many conditions have co-morbidities,4 thus clouding the ability to accurately understand the full extent of a person’s medical condition. A patient suffering from any medical condition will seek treatment in an effort to resolve the difficulties associated with the illness. The primary care physician (PCP) is often the first stop along the medical management process. After initial consultation, if the medical issue is out of the knowledge base of the PCP, a referral to a specialist is made.5 If the subsequent examination is inconclusive, or an incorrect diagnosis is made, the patient may receive improper treatments6 and experience a rising level of frustration. The person begins a cycle of searching for additional opinions in an effort to resolve the symptoms. The case report presented here illustrates one woman’s frustrating search for a proper diagnosis, understanding, and treatment of a difficult to diagnose condition known as paradoxical vocal fold motion (PVFM).

Paradoxical vocal fold motion is a medical condition that is defined as inappropriate adduction of the vocal fold, which may combine with incomplete glottal closure causing an obstruction to the airway leading to a host of symptoms, including but not limited to wheezing, chest tightness, throat tightness, change in voice, and stridor.8 This condition is predominately found in females,6 with the degree of the condition ranging from mild and intermittent to constant and severe. The patient frequently reports “choking” or “tightness” in the throat making breathing difficult; the episode lasts from a few minutes to hours,7,9 with the symptoms and physical findings completely resolving at the end of the “attack.” Co-morbidities in PVFM episodes have been found to include gastroesophageal reflux disease, asthma, post-nasal drip, and anxiety.10,11 Patients with this condition are typically misdiagnosed with resultant mistreatment and non-effective medications. Any examination during a period of being asymptomatic will reveal confusing negative findings.12 One study13 indicated that in one year, patients with PVFM, before being properly diagnosed, had an average of 9.7 emergency room (ER) visits, and 5.9 hospital admissions. Morris et al14 noted patients being misdiagnosed for 4.9 years, and an average 6 ER visits yearly. When a diagnosis is unrecognized and untreated, detrimental psychological effects and a reduced prognosis may occur.14,15

CASE STUDY

Ms W is a 42-year-old female who reported a long history of “months and months experiencing throat tightening and trouble breathing lasting up to several hours.” She had seen multiple physicians and had been given no clear-cut diagnosis. On 5 occasions, she sought care in the ER, each time being discharged after examination, at times with new medications recommended, and advised to seek help through her PCP or other expert clinicians. After her last ER visit, Ms W sought follow-up care with an ear, nose, and throat (ENT) physician, traveling 3 hours for the consultation. On the day of the examination, the patient reported her complaints as, “left ear discomfort, pressure and throat discomfort” (Accessed physicians note, June 23, 2013). She reported to the ENT that 4 months previously, she had an “anaphylactic reaction” due to unknown reasons. She also reported to the ENT that 4 months previously, she had an “anaphylactic reaction” due to unknown reasons. She also reported to the ENT that 4 months previously, she had an “anaphylactic reaction” due to unknown reasons. She also reported to the ENT that 4 months previously, she had an “anaphylactic reaction” due to unknown reasons. She also noted “pain and fullness” in her left preauricular region radiating down into the mandible. The history and examination included the use of flexible laryngoscope that revealed “no masses or abnormality, with normal airway, normal laryngeal mobility, and no lesions.” The ENT concluded that the patient exhibited musculoskeletal symptoms and she was referred for physical therapy.
care to an urban outpatient orthopaedic clinic with a diagnosis of “TMJ/Myofacial Pain/Spasms of the Throat.”

Physical Therapy Examination
Ms W reported pain in her face in the muscles of mastication (primarily on the left) and in the bilateral cervical region with a pain level on a Numeric Pain Rating scale of 8/10 (with 0 being no pain to 10 being maximum pain). She presented with postural deficits of forward head and rounded shoulders. Her active range of motion of her cervical and mandible were within normal limits, with no loss of sensation, strength, or active range of motion of her extremities. “Tenderness” with palpation of her muscle of mastication and suboccipital region was noted. She reported a Neck Disability Index score of 58/100 (with 0 being target value), and a TMD Index score of 23/40 (with 0 being target value). Ms. W’s overriding complaints were of “tightness” and “trouble breathing,” located in the anterior portion of her throat. She carried an EpiPen with her at all times due to “the anaphylaxis” that she experienced in her work environment. She recalled having one episode of vocal tightness after an incident of yelling very loudly.

Results of PT Intervention

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Initial Evaluation</th>
<th>Final Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior Throat Tightness</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Cervical and TMD Pain</td>
<td>8/10</td>
<td>1/10</td>
</tr>
<tr>
<td>Neck Disability Index</td>
<td>58/100</td>
<td>2/100</td>
</tr>
<tr>
<td>TMD Disability Index</td>
<td>23/40</td>
<td>3/40</td>
</tr>
<tr>
<td>Number of Visits</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Speech Therapy Examination

The patient was seen for a speech therapy examination, during which she complained of throat tightening of unknown etiology occurring weekly. Ms W reported anaphylaxis of unknown cause and a feeling of throat tightening during these times. She did not feel this was allergy related. She reported that the first episode of voice tightening was one year prior to evaluation. She denied dysphasia. During episodes of vocal tightness, the patient used a steroidal inhaler for relief.

The patient quit smoking 25 years ago. She had a diagnosis of gastroesophageal reflux disease that she controlled with her diet. The patient reported she did not drink alcohol. She limited her caffeinated beverage intake to one cup of coffee per day. Total vocal use was approximately 2 hours daily. She recalled having one episode of vocal tightness after an incident of yelling very loudly.

Behavioral voice assessment revealed mild strained vocal quality and low volume. Use of clavicular breathing was observed. Noninstrumental assessment revealed within functional limit pitch range.

The S/Z ratio, an indicator of laryngeal pathology was used. The voiceless/voiced cognate pair productions tool takes the length of time a person can sustain an “S” sound divided by the length of time a person can sustain a “Z” sound. Normal is considered one second; anything over 1.40 seconds is considered as having possible vocal fold dysfunction. The S/Z ratio was 1 maximum phonation time for Ms W was 4.5 seconds judged across 3 consecutive trials. The norm is 15 to 20 seconds.

Functional Communication Measure of Voice, a series of 7-point rating scale going from Level 1 (least functional) to Level 7 (most functional) designed to describe a patient’s functional communication ability, was used at initial evaluation as an outcome measurement. Ms W was determined to fit into a Level 5: Voice occasionally sounds normal with self monitoring, but there is some situational variation. The individual’s ability to participate in vocational, avocational, and social activities requiring voice is rarely affected in low vocal demand activities, but is occasionally affected in high-vocal demand activities.

Given the absence of organic findings on the ENT evaluation and the results of the voice evaluation, it was determined that the patient had symptoms consistent with PVFM. The goals of treatment were to focus on retraining normal adductory and abductory movements during phonation and breathing as described in the literature.

Speech Therapy Intervention and Results
Speech therapy “is regarded as the primary therapy and cornerstone of treatment,” for paradoxical vocal cord movement, while Morris & Christopher noted, “speech therapy has been the primary modality used for chronic treatment, and to prevent recurrent symptoms.” The patient was seen for voice therapy with a focus on training diaphragmatic breathing techniques, relaxation techniques to facilitate vocal cord abduction, negative practice activities to help facilitate decreased reaction to tightening of the vocal cords, and improved coordination of airflow for speech. In addition, vocal hygiene, including suppression of behaviors such as coughing or throat clearing, was taught.

At the end of 4 sessions of voice therapy, the patient’s complaints were resolved with her S/Z ratio being a 1, her Functional Communication Measure for Voice was Level 7, while experiencing no pain in the face, throat, or cervical regions. The patient was able to successfully and independently participate in vocational, avocational, and
social activities requiring high or low vocal demands (for results of the speech therapy care, see table below). Self-monitoring was effectively used, but only occasionally needed. Teaching relaxation, airflow, and vocal control allowed the patient to have increased control during vocal tightening episodes. Ms W reported although she still had episodes of “vocal tightening,” she was able to immediately relax her vocal cords by implementing the techniques she learned. The patient felt she had the ability to differentiate paradoxical movement of her vocal cords and anaphylaxis. After both a 6- and 12-month follow-up discussion, the patient reported being able to control her episodes of vocal tightening with the techniques she had learned; thus eliminating further ER visits. The patient was more comfortable in controlling her “throat tightening” when she felt it coming on.

RESULTS

Results of Speech Therapy Intervention

<table>
<thead>
<tr>
<th>Symptom</th>
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<th>Final Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior Throat Tightness</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>S/Z Ratio</td>
<td>1:1</td>
<td>1:1</td>
</tr>
<tr>
<td>Maximum Phonation Time</td>
<td>4.5 seconds</td>
<td>15 seconds</td>
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<tr>
<td>Functional Communication</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Number of Visits</td>
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DISCUSSION

So why is a paper describing speech language pathology care, being published in a physical therapy publication? This case report has significant implications for PTs regardless of practice setting. Both of the authors believe that due to the variety and complexities of the numerous patients seen in the course of daily clinic care, having a pool of experienced professionals to collaborate with is of vital importance. One must know his or her own knowledge-based limitations, and consult another professional when needed. Coupled with the fact that “Face to face patient-provider interaction has become less common across the spectrum of health care, affecting all providers,” a close inter-professional communication is essential for those patients that present with complex conditions. The therapist must not be afraid to question the referral diagnosis, and needs to be properly prepared to defend his professional opinion, based on the facts, to make sure the proper care is given. In the case presented here, the PT knew, based upon the history and presentation of the patient’s symptoms, that this was a “rare and confusing” case, outside of his skill set. Having a close association with speech language pathology, and the ENT physician, allowed the PT to properly facilitate further care of Ms W, to an additional professional who could continue to decode the complaints effectively. The SLP, having the ENT and PT rule out other medical issues, could then focus on and properly diagnose and treat the underlying PVFM.

CONCLUSION

The patient, Ms W, had been seeking care with multiple health providers for her major complaint of anterior throat tightening and difficulty breathing and was misdiagnosed with anaphylaxis and temporomandibular disorder. She was seen by a PT who suspected a condition other than what was diagnosed, and suggested an evaluation by a SLP. After a thorough history and examination, the patient was diagnosed with PVFM disorder. Despite having this condition for over a year, her complaints were resolved after 4 sessions of care and she returned to normal functioning. A 12-month follow-up revealed no complaints by the patient. Ms W’s feelings on this matter were more succinctly stated this way, “your effort accomplished that in which the many doctors and the medications could not.”

REFERENCES

19. Mayer JM, Mooney V, Matheson LN, et


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Call for Candidates 2016 Election

Dear Orthopaedic Section Members:

The Orthopaedic Section wants you to know of 3 positions available for service within the Section opening up in February 2016. If you wish to nominate yourself or someone else, please visit the Orthopaedic Section's web site and fill out the Nomination form: http://www.orthopt.org/uploads/content_files/Committees/Nominating/Orthopaedic_Section_Nomination_Form.pdf and submit to the Orthopaedic Section office at tfred@orthopt.org. Deadline for nominations is September 1, 2015. Elections will be conducted during the month of November.

Open Section Offices:

- President: Nominations are now being accepted for election to a 3-year term beginning at the close of the Orthopaedic Section Membership Meeting at CSM 2016.
- Director: Nominations are now being accepted for election to a 3-year term beginning at the close of the Orthopaedic Section Membership Meeting at CSM 2016.
- Nominating Committee Member: Nominations are now being accepted for election to a 3-year term beginning at the close of the Orthopaedic Section Membership Meeting at CSM 2016.

Deadline for Nominations: September 1, 2015

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