



Detectable voice change with the edrophonium test in laryngeal myasthenia gravis

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Abstract

A case of laryngeal myasthenia gravis in a 65-year-old woman presenting with hoarseness as the sole symptom is reported. Voice spectrography was performed before and after injection of intravenous edrophonium. There was a marked improvement in the patient's voice after the administration of edrophonium, which was confirmed by the changes seen on the sound spectrogram. This was the only objective indication of a diagnosis of myasthenia gravis. No thymoma was seen on chest X-ray and the patient was negative for anti-acetylcholine receptor antibodies. Treatment for laryngeal myasthenia gravis was initiated and the patient's vocal problems resolved. This case emphasizes the need to consider systemic diseases in the differential diagnosis of hoarseness and demonstrates the need for careful follow-up in such patients.

Keywords

Hoarseness, myasthenia gravis, diagnosis, edrophonium test, sound spectrography

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Introduction

The differential diagnosis of husky or breathy hoarseness includes glottal incompetence as a result of vocal fold atrophy caused by physiological ageing of the vocal fold muscles. This is easy to diagnose using fiberoptic examination of the larynx. However, another underlying critical disease may also be present. A rare case of myasthenia gravis presenting with hoarseness is described.

Case report

A 65-year-old woman was referred to the Department of Neurology, National

Hospital Organization Tokyo Medical Center, Tokyo, Japan, in January 2007 with severe hoarseness lasting more than 1 month for assessment for phonosurgery.

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Her voice was husky and breathy. Laryngeal stroboscopic examination revealed a glottal chink and vocal fold atrophy, leading to glottal incompetence during phonation. The maximum phonation time was only 7 s. The diagnosis was sulcus vocalis with vocal fold atrophy caused by physiological ageing of the vocal fold muscles. Treatment with voice therapy sessions and self-administered vocal exercises¹ for 3 months was recommended. Following treatment, the hoarseness disappeared and the maximum phonation time increased to a normal value of 20 s.

This improvement was maintained for 20 months, but the patient's voice then began to become hoarse at night; she was still able to phonate well in the daytime. Subsequently, her voice gradually worsened in the daytime. A possible diagnosis of myasthenia gravis was suggested and further investigations were performed. However, no thymoma was seen on chest X-ray, the

patient was negative for anti-acetylcholine receptor antibodies and clinical examination results including brain magnetic resonance imaging were normal. The only symptom was hoarseness.

Laryngeal stroboscopic examination showed the same findings as at the patient's first visit 2 years before (a glottal chink and vocal fold atrophy). Voice spectrography was performed before and after injection of 2 mg of intravenous edrophonium.² Figure 1 shows the sound spectrogram recorded for the sustained phonation of the vowel sound /a/ ("ah") before and after the administration of edrophonium. There was a marked improvement in the patient's voice after the administration of edrophonium, which was confirmed by the changes seen on the sound spectrogram. On further examination, the patient was only able to maintain high-pitched vocalization for a few seconds (the 'sinking pitch' sign).³ These findings

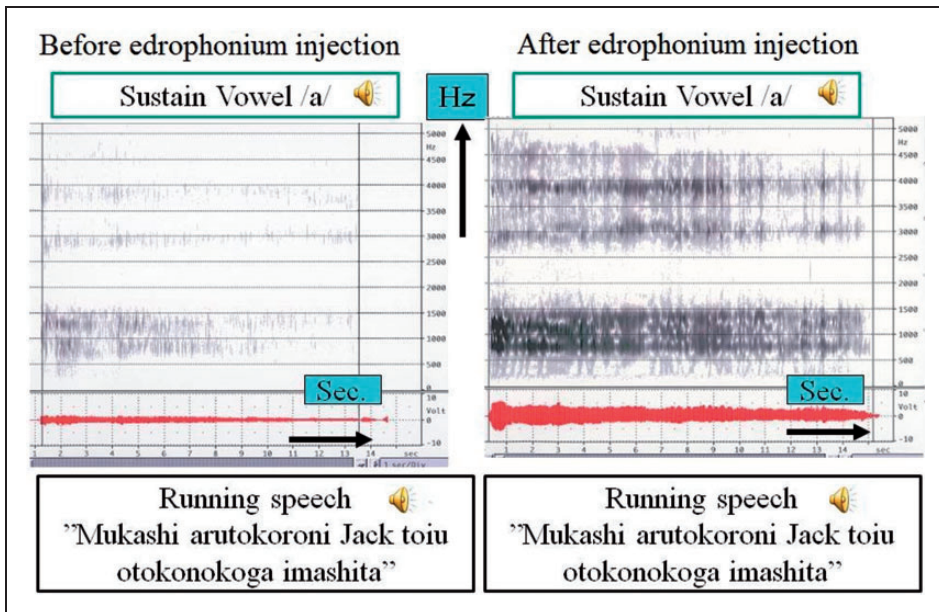


Figure 1. Sound spectrograms before and after the administration of intravenous edrophonium showing sustained phonation of the vowel sound /a/ (“ah”), with example audio files of sustained phonation of the vowel sound /a/ and of running speech; click on the speaker symbols to hear the audio files.

were the only objective indication of a diagnosis of myasthenia gravis. Based on the edrophonium and spectrographic test results, treatment for laryngeal myasthenia gravis was initiated and the patient's vocal problems resolved completely.

Informed consent for her case to be published was obtained from the patient.

Discussion

In cases where hoarseness is the sole primary manifestation, it is very difficult to distinguish myasthenia gravis from other, more common laryngeal conditions.⁴ One report has suggested that dysphonia can be the first sole symptom of the isolated bulbar presentation of late-onset myasthenia gravis.⁵ Mao et al.⁶ reported on 40 patients with laryngeal myasthenia gravis who presented with dysphonia as their initial primary complaint. Among them, only one patient was positive for anti-acetylcholine receptor antibodies. Edrophonium is a short-acting acetylcholinesterase inhibitor that improves strength in myasthenia gravis by increasing the binding of acetylcholine to its receptor; weakness caused by abnormal neuromuscular transmission characteristically improves after intravenous administration of edrophonium. When hoarseness is the sole symptom and myasthenia gravis is suspected, the minimally invasive edrophonium test with sound spectrography is a useful, objective tool for the differential diagnosis of laryngeal myasthenia gravis.

The patient in the case presented here did not have any other symptoms or clinical findings apart from a husky voice. An initial diagnosis of hoarseness due to vocal fold atrophy due to ageing and sulcus vocalis was made, but the patient had a strong desire to be able to communicate with her family and friends as she had done before.

This case emphasizes the need to consider systemic diseases in the differential diagnosis of hoarseness. As well as myasthenia gravis,

conditions such as genetic diseases,⁷ allergic diseases⁸ and collagen diseases⁹ may be present but may be missed due to concomitant vocal fold atrophy due to physiological ageing. In the case reported here, an initial diagnosis of sulcus vocalis with vocal fold atrophy due to ageing was made and the patient was treated with voice therapy and exercises. The underlying diagnosis of myasthenia gravis was only made when the symptoms returned 2 years later. This demonstrates the need for careful follow-up in such patients.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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