The Effect of Intramuscular Stimulation on Otalgia due to Myofascial Pain Syndrome by Contraction of Trapezius Muscle

Ji-Won Chung

Department of Anesthesiology and Pain Medicine, Soonchunhyang University Cheonan Hospital, Soonchunhyang University College of Medicine, Cheonan, Korea

There are several causes of otalgia, specifically primary otalgia, which originates inside the ear, and referred otalgia, which originates outside the ear. In a rare case, otalgia may result from myofascial pain syndrome (MPS) due to a contraction of cervical muscles. The author of this study reports a case in which otalgia caused by MPS due to contraction of the trapezius muscle was treated with intramuscular stimulation (IMS). A 48-year-old female patient with otalgia for two weeks was otolaryngologically tested and no anomaly was found. A pain clinic consultation was requested and severe contraction of the trapezius muscle was observed by history taking, visual inspections and palpation. She was successfully returned to the normal state with two sessions of IMS.

Keywords: Earache; Superficial back muscles; Myofascial pain syndromes; Intramuscular stimulation

INTRODUCTION

Myofascial pain syndrome (MPS) is a very common disease that is identified through symptoms from sensations, motion, and the autonomic nervous system caused by multiple myofascial trigger points. Localized tenderness at trigger points induces referred pain and can spread even to distant parts of the body [1]. The types of pain may also vary, increasing the chances of misdiagnosis.

There are two types of otalgia: primary otalgia in which is caused by a disease of the ear, and referred otalgia in which is caused by the sensory nerves in the ear being stimulated by other non-ear parts. Referred otalgia accounts for 50% of all otalgia cases in adults [2]. While cases of primary otalgia arise in tertiary healthcare centers, referred pain may still account for up to 10% of all otalgia cases [3].

The common causes of referred pain are dental disease, disease of the mandibular joint, cervical spinal diseases, and neuralgia in the order of the highest frequency [3]. MPS is among the rare causes of otalgia; thus, when no anomalies are found in terms of the common causes, it is highly likely that otalgia may be misdiagnosed as a different type of pain, resulting in a delay of treatment.

The author of this study has successfully treated a patient with otalgia caused by MPS due to a contraction of the trapezius muscle widespread in the cervical and thoracic spine via intramuscular stimulation (IMS). Hence, I report this case along with literature references.

CASE REPORT

A 48-year-old female patient visited the otolaryngology department of Soonchunhyang University Cheonan Hospital as an outpatient for left otalgia that began two weeks earlier. She described it as a dull pain in the ear, and there was no display of other associated symptoms, such as headache, dizziness, or hearing loss. The pain lasted for about 1 to 2 minutes, repeatedly occurring at irregular intervals. The patient did not have any medical history in otolaryngology or history of recent infection or trauma, and she was not taking any drugs. Physical examination and otoscopic inspection did not find any otolaryngological diseases; therefore, the patient was referred for consultation to our pain clinic. There were no abnormalities found in the teeth or mandibular joint via histo-

Correspondence to: Ji-Won Chung
Department of Anesthesiology and Pain Medicine, Soonchunhyang University Cheonan Hospital, Soonchunhyang University College of Medicine, 31 Suncheonhyang 6-gil, Dongnam-gu, Cheonan 330-930, Korea
Tel: +82-41-570-2722, Fax: +82-41-573-3559, E-mail: wolftom@schmc.ac.kr
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http://sms.sch.ac.kr
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Interruption, as well as no abnormal radiological findings in the cervical spine. A physical examination revealed severe contraction of the superior and intermediate regions of the trapezius muscle, and a pain trigger point. Intramuscular stimulation was performed using a 3-cm dry needle on the tender point in the occipital region and the posterior of the neck (the origin of the trapezius muscle), and the central regions of the shoulder. During the IMS process, a twitching of the muscle and a subsequent relaxation of the contracted muscle was observed. After a while, MPS was improved and otalgia was also decreased. The patient was taught hyperthermia and kinesitherapy methods for maintaining muscle relaxation; she showed an improvement of approximately 70% of her otalgia upon a one-week follow-up. IMS was performed again, and the otalgia was completely treated after one week, with no recurrence during the subsequent two-month observation.

DISCUSSION

History taking is critical in the diagnosis of otalgia because such a diagnosis is significantly dependent on the characteristics of the regions of otalgia, the duration since onset, aggravating factors, the duration of pain, the pain patterns, any accompanying symptoms, and general cancer risk factors. Pain associated with infection is generally continuous and is aggravated over the course of several hours or days. Intermittent pain is actually more likely to be associated with musculoskeletal diseases, such as temporomandibular joint dysfunction or myofascial pain syndrome. It is important also to examine the types of accompanying symptoms because symptoms such as aural discharge, hearing loss and dizziness may be indicative of primary otalgia.

Referred otalgia can be suspected when a patient has pain in the ear or the periauricular area in spite of normal findings from a physical examination of the ear. In such cases, it is important to note that the intensity of the pain is not relevant to the severity of the trigger cause. A study of 615 patients reported that the most frequent causes of referred otalgia were dental disease (38%), temporomandibular joint dysfunction (35%), cervical spine disease (8%), and neuralgia (5%) [3]; MPS was categorized as a rare cause of referred otalgia.

MPS is defined as chronic muscle pain that is associated with certain localized regions called multiple trigger points that induce sudden and severe tenderness [1]. The pain is a result of the continuous tension or contraction of a muscle, leading to local circulatory failure, with the accumulation of algic substances which stimulate the sensory nerves. This pain stimulation in turn induces a motor or sympathetic nerve reflex, forming a vicious cycle of pain that further aggravates the pain [4]. Myofascial pain is nondermatomal and non-neuromuscular, may not accompany sensory or motor defects, and may be associated with dysesthesia and hyperesthesia of the associated region. The trigger points of MPS often accompany characteristic tenderness as well as referred pain and symptoms involving the sympathetic nervous system. Treatment involves drug therapy using non-steroidal anti-inflammatory drugs and muscle relaxants, stretching, hyperthermia, physiotherapy, tender point injection, and IMS.

The trapezius muscle is a diamond-shaped, superficial and flat muscle enveloping most of the muscles in the superior region of the back and posterior of the neck. It originates from the occipital bone, the superior nuchal line and the nuchal ligament, and extends through the seventh cervical vertebrae (C7) and the spinous processes of the first through the twelfth thoracic vertebra. The superior part of the trapezius is inserted into the lateral half of the clavicle, the middle part is inserted into the acromion, and the inferior part is inserted into the root of the spine of the scapula. The trapezius muscle is innervated by the accessory nerve (CN XI) and third and fourth cervical nerves (C3, C4) [5]. The superior part of the trapezius muscle is in charge of the elevation and upward rotation of the scapula; the middle part retracts the scapula, and the inferior part is in charge of the depression and upward rotation of the scapula. The trapezius is a muscle that is frequently tensed and is often a pain trigger point. Unnatural postures or overuse of the muscle, trauma such as sprain or contusion and severe stress may cause a contraction of the muscle, which can eventually lead to referred pain in the pterion, mandibular joint, teeth, and parotic regions [6].

IMS is a treatment method developed by Gunn [7] which eliminates pain and improves motor function in patients with abnormal neural transmission system caused by functionally impaired efferent nerves due to neuromuscular dysfunction by stimulating the affected tissue area with a needle to induce a neural reflex. It is divided into Gunn’s IMS, IMNS (interventional microadhesiolysis and nerve stimulation), and FIMS (fluoroscopic-guided interventional musculoskeletal adhesiolysis and nerve stimulation) categories. Treatment usually involves the use of a dry needle specially developed for IMS, but sometimes a thick and wide round needle is used as well.

In this case, the patient visited the hospital for otalgia that oc-
curred without a history of any specific comorbidity, trauma or infection. However, there were no abnormal findings during her otolaryngological tests, but a physical examination in a pain clinic revealed pain trigger points in the occipital regions and posterior of the neck (the origin of the trapezius muscle) and the central regions of the shoulder. After IMS was performed on the trigger point, the pain was lost without recurrence. Otalgia may result from a variety of causes other than lesions of the ear; in the present case, no other cause was observed other than the trigger point found in the trapezius muscle. The patient appears to have had MPS caused by contraction of the trapezius muscle, and otalgia seems to have resulted from the trigger point and its referred pain.

It is important for physicians who frequently encounter patients who complain of pain to understand the pain in the region of the primary cause, but it is equally important to identify and treat referred pain caused by anomalies in other regions. Hence, detailed history taking, a scrupulous physical examination and other necessary tests should be employed to pinpoint the cause or causes of any referred pain.

REFERENCES