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Case Report

Injection of Remote Myofascial Trigger Points for Pain Control: A Case Report

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The purpose of this case report is to demonstrate the remote effect of myofascial trigger point (MTrP) injection for pain control. It describes a patient suffering from chronic pain due to MTrPs in bilateral upper trapezius muscle with poor results to direct MTrP injection to upper trapezius. After injection to the MTrPs in bilateral extensor carpi radialis longus, extensor indicis, and first dorsal interosseous muscles, the effectiveness of MTrP injection to bilateral upper trapezius muscles remarkably enhanced. This patient finally became almost pain free. The reason for poor relief of pain immediately after the first MTrP injection (directly on the upper trapezius muscles) was probably due to low pain threshold as a consequence of superimposed fibromyalgia syndrome. The muscles selected for the subsequent injection were actually satellite MTrPs of the key MTrP in the upper trapezius muscle. The remote effectiveness of MTrP injection is probably related to the neural connection in the spinal cord. (Tw J Phys Med Rehabil 2008; 36(1): 47 - 52)

Key Words: chronic pain, myofascial trigger point, trigger point injection, remote effect

INTRODUCTION

Local anesthetic injection has been considered as an effective technique for the control of myofascial pain due to myofascial trigger points (MTrPs).[1,2] MTrP is the most tender (hyperirritable) spot in a taut band of a muscle, characterized with typical referred pain pattern and local twitch response (LTR; a sudden forceful contraction of some muscle fibers in the taut band) in response to hyperstimulation of the MTrP.[2,3] It was demonstrated that immediate pain relief could be obtained if LTRs were elicited during MTrP injection[1] or dry needling.[1,4,5] However, the effectiveness could last for only 2 weeks.[1] In our clinical practice, the effect of pain relief can be even shorter than 1 week, sometimes, only for a few days. Occasionally, the pain of an MTrP is so severe (such as in severe fibromyalgia) that injection of this MTrP is not effective, or even can make it worse (increased pain) after injection. In such case, other therapeu-

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tic approaches should be considered. In this case report, we demonstrated an effective way to inactivate a severe MTrP by injection of the other MTrPs remote to this severe MTrP based on the principle of traditional acupuncture.

CASE REPORT

Medical History

A 36 year-old woman had chronic pain in bilateral shoulders (symmetrically) for about 5 years. She attributed her pain to her job. She had been working as a secretary and had to do typing very frequently. Episodically, she had exacerbation with pain intensity up to 7-8/10 (numerical rating scale from 0 to 10 with 0 = no pain and 10 = worst pain ever experienced in the life), especially after prolonged sitting for computer work. She had received various tests including X-ray of cervical spine, MRI of cervical spine, electromyography, and blood chemistry. All reports stated negative findings. She was treated with oral non-steroidal anti-inflammatory drugs. She also received physical therapy including thermotherapy, electrotherapy, stretch, and massage. All therapies could reduce pain intensity. Unfortunately, the effectiveness was only temporary.

In the last 2 days prior to her first visit to our pain clinic, she had being working continuously for many hours and had increased shoulder pain. At the time of the first visit, the pain intensity was up to 8/10.

Physical Examination

There were active MTrPs in the cervical paraspinal muscles and bilateral shoulder girdle muscles. The most painful sites were in the upper trapezius muscles. The diagnosis of MTrP was based on that described in the "Trigger Point Manual".[2,6] Examination of the cervical spine revealed a reduced range of motion in all directions, especially during rotation and side bending. There was evidence of reduced normal lordotic curvature due to paraspinal muscle spasm. Cervical facet sign (ipsilateral rotation of cervical spine followed by extension) was negative. Spurling sign (intervertebral foramen compression) was also negative. Examination of bilateral shoulders revealed normal ranges of motion. Impingement sign (pain with shoulder in a high abduction position) was negative. Resistive contraction of rotator cuff muscles induced no pain. There were no neurological abnormalities. The diagnosis was myofascial pain due to MTrPs in bilateral upper trapezius muscles secondary to chronic strain of upper trapezius muscle.

Initial Treatment

After examination, she was informed about the diagnosis and the treatment plan. She then received MTrP injection to the upper trapezius muscles in both sides. The technique of MTrP injection was the same as that described by Hong.[1] Initially, the needle was inserted into the subcutaneous layer. Then the needle was moved into the muscle layer at a speed of approximately 10 mm/sec for a distance about 5-15 mm, and pulled out to the subcutaneous layer at the same speed. A drop (approximately 0.02-0.05 ml) of 1% lidocaine was injected as soon as an LTR was elicited during needle insertion. This needle insertion was repeated again in a different direction (into another tract), and so on. In this way, many LTRs could be elicited. Totally about 1 ml of 1% lidocaine was used for each site. Remarkably, there was an increased range of motion in the cervical spine after treatment. However, the pain intensity was only slightly reduced (down to 5-6/10).

Second Visit (one week after the initial visit)

Within 3 days after the first treatment, the pain and tightness progressively returned to the original levels. She then received injection with 1% lidocaine to MTrPs in bilateral extensor carpi radialis longus (same site as acupuncture point, Qu-chi, LI-11), bilateral extensor indicis (same site as acupuncture point Wai-guan, TE-5), and bilateral first dorsal interosseous muscles (same site as acupuncture point He-gu, LI-4) subsequently. The selection of muscles for injection was based on the concept of traditional acupuncture in treating neck and shoulder pain. The acupuncture points for the treatment of neck and shoulder pain include Fen-chi (GB-20), Qu-chi (LI-11), Wai-guan (TE-5), He-gu (LI-4), San-yin-jiao (SP-6), Yang-ling-quan (GB-34), etc. Immediately after injection, the pain intensity in the upper trapezius was reduced to 4-5/10. Then the MTrPs in bilateral upper trapezius muscles were injected. After completion of

treatment, the pain and tightness in both shoulders subsided almost completely. She was advised to continue physical therapy at a nearby facility. She was also instructed about body mechanics (appropriate postures at work and avoidance of prolonged sitting continuously) and home program (isometric exercise, heat and stretch).

Third Visit (two weeks after the second visit)

The patient reported no pain after the second treatment for about 10 days. Then she returned to work again but the work loading was cut down to only about 60% of previous level. After working for 2 days, the pain in the shoulder recurred with an intensity about 6-7/10. The same procedures as that for the second treatment were given again. The pain intensity reduced to 0-1/10 after treatment and the upper trapezius muscles were completely relaxed.

Follow Up Phone Call (6 months after initial visit)

The patient did not return to our clinic after the last visit. A follow-up phone call about 6 months after the initial visit revealed that, after the last treatment, she no longer suffered serious discomfort at any site (with pain intensity 1-2/10). Overall, she showed an improvement of at least 80% subjectively. She had watched for body mechanics and had performed home program as instructed.

DISCUSSION

In this case report, we have demonstrated the remote effects of MTrP injection for pain control. When a highly active MTrP can not be effectively controlled by MTrP injection, an alternative way of injection to the remote MTrPs can be considered based on the principle of traditional acupuncture. Injection of the remote MTrPs may reduce the pain intensity of the original irritable MTrP and subsequently, this original MTrP can be injected effectively. This technique is particularly useful for the patients with superimposed fibromyalgia syndrome or tendency of fibromyalgia as discussed below.

Issue of Diagnosis

The diagnosis of myofascial pain is based on the existence of one or more active MTrPs.[2] In the last 15 years, the nature of MTrPs has become better understood based on both human[1,3,7-12] and animal studies.[8,13-20] It has been strongly suggested that an MTrP is usually secondary to, or associated with, a lesion other than the muscle itself.[3] Frequently, a patient with an MTrP the upper trapezius muscle may have cervical disc lesion,[21] or cervical facet joint lesion.[22] However, in our case, these two conditions could be excluded based on the clinical examination and radiological studies. Since this patient had history of chronic overloading of upper trapezius muscles, it was reasonable to consider that the MTrPs of upper trapezius muscles were secondary to, or at lease related to, the chronic strain of the upper trapezius muscles.

This patient had no remarkable pain relief after MTrP injection of upper trapezius muscles as usually observed on usual patients.[1] A patient with fibromyalgia frequently responded to MTrP injection differently from usual patients. Hong et al compared the responses to MTrPs injection between patients with and without fibromyalgia and found that fibromyalgia patients had severe pain immediately after injection and might last for a few days before improvement.[23] Furthermore, this patient had symmetrical pain in the neck, upper back and shoulders. Therefore, we highly suspect that our patient might have superimposed fibromyalgia syndrome.

Issue of Fibromyalgia

According to the old concept, a patient with myofascial pain has one or more myofascial trigger points, and referred pain can be elicited by compression of the trigger point. On the other hand, a fibromyalgia patient has tender points and no referred pain can be elicited. However, Hong has strongly disagreed with this concept.[3] In an algometer study on tender points and trigger points in both normal and pain subjects, a referred pain could be elicited even from a tender spot not in the MTrP region if the compression pressure was high enough.[9] No referred pain could be elicited in many tender points or trigger points since the patient could not tolerate the high pressure that was high enough to elicit referred pain.[9] MTrP is one kind of tender point located in the endplate zone. Tender points can be identified in many regions other than muscle tissue as far as sensitized nociceptors could

be found in those spots. A fibromyalgia patient usually has both tender points and MTrPs with low pain threshold in multiple sites. Since a fibromyalgia patient has low pain threshold so that many latent MTrPs become active ones. The reason why a fibromyalgia patient has low pain threshold is probably related to the low serotonin level and high substance P level in the cerebrospinal fluid.[24]

Mechanism of MTrP injection

The mechanism of MTrP injection is still uncertain. Based on previous human[1,3,7-12] and animal studies,[8,13-20] there are multiple sensitive loci in an MTrP region. When a sensitive locus is stimulated with high mechanical pressure (hyperstimulation), an LTR can be elicited in addition to local pain and referred pain. This sensitive locus is probably nociceptors (free nerve endings) based on histological studies.[18,19,25] The effectiveness of MTrP injection depends on the occurrence of LTRs during injection.[1] The reason of the importance of LTR elicitation during MTrP injection is still unknown. Most likely, strong pressure stimulation to sensitive loci generates powerful neural impulses to the dorsal horn cells in the spinal cord. These impulses subsequently break the vicious cycle of the neural circuit responsible for MTrP ("MTrP circuit"),[26,27] in a manner that could be similar to *hyperstimulation analgesia*. During MTrP injection, the needle is moved rapidly to generate high pressure stimulation.

Possible Mechanism of Remote MTrP Injection

The selection of acupuncture points for treating our patient was based on the description in the literature of traditional acupuncture,[28-30] as well as authors' clinical experience. In acupuncture therapy, effectiveness in remote pain control has been well documented.[28-30] This phenomenon may be related to a spinal cord mechanism similar to the MTrP mechanism.[3,31] Recently, Kuan reported a patient with reflex sympathetic dystrophy following a traumatic shoulder injury treated successfully by local steroid injection after pre-treatment on the remote MTrPs.[32] A more recent study by Hsieh et al.[10] confirmed that dry needle-evoked inactivation of a primary (key) MTrP could inhibit the activity of satellite MTrPs situated in its zone of pain referral. The MTrPs injected in this case were actually satellite MTrPs of the key MTrP in upper trapezius muscle. From acupuncture point of views, the injected points actually located in the channels (meridians) of large intestine and triple energizer. It is very likely that needle stimulation of a certain point can produce an expanding effect at a remote site via the central connections in the spinal cord.

CONCLUSION

Following the principle of traditional acupuncture, injection of MTrPs remote to a hyperirritable MTrP may reduce the pain intensity of this hyperirritable MTrP. This approach can be applied for MTrP injection on difficult cases.

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遠端肌激痛點注射對疼痛的控制：病例報告

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本病例報告之目的在於描述肌激痛點注射之遠端效應。有位雙肩上斜方肌長期疼痛之病患，在接受直接激痛點注射無效之後，於本門診先接受雙側橈側伸腕長肌、伸食指肌、及第一背骨間肌之激痛點注射後，再做上斜方肌之激痛點注射，其效果非常好，此病患之疼痛幾乎完全解除。此病患第一次在上斜方肌接受直接激痛點注射後，無法立即止痛之理由，可能是因爲此病患同時有肌纖膜疼痛症候群而導致疼痛閾值降低。於本門診所注射之肌激痛點則包括上斜方肌之衛星(次要)激痛點。激痛點注射之遠端效應可能與脊髓內之神經連結有關。（台灣復健醫誌 2008；36(1)：47 - 52）

關鍵字：慢性疼痛(chronic pain)，肌激痛點(myofascial trigger point)，肌激痛點注射(trigger point injection)，遠端效應(remote effect)

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