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Case Report

만성 난치성 상부 등 통증에서 초음파 유도 하 흉추 주위 공간 차단술

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Ultrasound Guided Thoracic Paravertebral Space Block for Chronic Intractable Upper Back Pain

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There are some cases of myofascial pain syndrome (MPS) with chronic upper back pain that does not respond to dry needling or trigger point injection, well-known treatments for MPS. A 67-year-old female developed a stabbing upper back pain with trigger point at left T7～8 levels 10 years ago. She complained of the pain with Numeral Rating Scale (NRS) 8 points. Myofascial release technique and trigger point injection had no effect. Under ultrasound guidance 20 ml of 1% lidocaine was injected into thoracic paravertebral space. Immediately, the pain was reduced to NRS 4 points. One week later, the second block was performed in the same way as the first, and the pain was reduced to NRS 2 points. The stabbing pain disappeared, and oral opioids were discontinued. Ultrasound guided thoracic paravertebral space block is an effective and safe treatment for refractory MPS with chronic upper back pain. **(Clinical Pain 2021;20:141-144)**

Key Words: Myofascial pain syndrome, Upper back pain, Thoracic paravertebral space block

INTRODUCTION

Myofascial pain syndrome (MPS) is a noninflammatory disorder of musculoskeletal origin, associated with pain and muscle stiffness. It is often characterized by active trigger point with referred pain and is associated with sensitized local nerve endings causing pain and decreased range of motion [1]. There are multiple interventions for MPS such as nonsteroidal anti-inflammatory drugs or opioids medication, myofascial releasing technique and injection therapies including trigger point injection (TPI) [2]. Although these treatments are usually effective, there are some cases of chronic intractable upper back pain that does not respond to well-known treatments for MPS. It tends to be more widespread than acute or recent onset syndromes and never go away entirely if not treated effectively [3]. In such cases, patients often complain of depression and anxiety due to refractory pain, which leads to a vicious cycle of poor compliance with treatment. Especially in case of chronic upper back pain, injection treatment has the possibility of complications such as pneumothorax, vascular puncture, hypotension, infection, cerebral infarction, and sudden death. The risk of addiction to pain killers such as opioids is also high. The treatment is relatively limited compared to chronic neck or lower back pain. Thoracic paravertebral space (TPVS) block involves the injection of local anesthetics into a wedge-shaped space lateral to the spinal nerves as they emerge from the intervertebral foramina [4]. It results in an ipsilateral somatic motor and sensory nerve block of multiple contiguous thoracic dermatomes above and below the site of injection [5]. TPVS block is known to be applicable to postoperative pain relief and various pain control in the upper back and chest wall, including open chest surgery and breast surgery [6]. In this case, we intend to report the usefulness of TPVS block for refractory MPS with chronic intractable upper back pain which lasted for 10 years and was not relieved by TPI and

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myofascial release technique.

CASE REPORT

A 67-year-old female developed a stabbing pain in her left upper back without any trauma history 10 years ago. The pain gradually worsened, making it difficult to continue daily activities and work in orchard the patient had been doing for decades. The patient was diagnosed with MPS at local hospital and underwent myofascial release technique and TPI for several years but there was no relief in pain. The patient had visited emergency room four times within a month before admission to our hospital, each time receiving intravenous opioids and muscle relaxants. It worked temporarily, but the pain soon recurred.

When first visited to our hospital, 10 years after symptom onset, she complained of the pain with Numeral Rating Scale (NRS) 8 points intermittently aggravating up to NRS 10 points when back muscles stretched. There was a definite trigger point with taut band on left longissimus thoracis muscle at T7 and T8 vertebrae levels. The patient regularly took oral opioids (oxycodone HCl 20 mg/day) and anticonvulsants (pregabalin 300 mg/day). The patient also showed depression and anxiety with Beck Depression Inventory-II 18 points because of refractory pain. Cervical and thoracic spine MRI, laboratory test, neurologic exam and electromyography were performed to differentiate underlying diseases such as tumor, musculoskeletal abnormalities, inflammatory disease and neurological diseases, and there were no specific findings. To release the trigger point, myofascial release technique and intramuscular stimulation (IMS) were performed 4 times and twice respectively. Non-invasive pain-free signaling therapy (Pain-Scrambler MC-5A, Competitive Technologies, Inc., Fairfield, USA), ultrasound and Interference Current Therapy were also applied to the pain site, but the pain did not reduce. A week after admission, confirming that well known treatments for MPS were ineffective, ultrasound guided TPVS block was performed to achieve broad range of pain block effect. The patient took a prone position so that the pain site could face upward, and a cushion was placed under the chest to better expose the injection site (Fig. 1). The injection level was determined based on the patient's inferior angle of left scapula. At this level, the transverse process and spinous process of the thoracic vertebrae were checked in cross and longitudinal view, and TPVS including the pleura and intercostal membrane was clearly visible (Fig. 2). In longitudinal view, the needle was advanced to contact the superior border of transverse process of T8 vertebra. After contact, the needle was further advanced above it and pierced costotransverse ligament. Then 20 mL of 1% lidocaine was

Fig. 1. Prone position of patient. Linear transducer was placed at the injection site. The circled area indicates the most painful site (Left T7～8 levels).

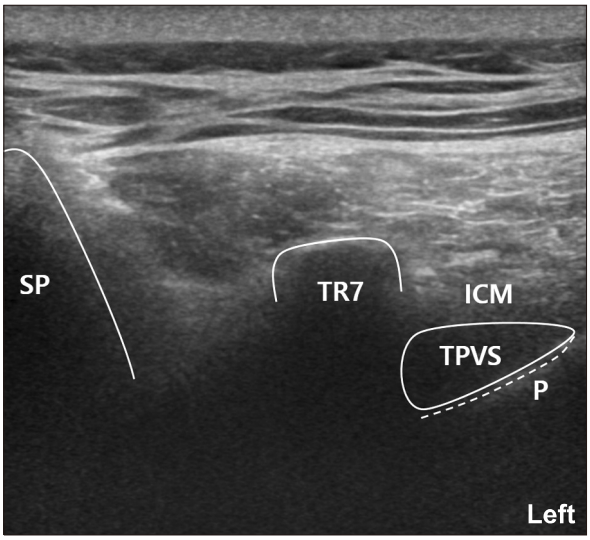

Fig. 2. Ultrasonographic imaging in transverse view. SP: spinous process of T7 vertebra, TR7: left transverse process of T7 vertebra, ICM: internal intercostal muscle, TPVS: thoracic paravertebral space, P: pleura.

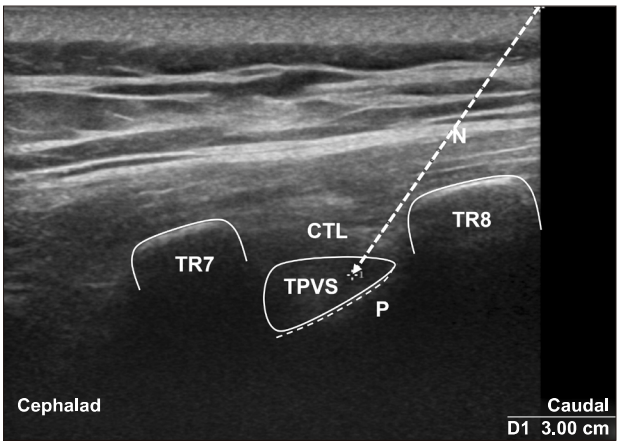

Fig. 3. Ultrasonographic imaging in longitudinal view. The needle was advanced to contact the superior border of transverse process of T8 vertebra. After contact, the needle was further advanced above it and pierced costotransverse ligament. Then 20 ml of 1% lidocaine was injected into the TPVS between T7 and T8 vertebrae. TR7: left transverse process of T7 vertebra, TR8: left transverse process of T8 vertebra, CTL: costotransverse ligament, TPVS: thoracic paravertebral space, P: pleura, N: needle.

injected into the TPVS between T7 and T8 vertebrae according to previous study [5]. It was confirmed that the solution accurately enters and spreads in the area using ultrasound (Fig. 3). Immediately after injection, the pain was reduced from NRS 8 to NRS 4 points with adverse effect of mild dizziness and nausea which disappeared within an hour. A week later, the pain gradually worsened to NRS 6 points, but still reduced compared to the initial state. A week after the first injection, the second TPVS block was performed in the same way as the first and the pain was reduced from NRS 6 to NRS 2 points immediately. There was adverse effect of mild dizziness and nausea immediately after the second injection, but it disappeared in an hour. The pain remained reduced state at NRS 2 points, and the stabbing pain as before disappeared. Oral opioids (oxycodone HCl 20 mg/day) were discontinued, and the patient discharged 2 days after the second injection. Until the outpatient follow-up, a month after the second injection, the patient had never visited to the emergency room as before. In other words, she did not receive intravenous opioids and muscle relaxants. The pain gradually worsened to NRS 5 points after a month, but it was not so severe that it was a problem in everyday life as before.

DISCUSSION

MPS is a pain condition originating from muscle and surrounding fascia. Prevalence of MPS varies from 30% to 93% among the persons with musculoskeletal pain [7]. However, previous study presented the discrepancy between prevalence and perceived effectiveness of treatment methods in MPS [8]. Especially in case of chronic upper back pain, there is a limitation in treatment in contrast to chronic neck or lower back pain for which various intervention methods are known. Injection therapy such as TPI or IMS is not easy due to the risk of complication of pneumothorax.

In this study, the patient underwent TPI, IMS and myofascial release technique for refractory upper back pain that had persisted for 10 years. The patient also took oral opioids regularly (oxycodone HCl 20 mg/day). However, there was no effect. After TPVS block, the pain was reduced to NRS 2 points. The stabbing pain as before disappeared, and oral opioids (oxycodone HCl 20 mg/day) were discontinued. The patient also stopped taking oral opioids.

TPVS block has been used to manage benign and malignant neuralgia of thoracic dermatomes. It can block both the somatic and sympathetic nerves along the continuous dermatomes above and below the injection site with a single procedure. Gerwin et al. [9] stated that sympathetic nervous system activity could cause myofascial pain. Sympathetic nervous system activity induces constriction of capillaries, causing ischemia and muscle damage. As the pH becomes acidic, the activity of acetylcholinesterase is inhibited, and the release of acetylcholine is facilitated. As a result, acetylcholine activity is increased with sarcomere hypercontraction, and the formation of taut bands [9]. In this case, it is assumed that TPVS block relieved the pain by blocking this serial sequences.

Therefore, TPVS block is expected to be helpful in pain relief in patients with chronic intractable upper back pain in which opioids, myofascial release technique or TPI, well-known treatments for MPS are not effective. It is also a simple, easy-to-learn and highly successful technique and is associated with a low complication rate even with repeated injections. Previous study reported 2.6% complication rate in 156 consecutive TPVS block cases who received multiple injections [10].

In conclusion, ultrasound guided TPVS block is an effective and safe treatment for chronic intractable upper back pain. Additional research is needed based on more cases and treatment experience on the long-term effects of TPVS block.

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