

신경근병증에 대한 침술 치료 후 복통을 동반한 다리의 국소 파상풍

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Localized Tetanus in Legs with Abdominal Pain after Lumbar Radiculopathy Acupuncture Treatment

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Tetanus is an infectious disease that causes muscle spasm with spastic paralysis and pain. Localized tetanus is rare and milder than the generalized form, however, it should be immediately treated because it may precede the onset of generalized form. The authors experienced a case of localized tetanus in both legs with abdominal pain after lumbar radiculopathy acupuncture treatment and here report this case with relevant literature reviews. (Clinical Pain 2020;19:36-39)

Key Words: Localized tetanus, Acupuncture, Abdominal pain

INTRODUCTION

Acupuncture is an alternative medicine that originated in ancient China and has been used commonly in Eastern countries for the treatment of chronic pain.¹ Recently it became widely used in Western countries. Acupuncture is known to be effective for relieving chronic low back pain, pain in the neck and shoulders and related headaches.^{2,3} However, it also has several adverse effects because it is an invasive procedure that uses needles penetrating the skin and muscles.⁴

Tetanus is an infectious disease that causes muscle spasm combined with spastic paralysis and pain. It is caused by *Clostridium tetani*, which produces the tetanus toxin, and occurs in contaminated wounds. In general, patients with tetanus have continuous muscle contractions in the same anatomic region. The injury and the contraction may persist for many weeks before gradually subsiding.

Limb localized tetanus is rarely reported, localized tetanus associated with acupuncture treatment is even more

rare. To the author's knowledge, this is the first report of localized tetanus developed after acupuncture treatment and it has unique clinical presentation of abdominal pain.

CASE REPORT

A 64-year-old man with bilateral leg pain and spasms visited our outpatient clinic and admitted. He had 4th and 5th lumbar discectomy surgery for lumbar radiculopathy 4 years before. He had bilateral acupuncture at thigh and calf 5 days ago by a licensed acupuncturist for the pain of both legs. At the clinic, he had abdominal pain, however, he did not undergo acupuncture treatment on pelvis and abdominal region. The patient did not know if he had been immunized for tetanus and was taking medications to control low back pain. On the date of admission, he developed severe bilateral leg spasms. The spasms were sudden, powerful, and painful contractions and occurred frequently, but trismus and opisthotonos, which are common in generalized tetanus, were not seen.

When he visited the emergency room, initial vital signs indicated a body temperature of 36°C, a pulse rate of 86 beats per minute, a respiratory rate of 20 per minute and a blood pressure of 133/77 mmHg. Physical examination of the bilateral leg muscles revealed severe spasm and muscle power determined by Medical Research Council (MRC)

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grade was ‘good’. He showed severe spasticity or stiffness compatible to the 4th grade of the modified Ashworth scale for both legs. Initial lactate dehydrogenase, creatine phosphokinase, and myoglobin were checked and the values were 622 U/L (211~423 U/L), 3423 U/L (30~180 U/L), and 446 ng/ml (0~70 ng/ml) respectively. Complete blood cell count indicated 13,200/mm³ white blood cells with 92% of segmented neutrophil, 12.2 g/dl hemoglobin, and 203,000/mm³ platelets. Routine urine analysis and blood coagulation test were within normal limits. There were several etiologies which may cause lower extremity spasticity like brain injury, spinal cord injury, multiple sclerosis, and localized tetanus, etc. We performed Brain MRI, L-spine MRI, CSF studies, awaking electroencephalogram to rule out these diseases. Because the tests showed no abnormality relevant to the symptoms, it was less likely to be spasm due to the brain injury or spinal cord injury or multiple sclerosis.

Because the serum titer or tetanus toxin assay was not available in the hospital there were no definite tools for diagnosing tetanus, so the diagnosis were based on the clinical presentation and patient’s history. The fact that the patient had acupuncture on both lower extremity and the typical pattern of spasm lead to the diagnosis of localized tetanus and started treatment immediately. Treatment was started by initially injecting Hypertet[®] (Green cross, Gyeong-gi,

Korea) 5000 IU and diazepam. Medication including baclofen and pregabalin was also given to relieve pain and spasticity.

He also complained of pain and swelling on the right inguinal and lower abdominal regions, which were investigated with an abdominal computed tomography (CT) based on suspicion of pelvic ascites. The abdominal CT showed the possibility of an intramuscular hematoma, or hemorrhagic cyst, or a post-traumatic cyst in the right iliacus muscle and the radiologist recommended an enhanced pelvic magnetic resonance imaging (MRI) exam. The enhanced pelvic MRI showed multiple muscular oedema in right psoas, iliacus, gluteus minimus, medius and maximus, adductor magnus, longus, brevis, and pectineus muscles. It also showed proteinaceous fluid collection in the right adductor magnus (Fig. 1) and psoas muscle (Fig. 2) suggestive of grade II muscle injury and intramuscular hematoma. The patient was referred to an orthopedic surgeon for surgical treatment of hematoma, and was advised to treat conservatively until the hematoma spontaneously absorbs. Approximately 2 weeks after admission, the patient was transferred to the rehabilitation department and went through a nerve conduction study on the median, ulnar, posterior tibial, peroneal, and sural nerves to rule out other causes of his symptoms. The results showed no electrophysiologic evidence suggesting peripheral neuropathy.

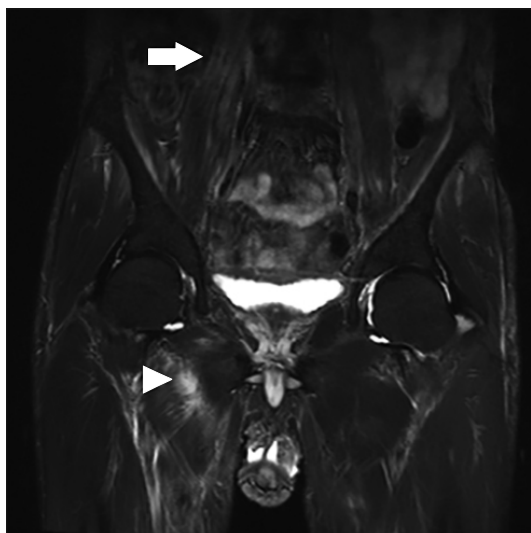


Fig. 1. High signal intensity was observed on right adductor magnus (arrowhead) and psoas (arrow) muscles in coronal view of T-2 weighted MRI images.

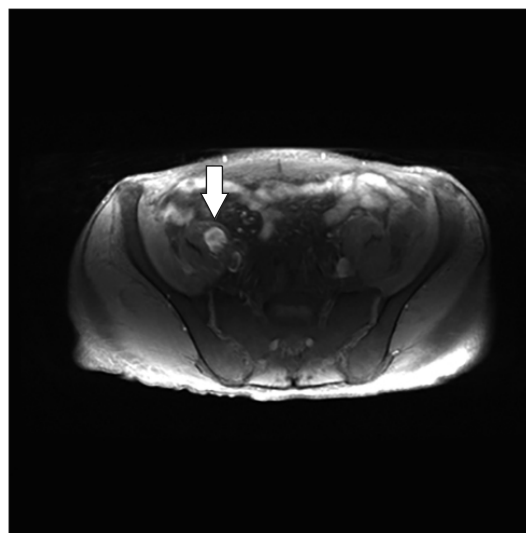


Fig. 2. Proteinaceous fluid collection in the right psoas muscle (arrow) in axial view of fat-suppression T-1 weighted MRI images.

Needle electromyography could not be performed because he had fear of needle insertion and refused this evaluation. He simultaneously started physical therapy that included physical modality with interferential current therapy, range of motion exercises for the lower leg and gait training.

Muscle spasm and stiffness improved gradually after treatment and muscle enzyme levels rapidly dropped to the normal range 2 weeks after symptom started. He was discharged after 2 months with medications. On physical examination at discharge, muscle spasm and stiffness of both legs was remarkably reduced and muscle power was normal grade in MRC grade. Also, he could walk without devices or assistance. After discharge, the authors performed follow-up examinations 3 times per month in the outpatient clinic and the patient did not show any other abnormal symptoms or signs related to tetanus.

DISCUSSION

Tetanus has been reported frequently in the past, however, because a vaccination has been widely used, now tetanus became a rare disease. Diagnosis of tetanus rely on clinical history and symptoms such as lockjaw, spasm of muscles, and opisthotonos. Trismus, dysphagia, and generalized muscle stiffness are the most common clinical manifestations of generalized tetanus.⁵ This case is more unique because it is a case that localized tetanus is diagnosed with symptoms of bilateral lower extremity and abdominal pain without facial or systemic symptoms. His acupunctured history, typical spastic pattern of lower extremity and exclusion of other diseases lead to diagnosis of localized tetanus. As a limitation of this case, the serum titer or tetanus toxin assay was not available in the hospital, treatment was started without these examinations. In addition, MRI and EMG were performed in consideration of lower extremity pain and spasticity due to side effects of acupuncture, but did not reveal any diagnosis other than tetanus to explain the manifestation of patients with modified Ashworth scale 4 and typical spastic patterns.

The authors hypothesized that poor sterilization of patient's skin or contamination from the practitioner's hand, especially dirty nails or contaminated injury could be the possible cause of localized tetanus in this case. In addition, it is conventional for acupuncturists to practice without wearing gloves for examining the tissues thoroughly. This

case emphasizes that strict cleaning of the patient's skin and acupuncturist's hand, including nails, should be done before the procedure.

In previous literature, localized tetanus was retrospectively analyzed from 1976 to 1997 in Abidjan.⁶ A total of forty-five patients were reported, and none of the patients had been immunized against tetanus. Three types of localized tetanus were observed: 32 cases of tetanus in the limbs, 11 cases of cephalic tetanus and 2 cases of abdominal tetanus. Infection occurred in limb wounds (38%), intramuscular injection (33%), craniofacial wounds (25%), abdominal wounds (2%) and unidentified portals of entry (2%).

In this case, symptoms of local tetanus developed not only in the patient's bilateral leg muscles which was directly injured by needles, but also in the lower abdomen. On pelvic MRI, multiple intramuscular hematomas were found in bilateral leg and necrosis with fluid collection was also found in right psoas muscle although it was not an acupuncture point. In this regards, the evidence for retrograde intra-axonal transport of tetanus toxin was reported⁷ and there was a report that iliopsoas hematoma had higher incidence in tetanus patient with anticoagulation treatment than patient with anticoagulation treatment alone.⁸ Although it has limitation in interpreting through this report because patient in this case was not having anticoagulation therapy, the authors suggest that tetanus toxin itself might be a bleeding risk factor and caused iliopsoas hematoma.

Electrophysiological study is also helpful in evaluating tetanus; however, this is not routinely performed and the results can vary. In sensory nerve conduction studies, single nerve action potential amplitudes may be slightly reduced or normal, and sensory nerve conduction velocities are similarly mildly reduced. Motor nerve conduction studies are similar to the sensory studies. In needle electromyography, continuous firing of motor units could be found in various muscles, which is consistent with the clinical finding of increased muscle tone. The elevation of muscle enzyme could be helpful in the diagnosis. In this case, the patient showed severe bilateral leg spasms after acupuncture and elevated muscle enzymes such as lactate dehydrogenase, creatine phosphokinase, and myoglobin.

Treatment of tetanus consists of human tetanus immunoglobulin and diazepam. In addition, patients should be

separated in quiet areas with dim lighting because spasms are triggered by noise and light. For antibiotic treatment, metronidazole is preferred and other antibiotics such as tetracyclines, macrolides, clindamycin, cephalosporins and chloramphenicol are also effective.⁹ In this case, we did not start antibiotic treatment because there was no visual wound and no sign of secondary infection. We prepared to start the antibiotics by close observation in case of aggravating patient status or evoking inflammation of the acupuncture site. However, antibiotic therapy did not require because the patient's condition subsequently improved and no additional wound developed. In addition, prognostic factors that are associated with adult tetanus deaths were reported to include post-operative tetanus, generalized tetanus, a fever of $\geq 40^{\circ}\text{C}$, and tachycardia of 120/min.¹⁰ Early treatment of this patient with human immunoglobulin, baclofen, and pregabalin and physical therapy plus the absence of poor prognostic factors were associated with complete recovery without progression to generalized tetanus or other associated complications.

In summary, localized tetanus is a rare form of tetanus, occurred after acupuncture in this case. The tetanus appears to be developed in muscles which needles are not inserted, presumably by antidromic nerve spread. In addition, it should be immediately treated because it may lead the generalized tetanus. This case implies that it is hard to over-emphasize the importance of strict sterilization during acupuncture treatment.

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