Case Report

Ann Rehabil Med 2011; 35: 570-573
pISSN: 2234-0645 • eISSN: 2234-0653
http://dx.doi.org/10.5535/arm.2011.35.4.570

arm
Annals of Rehabilitation Medicine

Prolotherapy-induced Cervical Spinal Cord Injury

- A Case Report -

Hyun-Sik Yun, M.D., Hyung-Seok Sun, M.D., Hyo-Jeong Seon, M.D., Jae-Young Han, M.D., In-Sung Choi, M.D., Ph.D., Sam-Gyu Lee, M.D., Ph.D.

Department of Physical & Rehabilitation Medicine, Research Institute of Medical Sciences, Center for Aging and Geriatrics, Regional CardioCerebrovascular Center, Chonnam National University Medical School & Hospital, Gwangju 501-757, Korea

A 49-year-old man received prolotherapy in the upper cervical region at a local medical clinic. Immediately after the procedure, he felt a sensation resembling an electric shock in his right upper and lower extremities, and continuously complained of numbness and discomfort in the right hemibody. He visited our clinic a week later. Upon physical examination, there were no significant abnormal findings. The visual analog scale was 60 points. T2-weight magnetic resonance images of the cervical spine showed a 0.7 cm sized bright oval spot on the right side of the spinal cord at the level of C4-C5 disc, suggesting spinal cord injury. There were no definite electrodiagnostic abnormalities. Digital infrared thermal images showed moderately decreased surface temperature on lateral aspect of the right forearm and dorsum of the right hand compared with the other side. Considering that very rare complications like spinal cord injury may develop after prolotherapy, we suggest that special interventions such as prolotherapy be performed by professional experts.

Key Words Spinal cord injury, Complications, Malpractice

INTRODUCTION

Prolotherapy is a pain-relieving treatment. The mechanism of action of prolotherapy is that the injection of proliferating agents onto the lax ligament or tendon triggers acute inflammatory reaction inducing the proliferation of fibroblast and collagen growth.[1] Common side effects regarding prolotherapy are pain and bleeding with an occasional sense of fullness and numbness. However, most of them are naturally healed. In addition, a pain flare during the first 72 hours after the injections is common clinically but its incidence has not been well documented. While prolotherapy performed by an experienced expert appears safe, the injection of ligaments, tendons and joints with irritant solutions raises safety concerns. Adverse events of prolotherapy injections include light-headedness, allergic reaction, infection or neurological damage with rare cases of severe complications.[2] This case study aims to report the unusual cases of cervical spinal cord injury as complication of prolotherapy.

Received July 14, 2010; Accepted October 22, 2010
Corresponding author: Sam-Gyu Lee
Department of Physical & Rehabilitation Medicine Chonnam National University Medical School & Hospital , 8, Hak-dong, Dong-gu, Gwangju 501-757, Korea
Tel: +82-62-220-5198, Fax: +82-62-228-5975, E-mail: LEE9299@hitel.net

CASE REPORT

A 49 year-old man received prolotherapy after suffering from pains at the right shoulder and elbow for five months at a local medical clinic one week before his visit to our clinic. Diagnosed with tendinitis, the patient got both physiotherapy and prolotherapy using a mixed solution of 15% dextrose and 0.125% lidocain onto the near right C5 nerve root, right shoulder and elbow. Right after prolotherapy, he suffered from a sensation resembling an electrical shock on both upper and lower extremities and weakness. Since then, the numbness and pain on the right upper and lower extremities persisted, leading to visit our outpatient care. His medical history showed no hypertension, diabetes mellitus, tuberculosis and trauma and got an appendectomy over acute appendicitis about 15 years ago. He complained of intermittent numbness and discomfort over the right upper and lower extremities. Though the pain was aggravated due to weather condition, there was no particular relieving factor. The visual analogue scale (VAS) checked 60 points. Neurological examination showed his consciousness was on alert mental state. Manual muscle test showed all extremities were normal and the sensory examination showed no indication of hypoesthesia despite the fact that he complained of numbness on the sensory dermatome at the level of C5-C7 nerve root. Vibration and proprioception tests showed no signs of abnormality. Perianal sense and anal sphincter's tones were well kept and a bulbocavernosus reflex was not unusual. His case was classified as American Spinal Injury Association (ASIA) impairment scale E level. Deep tendon reflex was within the normal range without spasticity and the ability to carry out activities of daily living and gait functioned independently. Laboratory test and cervical spine X-ray identified no sign of abnormality. A digital infrared thermal imaging study showed lateral aspect of right and dorsum of hand had

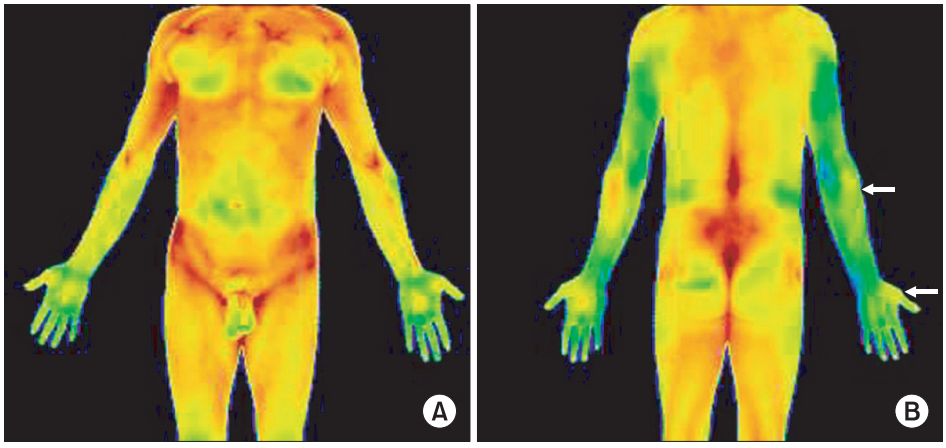

Fig. 1. Digital infrared thermal images show moderately decreased surface temperature on lateral aspect of right forearm and dorsum of right hand (arrow) compared with the other side. (A) anterior view; (B) posterior view.

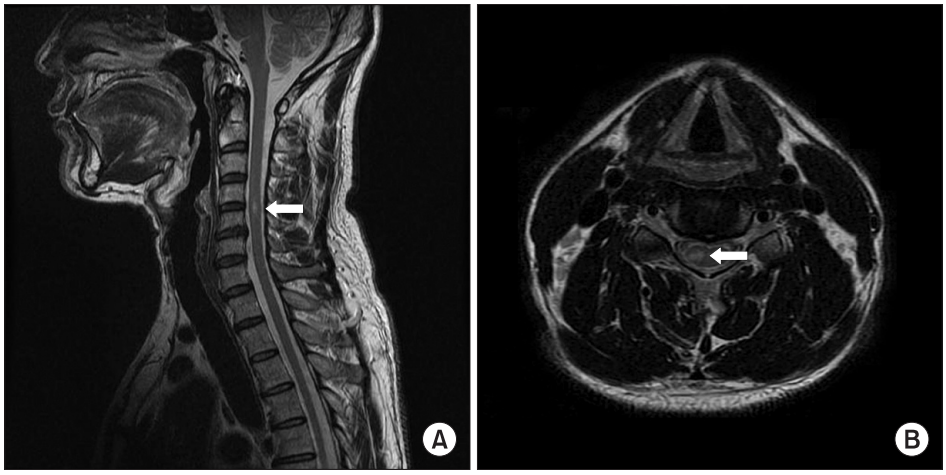

Fig. 2. Magnetic resonance images of the cervical spine: T2-weighted sagittal image (A) and T2-weighted axial image (B) show 0.7 cm sized bright oval spot (arrow) on the right side of the spinal cord at the level of the C4-C5 disc.

a lower skin temperature compared with the left side by 0.6-0.8°C (Fig. 1).

Somatosensory evoked potential and magnetic motor evoked potential studies found no definite electrodiagnostic abnormalities and T2-weighted magnetic resonance images (MRI) of cervical spine showed about 0.7 cm sized oval spot with high signal intensity on the right side of the spinal cord at the level of C4-C5 disc. Other mass or signal changes from arachnoid membrane were not observed (Fig. 2). For neuropathic pain relief, the patient used oral administration of Gabapentin 100 mg once a day for two weeks. As part of physiotherapy, transcutaneous electrical nerve stimulation (20 Hz, 10-50 mA, 10 minutes) and infrared therapy (60 Hz, 770 nm, 250 W, 10 minutes) were conducted once a day for two weeks. Additionally, stretching exercise at neck and upper extremities along with strengthening exercises such as isometric flexion exercise and extension exercise of cervical paraspinalis muscles were carried out. After one month of outpatient sessions, his pain level was reduced from 60 to 20 points at VAS.

DISCUSSION

There are a variety of therapeutic options available to reduce chronic musculoskeletal pain. However, patients often rely on complementary and alternative medical (CAM) therapy such as acupuncture or club needle. Prolotherapy is a type of CAM therapy injecting proliferative solution to reduce chronic musculoskeletal pain.[2] Still, without sufficient understanding and knowledge of safety over a particular type of CAM therapy, its benefits may be cancelled out. In addition, invasive CAM therapy is highly likely to cause side effects and adverse events.[3]

The question over the safety of prolotherapy naturally led to a study regarding its side effects and adverse events. In a study of prolotherapy-induced side effects and adverse events on the neck and back in the North America, Dagenais et al.[3] reported that the side effect with the highest estimated median prevalence was pain (70%), followed by stiffness (25%), bruising (5%), and temporary numbness (1%). On the other hand, the most commonly reported adverse events were cases of spinal headache, pneumothorax, temporary systemic reactions and nerve damage with rare cases of spinal cord insult such as meningitis, paralysis and spinal cord injury.

The previous study reported few severe complications such as neurological impairment resulting from spinal cord irritation. The mechanism behind these severe complications is that after prolotherapy on spinal aspects, proliferating solution was injected into subarachnoid space, causing pain and paraplegia, and adhesive arachnoiditis progressed chronically into mental deepening, hydrocephalus and other fatal complications.[4-6] Out of a slew of adverse events, intervertebral damage, nerve injury, spinal cord injury and hemorrhage can take place because of improper injection technique.[3] This case study also suggested that improper injection techniques were the reason behind a rare complication of cervical spinal cord injury.

In the case of adverse events such as spinal headache and pneumothorax, most are easily dealt with no permanent sequelae.[1,3] In this study, MRI findings identified spinal cord injury but there were few neurological symptoms except pain and after conservative physiotherapy and medication, the pain was reduced to a tolerable level. Nevertheless, given that some patients can suffer from delayed neurological impairment, though not right after injection, even though patients show signs of improvement, additional observation should be required to prevent neurological impairment.[4-6]

These side effects and adverse effects are similarly reported on other injection methods commonly used in the spine such as facet joint block, epidural block and local injection.[7-10] Also, complications from invasive injection modality can occur irrespective of the drug being injected.[3] Many of the detailed adverse event analyses indicate that needle injuries occurred when probing for the desired injection site with the needle tip, before delivering the intended bolus of the drug. Although we are aware that fluoroscopy is occasionally used for needle guidance by certain prolotherapy practitioners, this equipment was not widely available to many practitioners. Moreover, there is currently no evidence that this procedure leads to fewer needle injuries.[3] However, given that needle injury is more likely to cause complications than the drug itself, it is desirable to use the fluoroscope or improve the injection technique of physician.

In the field of pain rehabilitation medicine, diverse invasive procedures are conducted for the purpose of

diagnosis and therapy. However, procedures conducted unsuitably and by inexperienced physician can invite many side effects and complications. To prevent this, the understanding of anatomical structure on injection site is required and the procedure should be carried out under the guidance of a skilled expert or by physician with adequate training.

ACKNOWLEDGEMENTS

This study was supported by a grant of the Korea Healthcare Technology R & D Project, Ministry for Health, Welfare & Family Affairs, Republic of Korea (A084869).

REFERENCES

1. Banks AR. A rationale for prolotherapy. J Orthop Med 1991; 13: 54-59
2. Rabago D, Slattengren A, Zgierska A. Prolotherapy in primary care practice. Prim Care 2010; 37: 65-80
3. Dagenais S, Ogunseitan O, Haldeman S, Wooley JR, Newcomb RL. Side effects and adverse events related to intraligamentous injection of sclerosing solutions (prolotherapy) for back and neck pain: a survey of practitioners. Arch Phys Med Rehabil 2006; 87: 909-913
4. Schneider RC, Williams JJ, Liss L. Fatality after injection of sclerosing agent to precipitate fibro-osseous proliferation. J Am Med Assoc 1959; 170: 1768-1772
5. Keplinger JE, Bucy PC. Paraplegia from treatment with sclerosing agents. Report of a case. J Am Med Assoc 1960; 173: 1333-1335
6. Hunt WE, Baird WC. Complications following injection of sclerosing agent to precipitate fibro-osseous proliferation. J Neurosurg 1961; 18: 461-465
7. Fitzgibbon DR, Posner KL, Domino KB, Caplan RA, Lee LA, Cheny FW. Chronic pain management: American Society of Anesthesiologists Closed Claims Project. Anesthesiology 2004; 100: 98-105
8. Huston CW, Slipman CW, Garvin C. Complications and side effects of cervical and lumbosacral selective nerve root injections. Arch Phys Med Rehabil 2005; 86: 277-283
9. Lee LA, Posner KL, Domino KB, Caplan RA, Cheney FW. Injuries associated with regional anesthesia in the 1980s and 1990s: a closed claims analysis. Anesthesiology 2004; 101: 143-152
10. Nelemans PJ, deBie RA, deVet HC, Sturmans F. Injection therapy for subacute and chronic benign low back pain. Spine 2001; 26: 501-515