

Persistent Hiccups after Lumbar Spinal Selective Nerve Root Block

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Hiccups are generally benign and self-limited; however, sometimes they can be persistent and resistant to treatment. Diverse causes of persistent/intractable hiccups have been identified, including medications, a central nervous system pathology, malignancy, and metabolic abnormalities. Neural blocks are a well-known treatment option for chronic lower back pain and are usually indicated in acute and chronic lower back pain. When used in a careful manner with close monitoring, side effects are uncommon and transient; hence, the neural block procedure is considered a safe therapeutic intervention. We present a case of persistent hiccups after a selective nerve root block in a patient with a herniated lumbar disc. A literature review on underlying mechanisms is provided and specific therapies for management are recommended.

Key Words: Hiccups; Block; Opioid; Steroid; Proton pump inhibitor, Metoclopramide

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INTRODUCTION

Hiccups are a temporary phenomenon that most people experience occasionally. They are an involuntary, reflex-like activity that start with contraction of the diaphragm and are terminated shortly thereafter by the abrupt closure of the glottis. They are usually benign and self-limited; however, sometimes they can be persistent and refractory. Although their cause is mostly idiopathic, many causes have been determined; however, the exact mechanism is hard to prove. In addition, persistent and intractable hiccups are associated with nausea and vomiting, and when the oral intake becomes poor, morbidity increases. In most cases, hiccups are accompanied by during the treatment of other diseases. If proper evaluation and management are not performed, the medical staff may be perplexed and the rapport with the patient may be compromised.

Nerve block is a commonly used treatment modality for patients with lower back pain. A mixed solution (comprising steroids and local anesthetics) is injected into the target nerve, usually guided by C-arm fluoroscopy. Under appropriate supervision, a nerve block is considered to be a relatively safe procedure. However, in our hospital, a patient experienced severe hiccups after a nerve block; such a case has seldom been reported. On the basis of the case reported in this study, we reviewed the evaluation and management of patients with hiccups.

CASE REPORT

A 54-year-old male presented with radiating pain in his lower back and right leg, reported to have started in December 2014. He was diagnosed with herniated nucleus pulposus (right) at L4-5 and underwent conservative treatment. A selective nerve root block was performed first in July 2015 and again in August 2015, and radiofrequency ablation was performed in September 2015. There was a reduction in his symptoms. In February 2016, a nerve block was re-performed after symptom recurrence. The patient was admitted to our hospital in April 2017. He underwent a right L5-S1 dorsal root ganglion (DRG) block and a left L4-5 medial branch block (MBB); subsequent to this procedure, he developed hiccups. The patient had undergone a medical check-up at our institution in July 2015 and showed no specific findings on brain magnetic resonance imaging and magnetic resonance angiography, chest computed tomography, abdomino-pelvic computed tomography, coronary computed tomography, or esophago-gastro-duodenography. Similarly, there were no abnormal findings from his laboratory tests (including complete blood count and serum electrolyte) performed at admission. He complained of severe nausea and vomiting, so we discontinued acetaminophen/tramadol hydrochloride, buprenorphine patches, and eperisone, which were prescribed to relieve pain. Alternative medications, namely, amitriptyline, metoclopramide, and lansoprazole were pres-

cribed. His symptoms started to resolve gradually about 48 hours after onset.

DISCUSSION

A hiccup is a reflex-like activity that involves a sudden contraction of the diaphragm and intercostal muscles, followed by glottis closure. Hiccups are fairly common and are usually transient and self-limited; however they may become refractory. When hiccups last for more than 48 hours, they are considered persistent; hiccups lasting longer than 2 months are defined as intractable¹⁷. The pathophysiology of hiccups is complex and not well understood. The hiccup reflex arc is composed of three major parts: an afferent pathway mediated through the vagus and phrenic nerves and the sympathetic chain; a central hiccup center; and an efferent pathway transmitting within the phrenic nerve to the diaphragm and accessory nerves to intercostal muscles. The central hiccup center is not very well understood; it has been associated with areas such as the brain stem respiratory center, the reticular activating system in the medulla oblongata, the hypothalamus, and the temporal lobes^{2,9}. Dopamine, gamma-aminobutyric acid, and several other neurotransmitters are involved in the pathogenesis of hiccups².

Persistent hiccups are usually caused by direct injury or inflammation affecting one of the nerves involved in the hiccup reflex arc. Etiologies of hiccups include metabolic abnormalities, gastrointestinal pathology, medications (e.g., chemotherapy, benzodiazepines, opioids, and steroids), infection, and malignancy⁴. Hiccups lasting less than 48 hours are common and regarded as a benign condition. They usually do not require a thorough medical evaluation. Persistent and intractable hiccups require a detailed evaluation to identify the underlying etiology and administer appropriate therapy. First, a detailed medical history and physical examination are required, including laboratory tests. Additional testing, such as chest radiography, abdominal radiography, computed tomography (CT) scanning, magnetic resonance imaging (MRI), electrocardiography, and endoscopy should be considered if the findings of the history or physical examination suggest a specific etiology. Further specific and more invasive tests such as lumbar puncture and bronchoscopy should be considered to rule out central nervous system infection and pulmonary etiology¹⁴.

Several medications have been recommended for the management of hiccups. There is insufficient research on which agents are best suited. Medications such as proton pump inhibitors (PPI) and alginate reflux suppressants may be considered as initial treatment¹⁸. Chlorpromazine was recommended for the treatment of hiccups by the American Food and Drug Administration until recently¹⁴. This approval was recanted because of long-term neurological and other side effects¹⁸. Other frequently administered medications include metoclopramide, halo-

peridol, and baclofen^{15,16,20}. Anticonvulsants including phenytoin, valproic acid, and carbamazepine have been used for severe hiccups⁹. Case reports of treatment with nimodipine, nifedipine, sertraline, carvedilol, amantadine, and methyphenidate have demonstrated the potential of these medications^{7,8,10,19,21}. Finally, reductions in intractable hiccups with intravenous lidocaine, nefopam, amitriptyline, olanzapine have also been reported^{1,3,11}. Non-pharmacological approaches range from home remedies, such as breath holding, to oriental medicine, such as acupuncture, to refined interventions, such as phrenic nerve block and vagus nerve stimulation^{5,6,12,13,16}.

In this case, the exact etiology of hiccups could not be confirmed, but the patient had just been treated with a nerve block before he developed hiccups. Because the sympathetic trunk is relatively close to the nerve block sites (DRG and medial branch), it is believed that the administered injections may have acted on the sympathetic trunk to induce hiccups (Fig. 1). Depending on the position of the needle during the nerve block, an injection can affect the sympathetic chain either directly (if the needle is deep) or indirectly (from the DRG or medial branch to the sympathetic trunk via the gray ramus communicans) to induce hiccups. The composition of the injection (e.g., steroid dose) may also influence the development of hiccups. The patient was also prescribed a buprenorphine patch, and the duration of symptoms in this patient was relatively long. Considering the improvement in symptoms after medication modulation and the effects of nerve block and opioid medications, these two factors were assumed to be the cause for the hiccups. So, we removed the buprenorphine patch and administered amitriptyline, metoclopramide, and lansoprazole. Nerve block is a common procedure in patients with herniated disc and opioid medications are similarly frequently used. Taking this into considering, hiccups should be considered as a possible complication when treating similar patients, and further studies on these patients are necessary.

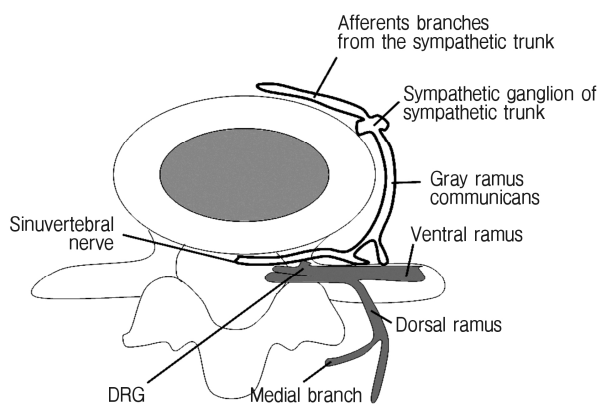


Fig. 1. Proximity between the nerve block site and sympathetic trunk.

CONCLUSION

The nerve block is a relatively safe treatment when properly performed, but our patient developed persistent hiccups as a side effect of a nerve block. It is important to note that when the needle is inserted deep during the procedure hiccups may develop; the development of hiccups may also depend on the composition of the injection. In addition, drugs such as opioids, which are used concomitantly in patients receiving nerve blocks, can also cause hiccups. If persistent or intractable hiccups develop despite sufficient caution, a thorough evaluation, from detailed medical history and physical examination to imaging and invasive tests, will be required. Immediate discontinuation of drugs that could cause hiccups, including chemotherapeutic agents, benzodiazepines, opioids, and steroids, is also needed. Thereafter, treatment based on the cause should be performed and appropriate medication modulation should be carried out. PPI can be considered as the first-line drug for the treatment of hiccups; amitriptyline and metoclopramide are also helpful in symptom relief.

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