Continuous Cervical Epidural Block for Persistent Intractable Hiccups

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Introduction

Hiccups is the sudden onset of erratic diaphragmatic and intercostal muscle contraction and immediately followed by laryngeal closure.(1) It consists of a sudden powerful activation of the inspiratory muscles of the thorax, diaphragm, neck accessory, and external intercostal muscles, with brief inhibition of the expiratory muscles and active movement of the tongue toward the roof of the mouth. Usually hiccups stop within a few hours, but some can not stop. Persistent and intractable hiccups typically defined as lasting for more than 48 hours and one month respectively.(2)

Intractable hiccups often limits a patient’s activities of daily living and may significantly lower functional status and quality of life. Sometimes intractable hiccups produce severe morbidity including insomnia, fatigue, malnutrition, weight loss, exhaustion, and even death. Despite these potentially fatal complications, definite treatment strategies are still unknown.(3-5) We describe the case of a patient with intractable hiccups unresponsive to pharmaco therapy, who was successfully treated with continuous cervical epidural block.

Case report

Five month prior to his initial presentation in our clinic, this 59-year-old man suffered cerebrovascular attack. Immediately following the stroke, hiccups began. The hiccups began occurring continuously during wakefulness and sleep with a periodicity of every 4 to 5 seconds. The patient became severely depressed and experienced difficulty sleeping because the hiccups were continuous. Multiple medical remedies were unsuccessful. After 3 months of intractable and persistent hiccups, the patient presented to pain clinic department at Korea University Hospital for further evaluation and treatment. Blood chemistries, chest and abdominal CT were unremarkable.

We assumed that a block of the efferent phrenic nerve block is effective. For treatment of persistent and intractable hiccups, we decided to conduct continuous cervical block cover the levels supplying the phrenic nerve (C3-C5).

The patient was given 1 g of cefazolin intravenously prior to the procedure. He was placed on the procedure table in a prone position. Supplemental oxygen was delivered through a nasal cannula, and blood pressure, electrocardiogram, and pulse oximetry were monitored throughout the procedure. The skin was prepped with 2% alcohol-chlorohexidine and draped in a sterile fashion. The continuous cervical epidural block was
Fig. 1. Radiograph shows epidural catheter and the spread of contrast media. Radiograph shows bilateral spread of contrast media in the upper cervical epidural space including C3-C5 after injection of 1.5mL of water-soluble contrast media through the catheter.

performed at the C7-T1 or T1-T2 intervertebral space with the neck flexed using the loss of resistance technique with a midline approach.

When the block needle (18 G Tuohy needle) reached the cervical epidural space, the correct placement of the needle in the epidural space was confirmed using contrast radiography. Then, a 22 G epidural catheter was advanced cephaladly to the C3-5 level through the needle. The correct catheter placement was also confirmed by radiography with the injection of contrast dye via the catheter (Fig. 1). Subcutaneous tunneling was performed for prolonged continuous epidural block. After placing the tunneled epidural catheter, a 6 mL bolus of 0.25% ropivacaine was injected and a continuous infusion of 4 mL/h of ropivacaine was administrated through the epidural catheter using infuser containing 0.75% ropivacaine 45 ml and normal saline (total 275 mL). After the procedure, patients were monitored for at least 30 minutes for the detection of immediate complications related to the continuous cervical epidural block.

On the 2nd days after the continuous cervical epidural block, the persistent and intractable hiccups were stopped.

Discussion

A hiccup is a repeated involuntary, spasmodic contraction of the diaphragm accompanied by sudden closure of the glottis.(6) Usually hiccups stop within a few hours, but some can not stop. Persistent and intractable hiccups (typically defined as lasting for more than 48 hours and one month respectively) can be of serious detriment to a patient’s quality of life, although they are relatively uncommon.(2)

But Persistent and intractable hiccup have unknown etiology. Some are well known to invade the hiccup reflex arc, whereas many others remain unexplained why they would elicit persistent or intractable hiccups since no obvious invasion to the hiccup reflex pathway was confirmed.(7-9)

The hiccup reflex arc is customarily divided into an afferent limb, a central connection, and an efferent part.(10) The afferent portion of the neural pathway of hiccup formation is composed of the vagus nerve, the phrenic nerve, and the sympathetic chain arising from T6 to T12.(11) The central connection is localized in the brain stem and a nonspecific area between the C3–5 spinal levels. The efferent pathways constitute the phrenic nerve to the diaphragm, direct plexus branches to the scalene muscles, vagal branches to the glottis, and intercostal nerves to the external intercostal muscles.(12) The pathophysiological disturbance that causes episodic or intractable hiccups usually involves the afferent or efferent neural pathways. Thus, a nerve block of some part of this pathway might be an effective treatment for hiccups.
Shigehito et al. conducted thoracic epidural block from T3 to T11 for block of the afferent portion of the sympathetic nerves in persistent and intractable hiccup patient.(3) But extended thoracic epidural block from T3 to T11 was ineffective. They tried cervical epidural block from C3 to C5 for block of the efferent portion in same patient. After cervical epidural block, The hiccup was stop. Extended cervical block cover the levels supplying the phrenic nerve (C3-C5) and that was effective in stopping hiccups. So they assumed that a block of the afferent portion of the sympathetic nerves was of no use in stopping hiccups and efferent phrenic nerve block is effective. So we tried “continuous” cervical epidural block in persistent and intractable hiccup and it was successful for treatment. The concentration of ropivacaine used here was determined empirically. Continuous infusion of 4 mL/h of ropivacaine was administrated through the epidural catheter using a disposable balloon infuser (Autofuser, ACE medical, Seoul, Republic of Korea) containing 0.75% ropivacaine 45 mL and normal saline (total 275 mL). To determine the optimal concentrations of local anesthetics, however, further clinical studies are required.

Hiccup usually results from a lesion involving the hiccup reflex arc. Among patients with persistent or intractable hiccup, attempt to identify the lesion causing it is needed since serious or lethal disorder may exist. Apart from lesion ablation, drugs and measures acting on the reflex arc may be effective, while some conventional remedies can be tried while their effects to erminate hiccups are uncertain. In conclusion, continuous cervical epidural block may be an effective treatment for persistent and intractable hiccups.

Abstract

Hiccups is the sudden onset of erratic diaphragmatic and intercostal muscle contraction and immediately followed by laryngeal closure. Usually hiccups stop within a few hours, but some can not stop. Persistent and intractable hiccups typically defined as lasting for more than 48 hours and one month respectively. Intractable hiccups often limits a patient’s activities of daily living and may significantly lower functional status and quality of life. We describe the case of a patient with intractable hiccups unresponsive to pharmacotherapy, who was successfully treated with continuous cervical epidural block.

Key Words: Continuous cervical epidural block, Intractable hiccups

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