

Persistent Hiccups as a Potential Complication after Interlaminar Epidural Steroid Injection Should be Included in the Consent Form: A Case Discussion

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Abstract

Persistent hiccups or Singultus (duration more than 48 hours) are a rare complication after epidural steroid injections. The literature on this subject is limited to a few case reports, and the exact mechanism is still unknown. This case, to our knowledge, reports the first case of persistent hiccups following an interlaminar lumbar epidural steroid injection of non-Particulate type. It was performed for the treatment of chronic pain due to lumbar radiculopathy, in a male patient in his early 30s. As the etiopathology and associated patient-related factors of this bothersome complication are not fully understood, and the number of interventional pain procedures is on the rise, anesthesiologists and pain physicians must anticipate this complication regardless of the age, site, and composition of epidural injection. Such potential complications should be included in the relevant informed consent.

Keywords

Persistent hiccups, Epidural steroid, Non-Particulate steroid, Singultus, Interlaminar

Introduction

Hiccups are a common, bothersome condition encountered at least once in every human's lifetime. They usually resolve within a few minutes but can persist for longer and be very distressing.

Epidural Steroid injections (ESIs) are among the most popular, widely performed interventional pain procedures. Steroid and local anesthetic combinations are usually used for this therapy. Reported side effects of ESI include numbness and tingling in the limb followed by perineal pruritus, headaches, insomnia, flushing, and increased radicular pain. Hiccups are rarely reported [1].

To our knowledge, this is the first case of persistent

hiccups complicating interlaminar epidural steroid injection.

Case History

A male patient in his early 30s, an IT professional without known comorbidities, was referred to us at the Department of Anesthesiology given a six-month history of exacerbation of lower back pain with radiation to bilateral lower limbs due to lumbar radiculopathy. Despite several orthopedic and neurosurgical consultations, and conservative management with analgesics and physiotherapy, it did not resolve. He had a recurrent history of the same over the past two years. However, now the pain was disabling enough to cost him his job, indicating an Epidural Steroid Injection (ESI) to address his radiculopathy. He had no significant surgical/medical history or known drug allergy in the past.

The interlaminar approach of epidural steroid injection was planned. At the L4-L5 disc level in the left lateral position under local anesthesia, an 18G Tuohy epidural needle was inserted. The epidural space was confirmed by the loss of resistance to air technique, and 12 ml of a mixture containing 2 ml (8 mg) of non-particulate Dexamethasone, 8 ml of 1.5% preservative-free Lignocaine and 2 ml 0.25% Ropivacaine was given after negative aspiration of blood and Cerebrospinal fluid.

Post-procedural vitals were stable, and the patient was comfortable without any symptoms of flatulence. He experienced a slight increase in the weight of his bilateral lower limbs but could flex his knees and freely move his feet with Bromage grade II, confirming

the absence of paralysis. The straight leg raise test improved, and the pain decreased too, affirming the correct placement of the steroid in the epidural space.

The patient was discharged on a non-steroidal anti-inflammatory drug (NSAID), omeprazole, an antibiotic, gabapentin, and vitamin B complex tablets. The following day, he reported persistent hiccups that were not controlled despite attempting remedial maneuvers like gulping sips of water and holding his breath. The patient was reassured, the NSAID and antibiotics were stopped, and blood investigations, including renal function test, uric acid, and TSH, were ordered, all of which came out to be normal. The hiccups eventually reduced in frequency and finally resolved on day four after the epidural steroid injection, without needing any medications from our side.

Discussion

Epidural steroid injections (ESIs) and other interventional pain procedures are becoming the bread and butter of an anesthesiologist's and pain physician's day-to-day practice for discogenic and radicular pain. The Hiccup, a rare but disturbing complication of this procedure, warrants some light to be shed on it.

Hiccups are considered a myoclonic contraction of the diaphragm and the respiratory musculature with the sudden closure of the glottis and a peculiar 'hic' sound. They can be Persistent (Singultus)- lasting longer than 48 hours, or Intractable - lasting for more than a month [2]. They have a multitude of etiologies ranging from being idiopathic to gastrointestinal disorders like hiatus hernia, gastroesophageal reflux disease to electrolyte imbalances and drugs to the symptom of grave underlying disorders of the renal, central nervous, and cardiovascular systems [3].

The hiccup reflex arc consists of three main components - the afferent limb, including the phrenic, vagus, and sympathetic nerves to convey somatic and visceral sensory signals, the central processing unit in the midbrain; and the efferent limb traveling in motor fibers of the phrenic nerves to diaphragm and accessory nerves to the intercostal muscles, respectively [4]. Irritation, in any form, of the limbs or the processing unit of this arc could result in hiccups.

Corticosteroids and Hiccups have a relationship that is not very well understood. Steroids are thought to lower the threshold for synaptic transmission in the midbrain and directly stimulate the hiccup reflex arc at its central processing unit [5]. There are several instances of hiccups following particulate steroids administered through various routes [6]. Another complication of concern associated with particulate steroid formulations given epidurally is post-procedural paralysis. This is possibly due to spinal ischemia secondary to a steroid particulate embolism. Non-Particulate steroid formulations, on

the other hand, have a safer clinical and non-inferior efficacy profile, making them a popular choice for ESIs nowadays [7].

The first case of hiccups following epidural steroid injections (ESIs) was reported in 2001 by Slipman, et al. [8]. Here, a thoracic ESI of betamethasone and 1% lignocaine, given on two different occasions, resulted in persistent hiccups. The hiccups were attributed to the steroid component of the mixture. Interestingly, in cases reported by McAllister, et al. and Kannaiah, the hiccups were attributed to the local anesthetic agent in the epidural mixture [9,10]. The volume effect of the solution injected into the epidural space may have a role in the mechanism of hiccups by altering the balance of the cerebrospinal fluid volume. The hiccups may have occurred due to Dural sac compression [11].

In 2015, Omar, et al. reported a case of hiccups after ESI with the transforaminal approach [1]. Literature showed a few instances of hiccups after thoracic/lumbar/caudal ESIs until 2018, when a case of the same following cervical ESI was reported [12].

We used the Interlaminar approach for ESI, which is widely accepted in large numbers in developing countries. The epidural space was confirmed by the universally accepted loss of resistance to air technique. After ESI, the patient's lack of paralysis, Bromage Grade II and clinical improvement of the pain also serve as indirect evidence to correct epidural placement of the steroid. Being from a developing country without access to fluoroscopic guidance and limited resources, we rely on solid clinical judgment for accurate needle positioning.

He did not complain of flatulence after the procedure, and the NSAIDs given for pain relief were supplemented with proton pump inhibitors. Hence, diaphragmatic irritation as a cause of the hiccups can be ruled out here.

A non-particulate steroid was used in our patient due to its safer clinical and non-inferior efficacy profile. Hiccups following injection of a non-particulate steroid via the interlaminar approach have not been reported previously. Moreover, he was a young man without any known comorbidities; hence the occurrence of hiccups cannot be attributed to a particular age group, which was a pattern in the previously reported cases of older men.

The treatment of these hiccups is a topic of controversy. Some physicians used drugs like baclofen [13] and chlorpromazine [14] to control them successfully, but the hiccups have also been resolved without any interventions.

Maneuvers of vagal stimulation through the nose, ear, and throat by using cold water, pulling on the tongue, and pressure on the carotid and eyeballs are known methods for relieving hiccups in the acute phase [15]. However, the nature of the hiccups occurring post

ESI is more persistent, and the efficacy of these methods for persistent hiccups is not established.

We recognize the concerns of the treating physician and firmly believe that the hiccups are benign and self-limiting on the observation that, in most cases, resolution happened spontaneously. No statistical significance between medication and resolution is found, and the fact that the hiccups resolved post medication can also be due to chance. Further studies in systematic reviews or meta-analyses are needed to form a protocol for treating hiccups following epidural steroids.

The risk factors and reasons for developing persistent hiccups after epidural steroid injections are still not precise. At this point, no direct association between the occurrence of hiccups post ESI and the age and ethnicity of the patient, site, and composition of the epidural injection can be established as even a non-particulate steroid with a clinically safer profile resulted in the hiccups. Only a male preponderance can be hypothesized based on the pattern of the same being reported only in male patients to date.

Thankfully, the hiccups have proven to be a benign and rare adverse event; however, they can be very disturbing. This subject warrants extensive research to understand the underlying causes and to be certain of the need for treatment. However, this case report, along with other case reports, indicate that it should be reasonable to include this potential complication in the consent form to inform patients before performing similar procedures.

Sources of Support

Nil.

References

1. El Abd O, Amadera J, Pimentel DC, Gomba L. Immediate and acute adverse effects following transforaminal epidural steroid injections with dexamethasone. *Pain Physician*. 2015;18(3):277-86. PMID: 26000671.
2. Kohse EK, Hollmann MW, Bardenheuer HJ, Kessler J. Chronic Hiccups: An underestimated problem. *AnesthAnalg*. 2017;125(4):1169-1183. PMID: 28759492.
3. Lewis JH. Hiccups: causes and cures. *J Clin Gastroenterol*. 1985;7(6):539-52. PMID:2868032.
4. Chang FY, Lu CL. Hiccup: mystery, nature and treatment. *J NeurogastroenterolMotil*. 2012;18(2):123-30. PMID: 22523721.
5. Davis JN. An experimental study of hiccup. *Brain*. 1970;93(4):851-72. PMID: 5490279.
6. Sugandhavesa N, Sawaddiruk P, Bunmaprasert T, Pattanakuhar S, Chattipakorn SC et al. Persistent severe hiccups after dexamethasone intravenous administration. *Am J Case Rep*. 2019;30;20:628-630. PMID: 31036799.
7. Cohen SP, Greuber E, Vought K, Lissin D. Safety of epidural steroid injections for lumbosacral radicular pain: unmet medical need. *Clin J Pain*. 2021;37(9):707-717. PMID:34265792.
8. Slipman CW, Shin CH, Patel RK, Braverman DL, Lenrow DA et al. Persistent hiccup associated with thoracic epidural injection. *Am J Phys Med Rehabil*. 2001;80(8):618-21. PMID: 11475484.
9. McAllister RK, McDavid AJ, Meyer TA, Bittenbinder TM. Recurrent persistent hiccups after epidural steroid injection and analgesia with bupivacaine. *AnesthAnalg*. 2005;100(6):1834-1836. PMID: 15920222.
10. Kanniah SK. Acute transient hiccups after epidural injection of levobupivacaine. *Int J ObstetAnesth*. 2009;18(2):193-4. PMID: 19223172.
11. Higuchi H, Adachi Y, Kazama T. Effects of epidural saline injection on cerebrospinal fluid volume and velocity waveform: a magnetic resonance imaging study. *Anesthesiology*. 2005;102(2):285-92. PMID: 15681941.
12. Ritz ML, Bailey C, Overstreet K, Gorlin A. Persistent hiccups following cervical epidural steroid injection with betamethasone. *Int Med Case Rep J*. 2018;11:263-264. PMID: 30349405.
13. Colorado B, Decker G. Persistent hiccups after an epidural steroid injection successfully treated with baclofen: a case report. *PM R*. 2017;9(12):1290-1293. PMID: 28483686.
14. Kaydu A, Kılıç ET, Gökçek E, Akdemir MS. Unexpected complication after caudal epidural steroid injection: hiccup. *Anesth Essays Res*. 2017;11(3):776-777. PMID: 28928587.
15. Cole JA, Plewa MC (2021) Singultus. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; PMID: 30855813.

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