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Cauda equina syndrome after caudal epidural sacral injection in severe lumbar spinal stenosis: Case report

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ABSTRACT

INTRODUCTION: Caudal epidural sacral injection is one of the most common conservative treatments for chronic low back pain with radiculopathy. Neurological deficit after injection is a rare complication that must be identified and treated properly.
PRESENTATION OF CASE: We report a case of cauda equina syndrome that persisted until 3 months after injection. A 63-year-old man came to our department with severe lumbar canal stenosis who experienced motor weakness, buttocks numbness and voiding difficulties immediately after injection. His lower extremities improved after 24 h, but his neurogenic bladder problems and perianal numbness still persisted. We collaborated with our interdisciplinary teams to do a rehabilitation program, and the symptoms were alleviated and he fully recovered within three months.
CONCLUSION: Patients with severe stenosis can be best described from magnetic resonance imagery scans, and clinicians should be careful about the risks after injection ranging from transient complications to persistent spinal cord injury.

1. Introduction

The prevalence of lumbar spinal stenosis is estimated at about 200,000 adults in the United States. This problem is the most common reason for >65 years old patients to undergo spinal surgery. Some patients refuse to have the operation [1,2]. Instead, epidural steroid injections have been widely used to treat lumbar spinal stenosis. Corticosteroids including local anesthetic agents can reduce inflammation and improve symptoms when delivered directly into the epidural space. There are three ways to approach the lumbar epidural space: cauda, transforaminal and interlaminar. This injection is reported safe, but sometimes leads to complications including headache, hiccups, fatigue, infection, bleeding, dural puncture, and nerve damage [3,4].

Cauda equina syndrome is a rare condition which has symptoms characterized by low back pain followed by sciatica, saddle and/or genital sensory disturbance with bladder, bowel and sexual dysfunction. It occurs following disc herniation, epidural hematoma, post trauma or surgical, infections, neoplasms, or after spinal anesthesia [5]. Some studies have shown that caudal sacral steroid injection can induce complications ranging from transient to persistent cauda equina syndrome [6,7].

Our case report describes a patient whose cauda equina syndrome suddenly developed after undergoing caudal sacral steroid injection for severe lumbar stenosis and who spontaneously recovered within 3 months with follow-up and rehabilitation. This case is reported according to the SCARE 2018 guidelines published by Agha et al. [8].

2. Case report

A 63-year-old man came to our spine clinic with chronic low back pain for 2 years. He also complained of radiating pain in both of his legs when standing or walking about 50 m. There was no history of neurological deficit, urination problems, drug allergy or family history. The lumbar magnetic resonance imagery (MRI) revealed low grade spondylolisthesis with severe canal stenosis at L4-L5. We advised to do a sacral caudal steroid injection to relieve the pain. The procedure involved image guided placement using 23-gauge syringe needle below the S3 to avoid the risk of dural puncture. We used 10 mL normal saline, 40 mg of triamcinolone and 8 mL of 0.25% bupivacaine. Suddenly after injection, the patient suffered more severe radiating pain with motor weakness in his both legs. He also complained about numbness in both buttocks. We planned to do an emergency decompression operation after these symptoms happened, but unfortunately, the patient refused (Fig. 1).

The patient had analgesic injection intravenous every 8 h to reduce the pain. After 12 h, the patient complained of difficulty to void his bladder, so we inserted an indwelling catheter. Subse-

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Fig. 1. Magnetic resonance T2-weighted imaging of the lumbosacral spine. A. Sagittal: low grade spondylolisthesis of L4-L5. B. Axial: severe central canal stenosis.

Table 1
Neurological examination.

	Grade motor power	Saddle anesthesia	Voiding Dysfunction
Immediately after injection	0 (complete paralysis)	(+)	(+)
20 h after injection	3 (lower movement is possible against gravity)	(+)	(+)
24 h after injection	4 (can against some resistance, able to walk using walker)	(+)	(+)
1 month rehabilitation program	5 (normal strength)	diminished	(+)
3 months rehabilitation program (Final follow up)	5 (normal strength)	(−)	(−)

quently, the patient could move his legs 20 h after injection and started to walk after 24 h. The pain had significantly decreased. We took out the catheter and the patient was discharged. About 12 h after he was discharged from the hospital, he came back to the emergency department with voiding difficulty and tingling sensation with pain in his buttocks. Then, we reinserted another catheter and consulted him to our rehabilitation team. After 3 months of the patient receiving medication, and bladder training in the rehabilitation program, the pain was improved and he could void spontaneously (Table 1).

3. Discussion

Caudal sacral steroid injection is a safer procedure for treating lumbar stenosis which can provide significant pain relief and offer an alternative to surgery. Several reviews have reported about the risk of rare complications after the injection procedure. One of the most dangerous complications is neurological deficit that can be transient or permanent. This complication can be due to several possible causes such as spinal infarction, chemotoxicity, vascular occlusion and epidural hematoma. The onset is also variable from within 1 h after injection, until 8 days after injection, but most often happens within 6–24 h [3].

Tackle et al. reported a patient with conus medullaris syndrome after undergoing transforaminal lumbar steroid injection who recovered within 1 month after injection. They suggested the possibility of vascular injury of either the artery of Adamkiewicz or collateral radiculomedullary artery branches after the injection procedure. Some studies suggested performing a MRI study if neurologic function fails to recover within 2–3 h time period after injection to exclude an epidural hematoma [1].

Drasner et al. reported cauda equina syndrome after an epidural injection using 5% lidocaine which entered the subarachnoid space accidentally. That can be ruled out in our case because there was no dural puncture or draining of cerebrospinal fluid after injection [9]. Kim and Kim, also reported temporary cauda equina syndrome following epidural adhesiolysis using 0.25% bupivacaine 10 mL and triamcinolone 40 mg injection. The patient finally recovered 1 month after the procedure following medication and physical therapy. They suggested the causative factors were osmotic damage produced by subarachnoid injection of large doses of hypertonic saline solution [10].

Seo et al. reported persistent cauda equina syndrome over 1 year after caudal epidural injection. They suggested two possibilities for the cause. The first was drug induced neurotoxicity by local anesthetics and the second was the possibility of mechanical compression which could cause ischemic damage [6]. Spinal infections can also be the causative agent of neurological deficit after injection. It will be presented with back pain and systemic signs in most cases. Median time to onset of spinal infections is 7 days, with reports as early as 72 h [11].

In our case, it happened suddenly after injection so we considered some mechanical problem after injection which can lead to neurological damage. The amount of fluid that was injected can highly increase the epidural pressure in a patient with severe spinal stenosis. Usubiga et al. also reported that in elderly patients, there was age-related degeneration causing decrease in dural membrane elasticity and an increase in epidural pressure [12]. Bloodworth et al. recommend decompressive surgery within 8 h when neu-

rological deficits progress due to intraspinal hematoma after a systematic review of 33 cases of sudden paralysis after injection [3]. Stoll et al. mentioned that epidural hematoma is a common complication after epidural injection in patients with coagulation disorders [13].

4. Conclusions

Despite caudal steroid injection being one of most common conservative treatments in lumbar canal stenosis problems, several uncommon complications have been reported. Especially in a patient with severe stenosis that can be best described from MRI, we recommend the clinicians careful consider the risks after injection such as transient until persistent spinal cord injury. If there was history of neurological deficit prior to injection we suggest considering an operative procedure. The patient should also be well informed concerning the risk of paralysis before the injection procedure. If the complication does happen, it is recommended to identify the probable causative factors and coordinate with the interdisciplinary teams to determine the next appropriate treatment.

Declaration of Competing Interest

The authors report no declarations of interest.

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Ethical approval

Medical and health research ethics committee, faculty of medicine,public health and nursing, Universitas Gadjah Mada :KE/0946/09/2020.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of written consent is available for review by Editor-in-Chief of this journal on request.

Author contribution

Sholahuddin Rhatomy and Hastomo Agung Wibowo: writing the manuscript, study design, data collector, final review.

Registration of research studies

1. Name of the registry: Research Registry.
2. Unique identifying number or registration ID: **researchregistry6078**.
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): https://www.researchregistry.com/browse-the-registry#home/registrationdetails/5f78da2caf6da50015468bbf/.

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