

# Cauda Equina Syndrome Following an Epidural Lysis Procedure: A Case Report

## *Epidural Lizis İşlemi Sonrası Gelişen Kauda Ekina Sendromu: Olgu Sunumu*

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### Abstract

Epidural lysis is known to be one of the therapy methods used following an unsuccessful low back surgery. Despite its proven effectiveness, several complications associated with epidural lysis procedure have been reported. The most common complications are dural perforation, breaking of the catheter and infections. Cauda equina syndrome is a rare complication seen after epidural lysis. A 51-year-old female complaining of lower back pain for six years underwent an epidural lysis procedure at the lumbar 3-4-5 level. Following the procedure, the patient was not able to walk due to weakness starting in both lower extremities, besides, she had fecal and urinary incontinence. After being diagnosed with cauda equina syndrome, a rehabilitation program was administered. After three months, the patient was ambulant with a bilateral dynamic carbon fiber ankle foot orthoses and a walker. It should be kept in mind that serious complications such as cauda equina syndrome, which may considerably affect the patients' quality of life in a negative way, might develop after an epidural lysis procedure.

### Keywords

Epidural lysis, cauda equina syndrome, rehabilitation

### Anahtar Kelimeler

Epidural lizis, kauda ekina sendromu, rehabilitasyon

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### Öz

Epidural lizis başarısız bel cerrahisi sonrası tedavide uygulanan yöntemlerden biridir. Bu prosedürün bilinen yararlı etkilerinin yanı sıra sonrasında gelişen çeşitli komplikasyonlar da raporlanmıştır. En sık gözlenen komplikasyonlar arasında dural perforasyon, katater kırılması ve enfeksiyonlar sayılmaktadır. Kauda ekina sendromu epidural lizisin nadir bir komplikasyonudur. Altı yıldır bel ağrısı şikayeti olan 51 yaşındaki kadın olgunun, lomber 3-4-5 seviyelerinden epidural lizis işlemi uygulanması sonrasında yürüyememe, her iki alt ekstremitede güçsüzlük, idrar ve gaita inkontinansı şikayetleri gelişmiş. Hasta, kauda ekina sendromu tanısı konularak rehabilitasyon programına alındı. Üç aylık tedavi sonrasında olgu, bilateral karbon fiber ayak-ayak bilek ortezi ve yürüteçle ambulasyonunu sağlar duruma gelmişti. Epidural lizis işleminden sonra kauda ekina sendromu gibi hastanın yaşam kalitesini kötü yönde etkileyebilecek, ciddi komplikasyonların gelişebileceği akılda bulundurulmalıdır.

## Introduction

Epidural lysis is known to be one of the therapy methods used following an unsuccessful low back surgery. This method is employed in cases where all other conservative treatments, including fluoroscopic injections, are inadequate. The purpose of this method is to ensure the injected medication reaches the target area by eliminating the scarred tissue at the epidural site (1). Despite its proven effectiveness, several complications occurring after an epidural lysis procedure have been reported. The most common complications are dural perforation, breaking of the catheter and infections (2,3). In the literature, there is only one reported case of cauda equina syndrome following an epidural lysis that recovered without any sequelae (4).

This article presents a case of cauda equina syndrome that developed as a consequence of an epidural lysis procedure which had poor motor recovery.

## Case Report

A 51-year-old female patient who was complaining of low back pain for the last 6 years and was diagnosed with spondylolisthesis and instability at the lumbar 3-4-5 level one year ago, underwent a laminectomy and fixation surgery in the lumbar 2-5 segments. Six months after the surgery, the patient visited the department of algology and an epidural lysis was performed at the lumbar 3-4-5 level. Following the procedure, the patient was not able to walk with weakness starting in both lower extremities. One month after the epidural lysis procedure, electromyographic assessment revealed multiple lumbosacral radicular involvement. Six months after the epidural lysis, the patient, who was ambulant using a wheelchair, was referred to our clinic. On examination, bilateral hip flexion was 4/5, bilateral knee extension -4/5, bilateral foot-ankle dorsiflexion -0/5, bilateral foot-ankle plantar flexion -0/5, and the bilateral big toe dorsiflexion was 0/5. During sensory evaluation, hyperesthesia at the bilateral lumbar 5, sacral 1 dermatome and anesthesia at the S4-S5 level were observed. The lower extremity deep tendon reflexes were elicited. The patient had fecal and urinary incontinence. Clinical and magnetic resonance imaging (Figure 1) findings were consistent with

cauda equina syndrome. A physiotherapy program of 30 sessions consisting of lower extremity passive joint range of motion, stretching and proprioception exercises and electrical stimulation of the bilateral tibialis anterior muscles was administered to the patient who had a baseline functional independence measure (FIM) score of 61. At the advanced stages of rehabilitation, she could stand up next to the bed. Later, she was trying to walk in parallel bars with a bilateral posterior leaf-spring ankle foot orthosis. The patient showed significant improvement in ambulatory status using parallel bars and proceeded to receive training to walk with a walker for short distances. At the end of the therapy, on examination, the hip flexion, knee extension and knee flexion advanced to 5/5, bilateral ankle dorsiflexion and plantar flexion to 1/5 and the FIM score reached a level of 107. Urodynamics showed a decrease in the detrusor muscle functions and a decrease in the sphincter activity. For this reason, training was given



**Figure 1.** On T1-weighted sagittal images, localized expansion of the right anterolateral epidural space at the level of L2-5 and extending to caudal epidural fibrosis of the subarachnoid space with distance view of the formation of band

for clean intermittent self-catheterization (CISC) for every 6 hours. After the CISC training, the patient had spontaneous voiding. A bowel rehabilitation program was initiated for fecal incontinence. After treatment, the patient was independent in terms of bowel management. The patient was discharged after being partly independent in her daily life activities and was clinically followed by our clinic. Informed consent was obtained from the patient.

## Discussion

Epidural adhesions generally develop as a result of hemorrhages at the lumbar surgery site. In time, these adhesions lead to an adhesion of the nerve root to a site, causing chronic radicular pain. The epidural lysis procedure is known to remove the adhesions at the surgery site with the help of a catheter. This procedure was first reported by Racz and Halubec (1) in 1989. With this method, steroids and other solutions can better penetrate into the site, with the aim to decrease the pressure on the nerves and to relieve the pain persisting after surgery.

Epidural lysis can cause complications, including dural perforation, breaking of the catheter, spinal cord compression, and infections. While complications related to the procedure are acute, those related to the medication administered have a later onset. Complications observed in the early stage include hemorrhage at the epidural site, penetration of the dura, bending of the needle tip, catheter migrating into the subdural space, breaking of the catheter, problems occurring during the retraction of the catheter, severe pain after injection, catheter blockage, and hypotension. Complications occurring at a later stage are known to be dural penetration, dermatomal pain, transient or permanent paresthesia, bowel and bladder dysfunction, headache, infection at the penetration site, epidural abscess, and arachnoiditis. Among these complications, perhaps the most serious ones are those resulting from administering excessive fluid. This can cause excessive epidural hydrostatic pressure, spinal cord compression, hematoma, infection, dural perforation, and even blindness. Another important complication is subarachnoid or subdural perforation, with anesthetics or hypertonic saline solution injected in these areas (5). The latter was the possible complication in our patient.

In the literature, there are publications stating that solution injected into the subarachnoid space causes myelopathy, paralysis and loss of sphincter control (5-7). Our patient developed cauda equina syndrome, a rare complication associated with epidural lysis. After analyzing a compilation of 839 epidural lysis cases, Manchikanti et al. (8) concluded that the incidence of transient nerve damage was 1.9%. However, transient spinal cord irritation or permanent damage has not been reported. Lucas et al. (9) reported that out of 2105 patients in whom hypertonic saline was injected to manage pain, 1% developed paraplegia or quadriplegia. In their study, Erdine and Talu (10) have reported that among the 250 patients, 1.6% had paresthesia, 1.2% - permanent paresthesia, 0.8% - urinary incontinence and 0.4% had bowel incontinence. In the literature, there are reported cases of plegia following epidural lysis. The case reported by Lee et al. (4) experienced transient cauda equina syndrome after the procedure. In all these cases, neurological deficits were observed to resolve gradually over time. In our case, the neurological damage following epidural lysis was permanent. In addition, although significant improvements were achieved in the functional state of the patient with the applied physiotherapy and rehabilitation programs, a spontaneous recovery was not observed.

There are some potential causes for the development of the cauda equina syndrome following epidural lysis. The first cause is high epidural hydrostatic pressure seen after excessive fluid injection and leading to nerve damage. Another possibility is mechanical nerve damage that has been reported to occur during endoscopy. When considering the fact that the caudal epidural space is narrowed by scar tissue, it is possible that local anesthetics or hypertonic saline solution leaking into the subdural and/or epidural space can compress the nerves in this area or cause chemical damage (5). Hypertonic saline injection was known to be causing factor in our case.

As a result, it should be kept in mind that serious complications like the cauda equina syndrome might develop after an epidural lysis procedure which may considerably affect the patients' quality of life in a negative way.

## Ethics

**Informed Consent:** Consent form was filled out by all participants.

**Peer-review:** Externally and internally peer-reviewed.

#### Authorship Contributions

Surgical and Medical Practices: C.Y., Concept: Y.T., Design: Y.T., E.T., Data Collection or Processing: C.Y., Analysis or Interpretation: Y.T., Ö.F.Ş., Literature Search: E.A., Writing: Y.T., E.A.

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