



Innovative Treatment for Chronic Lumbar Back Pain

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Abstract

Radiculopathy can occur in a variety of patients ranging from complications of obesity to sports injuries to a combination of repetitive stress movements with post-traumatic disc disorder. In the case of three teenage patients, each of these causes contributed to their pain that led them to present in Emergency Departments, Family Medicine clinics, and eventual referral to Pediatric Neurosurgery. Various approaches were administered to help with the pain of these teenagers that included local steroid injection and chiropractic adjustments that ultimately contributed to no lasting pain relief. Each patient was considered to have chronic lower back pain and deemed a candidate to receive an innovative treatment option to help manage the back pain. The patients were all referred to receive epidural lysis of adhesions (LOA) which provided the lasting relief of the pain that the patients were seeking. LOA is a procedure that includes using a needle, Racz catheter, and injectable contrast guided with fluoroscopy to locate the appropriate spinal level of the radiculopathy and associated scarred entrapment of nerves. LOA utilizes the injection of hyaluronidase dissolved in normal saline to free the entrapped nerve so that a local anesthetic/steroid solution can be injected to block sensory signals and provide pain relief.

Keywords

Radiculopathy; Post-traumatic disc disorder; Pediatric neurosurgery; Pain relief

Background

Epidural lysis of adhesion (LOA) with epidurography is a relatively new intervention in the treatment of chronic back pain, failed back surgery syndrome, spinal stenosis, and radiculopathy [1-3]. Radiculopathy is defined as radiating pain, numbness, and muscular weakness associated with the compromised nerve root, also known as sciatica [4-8]. LOA is characterized by the insertion of a Racz catheter through the sciatic hiatus into the epidural space surrounding a spinal nerve root compromised by the presence of scarring or compression of the nerve root itself or its blood supply followed by an injection of a combination of pharmaceutical drugs [1,2]. The scarring can be due to post-traumatic disc disorder (chemical irritation or the presence of micro bleeds and tears) or the result of previous back surgeries in an attempt to relieve the anatomical cause of pain [1,9]. The chemical irritation caused by degenerative diseases has been shown to have a higher influence on pain in comparison with associated mechanical complications of the disease [9].

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The LOA procedure is also provided as an alternative to the controversial epidural steroid injections, that prove to be inefficient in delivering drugs to the affected site due to the presence of the scarring [1,2,5,7]. The combination of medications injected, (ropivacaine, hyaluronidase, corticosteroids, and hypertonic saline solution) has been shown to lyse adhesions and enable through perfusion in post-operative epidurographies [1,9,10]. LOA has been found to not only be a cost effective alternative, but a safe and effective procedure resulting in lower opioid use, fewer work absences, and decreased overall pain [1,3,9]. Back pain and spinal stenosis are diseases associated with the natural process of aging. As the world population continues to increase in age, the prevalence of chronic back pain and the need for this procedure is predicted to increase [1]. There are few complications associated with the procedure that can be avoided with correct technique and experience [1,9,10]. The following case study follows three teenagers who had suffered from radiculopathy as a complication of lumbar disc herniation. The three teenage patients engage in different levels of physical activity: patient 1 is obese, while patient 2 and 3 are a weight lifter and golfer, respectively. Each teenager was treated with epidural LOA to relieve the pain and radiculopathy associated with the disc herniation.

Patient 1

This patient is a sixteen-year-old female that presented in Pediatric Neurosurgery *via* referral for L4-L5 herniated disc. During the last ten years, her parents described her as clumsy due to her walking style and difficulties with staircases. Lower midline pain began with intermittent right lower extremity weakness approximately a year ago, followed by left distal lower extremity weakness. The patient reports having daily pain but no problems with urination or defecation. The patient also states having tremors of hands and legs as well as some anxious periods. The patient is 67.9 inches tall and 250.8 pounds with a BMI of 38.31 which places her in the 98.82 BMI percentile.

Approximately three months after the first visit with Pediatric Neurosurgery, the patient was diagnosed with moderate articulo-autonomic dysplasia and Ehlers-Danlos syndrome as well as aphasia.

The patient's musculoskeletal exam showed the patient has full range of motion in every direction. Neurologic exam showed the gait to have emphasized mistakes along with inconsistent and changing wobbliness with differed attention. The patient received an MRI which showed a central L4 disc herniation.

To treat the pain associated with the L4-L5 disc herniation, the patient was referred to receive LOA.

Patient 2

This patient is a fifteen-year-old male that presented in the Emergency Department complaining of back pain. The onset of the pain was seven days ago after lifting weights at school. The pain is in the lumbar region, and the patient reports no radiation of pain. The patient reports that movement makes the pain worse while resting relieves the pain. The patient denies any prior episodes. The patient's past medical history is unremarkable. Musculoskeletal exam showed normal strength and range of motion. Physical exam of the back

showed diffuse pain and tenderness in lumbar region. There was no step off found and no vertebral point tenderness.

Approximately four months later the patient was referred to Pediatric Neurosurgery for mild degenerative disc disease and bulging L4-L5 disc. The patient received an MRI three months' prior of the lumbar spine. The patient complained of constant lower back pain without numbness or pain in legs or arms. The patient stated that his sleep had been altered due to the pain. More than two years later the patient returned to Pediatric Neurosurgery for a follow up. The patient continued to complain of lower back pain despite receiving physical therapy. The patient described his pain as located in the middle lower back that radiated to the posterior right leg. The patient stated that the pain is worse after laying down and that the pain extended to his right leg upon walking and standing. MRI shows patient to have a L5 disc herniation.

In response to the patients continued lower back pain, he has been referred to receive LOA to treat the pain the patient is experiencing.

Patient 3

This patient is a fifteen-year-old male that presented in the Emergency Department complaining of midline lower back pain that began 1.5 weeks ago and has been constant and progressively worsened. The location of the pain was in the thoracic lumbar region. He reports that he had gone to a chiropractor the previous day where he received an adjustment. The patient stated that the pain now radiated into his ribs which was causing him to shake. The patient described his pain as achy, and he denies any injuries. The patient stated that movement and bending worsens the pain. His playing of golf causes a significant risk factor due to the repetitive stress associated with the sport. The patient also denies any bowel or bladder dysfunction and saddle numbness. The patients past medical history is unremarkable. Physical exam findings showed that in both the thoracic and lumbar spine region the patient experienced midline diffuse moderate tenderness without any abrasions, step-off, or vertebral point tenderness. Images of the lumbar spine revealed patterns of rotary scoliosis. There were no developmental anomalies of the vertebral bodies found. Spondylolysis was also ruled out with imaging. With these results the patient was discharged.

Seven months later the patient presented in the Family Medicine office complaining of back pain that was localized and located on both sides and lumbar region. The patient stated that the back pain began one day ago after exertion. The patient described the pain as sharp, shooting, stabbing, and tearing. The patient described the severity of his back pain as moderate as well as constant with fluctuation in intensity. A MRI of the lumbar spine was ordered for the patient. One month later the patient returned to the Family Medicine office to review the results of the MRI. The MRI showed the patient to have Degenerative Disc Disease (DDD) of T12-L1 with bulging disc, DDD of L4-L5 and L5-S1 with mild bilateral foraminal stenosis.

Two months later the patient was referred to Pediatric Neurosurgery for his chronic back pain. Pediatric Neurosurgery confirmed the presence of mild DDD with moderate foraminal stenosis. It was recommended that the patient refrain from golf for a period of time and physical therapy. Three months later the patient returned to Pediatric Neurosurgery for a follow up. The patient completed physical therapy and reported relief of pain, but the patient had recent flare ups of the pain two weeks prior with

radiculopathy and difficulty in movement of the right leg. LOA has been recommended to the patient for pain management.

Discussion

In each case the patient was referred to receive LOA to manage their pain. After sterile preparation, the appropriate lumbar spinal level was palpated and local anesthetic was injected under the skin on the opposite side of the identified radiculopathy. The skin was then cut with an 18-gauge cutting needle. An epidural needle was inserted through the cut in the skin while guided with fluoroscopy.

Carefully, the needle was crossed to the side of the identified radiculopathy. The distal opening of the needle was turned ventral lateral followed by the insertion of a Racz catheter. While guided by fluoroscopy, the catheter was advanced toward the appropriate spinal level and an additional 2 to 3 mL of contrast was injected to attempt to identify the scarred, entrapped nerve root. Once identified, 1500 U of hyaluronidase dissolved in 10 mL of normal saline was injected to open the nerve root. Following the opening of the entrapped nerve root, the patients received an injection of 4 mg of dexamethasone mixed with 9 mL of 0.2% ropivacaine which provided pain relief of their radiculopathy [10].

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