

Rhizolysis: An Unusual Postoperative Complication

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Abstract

Percutaneous retrogasserian glycerol rhizolysis, introduced in 1981, has become established in the management of trigeminal neuralgia secondary to multiple sclerosis and pontine infarction. More recently, this technique was established as safe and reliable in managing pain originating from the zygapophyseal joints, with successful relief of pain in 67% of patients treated for lower back pain. In this article, we report a case of complete paralysis of lumbar paravertebral muscle function caused by severe multifidus degeneration after 3-level lumbar rhizolysis. This paralysis resulted in kyphosis and loss of sagittal balance.

Since its introduction in 1981, percutaneous retrogasserian glycerol rhizolysis has become established in the management of trigeminal neuralgia secondary to multiple sclerosis and pontine infarction.¹⁻³ More recently, the technique was found to be safe and reliable in managing pain originating from the zygapophyseal joints (Z-joints),⁴⁻⁶ with successful relief of pain in 67% of patients treated for lower back pain.⁵

Lower back pain arising from Z-joints was first demonstrated by Hirsch and colleagues.⁷ Each Z-joint is innervated by the dorsal ramus. The anatomy of the lumbar dorsal rami was described through the dissection of 4 human cadavers,⁸ reliably demonstrating 3 branches (medial, lateral, intermediate) originating from the dorsal rami of L1-L4. These branches supply the multifidus, iliocostalis, and longissimus, respectively.

In our unit, when managing chronic back pain, we commonly perform radiofrequency electrothermal ablation of the medial branch of the posterior ramus under image intensifier.

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We report a case of complete paralysis of lumbar paravertebral muscle function caused by severe multifidus degeneration after 3-level lumbar rhizolysis. This paralysis resulted in kyphosis and loss of sagittal balance. The patient provided written informed consent for print and electronic publication of this case report.

CASE REPORT

The patient was an employed 59-year-old woman. She was postmenopausal and a nonsmoker. Past medical history included bilateral salpingo-oophorectomy, uterine prolapse, detrusor instability, and 20 years of chronic lower back pain.

On presentation, the patient's visual analog scale (VAS) score for back pain was 7/10, and her Oswestry Disability Index (ODI) was 26%. Lower limb neurology and standing posture were normal, and forward flexion was relatively normal. There was restricted and painful extension to 15° with painful lateral bending and rotation, and there was tenderness on deep palpation over the lower lumbosacral facets.

In 2007, the patient had an initial positive response to 3-level bilateral facet joint injections. When another set of injections failed to produce similar beneficial pain relief, she underwent rhizolysis of L3-L4, L4-L5, and L5-S1. Not only did these injections not address the back pain (VAS, 8; ODI, 48%), but a kyphotic deformity gradually developed across the thoracolumbar junction, with subsequent loss of sagittal balance.

Six months after rhizolysis, lumbar lordosis was 22° (normal range), with a thoracolumbar kyphosis of 34.9° (normal range), and relatively normal sagittal balance (Figure 1A). By 2008, lumbar lordosis had increased slightly to 22.9°, the thoracolumbar kyphosis had increased to 40°, and sagittal balance was still relatively normal (Figure 1B). During this time, the patient kept her job as a cleaner with the help of occasional facet joint injections and regular use of simple analgesics.

In 2010, she presented with disabling back pain, bilateral anterior knee pain, and inability to stand upright for long. She was on regular high-dose oral morphine and fentanyl transdermal patches, to such an extent that she developed significant opioid-related side effects: slurred speech, hallucinations, and drowsiness. Radiographs showed deterioration of lumbar lordosis to only 8°, thoracolumbar kyphosis of 43.3°, and positive sagittal balance of 9.5 cm (Figure 1C). ODI was 50%. Magnetic resonance imaging (MRI) showed wide-

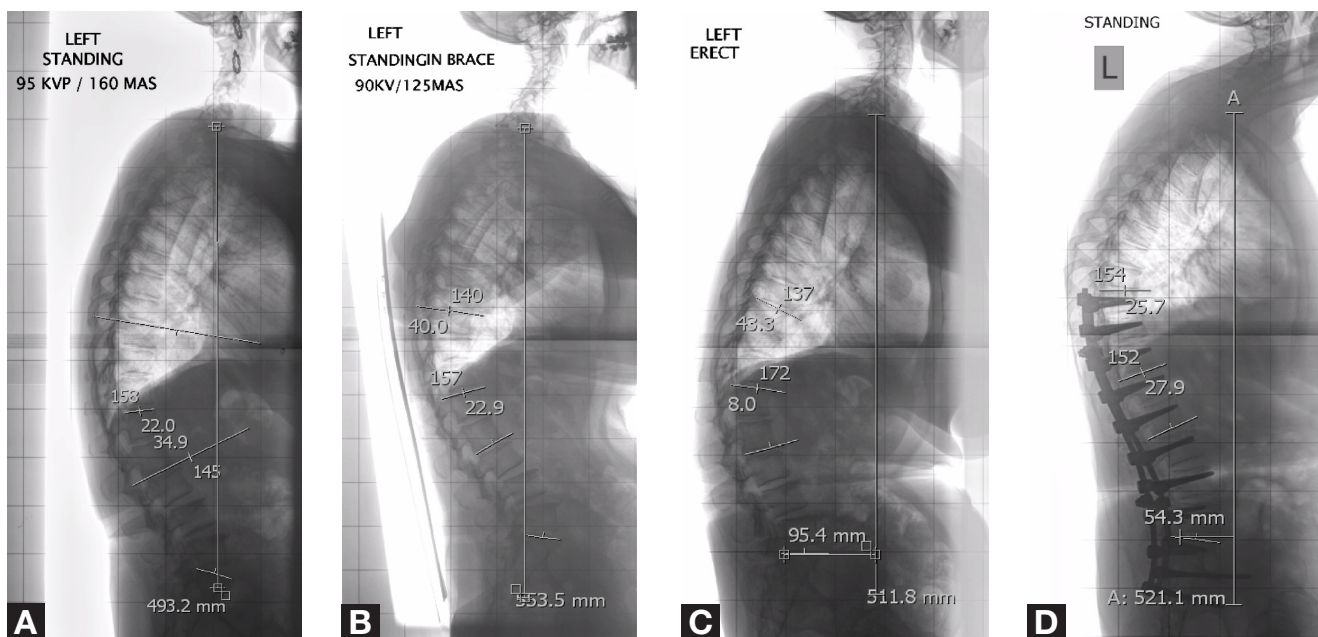


Figure 1. Standing lateral view of whole spine shows (A) lumbar lordosis of 22°, thoracolumbar kyphosis of 34.9°, and normal sagittal balance (2007); (B) lumbar lordosis of 22.9°, thoracolumbar kyphosis of 40°, and normal sagittal balance (2008); (C) lumbar lordosis of 8°, thoracolumbar kyphosis of 43.3°, and positive sagittal balance of 9.5 cm (2010); and (D) at 1-year follow-up, lumbar lordosis of 27.9°, thoracolumbar kyphosis of 25.7°, and sagittal balance of 5.4 cm (2010).

spread, multilevel degenerate, and dehydrated disks with some shallow bulges, but no significant neural compression. MRI also showed selective fibrofatty degeneration of the multifidus part of the paravertebral muscles. Of the core stability muscles, the psoas and the longissimus were relatively unaffected (Figure 2). A diagnosis of neuromuscular kyphosis secondary to multifidus paralysis was made.

As all conservative treatment modalities had failed, the patient agreed to T10–pelvis correction and fusion of the kyphotic deformity using the USSII pedicle screw system (Synthes, West Chester, Pennsylvania). During surgery, the multifidus muscle was clearly distinguishable from the longissimus in its consistency and contractibility. Histopathologic sections showed complete fibrosis degeneration of the muscle.

One year postoperatively, sagittal balance improved substantially (Figure 1D), the patient discontinued morphine and fentanyl, and was taking simple analgesics only on occasion. VAS improved to 37%.

DISCUSSION

Rhizolysis is widely regarded as a safe procedure in the management of lower back pain.⁹ The aim of the procedure is to denervate the facet joints. Accurate positioning of the needle at or near the median branch of the posterior ramus is crucial if it is going to be efficacious in the appropriately selected patients. Therefore, it is vital that the anatomy remain undisturbed. For this reason, we do not recommend this procedure in our unit in patients who have previously undergone posterior spinal surgery. In radiofrequency ablation, the patient is awake under

mild sedation while the needles are positioned. Then, there is a series of motor and sensory stimulations to ensure accurate needle positioning. Ipsilateral multifidus contraction and fasciculation are indicative of accurate needle positioning. The denervation is—at least temporarily—expected and desired to create an insensate facet joint and a paralyzed multifidus muscle, a situation similar to that of a Charcot joint. Although supporting evidence is lacking, rhizolysis has been theorized to lead to accelerated degeneration, as the joint is insensate and the protective muscles are not functioning. Undesired outcomes include transection of the lateral branches of the lumbar dorsal rami during rhizolysis.⁹

Although the etiology has not been established, we believe there is a strong association between paralysis

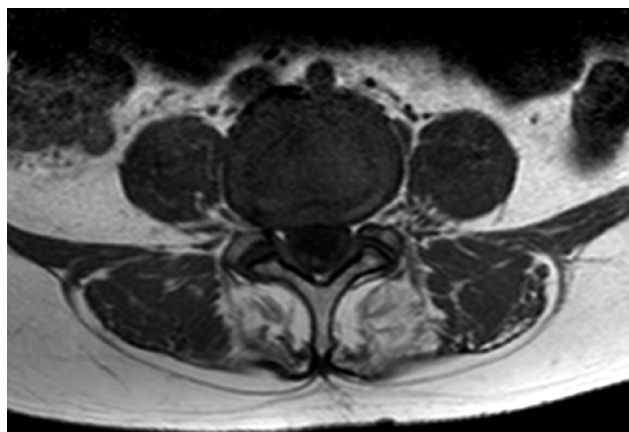


Figure 2. MRI of lumbar spine shows selective fibrofatty degeneration of multifidus part of paravertebral muscles.

of the multifidus and progressive deformity, with loss of sagittal balance in this patient's case. Severe back pain, which ensued after an initial short-term response, could have been caused by both muscle fatigue secondary to positive sagittal balance and progressive facet joint degeneration. In our review of the literature, we did not find any cases in which these results could be attributed to allergy or chemicals in the case of chemical rhizolysis. This case has made us more vigilant and selective in offering rhizolysis for younger patients.

AUTHORS' DISCLOSURE STATEMENT

The authors report no actual or potential conflict of interest in relation to this article.

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