

CASE REPORT

Radiofrequency Lesioning of Rami Communicans for Discogenic Back Pain: Is Failure Inevitable? A Case Report

¹Praneet Singh, ²Gautam Das, ³Ronnie P Kaddu

ABSTRACT

Internal disc disruption is the most common cause of low back pain amongst the younger adults. It is characterized by diffuse axial back pain with or without non-dermatomal leg pain limited up to knee usually. Presence of hyper-intense zone in magnetic resonance imaging (MRI), provocative discography and rami communicans block is the current diagnostic modalities. Radiofrequency ablation of the rami communicans is one of the therapeutic options in cases which are resistant to other treatment modalities. However, many a time it has been found that in spite of significant pain relief achieved with diagnostic rami communicans block with local anesthetics, conventional radio frequency procedures may give unsuccessful outcomes. We hereby discuss a similar case scenario with possible explanations based on literature.

Keywords: Discogenic back pain, Rami communicans block, innervation of disc, Sinuvertebral nerve

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INTRODUCTION

Crock¹ first proposed the concept of Internal disk disruption (IDD). It is defined as lumbar spinal pain, with or without referred pain, stemming from an intervertebral disk, caused by internal disruption of the normal structural and biochemical integrity of the symptomatic disk.² IDD causing discogenic low back pain accounts for 26 to 42% of chronic low back pain patients.³ Clinical features include predominant back pain with non-dermatomal leg pain mostly limited up to the knee. The presence of a high-intensity zone (HIZ) on T2-weight MRI sagittal images in the posterior annulus (representative of a radial annular fissure) has a near 90% positive predictive value with concordant discography but this is not absolute,

and the absence of a HIZ does not exclude discogenic low back pain.⁴⁻⁶ Rami communicans block is used as a diagnostic modality⁷ as well as for therapeutic purpose.⁸ However, conventional radiofrequency (RF) ablation of rami communicans fibers may give inconsistent results in spite of a positive diagnostic block.

CASE REPORT

A 38-year-old male presented to our outpatient department with a complaint of predominantly low backache and buttock pain for the past 2 years. Most recently, the pain had exacerbated for the past 4 months. The pain was gradual in onset, NRS varied with posture, being seven on sitting and bending forwards and three on lying down and standing. The pain did not even allow him to sit for more than 10 minutes at a stretch. The pain was mostly felt in the back region and sometimes referred to both his lower limbs up to his knee joints. On examination, no local tenderness was present but deep percussion over the back elicited mild pain in back. His sensory and motor examinations were within normal limits. The pain was not reproducible in any movements. Keeping a probable diagnosis of discogenic back pain, a lumbar spine MRI was ordered which revealed a midline hyper intense zone (HIZ) in L5-S1 intervertebral disc region. (Fig. 1) A dual diagnostic rami communicans block was performed at bilateral L2 vertebral body level, first with 1% lignocaine and later with 0.25% bupivacaine yielding

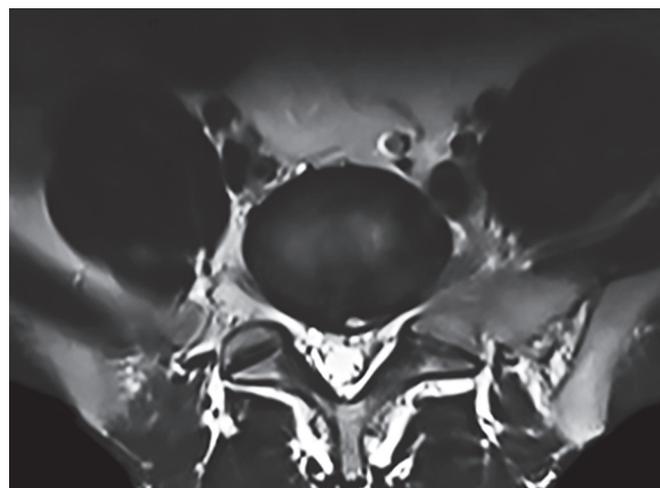


Fig 1. MRI T2 images showing L5-S1 HIZ

^{1,3}Fellow, ²Director

¹⁻³Daradia: The Pain Clinic, Kolkata, West Bengal, India

Corresponding Author: Praneet Singh, Daradia: The Pain Clinic, Kolkata, West Bengal, India, e-mail: singhpraneet87@gmail.com

an 80 to 90% relief of symptoms. His relief of symptoms after blockade with 0.25% bupivacaine outlasted that after 1% lignocaine by a period of about 1 hour. Clinical features, as well as a positive diagnostic block, proved it to be a case of Internal disc disruption. So the patient was started on conservative management. However, due to only a partial relief of symptoms with conservative management, he was planned for radiofrequency (RF) ablation of rami communicans at bilateral L2 vertebral body levels. Conventional RF ablation of Rami communicans was performed with two cycles at each level at 70 degrees for 90 seconds. Postprocedure patient's course was uneventful, and the patient was discharged home. However, patients follow up over the next couple of months revealed a hypohydrosis bilaterally below the L2 dermatome with a non-significant pain relief.

DISCUSSION

The nerve supply of the intervertebral disc is complex and has been a matter of debate since long. Anterolateral part of the intervertebral disc is innervated by grey rami branches of the sympathetic trunk while the posterior part of the disc receives its innervations via branches of the sinuvertebral (or recurrent meningeal nerve). A study by Groen et al.⁹ showed that sinuvertebral nerves ultimately join grey ramus communicans and ascends via the sympathetic trunk. Ultimately signals from both the anterolateral as well as posterior part of the disc are carried via sympathetic fibers which can be blocked via the grey rami communicans block serving both the diagnostic as well as therapeutic purpose. This assumption has been endorsed by Suseki et al.¹⁰ and supported by an RCT showing pain relief following RF lesioning of the rami communicans.⁸ A study by Das et al.¹¹ demonstrated that rami communicans fiber block before annulus puncture while performing endoscopic discectomy completely abolished pain response.

Rami communicans denervation via radiofrequency-ablation thereby serves as an important treatment modality for discogenic back pain. However, radiofrequency ablation of rami communicans fibers often results in inconsistent success rates in terms of pain relief even after full satisfactory results of diagnostic blocks. A randomized sham-controlled, double blind, multicenter clinical trial by van Tilburg et al. showed poor outcome even after successful nerve block with local anaesthetic.¹²

One of the possible explanations of this ambiguity in diagnostic and therapeutic blocks success rates can be based on Bogduk's¹³ explanation of several rami communicans fibers at each level instead of one. In their study, they demonstrated the presence of three types of rami communicans at each level (as demonstrated in Fig. 2) typical rami communicans, one or more commonly two

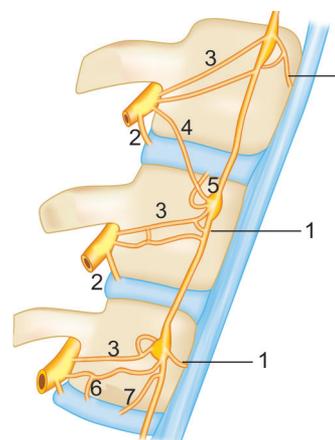


Fig 2. A line diagram adapted from Bogduk et al¹³ illustrating examples of the various types of nerves described in their study; 1, nerves to anterior longitudinal ligament; 2, branches to the posterolateral aspect of an IVD from ventral rami; 3, 'typical' rami communicans, crossing the vertebral bodies deep to psoas; 4, a ramus communicans which pierced between fibers of psoas; 5, 6, branches to the lateral aspect of an IVD from rami communicans; 7, a deep 'paradiscal' ramus communicans embedded in the connective tissue of an IVD

or more in number running from the sympathetic trunk around the concavity of vertebral body deep to tendinous arcade of the psoas muscle, other rami communicans penetrating the psoas muscle and ran their entire course through it to reach the ventral primary ramus and a deep paradiscal ramus communicans embedded in the connective tissue of an intervertebral disc. In addition, these rami communicans fibers have a variable course in the vertebral body but have a fixed course in the middle of the vertebral body. Radiofrequency lesioning being a precise one may remain unable to deal with this anatomic variability which might have been circumvented by the local anesthetic block spread yielding a positive diagnostic block success but therapeutic failure.

CONCLUSION

Thus, in spite of good results obtained after diagnostic rami communicans blocks with local anesthetics, precise lesioning by conventional RF may give inconsistent results in terms of pain relief due to the multiple numbers as well a course of these fibers. The larger sized RF lesions produced by bipolar or cooled RF may help to overcome this shortcoming posed by conventional RF. However further studies are required to say anything conclusively.

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