Herniated nucleus pulposus with laminectomy procedure

Health & Medicine

Running head: HERNIATED NUCLEUS PULPOSUS Herniated Nucleus Pulposus & its Treatment with Laminectomy Insert Here Insert Affiliation Here Abstract

Herniated nucleosus pulposus (HNP) results when a part or the entire portion of the nucleus pulposus of an intervertebral disk is forced out through a weakened portion of the disk. It occurs in three steps – protrusion, extrusion and sequestration. The extruded nucleus pulposus impinges on the spinal nerve roots, causing back pain and other symptoms. HNP is diagnosed using a number of techniques, of which, MRI is the method of choice. Conservative treatment of HNP can be performed. However, in absence of a favorable response, surgical interventions are carried out. Laminectomy is the most common surgical treatment for HNP. Through this procedure, the nucleus pulposus of the herniated disk is removed after excising a portion of the vertebral lamina.

Herniated Nucleus Pulposus

And its Treatment with Laminectomy

Introduction

Herniated nucleus pulposus (HNP), also called herniated disk, slipped or ruptured disk, occurs when the whole or a portion of the nucleus pulposus is forced out through a weak or torn anulus fibrosus (outer ring) of an intervertebral disk (Williams & Wilkins, 2010). The nucleus pulposus is the gelatinous, soft central region of the disk. Physical stress may result in a tear or weakening of the anulus fibrosus because of which the nucleus pulposus is forced into the spinal canal. The herniated disk may then impinge on the nerve roots of the spinal cord exiting from the spinal canal or the spinal cord.

This results in nerve root irritation, manifesting as back pain and other symptoms. The process of HNP occurs in three steps, protrusion, extrusion and sequestration. In the first step, the nucleus pulposus pushes through the outer ring of the disk, followed by forcing against the nerve root in the second step. The final step, i. e. sequestration, occurs when the disk core bursts and the outer ring tears, impinging the nerve root. The symptoms of HNP include severe pain in the lower back, which radiates into the legs, feet and buttocks. Sensory and motor loss may also occur in the affected area (Williams & Wilkins, 2010).

Diagnosis & Imaging Modalities

HNP is diagnosed via the straight-leg-raising test (Williams & Wilkins, 2010). X-ray of the spine is also performed to identify other abnormalities. Myelography, CT scans and MRI are often used for thorough diagnosis of HNP. Plain radiographs have limited utility in the detection of HNP. Magnetic Resonance Imaging (MRI) is the method of choice for the confirmation of HNP. It is the best imaging modality for the detection of herniated disks, disk pathology and impingement of the nerve root. MRI successfully reveals bulges, protrusions and other abnormalities even in asymptomatic patients (Brust, 2006). MRI is a non-invasive procedure and does not subject a patient to unnecessary radiation (Phillips & Lauryssen, 2009). Jackson et al (cited in Phillips & Lauryssen, 2009) have shown that of the three imaging modalities, namely MRI, CT, and CT-myelography, MRI is the most sensitive method for the detection of HNP.

Laminectomy

Patients with HNP are initially subjected to conservative treatments such as

NSAIDs, corticosteroids and muscle relaxants. If the patient does not respond well to conservative treatment, surgical treatment becomes necessary. Laminectomy is the most common surgical treatment for HNP. In this surgical process, a portion of the lamina is excised and nucleus pulposus of the herniated disk is removed (Williams & Wilkins, 2010). In the process, one or more laminae of the vertebra are removed so that the spinal cord and its surrounding structures are exposed. Following this, a part or whole of the herniated nucleus pulposus along with any bony fragments and material from the disk are removed from the spinal cord. 90-95% of all herniated disks often occur at L4/L5 to S1 level of the spine (Holloway, 2004).

In case a laminectomy procedure does not eliminate pain, spinal fusion may become necessary. Sometimes, both laminectomy and spinal fusion are concurrently performed (Williams & Wilkins, 2010). Microdiskectomy is also performed for the removal of nucleus pulposus of a herniated disk.

References

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