

Comparison of the results of us and mri in the diagnosis of cervical and lumbar intervertebral discs hernia

Voronzhhev, I.A.¹, Kozarenko, T.M.¹, Eloeva, Z.V.¹, Kolomiychenko, Yu.A.¹, Lysenko, N.S.¹

Institute of Neurology, Psychiatry and Narcology of the National Academy of Medical Sciences of Ukraine, Ukraine¹



Keywords:

Magnetic Resonance Imaging (MRI); cervical disc; Radiology & Imaging; herniation.

ABSTRACT

The present method comparison study was carried out in the Radiology and Imaging Department of Dhaka Medical College & Hospital, Dhaka during the period of January 2012 to December 2013 to evaluate the role of Magnetic Resonance Imaging in the diagnosis of cervical disc herniation. A total of 40 patients having clinical features of cervical disc herniation with neck pain referred to the Department of Radiology & Imaging for MRI of their cervical spine were included in the study. At first all the patients were evaluated by detail history and clinical examination with special emphasis on clinical features. Then subsequently MRI of cervical spine was performed in all cases. The MRI report was checked by a competent radiologist of the department of Radiology and imaging DMCH. Among these 40 patients 11 were operated in department of neurosurgery, DMCH and 29 were operated in spine surgery unit, Department of Orthopaedic, BSMMU, Dhaka. The MRI and peroperative findings of these 40 patients were analyzed for the study. MRI findings correlated well in most of the cases with preoperative findings. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of MRI in the diagnosis of cervical disc herniation were 94.12%, 83.33%, 96.97%, 71.43% and 92.5% respectively. Therefore it can be concluded that MRI may be used as a reliable tool with which we can assess the level, type and position of cervical disc herniation and can plan the subsequent appropriate management in majority of cases.



This work is licensed under a Creative Commons Attribution Non-Commercial 4.0 International License.

1. Introduction

Cervical intervertebral disc herniation is an important cause of neck and arm pain. Herniation of disc is defined as a localized displacement of disc material beyond the limits of the intervertebral disc space. This herniation results in neck and arm pain with paresthesias in a dermatomal distribution and muscle weakness. Herniation may be described as a protrusion, extrusion or sequestration. In protruded type of disc herniation displaced disc material remains in continuity with the disc of origin and contained by annulus fibrosus. In extruded type disc material migrate through the annulus fibrosus but contained by posterior longitudinal ligament. In sequestered type disc material is free in spinal canal. Disc herniation may be posterolateral or central. Posterolateral herniation is more common and affects the exiting nerve root. In

cervical region disc herniation predominate in lower cervical level C5-6 and C6-7 [1]. 60-75% herniations occur at C6-7 and 20-30% at C5-C6 level [2]. Symptoms may begin as localized neck pain. This pain may be followed by referred (radicular) pain going down in the arm or forearm, this suggest progression of disease and indicate nerve root irritation or compression. Other symptoms include sensory loss, parasthesias and hyporeflexias. Disc herniation along with ligamentum flavum hypertrophy can cause acquired canal stenosis when the spinal canal diameter is less than 13mm in cervical region. This results in myelopathy causing weakness and wasting of hand muscle, weakness and spasticity of the lower limbs, gait disturbances, exaggerated reflexes and 50% develop bladder symptoms [3].

2. Methods

The present method comparison study was carried out among 48 patients with clinical diagnosis of cervical disc herniation referred to Radiology and Imaging Department of Dhaka Medical College & Hospital, Dhaka for MRI of cervical spine during the period of January 2012 to December 2013. The Research Protocol was approved by ethical committee of DMCH prior to commencement of the study. At first all the patients were evaluated by detail history and clinical examination with special emphasis on clinical features. Subsequently MRI of cervical spine was performed in all cases. A 0.3 Tesla open MRI machine (AIRIS-II-HITACHI) was used. Images were taken at sagittal and axial sections at spin echo (SE) sequence in T1-weighted and fast spin echo (FSE) sequence in T2 weighted images using slice thickness 5mm, intersection gap 4 mm. The MRI report was checked by a competent radiologist of the department of Radiology and imaging DMCH. Out of 48 cases, 5 had only disc bulge without neurological deficit, 3 patients had refused surgery and 1 patient was unfit for surgery and peroperative findings were available in 40 patients. Among these 40 patients 11 were operated in department of neurosurgery, DMCH and 29 were operated in spine surgery unit, Department of Orthopaedic, BSMMU, Dhaka. The MRI and peroperative findings of these 40 patients were analyzed for the study.

3. Discussion

MRI is the primary modality for imaging the spine as it can reliably image the vertebral marrow, paravertebral soft tissue, intervertebral disc, the cord, thecal sac and the nerve roots [1]. The method comparison study was carried out to establish the usefulness of MRI in the diagnosis of cervical disc herniation with peroperative correlation. Subjects of this study were taken from Dhaka Medical College & Hospital, Dhaka. During the study period of January 2012 to December 2013, 40 patients were included in this study as they fulfill the inclusion and exclusion criteria. In this study 21(52.5%) cases are found between 30 to 39 years, 14 (35%) cases cases were between 40-49years and 5 cases (12.5%) were between 50-59 years. Peak incidence of symptomatic cervical disc herniation is between 30 years to 50 years [6]. In present study neck pain, paresthesia, sensory changes, limb weakness, abnormal deep tendon reflexes were present in most of the patients. The most common clinical findings seen in patients with cervical disc herniation is radiculopathy. The diagnosis of cervical radiculopathy can be considered in patients with arm pain, neck pain, and paresthesias, numbness and sensory changes, weakness, or abnormal deep tendon reflexes in the arm [7].

4. References

[1] Ramani P.S. Textbook of Spinal Surgery. New Delhi, Jaypee brothers 2005; 286.

[2] Osborn, A.G. Diagnostic Neuroradiology. St. Louis, Mosby Elsevier 1994; 850.

[3] Ray, A., Cowie, R. What should be done for the patient with neck pain (when plain x-ray says spondylosis). Arthritis research campaign. 2005 Available from:

www.arthritisresearchuk.org/~media/files.On/1 P 07-jan2002.ashx.

[4] Keith, D.W. & Ashley, L.P. Lower Back Pain and Disorders of Intervertebral Discs. In: Canale, S.T. & Beaty, J.H. editors. Campbell's Operative Orthopaedics. Philadelphia, Mosby Elsevier, 2007;1292

[5] Modic, M.T., Ross, J.S. Masaryk, T.J. Imaging of degenerative disease of cervical spine. Clin Orthop Relat res. 1989; 239:109-120.

[6] Toshiki, A. Symptomatic cervical disc herniation in teenagers: two case reports, Journal of medical care reports. 2013;7: 42.

[7] Christopher, M.B. Diagnosis and Treatment of Cervical Radiculopathy from Degenerative Disorders. North American Spine Society: 2010;12.

[8] Buzzle.com. disc desiccation. [online]. 2012: available from: <http://www.buzzle.com/articals/discdesiccationhotmail>.

[9] Kelsy, J.L., Githens, P.B., Walter, S.D. An epidemiological study of acute prolapsed cervical intervertebral disc. J Bone Joint Sur, 1984;66:907.

[10] Turek, S.L. The cervical spine. In: Pederson, DD editors. Orthopaedics Principles and the application. Pennsylvania, J.B. Lippincott Company. 1989.

[11] Russell, E.G. Cervical disc disease, Radiology Journal. 1990; 177: 313-325.

[12] Maryam, B. MRI findings in spinal canal stenosis. Iranian Journal of Radiology, 2010; 7: 25.

[13] Kenneth, M.A. & Jhon, R.H. MR Imaging of spinal stenosis. Applied Radiology. 1997; 26.

[14] Mogdad, F.A., Nofal, M.K., Piers M, Sean, P.H. The value of neurophysical and imaging studies in predicting outcome in the surgical treatment of cervical radiculopathy. Eur Spine J. 2007; 16: 495-500.

[15] Wilson, D.W., Pezzuli, R.T., Place, J.N. Magnetic resonance imaging in the preoperative evaluation of cervical radiculopathy. Neurosurgery.1991; 28:175-179.

[16] Erik Van de Kleef, Michel Van Vyre. Diagnostic imaging algorithm for cervical soft disc herniation. Journal of Neurosurgery and Psychiatry.1994;57: 724-728.