

## MRI EVALUATION OF NECK PAIN

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Patients with neck pain both acute and chronic of various aetiologies are commonly found throughout the world for years. Magnetic Resonance Imaging (MRI) is an excellent imaging modality for demonstration of aetiology of neck pain. Degenerative changes, infective processes, neoplastic processes, mechanical injuries and congenital disorders of the spine can be detected by MRI without any hazards. This prospective study of neck pain was done in Radiology and Imaging department of Bangabandhu Sheikh Mujib Medical University and Combined Military Hospital, Dhaka on 60 cases of both sexes reported during the period, February 2006 to September 2006. The aim of the study was to find out the role of MRI in diagnosis and evaluation of chronic and acute neck pain. Out of 60 cases, 51 cases were with cervical spondylotic changes, 2 cases were with spinal trauma, 2 cases were space occupying lesion (SOL) in spinal cord, 1 case was SOL in vertebra, 1 case was soft tissue mass in neck. Only 2 cases showed normal MRI findings. The youngest patient was a fourteen year old male and oldest one was 75 years old male person. Highest incidence was in the 5th decade numbering 20 (33.3%). MRI is non-invasive, non hazardous method and have very few contraindications. Though MRI is relatively expensive and still then it is good considering the diagnostic accuracy and cost effectiveness.

**Key Words:** MRI evaluation, Neck pain.

**Introduction**

A revolutionary change in the field of radiology and imaging has occurred following advent of "Magnetic Resonance Imaging (MRI)". Due to high sensitivity of MRI abnormalities are often detected in the early stage of disease. MRI reveals disc herniation causing neck pain and myelopathy<sup>1</sup>. MR imaging of the cervical spine in traumatic cases of neck pain provide information that aid in the diagnosis and management of patients with unilateral locked facets of the cervical spine<sup>2</sup>.

**Materials and Methods**

This study of 60 cases of neck pain was done at the Radiology and Imaging department of Bangabandhu Sheikh Mujib Medical University (BSMMU) and Combined Military Hospital (CMH), Dhaka with the

cooperation of the neuromedicine and neurosurgery departments of BSMMU and CMH, Dhaka.

Patients, both admitted and outdoor, included in this study had neck pain, both acute and chronic. Presenting signs and symptoms were analyzed and recorded on a prescribed form irrespective of age, sex, region, race, profession and social status. Plain X-ray and subsequently MRI of cervical spine region were done. MRI findings were evaluated and recorded on tabulated formats.

**Results**

The age incidence varied from 10 to 80 years. The youngest patient was a fourteen year old male and oldest one was 75 yrs old male person. Highest incidence was in the 5th decade numbering 20 (33.3%). The incidence in the 6th decade were 14 (23.3%) and in the 4th decade was 12 (20%) (table-I).

Male and female ratio was 3:1. Most of the patients underwent MRI for neck pain were service holder (40%) and businessmen (26.66%) (table-II). The nature of the diseases was shown in table-IV. Out of 60 cases 51 cases were with cervical spondylotic changes, 2 cases were with spinal trauma and 2 cases were space occupying lesion (SOL) in spinal cord. Only 2 cases showed normal MRI findings. Most of the patients underwent MRI of cervical region for neck pain showed central or para central stenosis (table-V). In this study the most commonly involved disc was between C<sub>5</sub> and C<sub>6</sub> and

**Table I :** Frequency of neck pain in different age group (n=60).

Age	Number of Patients	Percentage
01-20	02	03.3
20-30	05	08.3
30-40	12	20.0
40-50	20	33.3
50-60	14	23.3
60-70	06	10.0
70-80	01	01.7

**Table-II:** Occupational distribution of study population (n=60).

Occupation	No of Patient	Percentage
Service	24	40.0
Businessman	16	26.7
House Wife	11	18.3
Student	05	08.3
Cultivation	04	06.7

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between C<sub>2</sub> to T<sub>1</sub>. All discs were found to be involved in different frequencies (table-VI).

**Table-III :** Distribution of cases as per clinical feature (n=60).

Symptoms/sign	No of Patient	Percentage
Neck pain	60	100.0
Vertigo	01	01.7
Right brachyalgia	08	13.3
Left brachyalgia	11	18.3
Muscle wasting	03	05.0
Quadriparesis	01	01.7
Restricted movement of neck	08	13.3
Tingling	10	16.7
Numbness	10	16.7

**Table-IV:** MRI analysis of nature of disease of the spine (n=60).

Findings	Male	Female	Total	Percentage
Normal findings	02	00	02	03.3
Positive findings	42	16	58	96.7
Degenerative cervical spondylosis	36	15	51	85.0
Traumatic condition	02	00	02	03.3
SOL in spinal cord	02	00	02	03.3
SOL in vertebra	00	01	01	01.7
SOL in vertebral canal	01	00	01	01.7
Soft tissue mass in neck	01	00	01	01.7

**Table-V :** Analysis of disc lesions in cervical region by MRI (n=60).

Disc lesion	Number of Patients	Percentage
Disc desiccation	40	66.7
Disc bulge	45	75.0
Disc Protrusion	08	13.3
Disc extrusion	04	06.7
Central stenosis	30	50.0
Left Para central stenosis	17	28.3
Right Para central stenosis	14	23.3
Bilateral foraminal narrowing	30	50.0
Left foraminal narrowing	35	58.3
Right foraminal narrowing	28	46.7
Pressure effect over the theca	50	83.3

**Table-VI :** Distribution of intervertebral disc lesions in the cervical region by MRI (n=60).

Intervertebral disc involved	Number of Patients	Percentage
Disc in between C2 and C3	03	05.0
Disc in between C3 and C4	15	25.0
Disc in between C4 and C5	30	50.0
Disc in between C5 and C6	47	78.3
Disc in between C6 and C7	38	63.3
Disc in between C7 and T1	02	03.3

## Discussion

Several recent development came to enrich clinical acumen and technical modalities and expertise, among which plain x-ray is the most popular one used in diagnosis of neck pain. On the other hand MRI is the gold standard modality for diagnosis of neck pathology<sup>3</sup>.

Analysis of clinical features of 60 patients reveals that most of the patients had radiating pain to the upper limbs. Other features included tingling (16.67%), numbness (16.7%), restricted movement of neck (13.3%), muscle wasting (5%), vertigo (1.7%) and quadriparesis (1.7%). Patient with neck pain may have associated other symptoms of radiculopathy and myelopathy<sup>4</sup>.

Almost all the patients (96.66%) underwent MRI of cervical spine for neck pain showed lesions. Only 2 patients among 60 had no lesion. Out of 60 cases 51 had cervical spondylosis.

In one male patient presented with neck pain and subsequent quadriparesis, MRI of cervical spine showed metastasis in C<sub>5</sub> and C<sub>6</sub> vertebra from thyroid carcinoma with soft tissue extension of the mass compressing the spinal cord. Simultaneous metastases to the bone and soft tissue are extremely rare<sup>5</sup>.

MRI offers new opportunity for early diagnosis of myelopathy owing to osteoarthritis or rheumatoid arthritis, vertebral osteomyelitis and metastatic involvement of cervical vertebra<sup>6</sup>.

Of the traumatic 2 cases of present series, MRI findings in one showed compression fracture of C<sub>5</sub> and C<sub>6</sub> vertebra with degenerative changes and in another there was fracture of anterior part of the body of C<sub>7</sub> vertebra with compression of spinal cord by the postero superior part of the body of C<sub>7</sub> vertebra. Goradia et al observed that MRI is highly sensitive for injury to vertebra, disk, posterior longitudinal ligament and interspinous soft tissues, but less sensitive for injury to anterior longitudinal ligament and ligamentum flavum<sup>7</sup>.

Analysis of distribution of intervertebral disc lesion in cervical region by MRI showed that disc lesions were common in C<sub>5-6</sub> and C<sub>6-7</sub> and uncommon in C<sub>2-3</sub> and C<sub>7-T1</sub> levels. In another study of 150 cases of cervical spondylosis Ahn et al observed most common disc lesion in C<sub>5-6</sub> and C<sub>6-7</sub> levels<sup>8</sup>.

MRI is very helpful in evaluation of the spinal tumours, compression as well as involvement of bone and soft tissues and those can be clearly delineated<sup>9</sup>. One further advantage of MRI is the ability to visualize extensive regions of the spine in a non-invasive way<sup>10</sup>.

Tuberculosis of the spine is not uncommon in Bangladesh. Patient with tubercular spondylitis may present with backache and neck pain with neurological deficit due to vertebral body destruction and protrusion into the spinal canal causing compression of the spinal cord<sup>11</sup>. In a study of 100 cases of spinal tuberculosis 23% cases found in lower thoracic spine, 69% in thoracolumbar, 5% in cervical and 3% in upper dorsal spine region<sup>12</sup>. MRI should be considered to be the imaging modality of choice for patient suspected to have tuberculous spinal infection<sup>13</sup>. In this series no tuberculosis case was identified. This indicates that tuberculosis less commonly involves neck region.

MRI has exceeded original expectations and it now stands as the preferred imaging modality for evaluation of neck pain. The contrast, sensitivity and multiplanar imaging

capability of MRI provide an unique advantage. With a combination of imaging planes and pulse sequences, the anatomy of the discovertebral complex, spinal cord and dural sac are clearly depicted<sup>14</sup>. In this study, MRI showed vertebral lesion, spinal cord tumor, soft tissue mass in neck and pressure effect over the theca due to spondylotic changes and were accountable to neck pain.

### Conclusion

Considering the diagnostic accuracy, non-invasiveness, non hazardous and have very few contraindications of the procedure and better visualization of the lesions in different sections, MRI should be the pre and post operative diagnostic modality of the spine. The only disadvantage of MRI is its high cost, still then it is good considering the diagnostic accuracy and cost effectiveness.

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