



ROLE OF MAGNETIC RESONANCE IMAGING IN PATIENTS WITH CERVICALGIA IN A RURAL HEALTH SET UP

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RGUHS

INTRODUCTION:

Neck pain is a common health problem throughout the world causing significant individual disability and economic burden on health care facility (1).

It is one of the commonest complaints patients present with in routine clinical practice.

The cervical spine has the most spinal mobility with as much as 600 movements per hour in a normal individual(2).

The human spine is subjected to large compressive preloads during activities of daily living. The cervical preload approaches three times the weight of the head because of the muscle coactivation forces involved in balancing the head in the neutral position (3).

The causes of cervicgia are many and include abnormalities of the cervical spine or those related to the soft tissue surrounding the cervical spine.

MRI routinely demonstrates the cervical spine in multiple planes including extradural soft tissues (such as intervertebral discs), paravertebral musculature, the exiting nerve roots and intra dural structures (including the spinal cord). MRI provides more complete information about all these structures as compared to CT.

AIMS AND OBJECTIVES:

To study magnetic resonance imaging features of patients with cervicgia.

MATERIALS AND METHODS:

SOURCE OF DATA:

This prospective study included 50 consecutive patients with cervicgia in the age group 20-80 yrs referred to the Department of Radio-Diagnosis, MVJ Medical College & Research Hospital, Hosakote. The study period was one and half years starting June from 2022 to December 2023.

METHOD OF COLLECTION OF DATA:

MRI was performed using a 1.5 Tesla MR scanner and routine imaging sequences were done.

STUDY DESIGN: A hospital based prospective study.

Inclusion Criteria: Patients referred to Department of Radiodiagnosis for evaluation of cervicalgia on MRI during the study period. Age group of 20 – 80 years.

Exclusion Criteria:

Patients with cervical spine trauma.

Postoperative patients.

Patients who had metallic implants, pacemakers, hearing aids, insulin and medication pumps.

Patients less than 20 years of age.

EQUIPMENT AND PROTOCOL:

The imaging was done using a SIEMENS MAGNETOM ESSENZA 1.5 TESLA MRI machine and routine sequences were obtained. A dedicated head and neck coil was used for the study.



SIEMENS MAGNETOM ESSENZA 1.5 TESLA MRI MACHINE



Head and neck coil used for the study

STATISTICAL ANALYSIS:

The results of the descriptive analysis were presented in numbers and percentages. The statistical software SPSS 15.0 was used for analysis of the data and Microsoft word and excel was used to generate graphs and tables.

OBSERVATIONS AND RESULTS

Table 1: Age distribution of study subjects

AGE (years)	N	%
UPTO 30	8	16
31-50	30	60
51-70	11	22
71-90	1	2

Out of 50 patients who presented with cervical pain the maximum – 30 (60%) were between 31 – 50 years of age. There were only 8 patients below 30 years of age.

AGE DISTRIBUTION

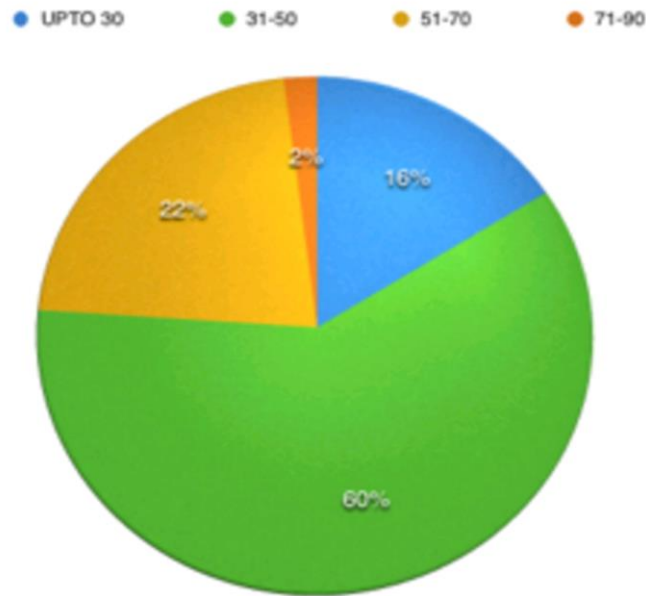


Table 2: Gender distribution of study subjects

SEX	N	%
FEMALES	20	40
MALES	30	60

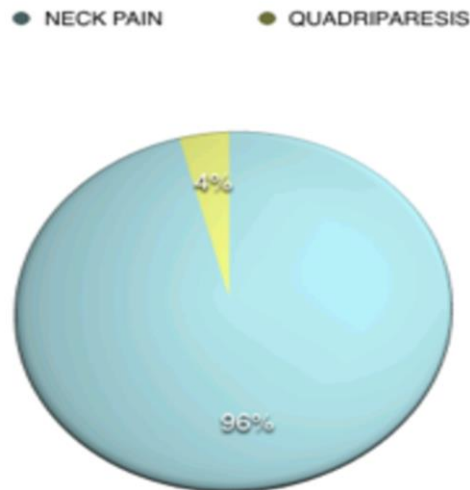
Out of the 50 patients who were studied 30 (60%) were males and 20 (40%) were females.

Table 3: Distribution of study subjects based on symptoms

COMPLAINTS	N	%
NECK PAIN	48	96
QUADRIPARESIS	2	4

The commonest symptomatology was neck pain in 48 (96 %) patients. There were 2 patients (4%) who presented with quadriplegia.

SYMPTOMS



The commonest symptomatology was neck pain in 48 (96 %) patients. There were 2 patients (4%) who presented with quadriparesis.

Table 4. Distribution of study subjects based duration of pain

DURATION	N	%
<6M	20	41
6M / >6M	28	58

Out of 48 patients who presented with cervicalgia, in 20 (41%) the duration of pain was less than 6 months and in 28 (59%) the duration was more than 6 months.

Table 5: Distribution of study subjects based on cervical lordosis

CERVICAL LORDOSIS	N	%
MAINTAINED	11	22
REDUCED	8	16
LOST	27	54
REVERSED	1	2
EXAGGERATED	2	4

In majority of the subjects - 27 (55%) cervical lordosis was lost. It was reversed in 1 (2%), exaggerated in 2 (4%), reduced in 8 (16%) and maintained in 11 (22%) subjects.

Table 6: Distribution of study subjects based on CVJ abnormalities

CVJ	N	%
NORMAL	45	90
TONSILLAR HERNIATION	1	2
LYTIC EXPANSILE LESION	1	2
ATLANTOAXIAL SUBLUXATION/DISLOCATION	2	4
BASILAR IMPRESSION	1	2

A majority of the patients 45 (90%) had normal appearance of CV junction. One patient (2%) had tonsillar herniation, one (2%) had a lytic expansile lesion involving C1 vertebra, two (4%) had atlanto axial dislocation and one (2%) had basilar impression.

Table 7: Distribution of study subjects based on C2/C3 disc findings

C2/C3 DISC FINDINGS	N	%
DISC DESSICATION	19	38
DISC BULGE	5	10
DISC PROTRUSION	4	8
INDENTATION ON THECAL SAC	9	18
NEURAL FORAMINAL NARROWING	1	2
EXITING NERVE ROOT COMPRESSION	0	0
CANAL STENOSIS	2	4
CORD SIGNAL	3	6
CORD INDENTATION	0	0
ANNULAR TEARS	0	0
FACET JOINT ARTHROPATHY	1	2
LIGAMENTUM FLAVUM HYPERTROPHY	0	0
LUSCHKA JOINTS HYPERTROPHY	1	2
SPONDYLOLISTHESIS	0	0
RUDIMENTARY DISC	1	2

Table 8: Distribution of study subjects based on C3/C4 disc findings

C3/C4 DISC FINDINGS	N	%
DISC DESSICATION	25	50
DISC BULGE	22	44
DISC PROTRUSION	9	18
INDENTATION ON THECAL SAC	23	46
NEURAL FORAMINAL NARROWING	8	16
EXITING NERVE ROOT COMPRESSION	3	6
CANAL STENOSIS	12	24
CORD SIGNAL	3	6
CORD INDENTATION	3	6
ANNULAR TEARS	0	0
FACET JOINT ARTHROPATHY	1	2
LIGAMENTUM FLAVUM HYPERTROPHY	0	0
LUSCHKA JOINTS HYPERTROPHY	1	2
SPONDYLOLISTHESIS	1	2
RUDIMENTARY DISC	0	0

Table 9: Distribution of study subjects based on C4/C5 disc findings

C4/C5 DISC FINDINGS	N	%
DISC DESSICATION	24	48
DISC BULGE	24	48
DISC PROTRUSION	12	24
INDENTATION ON THECAL SAC	26	52
NEURAL FORAMINAL NARROWING	12	24
EXITING NERVE ROOT COMPRESSION	7	14
CANAL STENOSIS	16	36
CORD SIGNAL	3	6
CORD INDENTATION	1	2
ANNULAR TEARS	0	0
FACET JOINT ARTHROPATHY	1	2
LIGAMENTUM FLAVUM HYPERTROPHY	0	0
LUSCHKA JOINTS HYPERTROPHY	2	4
SPONDYLOLISTHESIS	2	4
RUDIMENTARY DISC	1	2

Table10: Distribution of study subjects based on C5/C6 disc findings

C5/C6 DISC FINDINGS	N	%
DISC DESSICATION	30	60
DISC BULGE	29	58
DISC PROTRUSION	20	40
INDENTATION ON THECAL SAC	34	68
NEURAL FORAMINAL NARROWING	23	46
EXITING NERVE ROOT COMPRESSION	19	38
CANAL STENOSIS	23	46
CORD SIGNAL	2	4
CORD INDENTATION	4	8
ANNULAR TEARS	2	4
FACET JOINT ARTHROPATHY	1	2
LIGAMENTUM FLAVUM HYPERTROPHY	1	2
LUSCHKA JOINTS HYPERTROPHY	4	8
SPONDYLOLISTHESIS	3	6
RUDIMENTARY DISC	0	0

Table 11: Distribution of study subjects based on C6/C7 disc findings

C6/C7 DISC FINDINGS	N	%
DISC DESSICATION	22	44
DISC BULGE	22	44
DISC PROTRUSION	14	28
INDENTATION ON THECAL SAC	27	54
NEURAL FORAMINAL NARROWING	13	26
EXITING NERVE ROOT COMPRESSION	10	20
CANAL STENOSIS	12	24
CORD SIGNAL	1	2
CORD INDENTATION	0	0
ANNULAR TEARS	2	4
FACET JOINT ARTHROPATHY	1	2
LIGAMENTUM FLAVUM HYPERTROPHY	0	0
LUSCHKA JOINTS HYPERTROPHY	2	4
SPONDYLOLISTHESIS	2	4
RUDIMENTARY DISC	0	0

Table 12: Distribution of study subjects based on C7/T1 disc findings

C7/T1 DISC FINDINGS	N	%
DISC DESSICATION	12	24
DISC BULGE	5	10
DISC PROTRUSION	5	10
INDENTATION ON THECAL SAC	7	14
NEURAL FORAMINAL NARROWING	2	4
EXITING NERVE ROOT COMPRESSION	3	6
CANAL STENOSIS	2	4
CORD SIGNAL	1	2
CORD INDENTATION	0	0
ANNULAR TEARS	0	0
FACET JOINT ARTHROPATHY	1	2
LIGAMENTUM FLAVUM HYPERTROPHY	0	0
LUSCHKA JOINTS HYPERTROPHY	1	2
SPONDYLOLISTHESIS	0	0
RUDIMENTARY DISC	0	0

Table 13: Distribution of study subjects based on etiologies

ETIOLOGY	N	%
CERVICAL SPONDYLOSIS	41	82
TUMORS	2	4
(a) METASTASES C4/5 - C7/T1	1	
(b) INTRAMEDULLARY LESION C6 - D2	1	
ANKYLOSING SPONDYLITIS C2/3 - C6/7	1	2
RHEUMATOID ARTHRITIS C1/C2	1	2
SUBDURAL COLLECTION upto C2	1	2
TUBERCULAR SPONDYLITIS C2	1	2
CHIARI 1 MALFORMATION	1	2
ATLANTOAXIAL SUBLUXATION	1	2
CERVICAL CORD DEMYELINATION C6/7	1	2
TOTAL	50	100%

Case1:

A 58 year old female patient presented with cervicalgia of 7 months duration.



T1W sagittal image

T1W sagittal image showing Type II end plate changes (hyperintense) at inferior end plate of C4 vertebra, marginal osteophytes from C4 to C6 levels, disc height reduction at C4/C5 level and retrolisthesis of C4 over C5 vertebra – diagnosis of cervical spondylosis with disc degenerative disease.

Case 2:

A 25 year old male patient presented with cervicalgia of 6 months duration.



T2W sagittal image

T2W sagittal image showing incomplete C1/C2 block vertebra, increased anterior atlantodens interval and decreased posterior atlantodens interval suggestive of atlantoaxial subluxation causing Grade III central canal stenosis, compression of the cord and myelomalacia extending from upper border of C1 to upper border of C3 vertebra – diagnosis of atlantoaxial subluxation.



CT sagittal cervical spine

Complementary CT sagittal image showing incomplete C1/C2 block vertebra, increased anterior atlantodens interval and decreased posterior atlantodens interval suggestive of atlantoaxial subluxation causing central canal narrowing – diagnosis of atlantoaxial subluxation.

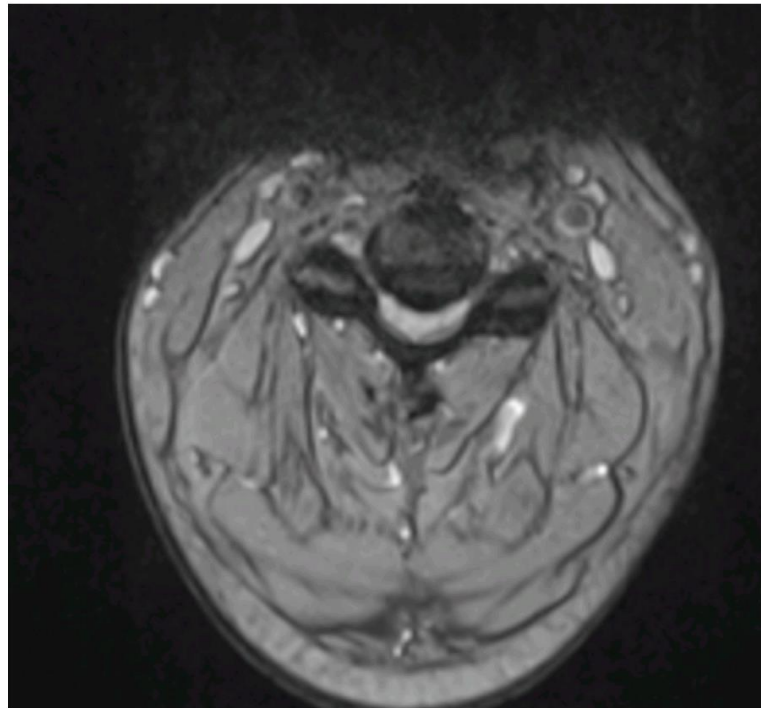
Case 3:

A 38 year old male patient presented with cervicalgia of 4 months duration.



T2W sagittal image

T2W sagittal image showing multilevel disc dessication with diffuse disc bulges and disc protrusions from C3/C4 to C6/C7 levels causing anterior indentation on thecal sac, bilateral exiting nerve roots and spinal canal stenosis at these levels with focal cervical spinal cord myelomalacia – diagnosis of cervical spondylosis and multilevel disc herniations with myelomalacia.



T2W axial image

T2W axial image showing disc dessication with diffuse disc bulge and disc protrusion causing anterior indentation on thecal sac, bilateral exiting nerve roots and spinal canal stenosis.

DISCUSSION:

The present study included 50 patients, who presented with cervical pain.

Age distribution A majority of patients who presented with cervicalgia were in the age group of 31-50 years in the present study.

Gender distribution: In this study males were affected more with cervicalgia than females.

Symptoms: The commonest symptomology in the present study was neck pain. Nonradiating type of pain was observed more compared to the radiating type of pain.

Cervical lordosis: In the present study cervical lordosis was lost in majority of the patients.

CVJ status: In the present study CVJ abnormalities observed were tonsillar herniation and atlantoaxial subluxation.

Degenerative disease of cervical spine:

Disc desiccation: The most common disc abnormality in the present study was disc dessication at C3/C4, C4/C5 and C5/C6 levels.

Disc bulge and herniation: In the present study majority of the patients showed disc bulges with or without associated disc protrusions. The most commonly affected levels were C3/C4, C4/ C5 and C5/C6.

Central canal stenosis: Out of 50 patients, majority of central canal stenosis was observed in 23 patients at C5/C6 level.

Cord signal changes and indentation: Out of 50 patients majority of cord signal changes, 3 each, were noted at C2/C3, C3/C4 and C4/C5 levels and cord indentation were seen in 4 cases at C5/C6 level.

Facet joint arthropathy, Luschka joint hypertrophy and ligamentum flavum hypertrophy: In the present study facet joint arthropathy was noted equally at all levels, ligamentum flavum hypertrophy at C5/C6 level in one patient and majority of Luschka joints hypertrophy at C5/C6 level in 4 cases.

Other etiologies:

In the present study one patient had Ankylosing spondylitis and presented with facet joint ankylosis and marginal syndesmophytes.

SUMMARY AND CONCLUSION:

A prospective study was conducted among 50 patients with cervicgia. On the basis of various observations in the present study, the conclusions drawn are:

- Majority of the patients were in the age group of 31 – 50 years with male: female ratio of 3:2 and the most common complaint was of neck pain 96% with radiating type seen in 43% of cases for a duration of more than 6 months in 60% of the cases.
- In majority of the cases cervical lordosis was lost (55%), CVJ abnormalities were present in 10% and vertebral bodies osteophytes in 62%.
- Majority of the disc desiccations were noted at lower cervical levels viz. C5/C6 – 30 (60%).
- Majority of disc bulges were at C5/C6 level -29 (58%), disc protrusions in 20 (40%), thecal sac indentation in 34 (68%), neural foraminal narrowing in 23 (46%), exiting nerve root compression in 19 (38%) and spinal stenosis in 23 (46%) of the patients at this level.
- Majority of cord signal changes 3 (6%) each were noted at C2/C3, C3/C4 and C4/ C5 levels.
- Majority of cord indentations were seen at C5/C6 level, - 4 (8%), annular tear was mainly at the levels of C5/C6 and C6/C7 levels - 2 each (4%), facet joint arthropathy equally at all levels, ligamentum flavum hypertrophy at C5/C6 level in one patient (2%) and majority of Luschka joints hypertrophy at C5/C6 level – 4 (8%).
- Spondylolisthesis was mainly observed at C5/C6 level in 3 (6%) and rudimentary discs at C2/C3 and C4/C5 levels – one each (2%).
- Other etiologies noted in the study were spinal tumors in 3 cases, cervical tubercular spondylitis in 1 case, infective subdural collection in 1 case, cervical spondyloarthropathy in 2 cases and cervical cord demyelination in 1 case.

Cervical spondylosis is the most significant cause (82%) of cervical pain in our study followed by other etiologies (2% each).

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