

Original Research Paper

THE ROLE OF MAGNETIC RESONANCE IMAGING IN ACUTE TRAUMATIC CERVICAL SPINAL CORD INJURIES**Author:****¹Dr. Vyshnavi H S, Senior resident, Department of Radiodiagnosis, ²Dr. Mohit Dattatray Patil***^{1,2}B J Govt medical college and Sassoon General Hospital, Pune*

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Article Received: 25-08-2022**Revised:** 14-09-2022**Accepted:** 03-10-2022**INTRODUCTION:**

MRI is unparalleled investigation for imaging of spine in patients of trauma. MRI has superior soft tissue contrast and multiplanar imaging capability without moving the patient. MRI is routinely used in evaluation in patients who have focal neurological deficit but have normal X ray and CT scan findings. The major causes of spinal injuries include fall from height, road traffic accidents, animal injuries, water sport injuries, medicolegal injuries and falls due to slipping.

The goals of imaging include detection of osseous injuries, coed compression, cord injuries, disc injuries, ligamentous injuries, vascular injuries, to aid in surgical planning and determining the potential for instability.

Advantages of MRI in spinal injuries are:

1. The major advantage is in evaluation of patients with SCIWORA (i.e spinal cord injuries without other radiological abnormality on CT and X rays).(1)
2. The ability of MRI to demonstrate and characterize acute cord injury appears to exceed that of other diagnostic techniques. (2)
3. It provides information about spinal epidural hematoma compressing the cord which is difficult in other imaging modalities.(3)
4. It helps in classification of injuries as stable and unstable depending on the involvement of anterior, middle and posterior columns which helps the surgeon in management of the patient.(4)
5. It gives information about the status of anterior longitudinal ligament, anterior annulus fibrosus, I, posterior longitudinal ligament and posterior annulus II, fibrosus, posterior bony and ligamentous complex which are important in stabilizing the spine.(3)

6. In a polytrauma patient MRI reveals multilevel injuries and clinically unsuspecting injuries compressing the cord.
7. It provides surgical roadmap for surgeons due to its superior soft tissue contrast.
8. It is used to diagnose vascular injuries like vertebral artery dissection and thrombosis etc. which requires urgent intervention without injection of intravenous contrast.(5)
9. Post traumatic disc herniation is best evaluated in MRI which is most common in our population. It can demonstrate which disc dehydrated and protruded and helps in surgical planning.

AIMS AND OBJECTIVES:**Role of MRI in:**

1. Evaluation of osseous and associated soft tissue injuries of cervical spine
2. Evaluation of cervical spinal cord injuries.
3. Evaluation of ligamentous and disc injuries of cervical spine. Evaluation of vascular injuries of cervical spine.

METHODOLOGY:• **Sample size: 50**• **Inclusion criteria:**

- 1) Patients with cervical spinal cord injury who have come to hospital within 72 hours..
- 2) Patients with neurological deficits with history of cervical trauma within 72 hours.
- 3) Patients with positive for CT cervical spinal injury
- 4) Stable patients who are willing to undergo MRI study.

• **Exclusion criteria:**

- I. Patients who don't consent to be a part of the study.
- II. Patients with claustrophobia, metallic implants (contraindicated for MRI), cardiac pacemakers and cochlear implants.

• **Study design:** Descriptive study

Observation and analysis:

Table No. 1: Age distribution in patients of acute cervical cord injury

Age group (in years)	No. of patients	Percentage
01-20	5	10
21-40	32	64
41-60	9	18
More than 60	4	8
Total	50	100

Table No. 2: Clinical symptoms in relation to cord edema and hemorrhage

Clinical symptoms	Cord edema and hemorrhage	Only cord edema
Mild	0	1
Moderate	7	27
Severe	15	4
Total	22	32

Table No. 3: Types of cord injuries in relation to type of injuries

Cord injuries	RTA (%)	Fall from height (%)	Self-fall (%)	Assault to neck (%)	Fall from swing (%)	Hit by bull (%)	Stab injury to neck (%)	Fall of heavy object (%)	Total (%)
Compromised	21 (63.4)	7 (21)	4 (11)	0	0	1 (3.3)	0	0	33
Edema	26 (59)	8 (18)	6 (13.5)	1(2.2)	0	1 (2.2)	1(2.2)	1(2.2)	44
Hemorrhage	12(63)	4 (21)	3(16)	0	0	00	0	0	19
EDH	3(75)	0	1(25)	0	0	0	0	0	4

DISCUSSION:

MRI is an important tool in the diagnosis of spinal cord

lesions, disc injuries, ligament injuries and osseous injuries. The kinesiological traumas are more commonly seen in home, road and work places of the common population. In the health care system, we respect early detection of disorders and early steps for management so that disease gravity and handicaps are better handled and structural and functional restoration to its best extent. Moderate symptoms like reduced power is more common in cervical cord injuries followed by severe symptoms such as absent power, loss of bowel and bladder sensations followed by mild symptoms such as neck pain and tenderness. Moderate and severe symptoms are more common in RTA followed by fall from height. we found that severe symptoms are seen with both cord edema and cord hemorrhage. Whereas most of the patients with only cord edema had moderate clinical symptoms. Cord edema and cord hemorrhage show significant association with severe clinical symptoms as compared to only cord edema. Cervical spinal cord edema associated with cord hemorrhage at the time of injury is associated with poor prognosis. Most common type

of cord injury is cord edema followed by cord hemorrhage then compromi

sed cord. All these types of cord injuries are more common in RTA followed by fall from height.

SUMMARY:

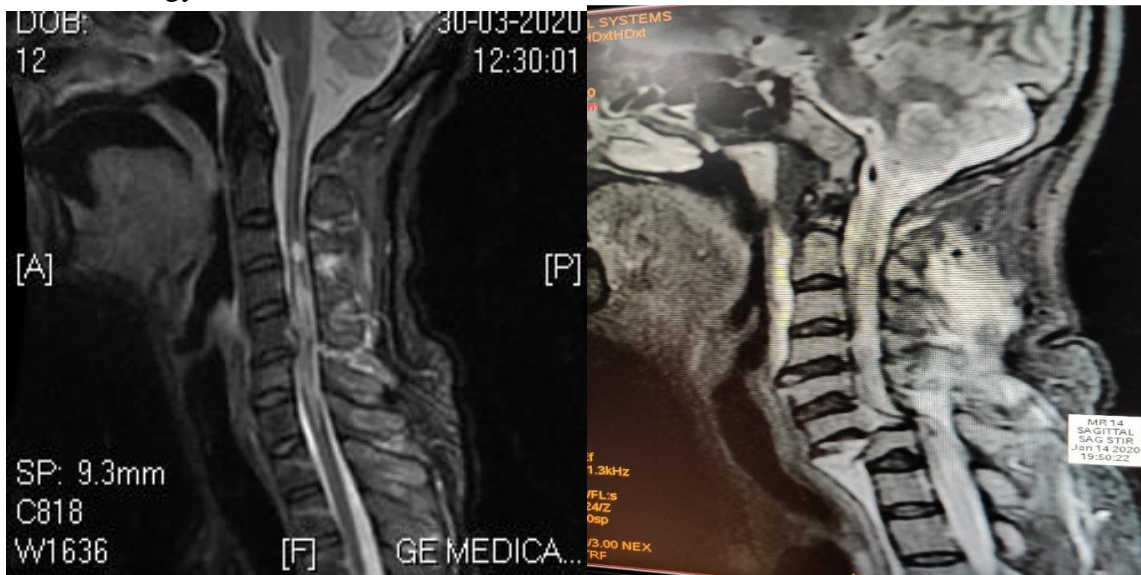
- Cervical spinal trauma is more common in males as compared to females.
- Cervical spinal trauma is more common in age group 21 to 40 years.
- In our study we found that most common type of osseous injury is posterior elements fracture. CT is better than MRI for evaluation of fractures.
- Spinal cord edema with hemorrhage showed a significant association with clinically severe symptoms as compared to only spinal cord edema. Cord hemorrhage is associated with poor prognosis.
- Moderate symptoms are more common with cord edema.

CONCLUSION:

Thus, MRI is a versatile modality for diagnosing cervical spinal cord injury like cord edema, hemorrhage, ligament injuries, disc injuries soft tissue injuries, and also vascular injuries.

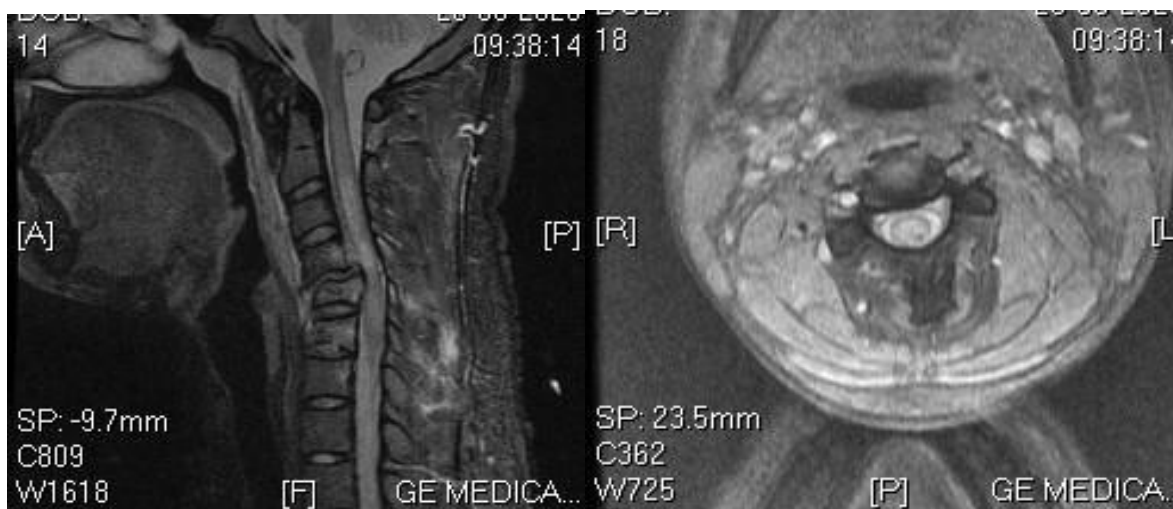
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Sagittal T2W Cord edema

Sagittal T2W cord transection



Sagittal STIR image showing marrow, spinal cord and para spinal muscles edema.

Axial MERGE image showing blooming s/o Cord hemorrhage