

A STUDY OF EPIDEMIOLOGY OF SPINE INJURY IN FALL FROM HEIGHT*Amel Antony¹, Vinod Jakob², Sreenidhi Sediguli³*¹*Professor, Department of Radiodiagnosis, Travancore Medical College, Kollam, Kerala.*²*Associate Professor, Department of Radiodiagnosis, Travancore Medical College, Kollam, Kerala.*³*Senior Resident, Department of Radiodiagnosis, Travancore Medical College, Kollam, Kerala.***ABSTRACT****BACKGROUND**

This study puts in a sincere effort to study the spinal cord injuries in cases of fall from height. This study is intended to help the fellow radiologists to identify and thus help the individuals to cut down the progression of the disease. Identifying the spinal trauma and its clinic - epidemiological aspects will help further the practicing clinicians. The study can also help in formulation of preventive measures and putting forward management protocols in cases of spinal injury.

METHODS

This study was done in the Department of Radiology, Travancore Medical College, Kollam. This study was done from June 2104 to march 2016. Thirty two cases were identified and were taken up for the study.

INCLUSION CRITERIA

Spinal injuries following fall from height.

EXCLUSION CRITERIA

Other spinal pathologies were not considered for the study.
Diabetic patients were excluded.

RESULTS

In the present study male sex amounted to ninety percent which amounted to twenty nine cases of spinal injury followed by female sex which amounted to ten percent which amounted to three cases. The age wise distribution of cases showed that age group of twenty to forty years showed maximum number of cases which amounted to sixteen admissions followed by age group of forty to sixty years which amounted to seven cases followed by age group of zero to twenty years which amounted to five cases, followed by age group of more than sixty years which amounted to four cases. Based on approximate height from which the fall occurred seventeen cases fell from the height of more than twenty feet, followed by nine cases which fell from the height of ten to twenty feet and six cases fell from the height of less than ten feet. The CT scan showed that eighteen cases had displaced spinal fractures followed by fourteen cases which had undisplaced spinal fractures. Cord injury was seen in six cases. Based on the level of spine injury twenty six cases had lumbar spine injury, eleven cases showed thoracic spine injury, three cases showed sacral spine injury and one case showed cervical spine injury.

CONCLUSION

As noted in our study fall from height is commonly seen in the males of productive age and the resultant spinal injuries usually result in loss of earning for the family and may result in life - long disabilities.

KEYWORDS

Spine injury, Height, Disabilities, Morbidity, CT.

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INTRODUCTION: Skeletal injuries occur in around eighty percent patients.¹ spine fractures are present in around a quarter of the total.²

Spinal cord injury occurs in the neck region frequently.³ Concomitant major injuries to other regions occur in around forty percent of patients in thoraco-lumbar region.⁴ There is a Chinese proverb "The higher you climb, the harder you fall". Falls from height are a common occurrence in developing countries. The severity of injuries suffered is not necessarily directly related to height of fall. Many a times people suffer severe injuries because of fall from small heights whereas yet others sometimes suffer little or no injuries following fall from a considerable height. Injuries suffered by the patient depend on which part of the body hits the ground first.

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Corresponding Author:

Dr. Amel Antony,

*Professor, Department of Radiodiagnosis,
Travancore Medical College, Kerala.*

E-mail: amel41@rediffmail.com

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But involvement of spine is invariably seen in most of the fall from height cases. The spine consists of vertebral column, spinal canal and its contents. The vertebral column is mobile yet protective to its contents the spinal cord and cauda equina. The vertebral column consists of 33 vertebrae (7 cervical, 12 thoracic/dorsal, 5 lumbar, 5 sacral and 4 coccygeal) held together by ligaments and muscles. The spinal nerves come out of the intervertebral foramina. Each vertebra is made up of an anterior body and a posterior arch. Parts of arch are pedicles, laminae, spinous process and articulating facets. The vertebral bodies are joined by intervertebral discs. The arches articulate through facets. Spinal injuries can be classified based on mechanism of injury into following types.⁵

- **Flexion Injury:** It is the commonest type of spinal injury, caused by fall from height on heels or buttocks. It can result in compression fracture of vertebral body, C5 to C7, it can lead to dislocation of one vertebra over another (most commonly C5 over C6), and can result in wedge fracture in dorso lumbar spine.
- **Flexion Rotation Injury:** It is the worst type of injury as it leaves the spine unstable with a high chance of neurological damage. Fall on posterolateral part of head can result in this type of injury. It can result in dislocation of facet joints, fracture dislocation of cervical vertebra and fracture dislocation of dorsolumbar spine.
- **Vertical Compression Injury:** Fall from height in erect position may lead to this kind of injury. This can lead to burst fracture of cervical spine, dorsolumbar spine.
- **Extension Injury:** This injury is commonly seen in cervical spine, usually seen when head hits the ground, extending the neck. It can result in chip fracture of anterior rim of a vertebra.
- **Direct Injury:** It is because of direct impact. Generally a fracture of spinous process can be seen.

In burst fractures, in cervical spine, a piece of bone or disc may get displaced into spinal canal, leading to pressure on cord and neurological deficit. In dorsolumbar spine fractures due to wide canal, neurological deficit are a rare occurrence. The spinal injury can be stable or unstable. In a stable injury, further displacement of vertebral bodies does not take place because of intact supporting structures. In an unstable injury there is possibility of further displacement of vertebral bodies leading to damage of spinal cord or nerve root. Cervical spine injuries can involve upper cervical spine or lower cervical spine. Upper cervical spine injuries are usually not compatible with life. They are occipital condyle injuries, Jefferson fractures i.e. fracture of ring of C1 vertebrae, odontoid fracture, hangmans fracture i.e. fracture of pedicle of C2 vertebra. CT scan aids in diagnosis. Lower cervical spine injuries are wedge fractures, facet dislocations, burst fractures and tear drop fractures. Thoracic fractures (T1-T9) are usually seen in elderly. Spine wedge fractures are most common.

Thoracolumbar fractures (T10- L5) are more common compared to thoracic fractures. Stable wedge fracture between T12 and L1 are most common. It is always wise to assume that a fall from height patient has a spinal column injury. Early diagnosis reduces the chance of long term morbidity. Ideally the patient should be immobilized with the help of spine board and hard collar until spinal injury has been ruled out. Imaging in the form of computerized tomography (CT) or MRI may be needed for assessing the injury. CT scan is useful in assessing the fractures, subluxation or dislocation of vertebrae. Vertebral canal diameter can also be assessed to see if the cord has been compromised. MRI scanning on the other hand is very sensitive. Soft tissue injuries are best shown by MRI. It is useful in determining the extent of spinal cord injury as well as assessing discs, spinal column, and cord and nerve root compression.⁶ This study puts in a sincere effort to study the spinal cord injuries in cases of fall from height. This study is intended to help the fellow radiologists to identify and thus help the individuals to cut down the progression of the disease. Identifying the spinal trauma and its clinic - epidemiological aspects will help further the practicing clinicians. The study can also help in formulation of preventive measures and putting forward management protocols in cases of spinal injury.

AIMS AND OBJECTIVES: To study the epidemiology of spine injury in fall from height cases.

MATERIALS AND METHODS: This study was done in the Department of Radiology, Travancore Medical College, Kollam. This study was done from June 2104 to march 2016. Thirty two cases were identified and were taken up for the study.

Inclusion Criteria: Spinal injuries following fall from height.

Exclusion Criteria:

1. Other spinal pathologies were not considered for the study.
2. Diabetic patients were excluded.

RESULTS:

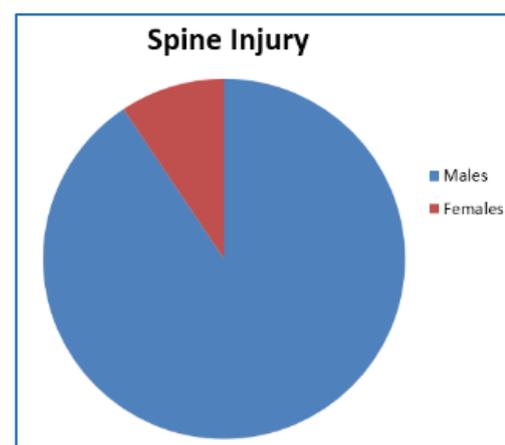


Image 1: Showing age Distribution

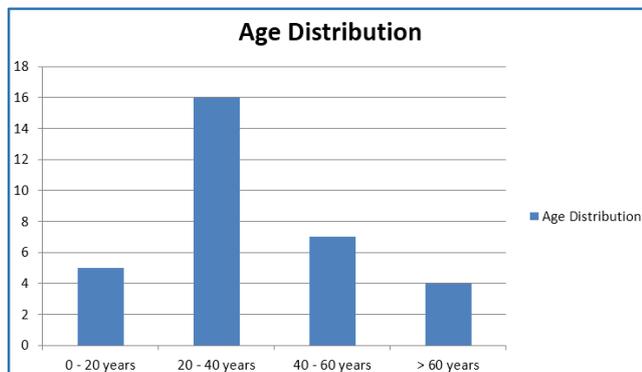


Image 2: Age Distribution Chart

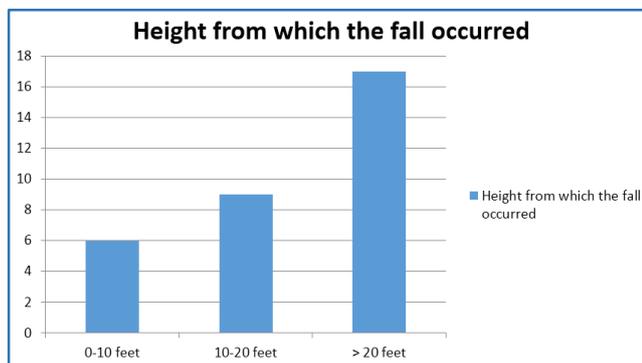


Image 3: Approximate Height from Which the Fall Occurred

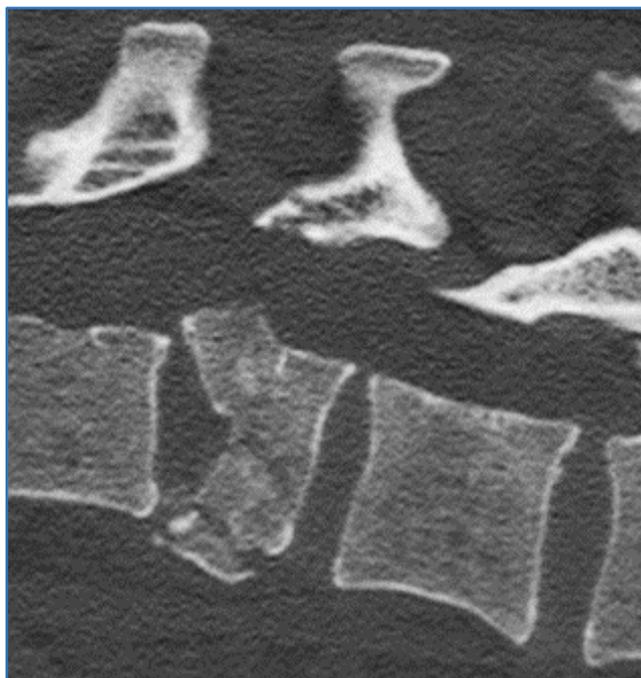


Image 4: Sagittal Section of CT Showing Fracture Spine with Fragment Displaced Into Canal

Injury	Frequency
Un-displaced spinal fractures	14
Displaced spinal fractures	18
Cord Injury	6

Table 1: Showing the Spinal Injury in CT

Level	Frequency
Cervical	1
Thoracic	11
Lumbar	26
Sacral	3

Table 2: Showing the Level of Spinal Injury in CT

DISCUSSION: In the present study male sex amounted to ninety percent which amounted to twenty nine cases of spinal injury followed by female sex which amounted to ten percent which amounted to three cases. The age wise distribution of cases showed that age group of twenty to forty years showed maximum number of cases which amounted to sixteen admissions followed by age group of forty to sixty years which amounted to seven cases followed by age group of zero to twenty years which amounted to five cases, followed by age group of more than sixty years which amounted to four cases. Based on approximate height from which the fall occurred seventeen cases fell from the height of more than twenty feet, followed by nine cases which fell from the height of ten to twenty feet and six cases fell from the height of less than ten feet. The CT scan showed that eighteen cases had displaced spinal fractures followed by fourteen cases which had undisplaced spinal fractures. Cord injury was seen in six cases. Based on the level of spine injury twenty six cases had lumbar spine injury, eleven cases showed thoracic spine injury, three cases showed sacral spine injury and one case showed cervical spine injury. According to a study conducted by Suraj Bajracharya et al⁷ fall from height was the most common mode of spinal injury. Mean age in males was 41.74 years and females were observed to be 38.56 years. Thoraco - lumbar regional injury amounted to the maximum number of injuries.

CONCLUSION: As noted in our study fall from height is commonly seen in the males of productive age and the resultant spinal injuries usually result in loss of earning for the family and may result in life - long disabilities. Awareness must be created so that injury to spine cases should be brought to the hospital which can result in less number of morbidities.

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