

ACUTE EVENTS THAT LEAD TO LUMBAR DISC PROLAPSE- A STUDY IN A TERTIARY CARE CENTRE IN EASTERN INDIA

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ABSTRACT

BACKGROUND

Lumbosacral Radiculopathy is one of the most common disorders treated by neurologists and spine surgeons. Intervertebral disc herniation is the most common cause of lumbosacral radiculopathy in patients under the age of fifty years. There are some known factors which can increase the degeneration of lumbar disc like smoking, sedentary lifestyle, driving, male sex, increasing age, obesity, heredity and poor posture. Acute events can easily produce disc prolapse in an individual already having degenerated disc. A retrospective and prospective study was undertaken among patients of lumbar disc prolapse to measure the acute events that lead to disc prolapse.

MATERIALS AND METHODS

This study includes patients attending the outdoor department or those admitted in the Neurology Department of Calcutta National Medical College and Hospital with symptoms of lumbosacral radiculopathy. The study period was from 01/05/2016 to 30/04/2018. Inclusion criteria were radicular pain with or without sensory or motor signs with MRI evidence of root compression, patients with electrophysiology suggestive of radiculopathy in the absence of MRI evidence of compression and symptom onset within last three months. Exclusion criteria were patients below the age of 21 years and those above 60 years. Recurrent attacks, failed back surgery, cauda equina syndrome and red flags. Thorough history was taken from the patients and their family members particularly searching for acute events that lead to acute disc herniation. Examination was done to detect root affection by looking for muscular atrophy, loss of power and reflexes, dermatomal sensory loss and impaired straight leg raising test. Associated findings like loss of lumbar lordosis, reduced motion of spine, tilted spine and local vertebral tenderness were also looked for. In majority of the cases investigations were done after 6 weeks of conservative management to confirm or refute disc prolapse. Investigations were done like plain radiography, MRI of the lumbosacral spine in all cases, while nerve conduction study and electromyography were done in some cases where no MRI evidence of compression could be found.

Study Design and Sample Size - This is a retrospective descriptive study and the Sample Size was 184 Patients.

RESULTS

In this retrospective descriptive study acute events noted within 48 hrs that led to lumbar disc prolapse are lifting of heavy weights 14.6%, bending 13%, falling 6.5 %, coughing 6.5%, sneezing 6.5%, twisting spine 5.9%, straining at toilet 3.8%, car accidents 3.8% and idiopathic 39.4%.

CONCLUSION

There is a need to increase awareness among both medical and the general population about the acute events that may lead to lumbar disc prolapse so that necessary precautions and life style modifications may be done.

KEY WORDS

Acute Events, Lumbar Disc Prolapse.

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BACKGROUND

Radiculopathy is defined as objective loss of sensory motor function as a result of damage to the nerve root and may occur with or without pain.⁽¹⁾

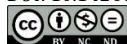
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Most common cause of radiculopathy under the age of fifty is intervertebral disc herniation.⁽²⁾ Intervertebral discs are sandwiched between adjacent vertebrae and chronic degenerative changes in these discs make them susceptible to mechanical stress like heavy weight lifting, forward bending, falling which leads to herniation. There are some risk factors of early degeneration that includes smoking, aging, lack of regular exercise, motor vehicle driving, repeated lifting of heavy weights, bending, twisting, male gender, obesity, jobs requiring prolonged standing or sitting, family history and poor posture. Four pertinent criteria must be present in order to diagnose acute radiculopathy owing to lumbosacral disc herniation. Radiating pain must be the dominant symptom not the back pain, pain distribution must be specific

and attributable to the particular dermatome. Nerve tension sign should be present like abnormal straight leg raising test or contra lateral leg raising test or bow string test. Neurological signs such as weakness, atrophy, sensory loss or abnormal reflexes should correlate with the level of disc herniation.

Four Stages of Disc Herniation

- 1st stage is disc degeneration when the nucleus pulposus becomes weak due to dehydration
- 2nd stage is prolapsed disc where disc bulge or protrusion occurs.
- 3rd stage is extrusion where the nucleus pulposus breaks through the annulus fibrosus but still remains within the disc
- 4th stage is sequestration where nucleus pulposus breaks through the annulus fibrosus and moves outside the disc.

The purpose of this study is to identify the acute events that lead to lumbar disc herniation so that preventive action may be taken to prevent disc herniation and thereby prevent loss of man days and valuable health resources.

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In majority of the cases investigations were done after 6 weeks of conservative management to confirm or refute disc prolapse. Investigations were done like plain radiography, MRI of the lumbosacral spine in all cases, while nerve conduction study and electromyography were done in some cases where no MRI evidence of compression could be found.

RESULTS

Only those patients that finished the study were taken. Total number of patients in the study was 184. The patients were between the ages of 21 to 60 years. Out of the 184 patients 130(70.6%) were male while 54 (29.4%) were female.

Event	Percentage of Patients	No. of Patients
Heavy Lifting	14.6	27
Bending	13	24
Slip and Fall	6.5	12

Coughing	6.5	12
Sneezing	6.5	12
Twisting Spine	5.9	11
Straining at Stool	3.8	7
Car Accidents	3.8	7
Idiopathic	39.4	72

Table 1. Acute events i.e. events that lead to acute lumbar disc herniation within 48 hours are noted in Table 1

Group	Percentage of Patients	Number of Patients
21-30 Yrs.	10.3	19
31-40 Yrs.	40.2	74
41-50 Yrs.	29.8	55
51-60 Yrs.	19.5	36

Table 2. Age Distribution of Patients

Root	Percentage of Patients	Number of Patients
L2	01.08	02
L3	02.7	05
L4	03.8	07
L5	46.19	85
S1	40.2	74
S2	1.6	03
Both L5S1	4.3	08

Table 3. Root Involvement in Disc Prolapse

DISCUSSION

Prevalence of lumbosacral radiculopathy is approximately 3.5% of the population and is equally distributed among men and women.⁽³⁾ Intervertebral disc herniation is the most common cause of lumbosacral radiculopathy in patients under the age of 50 years.⁽⁴⁾ Increasing age along with other risk factors produces clefts and fissures in the annulus fibrosus due to degeneration. These processes and mechanical loading forces applied over time may predispose adults to disc herniation.⁽⁵⁾ Pain characteristically is of abrupt onset and is intense and is precipitated by bending over or lifting weights or objects.

Pain is particularly aggravated by bending forward or laterally and is relieved on lying down. Diagnosis however is clinical and MRI and electrophysiological investigations can support the diagnosis and help to distinguish from other causes of lumbosacral radiculopathy. Degenerative changes in the disc make it vulnerable to prolapse in the face of acute precipitating events. In this study these acute events were studied and analysed. Jobs that require heavy lifting and other jobs requiring physical labour have a greater risk of developing lumbar disc herniation. It acts in two ways by increasing disc and spine degeneration and secondly by increasing intradiscal pressure resulting in prolapse. Lifting heavy goods, shutters of shops, furniture, water bucket, log of wood, patient lifting all require moderate to heavy lifting. In this study 14.6% (n=27) of patients did some heavy weight lifting activity within 48 hours of the onset of symptoms.

Bending forward increases the gap between adjacent vertebrae and lifting weights increases pressure in the front part of the spine. The core of the disc is squeezed by pressure from front to back resulting in disc herniation.⁽⁶⁾ In this study 13% (n=24) of patients developed disc prolapse from working for prolonged periods in forward bending position. Common occupations involving forward bending noted in the study group of patients are sowing of crops, moping of floors,

mowing grass, gardening, mining knitting, tailoring and making jewellery.

Slipping and falling can cause disc-prolapse. Fall can directly damage the disc on landing or during the process of tumbling down. Sudden jerky motion during falling can cause strain of deep muscles in the back which can wrench a disc out of place. In this study 6.5% (n=12) patients developed disc prolapse following fall. Majority of these slip and fall occurred from ladders, staircase, ridge, roof, courtyard, in the bathroom or working at heights like painting or masonry.

Coughing can increase the intradiscal pressure. Chronic coughing can occasionally produce disc prolapse in smokers.⁽⁶⁾ In this study 6.5% (n=12) of patients had cough induced disc herniation. All of these patients were smokers.

Similarly, a sneeze may precipitate disc prolapse by squeezing effect on the intervertebral disc. In this study 6.5% (n=12) of patients suffered disc prolapse from sneezing. Among these 5.4% (n=10) were suffering from common cold at the time of acute disc prolapse.

Repeated twisting causes the annulus to slowly weaken and increases the risk of disc herniation.⁽⁷⁾ Certain activities like playing golf, bowling, playing a swinging shot in tennis, baseball pitching or other forceful rotational movements produces twisting movement of the spine. In this study 5.9% (n=11) of patients suffered from herniated disc due to twisting movements of the spine. Majority of these twisting injuries occurred during fights, controlling cattle, parking a motorcycle or while playing sports like kabaddi and wrestling.

Straining at stool during constipation can create intense pressure over the spine resulting in herniated disc. Straining at stool is likely to cause disc-prolapse in those with already weakened discs.

People who spend half or more of their time on their job driving or riding motor vehicles are about three times as likely to develop a herniated disc compared to those who do not do such jobs.⁽⁷⁾ During a car accident, jerking movement can increase pressure inside the disc causing it to herniate. In this study 3.8% (n=7) suffered from herniated disc following a car accident.

In 39.4% (n=72) of patients cause of disc prolapse could not be identified as patients could not recollect any significant event in the preceding 48 hours of developing symptoms. This may be due to lack of observation, lack of knowledge about the precipitating factors for disc prolapse or overlooking minor activities like lifting, bending, sneezing coughing, twisting of spine or straining at stool.

CONCLUSION

There are few studies which have tried to identify acute events which lead to acute disc prolapse although risk factors for degenerative disc disease have been widely studied. This study shows that acute events like lifting heavy weights, bending forward, slipping and falling down, coughing, sneezing, twisting spinal movements, straining at stool, car accidents are the major cause of lumbar disc herniation. Doctors, healthcare providers and the general population have to be made aware of these facts. Applying this knowledge to modify lifestyle can prevent many disc-prolapses and thereby reduce morbidity and health care expenditure.

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