

Most Common MRI findings in Lumbosacral Degenerative changes in Nepal Police

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ABSTRACT

Introduction: Low back pain (LBP) is a common problem that affects about two-thirds of adults sometimes in their life. Magnetic Resonance Imaging (MRI) with excellent tissue contrast is a better modality for assessing it. We aimed to assess the common findings overall, gender-wise and age-wise in lumbosacral degenerative changes in Nepal police personnel.

Methods: The 54 Nepalese police with disc degeneration changes in the MRI report were included. The following MRI findings were evaluated: decrease disc height, disc desiccation change, diffuse disc bulge, asymmetrical disc bulge, disc protrusion, disc extrusion, annular tear, central spinal canal stenosis, foraminal stenosis, spinal nerve compromise, lumbar lordosis preserved or not, osteophyte and modic changes.

Results: Mostly involved lumbosacral discs were L4-L5 and L5-S1 and the least involved lumbosacral disc was L1-L2. Disc desiccation changes were the most common finding observed. Disc desiccation changes, decreased disc height, lateral recess stenosis, foraminal stenosis was common in L5-S1. Diffuse disc bulge, asymmetric disc bulge, disc protrusion, annular tear, central spinal canal stenosis were common in L4-L5. Modic type II change was the commonest endplate change observed. Lateral recess stenosis and foraminal stenosis showed an increasing trend with increment in age group. The most common finding in both gender was disc desiccation changes and diffuse disc bulge. However, disc protrusion, disc extrusion, and annular tear were more common in males and asymmetrical disc bulge in females.

Conclusions: This study shows L4-L5 and L5-S1 is the most common intervertebral disc involved in degeneration in Nepal police. Disc desiccation change and diffuse disc bulge are the most frequent finding irrespective of age and gender. Degenerative changes have an increasing trend with increasing age. Disc herniation is more common in male police individuals than female police individuals of Nepal.

INTRODUCTION

Low back pain (LBP) is a common problem that affects about two-thirds of adult sometimes in their life.¹ Nepal cannot however be removed from such a global problem. There are many causes among them, degenerative changes in the lumbosacral spine is

one of the leading causes of LBP. Moreover, Nepalese police are in a more rigorous workout than other individuals and degenerative changes can be more obvious. It includes conditions such as disc bulge, disc Herniation, osteophyte formation, spinal canal stenosis, lateral recess stenosis, foraminal stenosis, spondylolisthesis, radiculopathy, and vertebral body endplate changes. It can lead to a reduction in the quality of life.²

For diagnosing the cause of LBP, various modalities such as myelography, plain x-ray, and CT scan are used. However, magnetic resonance imaging (MRI) with excellent tissue contrast is a better modality for assessing. With MRI because of better resolution and contrast, anatomical evaluation of spinal cord, spinal discs, ligaments, vertebral bodies, vascular structures, muscle tissues, and facet joints are more accurate.³ Unfortunately, due to very few MRI machines in the country and the very high cost of MRI imaging, patients are reluctant to go for it. Therefore, only few researches have been carried out in our region regarding MRI findings in lumbosacral degenerative changes. However, as this study is confined to Nepal police personnel, and no previous study in Nepal police personnel has been carried out. Therefore, this is the first study of its type and will demonstrate the common findings overall, gender-wise and age-wise in lumbosacral degenerative changes, and sort out the most common findings and the common location of each finding using MRI in Nepal police.

METHODS

We conducted the cross-sectional observational prospective study from Dec 2020 to Feb 2021 in the Department of Radiodiagnosis and Imaging, Nepal Police Hospital, Kathmandu, Nepal and included the LS-MRI report of 54 Nepal police personnel (in-service and retired) in our study after the following exclusion and inclusion criteria. The patient with a history of trauma, spinal infection, surgical history in the lumbosacral region, active malignancy, pregnancy, and metabolic condition were excluded. The patient with LS-spine MRI report with degenerative changes but do not fulfill exclusion criteria were included in our study. MRI images were taken in a 1.5T Hitachi machine with the acquisition of the T1WI, T2WI, STIR images in sagittal, axial, and

coronal planes. The MRI findings evaluated were decrease disc height, disc desiccation changes, diffuse disc bulge, asymmetrical disc bulge, disc protrusion, disc extrusion, annular tear, central spinal canal stenosis, foraminal stenosis, spinal nerve compromise, lumbar lordosis preserved or not, osteophyte and modic changes. These findings were analyzed according to the recommendation of the Combined Task Forces of the North American Spine Society, American Society of Spine Radiology, and American Society of Neuroradiology.⁴ Two radiologists reported the MRI images with mutual consensus in disputed issues. The ethical clearance was obtained from Nepal Health Research council after Nepal Police Hospital approved the study.

RESULTS

54 Nepal police patients with Lumbosacral MRI reports were considered for the study, where 35 were male and 19 were female and the mean age was 41.8 years \pm 13.5 years (range 20 - 88 years) (Table 1). Age was further classified into five age groups. Age 20-29 group contained 9 patients report, age 30-39 contained 16, age 40-49 contained 13, age 50-59 contained 10 and age >60 contained 6 (figure 1).

TABLE 1. The demography of the patients.

Demographic marker		Mean \pm SD
Total MRI reports		54
Sex	Male	35 (64.8%)
	Female	19 (35.1%)
Age (years)		41.8 \pm 13.5

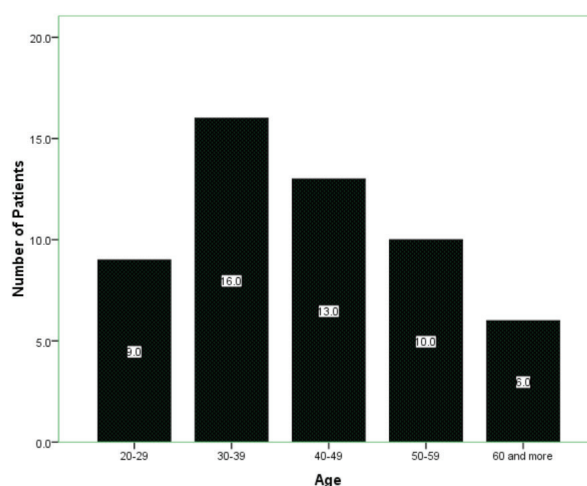


Figure 1. Bar graph showing the different age group in x-axis and number of patient in that age group in y-axis.

We studied 378 discs in 54 patients (D11-D12 to L5-S1). We have included D11, D12 as well in this study as these discs are normally studied in Lumbosacral MRI in a routine examination. However, we have not mentioned its finding in this section as the study is confined to the lumbosacral spine. We found 140 discs involved in degenerative changes. Most commonly, L4-L5 and L5-S1 were involved. Each was involved in 44(31.42%) cases. These discs were followed by L3-L4, L2-L3, and L1-L2 respectively. The least involved lumbosacral disc was L1-L2, which was found in six cases (4.2%) (Table 2). Overall, the most common finding was disc desiccation changes (DDC), which was observed in 47 cases (87.7%) with L5-S1 (38 discs, 36.53%) the most commonly involved disc level (Table 2 / Figure 2a). Then was diffuse disc bulge, which was observed in 46 cases (85.15%) with the maximum at L4-L5 level (32 discs, 45%) (Table 2/Figure 2b).

Asymmetric disc bulge was observed in 16 (29.2%) cases with commonest in L5-S1 (7 discs, 35%) followed by L4-L5 (6 discs, 30%) (Table 2/Figure 5c). Loss of lumbar lordosis was observed in 21 cases (38.8%) (Table 2/ Figure 3a). Decrease disc height (DDH) was observed in 29 cases (53.7%) with L5-S1 the most commonly involved disc level (18 discs, 39.13%) and was followed by L4-L5 (10 discs,) (Table 2 / Figure 3b).

TABLE 2. Degenerative signs and number of case/ percentage involvement of disc.

S/n	Degenerative signs	Total Case involved	Total disc involved	T11-T12	T12-L1	L1-L2	L2-L3	L3-L4	L4-L5	L5-S1
1	Disc	54(100%)	140	2(1.4%)	2(1.4%)	6(4.2%)	15(10.7%)	27(19.2%)	44(31.4%)	44(31.4%)
2	Decrease disc height	29 (53.7%)	46	2(4.34%)	2(4.34%)	2(4.34%)	6(13.04%)	6(13.04%)	10(21.73%)	18(39.13%)
3	Disc desiccation changes	47(87.7%)	104	1(0.96%)	0	2(1.92%)	10(9.61%)	21(20.18%)	32(30.76%)	38(36.53%)
4	Diffuse disc bulge	46(85.15%)	71	0	0	0	4(5.6%)	10(14.08%)	32(45%)	25(35.2%)
5	Asymmetric disc bulge	16(29.2%)	20	0	0	0	3(15%)	4(20%)	6(30%)	7(35%)
6	Disc Protrusion	14(25.9%)	17	0	0	0	0	2(11.7%)	8(47%)	7(41.17%)
7	Disc Extrusion	7(12.9%)	7	0	0	0	0	2(28.5%)	1(14.28%)	4(57.14%)
8	Annular tear	8 (14.8%)	0	0	0	0	1(10%)	2(20%)	5(50%)	2(20%)
9	Central spinal canal stenosis	29(53.7%)	0	0	0	0	1(1.7%)	7(12.28%)	25(43.85%)	24(42.1%)
10	Lateral recess stenosis	36(66.6%)	0	0	0	0	1(1.69%)	6(10.16%)	24(40.67%)	28(47.45%)
11	Foraminal stenosis	36(66.6%)	0	0	0	0	1(1.8%)	8(14.81%)	22(40.74%)	23(42.59%)
12	Nerve root compromise	29(53.7%)	0	0	0	0	0	5(12.5%)	14(35%)	21(52.5%)

T-Thoracic, L-Lumbar, S-Sacral

Disc protrusion and disc extrusion together makes disc herniation(5). Disc protrusion was observed in 15 (25.9%) cases (Table 2/Figure 4a) and was the commonest type of disc herniation compared to the disc extrusion which was seen in 7cases (12.9%) (Table 2 / Figure 4b). Disc protrusion was commonly observed in the L4-L5 level (8 discs, 47%) (Table 2/ Figure 4a). Annular tear in 8 (14.8%) cases with maximum in L4-L5 level (5 discs, 50%) (Table 2 / Figure 4c). Central Spinal Canal stenosis (CSC) was observed in 29(53.7%) cases (Table 2 / Figure 3a). Lateral recess stenosis (LRS) and Foraminal stenosis (FS)

were both equally in 36(66.6%) cases (Table 2 / Figure 5a, b). CSC, LRS, and FS were common in L4-L5 and L5-S1 levels. LRS and FS were the highest in the L5-S1 level (28 discs, 47.5%) and (23 discs, 42.59%) respectively followed by L4-L5 level (24 discs, 40.67%) and (22 discs, 40.7%). CSC was most commonly seen in L4-L5 (25 discs, 43.85%) followed by L5-S1 (24, 42.1%). Osteophytes were seen in 8 cases, mostly in L5 vertebrae (5 vertebrae, 22.7%) (Table 3). Endplate changes were seen in 7 (12.9%) cases with a maximum of Modic type II changes (5 cases, 71.4%) (Table 4).

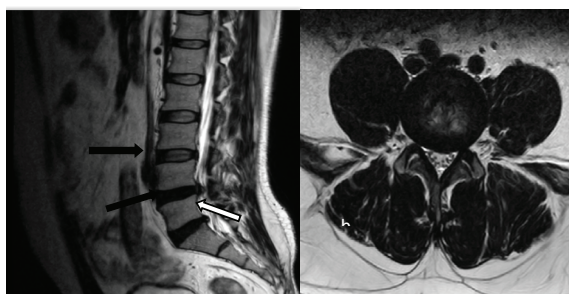


FIGURE 2. 2a. T2 sagittal image of L-S spine is showing Disc desiccation changes (black arrows) and Central canal stenosis (white arrow); 2b. T2 axial image of L-S spine is diffuse disc bulge.

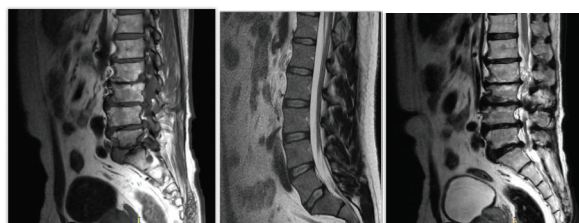


FIGURE 3. 3a. T1 sagittal image of L-S spine is showing Loss of lumbar lordosis; 3b. T2 sagittal image of L-S spine is showing normal lumbar lordosis; 3c. T2 sagittal image of L-S spine is showing Decrease disc height (arrows).

TABLE 3. Osteophytes and number of case/ percentage involvement of vertebrae.

Vertebrae number	Total Case	L1	L2	L3	L4	L5	S1
TCI	8 (14.8 %)	0	2(9%)	5(22.7%)	7(31.8%)	5(22.7%)	3(13.6%)

TCI: Total Case Involved; L-Lumbar

TABLE 4. Number of case/ percentage involvement in Modic changes.

End Plate Changes	Total Cases	Modic I	Modic II	Modic III
TCI	7(12.9%)	1(14.2%)	5(71.4%)	1(14.2%)

TCI: Total Case Involved; L-Lumbar

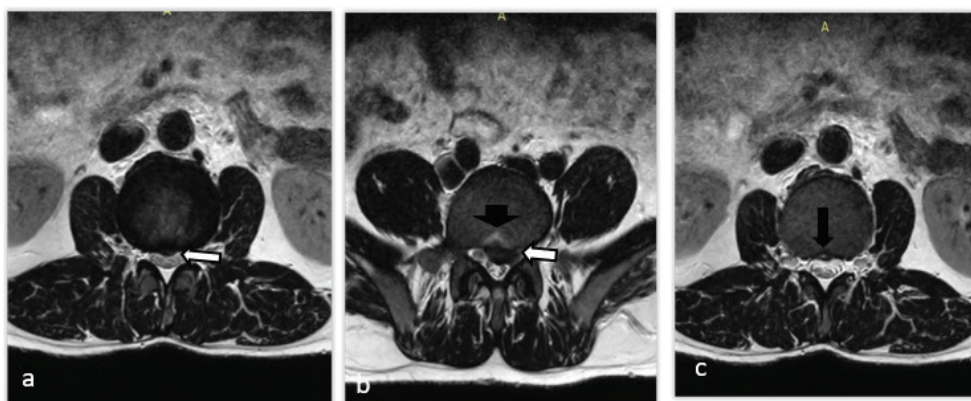


FIGURE 4: (A) T2 axial image of L-S spine is showing Disc Protrusion (arrow); (b) T2 axial image of L-S spine is showing Disc extrusion (white arrow) and annular tear (black arrow); (c) T2 axial image of L-S spine is showing posterior increase signal focus, annular tear (arrow).

We have divided cases into 5 groups according to the age, 20-29, 30-39, 40-49, 50-59, and ≥ 60 (Table 5). For each age group, most commonly found degenerative finding was DDC and DDB. For group 20-29, both was found in 5 (55.55%) cases however, in this age group, LRS and FS was also equally found in 5(55.55% cases) which were found less than DDC and DDB in their respective group comparison. Meanwhile, LRS and FS were almost similar or in slightly increment percentage order from lower age group to higher age group. LRS was 55.55%, 75 %, 69.2 %, 70 % and 66.66% consecutively and FS was 55.55%, 68.75%, 61.5%, 80% and 66.66% consecutively. In 30-39, 40-49, 50-

59 and ≥ 60 group DDC and DDB were obvious common findings than LRS and FS and to other degenerative findings. The least commonly found degenerative finding in the 20-29 group was DDH, ADB, DP, DE, AT each with 11.1% cases. However, we found an increment in the percentage of these degenerative findings with age. DDH was consecutively 11.11%, 56.25%, 69.23 %, 80% and 50% cases in increasing age group. Asymmetrical bulge was consecutively 11.11%, 25%, 30.7 %, 50% and 33.33%. Disc protrusion was consecutively 11.11%, 31.25%, 23%, 30% and 33.33% and disc extrusion was consecutively 11.11%, 12.5%, 15.3%, 10 % and 16.6 % (Table5).

TABLE 5. Degenerative signs and number of case/ percentage involvement of disc in respective age group.

s/n	Age Group	Total case	Disc/ Case	Decrease Disc Height	Disc Dessication changes	Diffuse Disc Bulge	Asymmetrical Disc Bulge	Disc Protrusion	Disc Extrusion	Annular Tear	Lateral recess stenosis	Foraminal stenosis
1	20-29	9	D11-D12	0	0	0	0	0	0	0	0	0
			D12-L1	0	0	0	0	0	0	0	0	0
			L1-L2	0	0	0	0	0	0	0	0	0
			L2-L3	0	0	0	0	0	0	0	0	0
			L3-L4	0	0	0	0	0	0	0	0	0
			L4-L5	1(100%)	3(50%)	3(42.85%)	1(100%)	1(100%)	0	1(100%)	3(50%)	2(40%)
			L5-S1	0	3(50%)	4(57.14%)	0	0	1(100%)	0	3(50%)	3(60%)
			TDI	1	6	7	1	1	1	1	6	5
			TCI	1(11.11%)	5(55.55%)	5(55.55%)	1(11.11%)	1(11.11%)	1(11.11%)	1(11.11%)	5(55.55%)	5(55.55%)
2	30-39	16	D11-D12	1(8.33%)	1(3.44%)	0	0	0	0	0	0	0
			D12-L1	1(8.33%)	0	0	0	0	0	0	0	0
			L1-L2	1(8.33%)	0	0	0	0	0	0	0	0
			L2-L3	0	1(3.44%)	0	0	0	0	0	0	0
			L3-L4	3(24%)	7(24.13%)	4(16%)	1(25%)	0	1(50%)	0	1(5%)	2(11.76%)
			L4-L5	1(8.33%)	9(31.03%)	13(52%)	1(25%)	2(33.33%)	0	0	8(40%)	8(47.05%)
			L5-S1	5(41.6%)	11(37.93%)	8(32%)	2(50%)	4(66.66%)	1(50%)	1(100%)	11(55%)	7(41.17%)
			TDI	12	29	25	4	6	2	1	20	17
			TCI	9(56.25%)	15(93.75%)	16(100%)	4(25%)	5(31.25%)	2(12.5%)	1(6.25%)	12(75%)	11(68.75%)
3	40-49	13	D11-D12	0	0	0	0	0	0	0	0	0
			D12-L1	0	0	0	0	0	0	0	0	0
			L1-L2	0	1(3.44%)	0	0	0	0	0	0	0
			L2-L3	2(16.66%)	3(10.34%)	0	0	0	0	0	0	0
			L3-L4	1(8.33%)	5(17.24%)	1(8.33%)	1(20%)	1(33.33%)	1(50%)	0	1(9.09%)	1(12.5%)
			L4-L5	3(25%)	8(27.5%)	9(75%)	0	1(33.33%)	0	2(66.66%)	5(45.45%)	4(50%)
			L5-S1	5(41.66%)	9(31.03%)	11(83.33%)	3(60%)	1(33.33%)	1(50%)	1(33.33%)	4(36.36%)	3(37.5%)
			TDI	12	29	12	5	3	2	3	11	8
			TCI	9(69.23%)	11(84.61%)	11(84.61%)	4(30.7%)	3(23%)	2(15.3%)	3(23%)	9(69.2%)	8(61.5%)
4	50-59	10	D11-D12	0	0	0	0	0	0	0	0	0
			D12-L1	0	0	0	0	0	0	0	0	0
			L1-L2	0	0	0	0	0	0	0	0	0
			L2-L3	1(10%)	3(14.28%)	2(13.33%)	1(14.28%)	0	0	1(25%)	0	0
			L3-L4	0	3(14.28%)	3(20%)	1(14.28%)	1(33.33%)	0	1(25%)	2(15.38%)	2(15.38%)
			L4-L5	3(30%)	6(28.57%)	3(20%)	3(42.85%)	2(66.66%)	1(100%)	1(25%)	5(38.46%)	5(38.46%)
			L5-S1	6(60%)	9(42.85%)	7(46.66%)	2(28.57%)	0	0	1(25%)	6(46.15%)	6(46.15%)
			TDI	10	21	15	7	3	1	4	13	13
			TCI	8(80%)	10(100%)	9(90%)	5(50%)	3(30%)	1(10%)	2(20%)	7(70%)	8(80%)
5	≥ 60	6	D11-D12	1(9.09%)	0	0	0	0	0	0	0	0
			D12-L1	1(9.09%)	0	0	0	0	0	0	0	0
			L1-L2	1(9.09%)	1(5.26%)	0	0	0	0	0	0	0
			L2-L3	2(18.18%)	2(10.52%)	2(16.66%)	1(33.33%)	0	0	1(20%)	1(11.11%)	9.09%
			L3-L4	2(18.18%)	5(26.31%)	1(8.33%)	1(33.33%)	0	0	1(20%)	2(22.22%)	27(27.2%)
			L4-L5	2(18.18%)	5(26.31%)	4(33.33%)	1(33.33%)	2(50%)	0	1(20%)	2(22.22%)	27(27.2%)
			L5-S1	2(18.18%)	6(31.57%)	5(41.66%)	0	2(50%)	1(100%)	2(40%)	4(44.44%)	4(36.3%)
			TDI	11	19	12	3	4	1	5	9	11
			TCI	3(50%)	6(100%)	6(100%)	2(33.33%)	2(33.33%)	1(16.6%)	2(33.33%)	4(66.66%)	4(66.66%)

TABLE 6. Degenerative signs and number of case/ percentage involvement of disc in Gender.

s/n	Gender	Total Case	Disc/ Case	Decrease Disc Height	Disc Desiccation changes	Diffuse Disc Bulge	Asymmetrical Disc Bulge	Disc Protrusion	Disc extrusion	Annular Tear	Lateral recess stenosis	Foraminal stenosis
1	Male	35	D11-D12	2(5.71%)	1(1.4%)	0	0	0	0	0	0	0
			D12-L1	2(5.71%)	0	0	0	0	0	0	0	0
			L1-L2	2(5.71%)	2(2.8%)	0	0	0	0	0	0	0
			L2-L3	5(14.28%)	5(7.04%)	3(6%)	1(11.11%)	0	0	1(11.11%)	1(2.5%)	1(2.6%)
			L3-L4	5(14.28%)	15(21.12%)	8(16%)	1(11.11%)	1(7.14%)	2(33.33%)	2(22.22%)	5(12.5%)	7(18.4%)
			L4-L5	9(25.71%)	22(30.9%)	22(44%)	3(33.33%)	6(42.8%)	1(16.66%)	4(44.44%)	16(40%)	16(42%)
			L5-S1	10(28.57%)	26(36.6%)	34(50%)	4(44.44%)	7(50%)	3(50%)	2(22.22%)	18(45%)	14(37%)
			TDI	35	71	50	9	14	6	9	40	38
			TCI	18(51.4%)	30(85.7%)	30(85.7%)	9(25.7%)	11(31.4%)	6(17.14%)	7(20%)	21(60%)	24(68.5%)
2	Female	19	D11-D12	0	0	0	0	0	0	0	0	0
			D12-L1	0	0	0	0	0	0	0	0	0
			L1-L2	0	0	0	0	0	0	0	0	0
			L2-L3	1(9%)	5(15.15%)	1(4.7%)	2(18.2%)	0	0	0	0	0
			L3-L4	1(9%)	6(18.18%)	2(9.5%)	3(27.3%)	0	0	0	1(5.26%)	1(7.14%)
			L4-L5	1(9%)	10(30.3%)	10(47.6%)	3(27.3%)	1(33.33%)		1(100%)	8(42.1%)	6(42.8%)
			L5-S1	8(73%)	12(36.36%)	8(38%)	3(27.3%)	2(66.6%)	1(100%)		10(52.6%)	7(50%)
			TDI	11	33	21	11	3	1	1	19	14
			TCI	11(57.8%)	17(89.4%)	16(84.2%)	8(42.1%)	3(15.7%)	1(0.5%)	1(0.5%)	13(68.4%)	10(52.6%)

In gender-wise comparison, the most common finding in each gender (male or female) was again DDC and DDB (Table6). Both were 85.7 % of cases in males while consecutively 89.4 % and 84.2 % in females. The occurrence of disc protrusion, disc extrusion, and annular tear was comparatively more in males than females. They were respectively 31.4 %, 17.14 % and 20 % in male while 15.7 %, 0.5 % and 0.5 % in female. However, the occurrence of asymmetrical disc bulge was more in females than in males. It was 42.1 % cases in females and 25.7% cases in males.

DISCUSSION

In this study, we attempted to observe the most common degenerative changes overall, age-wise and gender-wise in Nepal police. Furthermore, we also analyzed the most common vertebral level for each degenerative finding. Our study showed; Disc desiccation changes and diffuse disc bulge are the most common finding for any age group and gender. Lower lumbar vertebrae especially L4-L5 and L5-S1 levels are mostly involved in degenerative changes.

Most commonly affected vertebral levels i.e., L4-L5 and L5-S1 bear a high magnitude of compressive forces at the lumbosacral junction. In addition, the anterior shear forces increase proportionally with the rising lumbosacral angle at the L4-L5 and L5-S1 motion segments (6). Disc desiccation changes

and diffuse disc bulge are the most common findings in all aspects i.e., overall, age-wise as well as gender-wise, which is consistent with the finding of Kuswaha et.al.⁷ and Karki et al.⁸ Age-wise, both findings were the most common finding for the group. With increasing age, we found it to be increasing from 20-29 group and almost consistent between 30-40, 40-50, 50-60 and ≥ 60 (80%-100%) (Table 5). Genetic susceptibility may explain the prevalence of disc degeneration in young people. However, other factors, such as repeated trauma and a history of physical loading can cause disc degeneration.⁹ Between male and female, both finding was between 85%-90% (Table 6). The findings are consistent with previous studies.^{10,11} DDC results from the replacement of glycosaminoglycan in the nucleus pulposus with fibrocartilage, which results in reduced disk height due to decreased volume of nucleus pulposus.¹² A diffuse disc bulge is the diffuse bulging of the annulus beyond the disc space. However, the annulus remains intact.⁴

In the spine, an intervertebral disc is located between the vertebral bodies, which supports the spine by acting as a shock absorber. Intervertebral disc herniation in the spine is a condition in which the area of the disc is displaced posteriorly beyond the level of the adjacent vertebral body.¹³ The annulus fibrosis may or may not cover a herniated disc. The herniation may be either focal or bulging. If the

herniation is less than 180 degree of disc diameter it is called focal disc herniation and when it is 180degree to 360degree above the edges of the ring apophysis it is called disc bulge.¹⁴ Focal bulging can be disc protrusion or disc extrusion. A protrusion occurs when the maximum distance between the edges of the disc material outside the disc space is less than the distance between the edges of the base of the disc space. The base is defined as the width of the disc material at the outer edge of the original disc space, where the disc material beyond the displacement of the disc space is continuous with the disc material in the disc space (Figure 4a). An extrusion occurs when the herniated disc exceeds the distance between the edges of the disc material in at least one plane (Figure 4b).⁴ An annular tear was considered to represent the presence of any hyper intense signal within the peripheral annulus.¹⁵ In our work, disc protrusion 14(25.9%) was a more common finding than disc extrusion 7(12.9%) in a herniated disc. The most commonly involved disc in protrusion was L4-L5, 8(47%) and L5-S1, 7(41.17%). However, for extrusion L5-S1, 4(57.14%) was obvious higher finding to L4-L5, 1 (14.2%) or L3-L4, 2 (20%). Disc herniation, both protrusion, and extrusion showed an increasing trend with age. Between males and females, Herniation was more common in males, both protrusion (31.4% vs 15.7%) and extrusion (17.4% vs 0.5%). Previous studies support the sex difference, which has established that males are more prone to degenerative changes compared to females likely to be associated with increased mechanical stress and injury.¹⁰

As a consequence of disc degeneration, central spinal canal stenosis, lateral recess stenosis and foraminal stenosis with nerve root compression and compromise are common.⁸ In midsagittal T2 image, spinal canal diameter less than 12mm indicates a narrowing of the spinal canal. A lateral recess is the space that is bounded anteriorly by the vertebral body's posterior surface, posteriorly by the superior articular facet, and laterally by the pedicle. It is measured as the distance between the posterior aspect of the vertebral body and the superior articular facet at the pedicle level in the axial section. If less than 4 mm is deemed stenosed. Compression of neural foramina is observed in

sagittal T2WI.¹⁴ In our study, we found, lateral recess stenosis 36(66.6%) and foraminal stenosis 36 (66.6%) were the most common among four followed by central spinal canal stenosis 29(53.7%) and nerve root compromise 29(53.7%). Each of them were common in L5-S1 and L4-L5. These findings are consistent with Thapa et al for the Nepalese population.¹⁶ Prevalence of central canal stenosis and foraminal stenosis was seen increased from 20-29 group to 30-39 group, however, from 30-39 to ≥ 60 there was not much difference and ranged between (65% to 80%). We found lateral recess stenosis to be more in females (68%) than males (60%) while foraminal stenosis was more in males (68.5%) than females (52.6%).

Modic changes are manifested by alteration in MR signals adjacent to the endplates of the degenerated intervertebral disc. There are 3 types. Type I shows T1 hypointensity and T2 hyperintensity and depicts edema. Type II shows both hyperintensity and depicts fatty degeneration and Type III shows both hypointensity and depicts sclerosis.¹⁷ We found modic II the most common among the 3 of them. It is consistent with Rai GS et. al.¹⁸ Our study was conducted in a short period. Therefore, we were limited to only 54 cases. Furthermore, there can be variations in interpretation by the different radiologists. Direct correlation of MRI findings with patient symptoms was not performed as well.

CONCLUSIONS

This work shows, L4-L5 and L5-S1 is the most common intervertebral disc involved in degeneration in Nepal police personnel. Disc desiccation change and diffuse disc bulge are the most frequent finding irrespective of age and gender. Degenerative changes have an increasing trend with increasing age. Disc herniation is more common in male police personnel than females.

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