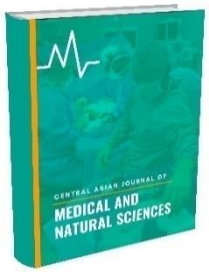
CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES



Volume: 04 Issue: 03 | May-Jun 2023 ISSN: 2660-4159

http://cajmns.centralasianstudies.org

The Diagnostic Relationship with Clinical and Neuroimaging Studies of Patients with Back Pain

1. **Islom Ibrahimovich Davranov**
2. **Aziza Tohirovna Djurabekova**

Received 2nd Mar 2023,
Accepted 3rd Apr 2023,
Online 30th May 2023

[1,2] Department of Neurological Diseases
Samarkand State Medical University

Abstract: Neuroimaging, a technique that allows seeing the structure, function and characterization of biochemical, biomechanical changes of the brain, has entered modern medicine, being now a separate section. The use of CT, MSCT and MRI in patients with spinal neurological dysfunctions has become traditional. In addition, the choice of diagnostic methods is different, as while CT scanning provides an opportunity to determine the local extent of compression in the spinal cord and the adjacent subdural spaces, MSCT is more comprehensive and accurately describes deep problems of the spinal cord disorders.

Key words: Neuroimaging, dorsopathy, radiculopathy, spinal cord.

Introduction. Diagnostic MRI studies with axial and sagittal planes at 1.5 or 3T in T1-T2 modes give complete information of the anatomical structure of the brain, where images are given to answer clinical questions of suspicion such as vascular malformations, parenchymal edema, differential approach of pathological process origin.

The most frequently encountered pathology by neuroimaging modality is dorsopathy by lumbosacral localisation. The term dorsopathy encompasses a variety of heterogeneous groups of diseases grouped by the cause of back pain - vertebrogenic and discogenic radiculopathy .

When assessing patients with dorsopathy, practitioners use a number of standard examinations (laboratory, neurophysiological), but the neuroimaging value of the study lies in the detailed, layer-by-layer, from every angle study of all the anatomical features of the spinal column structure (spinal cord, degeneration of vertebrae, discs).

Thus, the use of neuroimaging today confirms the gold standard of research, in its supersensitivity and informative diagnostics, in a non-invasive way and safe to use.

Purpose of the study: To carry out a correlation between clinical and neurological and neuroimaging examination methods for differential diagnosis of lumbosacral radiculopathies in dorsopathies and localization correspondence.

Material and methods of investigation. Subjects were patients who received inpatient treatment in MC SamGMU from 2022 to 2023, in the Department of Neurology; with complaints of lumbosacral pain, aged 30 to 60 years, the duration of disease on the anamnesis was from 2 to 20 years; number 63

people, where 66% were men, from the total number examined. Of the total sample of patients, 28 were new admissions and the remaining patients had previously received conservative treatment in the department. The first important step (with the consent of the patients) was the traditional clinical and neurological examination (examination of the patients), where motor and sensory changes were detected. A numerical rating scale (NRS) was used to assess pain syndrome intensity (11 points, where 0 was no pain and 10 was the most severe pain). All patients underwent neuroimaging (MRI) of the spine in frontal and sagittal planes on a Signa Explorer (GE) USA (2020) with 1.5 Tesla, slice thickness 3 mm, MSCT "Revalution EVO (GE)" USA (2020), where the slice thickness is 1.25 mm, voltage 120-170 mA. Statistical processing of the results of the ongoing study was recorded on an individual computer. Using Statistica for windows (2012) software, Mann-Whitney criteria were analyzed, correlation index was calculated according to traditional Spearman criteria.

Results of the study. The patients hospitalized at the neurology department of Samara State Medical University with the chief complaint of lumbosacral pain had the following clinical findings at the time of admission to the hospital. Painful symptom was not limited to lumbosacral region. Painful sensations were also defined in the buttock region, sometimes with irradiation along the posterior longitudinal line to the lower leg. Pain tended to increase with movement (walking, changing posture: sitting-standing, body rotation). OG patients were divided into two groups: the first group comprised 35 patients with radiculopathy (new admissions); the second group comprised 28 first-time admissions with radicular pain syndrome without radiculopathy.

Intergroup differences in pain intensity and severity were assessed by a digital rating scale (DRS), the scores between the groups were almost equal, as in group 1 the mean was 7.6±0.6, while in group 2 the mean was 8.1±0.5, where $p>0.1$. Clinical and neurological examination revealed motor disturbances in both groups. Thus, in group 1, 50% did not exceed 3 points in leg extensor strength, while in group 2, 46% did not exceed 2 points in leg extensor strength; thus, changes in leg extensor strength were worse in group 2. Besides the nature of the reflexive sphere, the 1st group showed hyporeflexia in 60% and areflexia in 33%, mostly of Achilles reflex, the 2nd group showed hyporeflexia in 70% and areflexia in 30%, mainly of Achilles reflex. That is, hyporeflexia predominates in both groups and the absence reflex is evenly distributed in both groups. To assess objectively the level of compression along the L5-S1 roots, the tension symptom method was used (depending on the degree of elevation), so in Group 1 it was above 400 in 53% of patients; in 40% below 400; in Group 2 it was above 400 in 56% of patients; below 400 in 40%. Consequently, Group 1 with exacerbation of radiculopathy (lumbosacral) and Group 2 first-time patients had identical scores for pain intensity, leg extensor strength and tension symptom level with a small percentage of excess in Group 2.

Sensory outcome analysis in both groups was as follows: group 1 had a 73% excess percentage of hypoaesthesia and the remaining percentage of paraaesthesia at 19%; whereas in group 2, hypoaesthesia was 85% and the remaining percentage (15%) was paraaesthesia. Thus, the sensory changes are mainly in the form of hypoesthesia, with a slight predominance in Group 2; this fact is also true for the paraesthesia type of sensory disturbances. As seen, the neurological examination findings in both groups are similar in clinical and neurological symptoms, but there is a slight difference in the intensity and level of sensory disturbances in Group 2.

The standard examination package for patients with back pain includes the dynamics of neuroimaging analysis. In accordance with the aim and objectives of this study, the patients underwent lumbosacral MRI (MSCT) on admission to hospital. The interesting fact was that despite the higher intensity of pain syndrome and sensory disturbances in Group 2, neuroimaging indices were sharply observed between the groups; indicating a coarser and more pronounced change process in Group 1 patients, who had a history of rehabilitation and were admitted to the hospital with an exacerbation. Thus, the

incidence of disc protrusion and herniation was higher in Group 1 patients, in spite of the relatively low pain factor in contrast to Group 2, and was 39.3%; the presence of herniation and protrusion (simultaneously) in 89%, in Group 1 there was disc-radicular conflict in 13.7%. In group 2, the presence of hernia in 21.1% of cases, protrusion in 77% of cases, and disco-radicular conflict in 38.5%. Correlation analysis of the frequency of protrusion and herniation was statistically significant according to (Pearson's) criteria, p>0.05, indicating an unexplicit difference, while the statistical difference in the parameter of disco-radicular conflict was estimated, where p>0.01, that is, the sign of the difference was confirmed. Thus, patients with a history of lumbosacral radiculopathy who were admitted to the hospital because of an exacerbation had a lower pain score on the numerical ranking scale (NRS) than patients admitted for the first time with lumbosacral pain syndrome. In addition, despite identical neurological symptoms in both groups, the frequency of herniated discs and discoradicular changes on MRI (MRI) of the lumbosacral region are significantly higher in the older patients, while in group 2 the frequency of protrusion is higher and the discoradicular changes are higher.

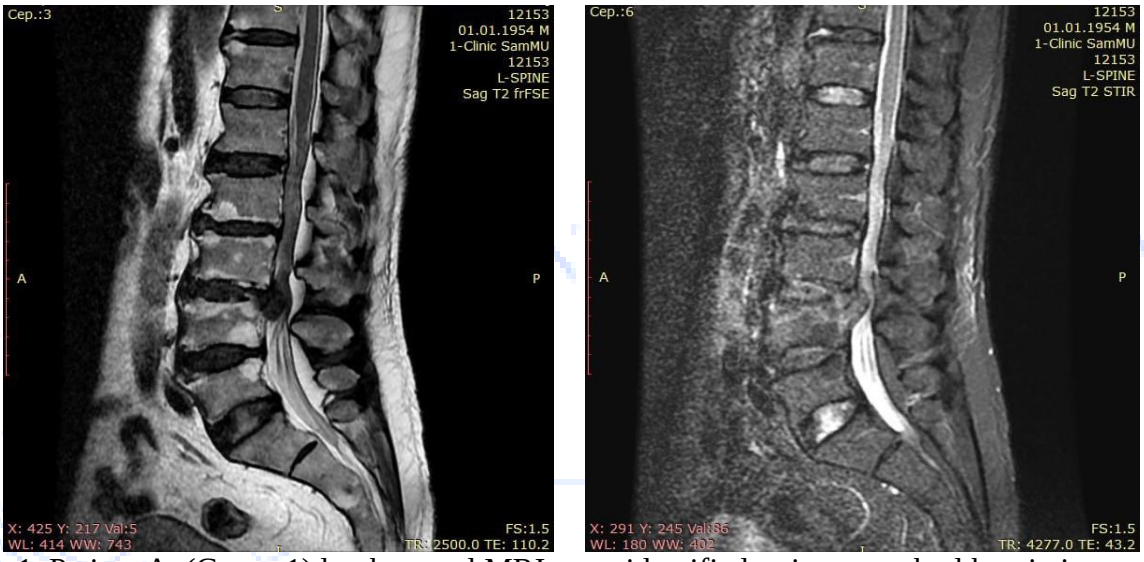


Figure 1. Patient A. (Group 1) lumbosacral MRI scan, identified as intervertebral herniation pressing on the lumen of the spinal canal

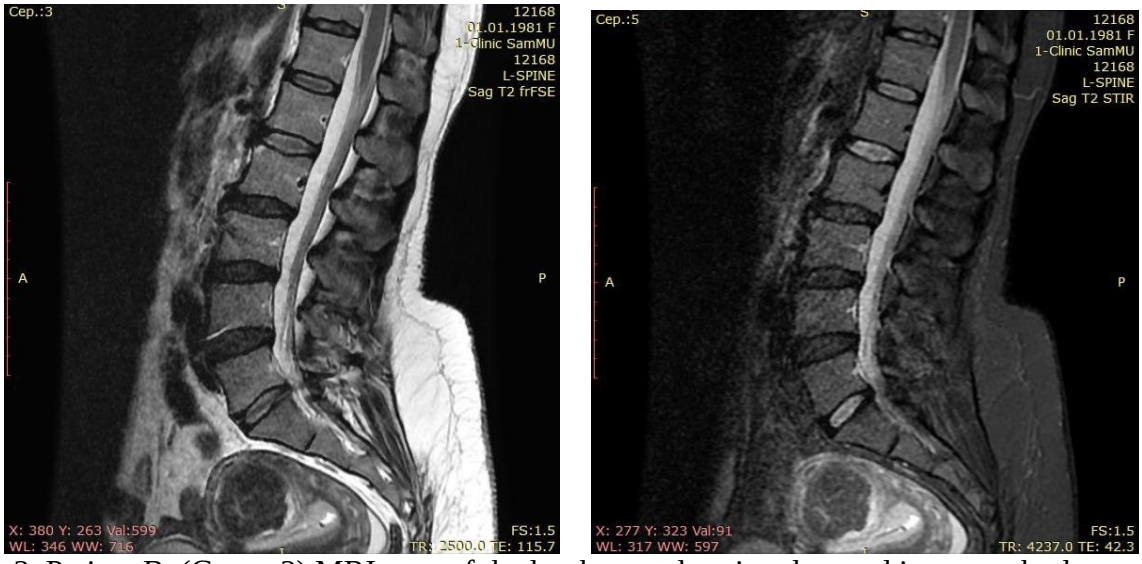


Figure 2. Patient B. (Group 2) MRI scan of the lumbosacral region detected intervertebral protrusion, deforming spondylosis

A characteristic feature of lumbar pain is a change in the shape of the spine, depending on the intensity of pain and the forced posture when standing. The level or presence of vertebral misalignment (listhesis) was studied in the studied patients during the neurological examination. Antespondylolisthesis was detected in 36% of patients in group 1, retrospondylolisthesis in 40.7%, and laterospondylolisthesis in 18% of cases. In Group 2, antespondylolisthesis was detected in 20%, retrospondylolisthesis in 27.5%, and no laterospondylolisthesis in the total sample of this group. In group 2, the index of spinal deformity as scoliosis was higher in 24.8%, while in group 1, only 3 patients had it. Which was statistically significant, and $p < 0.05$.

Thus, the presence of changes in neuroimaging indices in the intergroup comparison showed that a higher percentage of pathological process in patients with the disease duration and less pronounced intensity of pain, this index may be considered a compensatory factor, the same is true for changes in the spine structure, where ligeosis (displacement) is more marked in group 1 patients, while deformity scoleosis is typical for group 2. Evaluation of neuroimaging parameters of changes and duration (duration) of disease with the frequency of exacerbations revealed that the presence of spinal deformity listhesis, herniation/protrusion in such patients (group 1) increases the frequency of exacerbations at least 2 times a year, which is statistically significant as $p < 0.001$. In addition, Group 1 patients have a longer interval for exacerbations of lumbosacral pain than patients in the same group for less pronounced pathological degenerative changes in the intervertebral discs.

CONCLUSIONS:

1. The severity and intensity of lumbosacral pain are not related to degenerative changes (herniation/protrusion) in the intervertebral disc
2. The pathological process in the intervertebral disc depends on the duration of the disease and therefore the age of the patient, which in turn affects the frequency of exacerbations;
3. Neuroimaging techniques (MRI/MSCT) should be considered as mandatory/standard, not competing with clinical findings, but complementary, to further question tactics and optimise therapy

LITERATURE:

1. Волель БА, Петелин ДС, Рожков ДО. Хроническая боль в спине и психические расстройства. Неврология, нейропсихиатрия, психосоматика. 2019;11(Прил. 2):17-24.
2. Chaabeni A., Kalai A., Megdiche I., Migaou H., Jellad A. and Frih Z.B.S. Prevalence and Associated Factors of Low Back Pain among Adolescent Athletes from an Athletics Club: A Cross-Sectional Study. // Open Access Library Journal, 2023, № 10 (2), 1-7. doi: 10.4236/oalib.1109722.
3. Jeffries LJ, Milanese SF, Grimmer-Somers KA. Epidemiology of adolescent spinal pain: a systematic overview of the research literature. Spine (Phila Pa 1976). 2007;32(23): 2630-2637. doi:10.1097/BRS.0b013e318158d70b
4. Буриева Д.М., Хакимова С.З., Джурабекова А.Т. Сравнительное изучение функции поддержания вертикальной позы у здоровых лиц и больных с паркинсонизмом //Инновационная наука. – 2015. – №. 6-2. – С. 232-236.
5. Шмырина К.В., Джурабекова А.Т., Вязикова Н.Ф. Эффективность Миртазапина в комплексном лечении хронических вертеброгенных болей в спине, обусловленных остеохондрозом позвоночника //Российский журнал боли. – 2015. – №. 1. – С. 71-72.
6. Шмырина К.В., Джурабекова А.Т., Вязикова Н.Ф., Бекназаров Н.Н. Оптимизация лечения

остеохондроза пояснично-крестцового отдела позвоночника // Medicine (Almaty). – 2016. – No 7 (169). – P. 62-66

7. Косарев В.В., Бабанов С.А. Хроническая пояснично-крестцовая радикулопатия: современное понимание и особенности фармакотерапии. РМЖ. 2013;16: 844.
8. Жезлов М.М. Левин О.С. Диагностика и лечение вертеброгенной пояснично-крестцовой радикулопатии // ЖУРНАЛ Современная терапия в психиатрии и неврологии, 2012, № 4, с. 31-36
9. Berry J.A., Elia C., Saini H.S., et al. A review of lumbar radiculopathy, diagnosis, and treatment. // Cureus, 2019, № 11(10): e5934. doi:10.7759/cureus.5934
10. So J.S., Kim Y.J., Lee S.K., Cho C.S. Importance of differential diagnosis of a possible brain tumor in patients with cervical radiculopathy.// J Korean Neurosurg Soc. 2022; 65(1): 145-150. doi:10.3340/jkns.2021.0127
11. Lin J.H., Chen C.C. Current challenges in diagnosis of lumbar radiculopathy. // World J Anesthesiol, 2018; 7(3): 20-23
12. Котова О.В., Акарачкова Е.С. Боль в спине: эпидемиология, этиология, лечение. Consilium Medicum. 2017; 19 (2.3. Неврология и Ревматология): 43–47.
13. Renjith K.R., Shetty A.P., Kanna P.R.M., Rajasekaran S. Spinal melorheostosis: a rare cause for thoracic radiculopathy. Int J Spine Surg. 2020;14(2):209-212. Published 2020 Apr 30. doi:10.14444/7027