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Retrospective study of lumbar disc herniation in a hospital in North-Eastern Romania

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Abstract: Lumbar disc herniation is a degenerative neurological disorder characterized by a notable rise in incidence and prevalence among the population in modern times. It is primarily caused by factors such as microtrauma, sedentary lifestyle, prolonged static postures, excessive time spent at the computer, and overexertion. Materials and methods: A study was conducted retrospectively from 2022 to 2023 on patients who were admitted with lumbar disc herniation, at the Neurosurgery Hospital "Prof. N. Oblu", in Iași.The research focused on showcasing the aspects of disc issues/pathology in the North Eastern re-gion.Findings; The research included 1969 individuals with a majority noted among par-ticipants, from rural areas and females.The majority of patients fell into the adult age range of 41 60 years. Surgical procedures were performed on 71% of the patients while conservative treatment was administered to the remaining 29%.The distribution of ages shows that most individuals undergoing surgery or receiving conservative treatment fall, within the adult age range of 41 to 60 years. Surgery is performed on 71% of patients while conservative treatment is given in 29% of cases.All patients were advised to undergo follow up remedial therapy upon discharge. We faced challenges in evaluating the level of adherence which posed a limitation in our study.Conclusions: The study brings to the forefront the need for reparative therapy for patient's socio-professional and family reinte-gration and improvement of quality of life.

Keywords: lumbar disc herniation, anatomy, retrospective study, neurosurgery, recovery

1. Introduction

When the nucleus, cartilage, fragments of bone, annular tissue, or any mix of these elements is locally displaced beyond the confines of the disc space, a condition known as lumbar disc herniation (LDH) develops, resulting in low back discomfort. The mechanics

of the spine are altered by disc degeneration, which may have an adverse effect on the function of the ligaments and muscles that support the spine[1,2].

Studies have demonstrated that over 90% of older and middle-aged patients with LDH experience mechanical abnormalities related to their spine and muscle tissues[3].

Spinal disorders are pervasive and impact individuals of all ages around the globe. In developed countries, basic back pain affects an estimated 60–70% of the population during the course of their lives, with the incidence peaking during the prime of adult productivity.Low back pain is is an issue that impacts individuals globally posing challenges, in clinical, public health and socioeconomic realms. More than half of adults worldwide suffer from low back pain at some point in their lives, with varying degrees of symptom severity, and many cases have low back pain associated with sciatic symptoms. Only a small number of patients experience, back pain associated with joint and spinal disc degenerative conditions.

While there is a lack of fundamental epidemiological data to establish a connection between LDH and occupational conditions, certain epidemiological research have indicated the occurrence of LDH. According to Jordon, the occurrence of LDH in Finland and Italy is 1-3%, with a higher frequency among those aged 30-59 years. Men have twice the incidence of LDH compared to women [4]. Deyo et al. hypothesized that the prevalence of LDH in America would approximate 1–2% [5].

It was anticipated by Deyo et al. that the incidence of LDH in the United States would range from 1% to 2% [5].Between 1976 and 1990, 18.6 out of 100,000 people in Rochester and Minnesota had cervical disc herniation (CDH), according to research by Radhakrishnan et al. [6]. This rate peaked in people's 60s. At the same time, there can be a large number of DH instances that don't cause any symptoms at all [7,8].

Unfortunately, these findings are only applicable to a specific age group, geographic area, profession, or group; thus, they cannot be used to assess the occurrence distribution across all age groups or the age-related gender disparities in DH incidence [9-11]. Due to the impossibility of analyzing nationwide diagnosis papers up to now, these epidemiological studies have limitations. However, several efforts have been undertaken to examine all health insurance data and determine the distribution of disease occurrence, since big data analysis has become a prominent component of medical studies [12].

Around 85% of individuals experiencing symptoms related to a herniated disc are likely to see improvement within 8 12 weeks even without any particular treatment. Nonetheless those, with neurological findings or who do not respond well to conservative therapies may need additional assessment and care [13].

The primary objectives, in managing lumbar disc herniation involve alleviating pain and improving mobility. This typically involves utilizing noninvasive therapies such, as physiotherapy, massage and other conservative approaches. In situations where these methods prove ineffective, surgical intervention may be considered to address the condition.

Kinesitherapy, together with therapeutic massage, plays a significant role in muscle relaxation, regaining muscle tone and normal mobility in the lumbar spine, with the recovery of the correct position at rest and activity, leading to a reduction or even disappearance of cracks and pain [14, 15, 16].

While there isn't proof indicating a shift, in the occurrence of back pain or the underlying anatomical biomechanical mechanisms in the past five decades what has undergone significant transformation is how both the medical field and society respond to matters concerning lower back pain. It's crucial to emphasize the impact of rehabilitation before and after surgery along with advancements, in surgical procedures.

The purpose of this retrospective study is to evaluate individuals admitted to the hospital with a focus on lumbar disc herniation, aiming to highlight the unique aspects of this pathology in the North-Eastern area of Romania and to urge patients to follow a professional rehabilitation treatment, which would considerably improve the quality of life.

2. Materials and Methods

Research design:

Retrospective studies are a cornerstone of research across many fields, particularly in healthcare and social sciences.Despite its retrospective nature, this method plays a crucial role in advancing our understanding of complex issues.This retrospective study aims to thoroughly investigate patients treated for disc pathology. Several parameters were followed, including background, gender, age, and profession of the patients, associated diseases, types of surgery in those who had an indication for it, as well as the evaluation of the recovery treatment. Statistical and mathematical techniques were utilized to analyze the findings, including determining the occurrence rates of characteristics within the study population.

Participants:

The retrospective study sample comprises patients with disc pathology admitted between 2022 and 2023 to the Emergency Clinical Hospital "Prof. Dr. Nicolae Oblu" in Iași, a university hospital, specializing in neurosurgery, which is unique in the northeastern area of Romania.

All participants gave their consent after being informed and any personal information was taken out from the data to protect their privacy.. Informed consent was obtained from all participants, and personal identifiers were removed from the data to ensure anonymity.

3. Results

Our retrospective research included 1969 patients (944 in 2022 and 1025 in 2023) who were admitted to the Neurosurgery Hospital in Iasi for the diagnosis of lumbar disc herniation. The majority of patients in the group came from urban areas (1008 cases - 51.19% of the total), while those from rural areas totaled 961 (48.81%). This difference may be attributed to lower accessibility to medical services and the prevalence of physically demanding occupations in rural regions. (Fig. 1). Women were more affected than men (1006 women-51.09%, *versus* 963 men-48.91%), with an M:F ratio = 0.95, a situation common in both years. (Fig. 2).

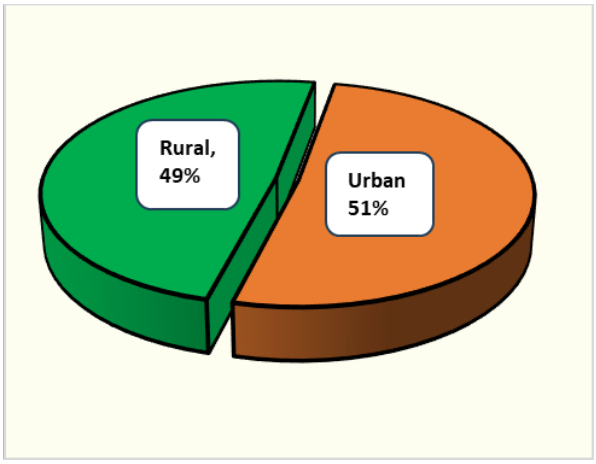

Figure 1. Lot distribution according to environment

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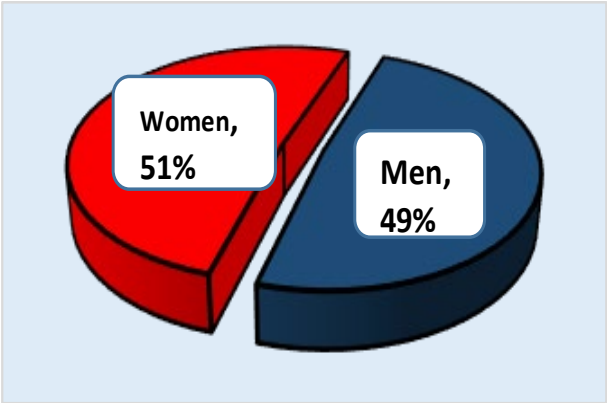

Figure 2. Gender distribution of patients in the group

According to the age histogram, the most affected group was 21-40 years old (943 cases - 47.89% of the total batch), followed by 61-80 years old (637 - 32.35%) and 21-40 years old (360 cases - 18.29%). The extreme age groups had a lower number of cases, specifically: under 20 years old - 11 cases (0.55%), and over 80 years old - 18 cases (0.91%). It can be seen that patients of active age are more exposed, as well as patients over 60 years old, less active, but prone to various low back microtrauma caused by household accidents or bone demineralization. (Fig. 3).

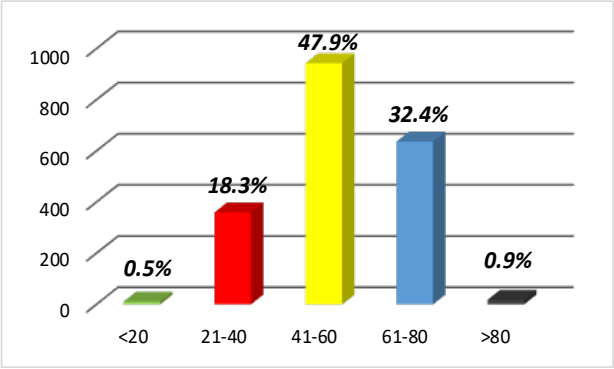

Figure 3. Histogram of age of patients with lumbar disc herniation

In all patients the presence of comorbidities was noted. The most common associated diseases were chronic conditions: cardiovascular (58.70%), neuropsychiatric (73.39%), obesity and diabetes (25.75%) and osteo-degenerative and osteoporotic (11.23%). Women were significantly impacted by these conditions. Out of the 10 patients, with SARS CoV 2 infection they received the treatment. (Fig. 4).

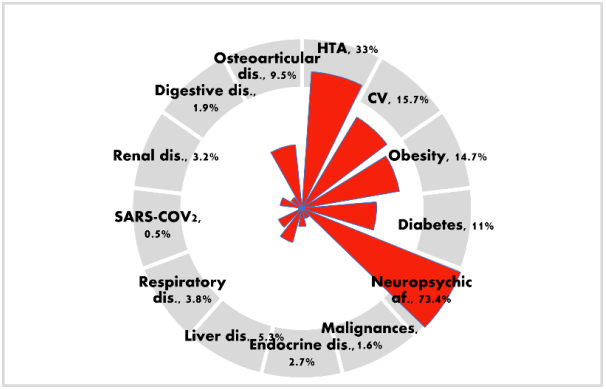

Figure 4. Associated diseases of patients with lumbar disc herniation

Regarding the professions of patients admitted for lumbar disc herniation, the most affected were pensioners (22%), farmers (17%), civil servants (12%), car drivers (10%), commercial workers (9%), dentists (7%), and athletes (6%). In 17% of cases, the profession could not be specified. Intervertebral disc overload, either through microtrauma, prolonged static positions, or excessive physical effort, exposes certain occupational categories more, as shown in Fig. 5.

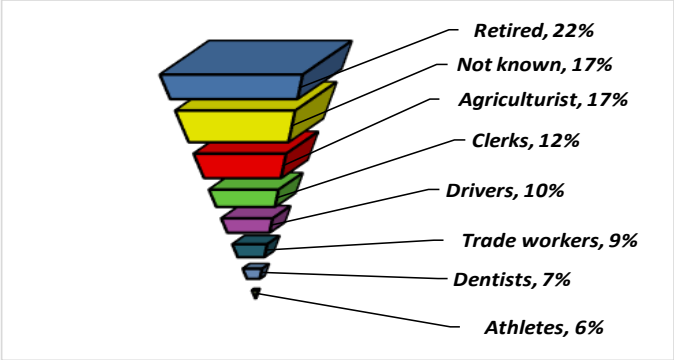

Figure 5. Professions of patients with lumbar disc herniation

Regarding therapeutic management, out of the total of 1969 patients with herniated discs referred to the three neurosurgery departments, the majority underwent surgery - 71% (1413 patients), while 27.78% (547 patients) received only conservative medical treatment. Nine patients (0.45%) refused any treatment (see Fig. 6).

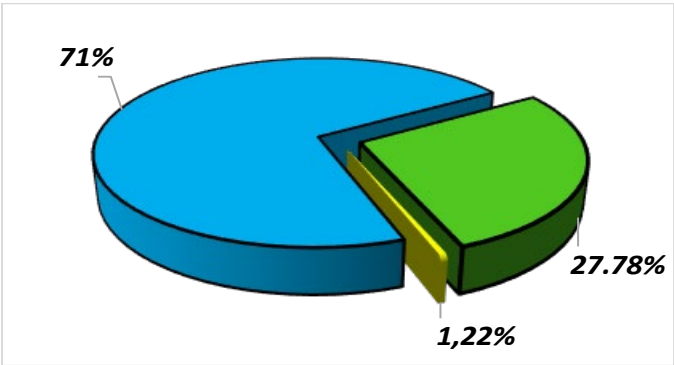

Figure 6. Treatment approaches for individuals, with lumbar disc herniation.

The most common surgical procedures were as follows: discectomies (surgical removal of a herniated disc pressing on a spinal root) - 1251 patients (88.6%), spondylosynthesis (surgical maneuver involving the union of two or more vertebrae) - 58 patients (4.63%), spinal decompressions - 37 (2.95%), and other procedures such as rhizolysis (selective destruction of problematic nerve roots in the spinal cord), infiltration with anesthetic products, postoperative reopening, removal of intradural lesions, internal segmental fixation of the spine, and correction of spinal procedures - 67 patients (5.35%) (see Fig. 7).

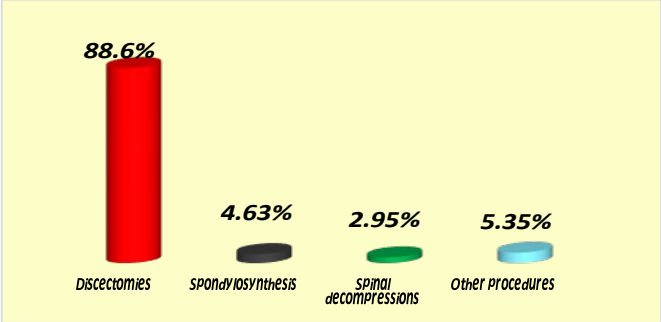

Figure 7. Surgical modalities practiced

All patients were referred for functional rehabilitation therapy, but only 55.3% (1088 patients) were referred to public or private rehabilitation centers. This was noted at the 6 and 12-month follow-up or recheck of patients' progress. From this point of view, our study has some limitations, as we did not benefit from complete feedback with all patients, many of whom did not attend the controls. However, among the compliant patients who followed a recovery program, some experienced a partial remission of symptoms (61% - 663 cases), while others (39% - 425 cases) achieved complete remission, enabling them to resume daily activities (see Fig. 8).

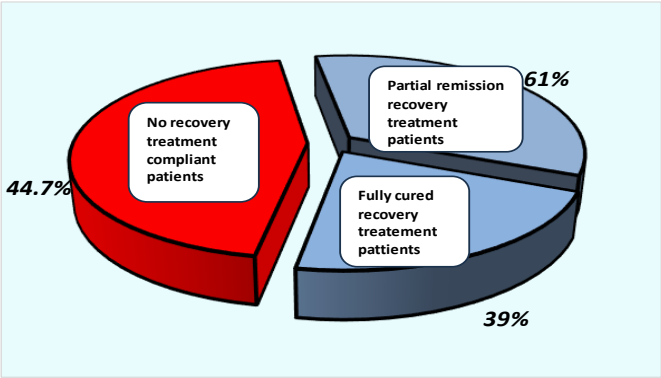

Figure 8. Recovery in patients with lumbar disc herniation

4. Discussion

The mechanism of low back pain has not been fully understood, but it is certainly multifactorial, involving both mechanical and inflammatory factors. Musculoskeletal disorders affecting the muscles, tendons, joints, and discs of the spine can lead to decreased work efficiency and quality of life. The prevalence of these disorders can vary based on individual habits and lifestyle changes, such as sedentary lifestyles, lack of exercise, weight gain, prolonged static postures, excessive time spent at the computer or laptop, excessive use of mobile phones, and ungraded exertion. Moreover, the COVID-19 pandemic from 2020 to 2023 has prompted governments to impose social restrictions to prevent its spread.

Being required to stay isolated at home for periods, with limited physical movement increased the likelihood of experiencing lower back pain. Additionally feelings of loneliness and social isolation worsened the perception of pain in individuals who had contracted COVID 19 [17, 18, 19].

Vertebral disc disease is a predominantly degenerative condition in which trauma can also contribute. Overstraining of the intervertebral disc by microtrauma in drivers,

prolonged static postures in civil servants, or high exertion in porters, etc., leads to a higher frequency of the disease in these professional categories [20, 21, 22].

Spinal pathology is directly related to exertion. Thus, professions that require high physical effort are more prone to lumbar disc herniation (e.g., construction and agricultural workers). Changes in diet and the increasing frequency of obesity among the child population are contributing factors, leading to overstraining of the intervertebral disc and an increased incidence among individuals under 45 years of age [23, 24].

Vicious postures, lack of tone in the paravertebral and abdominal muscles, sedentary lifestyles, obesity, or other associated diseases have sigificantly altered the incidence of this condition. Until recently, it was primarily considered a disease of the elderly, but it now manifests at younger and younger ages.

There is a male predominance in the incidence of operated lumbar disc herniation, ranging from 1.3:1 to 2:1, explained by the type of work performed and constitutional differences, with the longilinear type being more prone [23].

Lumbar disc herniation is most commonly single, but it can also be multiple, occurring in different regions of the spine or even within the same region. The persistence of postoperative low back pain may be attributed to the presence of another hernia in the same region. Since the introduction of nuclear magnetic resonance into the diagnostic protocol of lumbar disc herniations, it is impossible not to detect multiple herniations preoperatively [25].

A recent epidemiological study conducted by Shiga and colleagues [26] highlights that 1% of the population is affected by lumbar disc herniation.

The most affected segments are L4-L5 (50.6%) and L5-S1 (40.8%). Surgical treatment is predominantly administered to patients aged 20-40 years and primarily to men. No clear link has been identified between sports and the development of lumbar disc herniation [26].

Zielinska and colleagues found in their research that lumbar disc herniation affects 5 to 20 out of every 1000 adults each year with the highest prevalence seen in individuals aged between their thirties and fifties with a ratio of 2 males, to every female. The study showed that the estimated prevalence of symptomatic lumbar disc herniation was about 1-3%, and was most significant among people aged 30-50 years [27].

Patients aged 25-55 have an approximately 95% chance of disc herniation occurring at either L4-L5 or L5-S1. Disc disease is the underlying etiology in less than 5% of patients with back pain. The people most affected are those aged 30-45, as they are also the most active and are most exposed to traumatic forces. The same study indicated that among patients with symptomatic disc disease, those who were socioeconomically disadvantaged experienced more severe functional limitations, higher levels of pain, and increased depressive symptoms [27].

In young patients with lumbar disc herniation, physiokinetic rehabilitation therapies should be initiated before considering any neurosurgical interventions [28, 29].

Another study by Li JX et al. [30], conducted in Taiwan over a 12-year period, found that individuals with diabetes or other comorbidities had a higher risk of developing disc disease compared to non-diabetic patients. The study included 2.6 million subjects with diabetes as an associated disease, compared to 16.9 million without diabetes [30, 31].

Therapeutic management of patients with lumbar disc herniation, from conservative medical or surgical treatment to functional recovery, must be consistent with an aseptic environment in all spaces where these patients are cared for: wards, operating rooms, recovery rooms, to limit the phenomenon of microbial resistance [32, 33,34].

Some patients with lumbar disc herniation experience recurrences, characterized by severe symptoms and increased additional costs. A multicenter study by Mariscal G et al. revealed that the incidence of repeat disc herniation varied from 0% to 14% [35]. The majority of recurrences were observed at the level and, on the same side, typically within

a period of 1-5 years. Certain factors may predispose to recurrence, including male gender, aging, obesity, diabetes mellitus, and intervertebral disc structure [19].

Regarding the return to work of patients who required surgery, 95% of them returned to work within 6-12 months, with an average absence of 78 days.

This period was not associated with various comorbidities such as obesity or risk factors such as smoking and alcohol consumption [36].

5. Conclusions

Our retrospective study conducted on a large group of patients, over a period of 2 years, highlights the distribution of lumbar disc herniation in the population of the North-East area of Romania. In the group under observation the disease occurred frequently among city dwelling patients (51.19%) engaged in strenuous work. The prevalence was roughly equal among both genders and in the age range of 41 60 years (47.89%). Additionally there was a presence of various concurrent conditions such as cardiovascular issues, neuro psychiatric disorders, degenerative bone diseases and osteoporosis which were more prevalent, among females. These comorbidities acted as triggering factors that complicated the progression of the disease.

Professions affected included those exposed to excessive exertion, vicious static positions, orthostatism, or prolonged sitting at a computer (such as athletes, dentists, and drivers). The most prevalent therapeutic approach in our study was neurosurgical intervention (71%) compared to medical treatment (27.78%). Recovery programs followed by compliant patients resulted in partial (61%) or complete (39%) remission of disc symptoms, enhancing the quality of life for patients.

Our research underscores the importance of rehabilitative programs under the careful guidance of physiokinetic therapists for patients with lumbar disc herniation.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study. Written informed consent has been obtained from the patient(s) to publish this paper.

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