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Analysis of the Causes of Lumbar Disc Herniation in Patients Treated Neurosurgical Due to it

Analiza przyczyn dyskopatii lędźwiowej w grupie osób leczonych neurochirurgicznie z jej powodu

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Abstract

Introduction. Discopathy is a serious social problem because it affects professionally active people and often at a very young age (usually discopathy occurs in 3rd–4th decade of life). The etiology and pathogenesis of lumbar disc disease is not known in detail. Studies say about many factors predisposing to disease of the intervertebral disc. Understanding the causes of discopathy can contribute to better prevention of this disease.
Aim. Study the causes of lumbar disc herniation and to evaluate the respondents' knowledge about them.
Material and Methods. The study was conducted among 67 patients with lumbar discopathy hospitalized in the Department of Neurosurgery or treated in the neurosurgical practice of Lower Silesia Specialized Hospital name Tadeusz Marciniak in Wroclaw. The study was performed with the use of diagnostic questionnaire using the survey technique. The obtained data were processed with statistical analysis software Statistica 10 underwent statistical analysis.
Results. Analysis of the research material has shown that: over 55% respondents think that the cause of lumbar disc herniation is their work; over 40% of respondents in the course of work lift weights exceeding acceptable standards; the vast majority of respondents feel pain of the spine (located on the VAS (Visual Analogue Scale) in the range of 7 to 10; almost half of respondents are overweight (25 <BMI> 30).
Conclusions. 1) Patients with lumbar disc herniation suffer from severe back pain. 2) Patients suffering from disc herniation often at work take forced sitting position or in the wrong way lift weights. 3) Patients with disc herniation do not have knowledge about the prevention of this disease. **(JNNN 2015;4(4):152–157)**
Key Words: discopathy, low back pain, patient's knowledge

Streszczenie

Wstęp. Dyskopatia jest poważnym problemem społecznym ze względu na to, że chorują na nią ludzie aktywni zawodowo, często w bardzo młodym wieku (najczęściej występuje w 3–4. dekadzie życia). Etiopatogeneza dyskopatii lędźwiowej nie jest szczegółowo poznana. Badania mówią o wielu czynnikach predysponujących do wystąpienia choroby krążka międzykręgowego. Poznanie przyczyn może przyczynić się do lepszego zapobiegania tej coraz częściej występującej chorobie cywilizacyjnej.
Cel. Zbadanie przyczyn powstawania choroby dyskowej kręgosłupa lędźwiowego oraz ocena wiedzy badanych na temat tychże przyczyn.
Materiał i metody. Badania przeprowadzono wśród 67 osób chorych na dyskopatię lędźwiową przebywających na oddziale neurochirurgii lub leczących się w poradni neurochirurgicznej Dolnośląskiego Szpitala Specjalistycznego im. T. Marciniaka we Wrocławiu. W badaniu posłużono się metodą sondażu diagnostycznego z zastosowaniem techniki ankiety. Do analizy danych użyto programu statystycznego Statistica 10.
Wyniki. Z analizy materiału badawczego wynika, iż, powstanie dyskopatii lędźwiowej wiąże się z pracą zawodową (56,72%). Ponad 40% badanych w trakcie pracy zawodowej podnosi ciężar powyżej dopuszczalnej normy. Zdecydowana większość ankietowanych odczuwa silny ból kręgosłupa (zlokalizowany na skali Visual Analogue Scale — VAS) w przedziale od 7 do 10 pkt.). Prawie połowa badanych ma nadwagę (25<BMI>30).

Wnioski. 1) Pacjenci ze zdiagnozowaną dyskopatią lędźwiową doświadczają silnych dolegliwości bólowych kręgosłupa. 2) Chorzy cierpiący z powodu dyskopatii podczas pracy zawodowej często przez wiele godzin przyjmują wymuszoną pozycję siedzącą lub w niewłaściwy sposób podnoszą ciężary. 3) Pacjenci z dyskopatią nie posiadają wiedzy na temat profilaktyki tego schorzenia. **(PNN 2015; 4(4):152–157)**

Słowa kluczowe: dyskopatia, ból krzyża, wiedza pacjentów

Introduction

The XXI century is a period of rapid development of many sciences, including technology, electronics, medicine, computer science and many others. Unfortunately, this rapid development also had its negative consequences. Upright man, (from the Latin "Homo erectus") adopted to running and leg-based gait, transformed the lifestyle into sedentary, passive, and became a sedentary man (from the Latin "Homo sedentarius").

A contemporary man, from an early age, spends most of the day sitting, and their diet is rich in excessive amounts of carbohydrates and animal fat, leading to overweight or obesity. Sedentary lifestyle, lack of exercise and improper diet induce the development of chronic overload changes in the lumbar spine characterized by low back pain [1].

Lumbosacral pain, commonly referred to as low back pain, is the main symptom of spinal diseases. It is the most common pain syndrome beside headache, and the second most common reason for visiting a GP. Among adults, 60–90% of the population experience a severe incident of back pain at least once in the lifetime. Due to the prevalence and consequences, the spinal lumbar disorders present a major social problem around the world [2,3].

Back pain should be treated as "extremely difficult health problem". It clearly reduces the quality of life by affecting the performance of basic daily activities, such as: washing, dressing, cleaning, cooking and many other. In people under 45 years of age, low back pain has become a major cause of physical disability. Back pain is caused by lesions in the spine, and other lesions of the tissues and internal organs. However, 60–90% of cases are the result of damage to the disc, which often leads to the formation of nucleus pulposus hernia called discopathy [2].

Discopathy, also called degenerative disk disease is a serious social problem due to the fact that it affects working population, often at a very young age (usually occurs in the 3rd or 4th decade of life). The disease occurs when the fibrous ring of the intervertebral disc ruptures and the nucleus pulposus moves to the disc rupture resulting in bulge or hernia [4,5].

Ethiopathogenesis of lumbar disc herniation is not known in detail. Studies talk about a number of factors predisposing to the intervertebral disc disease. Some factors are believed to exert influence: smoking, birth defects, posture defects, reduced physical activity, sedentary lifestyle, injuries, changes of collagen in the intervertebral discs, genetic factors, stress and many other [4].

It is necessary to note that discopathy carries a lot of negative consequences: health, social, psychological, professional and economic [1]. Therefore, it is important to analyze the causes of lumbar disc herniation. Thorough study and finding the reasons may contribute to better prevention of growing incidence of this civilization disease.

The aim of the study is to analyze the causes of lumbar disc herniation and evaluate the respondents knowledge about the causes of this disease.

Material and Methods

The study was conducted among 67 patients with lumbar discopathy, hospitalized in the Department of Neurosurgery or treated in the neurosurgical practice of Lower Silesia Specialized Hospital name Tadeusz Marciniak in Wroclaw.

The research project was approved by the Bioethics Committee of Wroclaw Medical University.

The study was performed with the use of diagnostic survey using the survey technique. The anonymous survey in the form of the author's self-designed questionnaire consisted of 56 open and closed-ended questions. The closed-ended questions had to be answered by choosing one or several answers, the open-ended questions by writing the answer in a dotted place.

Questions included in the survey referred to:

— socio-demografic characteristic of respondents,
— sympthoms of lumbar disc herniation including the lumbar pain,
— treatment and rehabilitation in discopathy,
— causes of discopathy,
— respondents' knowledge about their disease,
— lifestyle of people suffering from lumbar discopathy.

The study results and the statistical analysis of results were processed using Microsoft Office Excel 2007 spreadsheet, the text editor Microsoft Office Word 2007 Microsoft Office Excel 2010 and the statistical analysis software STATISTICA version 10. The interpretation of differences in qualitative variables was based on the analysis of test results Chi^2. The level of significance was

set at p<0.05. The correlation between the selected variables was examined with the use of Pearson correlation coefficient.

Results

The most numerous group of respondents were:
— females (52.24%),
— aged 55–64 years (31.34%),
— with body weight 71–80 kg (41.79%) and height 161–170 cm (31.34%),
— overweight (25<BMI<30 — 47.72%),
— married (65.67%),
— from urban areas (91.04%),
— with secondary education (50.75%),
— suffering from the disease no longer than 5 years (37.32%) and affected region L5-S1 (53.25%).
Detailed data are presented in Table 1.

Table 1. Characteristics of the studied group

Studied Feature		N	%
Sex	Female	35	52.24
	Male	32	47.76
Age	18–24	5	7.46
	25–34	7	10.45
	35–44	16	23.88
	45–54	16	23.88
	55–64	21	31.34
	65–74	2	2.99
Maritial status	Married	44	65.67
	Single	15	22.39
	Widow/Widowem	8	11.94
Place of residence	Rural area	6	8.96
	City with less than 50.000 inhabitants	12	17.91
	City with 50.000 to 100.000 inhabitants	7	10.45
	City with 100.000 to 500.000 inhabitants	19	28.36
	City with over 500.000 inhabitants	23	34.33
Education	Primary	4	5.97
	Vocational	13	19.40
	Secondary	34	50.75
	Higher	16	23.88
Duration of disease	≤5	25	37.32
	6–10	16	23.88
	11–20	18	26.87
	21–30	3	4.48
	31–40	5	7.47

The analysis of the study material shows, that according to respondents professional work (56.72%) is most often responsible for the formation of lumbar disc herniation. Every fourth respondent did not know the cause of the disease, and more than 70% of respondents admitted to ignorance in terms of preventive methods to avoid discopathy. In contrast, the vast majority of respondents declared knowledge of the symptoms of the disease.

One in four respondents reported family history of discopathy. Most often this disease was diagnosed in fathers (66.67%).

Nearly 3/4 of respondents are professionally active people, where almost half of them do mental work in a sedentary position. Every fourth professionally active respondent assesses the degree of work as light, and every third as hard. Over 40% of professionally active population must lift the weights exceeding acceptable standards (12 kg for women and 30 kg for men). Unfortunately, over 30% of working population lifts weights incorrectly, i.e. flexing the spine (bending down) and having stretched legs at the knees and almost half of respondents additionally during weightlifting bend and rotate the spine. Nearly 4 in 10 in a group of working people declare that at work they often repeat bending and rotating movements of the spine. Also, more than 30% of respondents in a workplace are subjected to vibrations. Due to discopathy, 1/4 of respondents had to resign from work they did so far.

The vast majority of respondents feel the pain measured on the VAS scale (Visual Analogue Scale) ranging from 7 to 10. The most common is the pain of a radiating (34.76%) and chronic (21.95%) nature, aggravating during moves (53.57%). Despite severe pain, 9 out of 10 patients are able to ambulate independently. Most respondents did not know, however, methods of handling pain and when the strong pain appears they turn to painkillers (53.47%). Our study showed no statistically significant difference between women and men in terms of knowledge of the methods of dealing with pain (p=0.4). To mention other ailments, almost 87% of respondents felt numbness in one or both lower extremities, and 12% of respondents reported occurrence of muscle atrophy. The surveyed individuals are diagnosed with other

disorders in the spine region — every third respondent has been diagnosed with a degenerative disease of the spine, and one in seven has a scoliosis. Every tenth respondent also suffers from diabetes.

The vast majority of respondents was hospitalized due to lumbar disc herniation at least once (89.55%). Every fourth respondent was operated due to this disease, among which 77.78% once, and 22.22% twice. Almost all respondents participating in the study were rehabilitated due to illness. The most common form of rehabilitation was general gymnastics (20.66%), followed by massage (20.66%) and ultrasound (13.64%). After rehabilitation, almost 3/4 of respondents experienced the improvement of the quality of life, since pain was partially reduced (78.69%).

The study shows that 53.73% of respondents spend free time actively. However, most respondents (29.85%) take up physical activity occasionally or 1–2 times a week (23.88%). Every third respondent exercises daily or 3–4 times a week. The most common type of physical activity is cycling (31.34%) and swimming (28.36%). Only 9% of respondents do competitive sports.

The data obtained show that 2/3 of respondents consume daily three to four meals, while 22.39% eat five meals or more. The research shows that in the diet of 3/4 of respondents prevail cereal products, in 64.18% fruits and vegetables, and 62.69% of respondents chose meat as the dominant product. However, up to 17.91% of respondents most often eat sweets.

Among the respondents, a proper body mass index was only in one out of three women and one out of four men. In contrast, 65.71% of women and 75.01% of men were overweight or obese. The analysis of the study material shows that BMI increases with age (Pearson correlation coefficient r=0.235, p<0.05) (Table 2). However, no correlation was found between BMI and the severity of pain experienced by respondents (Persona correlation coefficient r=0.184, p>0.05).

Table 2. BMI classification and the age of the studied

BMI class	Age											
	18–24		25–34		35–44		45–54		55–64		65–74	
	N	%	N	%	N	%	N	%	N	%	N	%
Underweight	1	20	0	0	0	0	0	0	0	0	0	0
Proper value	3	60	4	57.1	5	31.25	3	18.75	4	19.05	0	0
Overweight	0	0	1	14.3	6	37.5	10	62.5	14	66.67	1	50
Obesity	1	20	2	28.6	5	31.25	3	18.75	3	14.28	1	50
Total	5	100	7	100	16	100	16	100	21	100	2	100

r=0.235; p<0.05

Almost 40% of respondents smoke cigarettes with varying frequency and 60% of them smoke more than 15 years. In contrast, half the respondents believe they are susceptible to stress.

The vast majority of respondents did not know if smoking (70.31%) and stress (68.66%) have an impact on formation of discopathy. Only a small group of respondents agrees that smoking influences the formation of lumbar disc herniation.

Discussion

A growing concern in highly developed countries are spinal pain syndromes whose major cause is a degenerative disease of the intervertebral discs, leading to discopathy [6]. Low back pain and lumbar discopathy is observed more often in young people, even teenagers. According to Dziewulski, the reason underlying this condition is the sedentary lifestyle, lack of physical activity, passive leisure time [2].

In adults, pain in the lumbar spine is a common ailment and is particularly prevalent in those over the age of 40, however, intervertebral disc degeneration may begin even in the second decade of life (20 years old) [7,8]. Own research shows that 27% of respondents fell ill in the second decade of life.

Discopathy most often affects segments L4-L5 and L5-S1 due to the their high mobility and substantial compression load [4]. Analysis of the research material showed that discopathy of segment L5-S1 is characteristic for 53%, while segment L4-L5 for 38% of respondents.

Ethiopathogenesis of lumbar disc disease is not fully understood. There are a number of factors predisposing to degeneration of the intervertebral disc and disc disease i.a. trauma, a sedentary lifestyle, sudden movement from flexion to extension, lifting weights with the rotation of the spine, family predisposition, qualitative and quantitative changes in the intervertebral disc and the other [4]. According to 57% of respondents, an underlying cause of disease is work.

The cause of the low back pain are excessive loading leading to degenerative changes exacerbating with age [8]. Symmetrical or asymmetrical pain radiating into the lower extremity and trunk transposition occur in the full-blown low back disease [4]. In own study, 70% of respondents experienced the pain radiating into one of the extremities.

Discopathy is often also accompanied by osteoarthritis of the spine or overload disease [8]. The analysis of the study shows that 57% of respondents, in addition to lumbar discopathy, also suffer from degenerative disease of the spine, and 21% suffer from overload disease of the spine.

According to Łebkowski [8], overload-degenerative changes progress faster in people performing physical work. It is therefore extremely important in prevention of the musculo-skeletal system diseases to maintain the proper body posture during work [9]. In own study, 29% of respondents are professionally active. The study findings also reveal that not only hard physical work is the cause of lumbar disc herniation but also light or relatively hard work in sedentary position as described by respondents — 69% of respondents perform such work. Studies by other authors [9,10] show that people working in sedentary position at the computer often complain about pain localized in the lumbar or cervical segments of spine.

The literature related to the study subject emphasizes the influence of vibrations on the development of discopathy, since vibrations cause a disturbance in the blood supply to the intervertebral discs leading to malnutrition and subsequently to the formation of disc disease [7]. The study by Pyskało et al. [5] did not confirm such dependence. In own study, every third respondent is exposed, at work, to vibrations (mechanical oscillations).

Other secondary causes of lumbar discopathy are environmental factors, i.e. mechanical loading combined with the movements of flexion and rotation of the spine [7] and frequent position of flexion or lifting weights in anteversion (hypothesis Kapandji'ego) [6]. The study shows that these causes can result in disc herniation or exacerbation of condition, as 47% of respondents bend and rotate the spine while lifting weights, and 39% of people often repeat bending and rotating movements of the spine at work.

Łebkowski [7], believes that injuries and mechanical loads lead to damage of fibrocartilage in the disc and its destruction. A serious mechanical trauma, connected with triggering the activity of macrophages and cytokines, can also cause damage to the intervertebral disc. This study showed, that almost one quarter of patients with discopathy had a back injury. However, a back injury as the cause of lumbar disc disease requires further study.

According to Żytkowski [6], discopathy is a "consequence of early wear and tear to the tissues", and it is strictly connected with genetic predisposition (less hydration of proteoglycans and worse quality of collagen IX induced by gene mutations). Own research shows that every fourth respondent had an incidence of discopathy in an immediate family member.

Smoking causes vasoconstriction, thereby leading to the degeneration of the intervertebral disc through its nutritional disorder [11]. According to Wieira et al [12], employees who smoke, are two times more likely to experience back pain during their working life. The study shows that among 39% of smokers, 85% of them have suffered from discopathy for more than 3 years, which may mean that smoking interferes with the nutrition of intervertebral disc and leads to lumbar disc herniation. The study also shows that 70% of respondents are not aware of the fact that smoking affects the formation of discopathy.

According to Śliwinski et al. [13] diabetes accelerates the process of degeneration of the intervertebral disc by inducing malnutrition of the disc. The study shows that one in ten respondents suffering from discopathy was also previously diagnosed with diabetes.

The studies by Gasik et al. [14] and Wieira et al. [12] have shown that obese people often suffer from lumbar disc herniation (without a genetic-family predisposition) or experience lower back pain. This is confirmed by the results of own study, where as many as 70% of respondents have abnormal body weight (BMI>25).

The studies by Berny et al. [15] and Zuba et al. [16] showed that patients with lumbar disc herniation are characterized by poor knowledge in the field of prevention of overloading the spine in different positions, the ways to cope with intensive back pain, and the rules governing lifting objects. This study confirms the low level of patients' knowledge in the field of disc disease prevention methods and ways to handle back pains.

Rehabilitation, as a form of conservative treatment of disc herniation and back pain, effectively improves the well-being of patients and reduces the sensation of pain [17,18]. The studies by Mierzwa et al. [19] and Binek et al. [20] showed that patients after completing the therapeutic program, which covers a variety of forms of physiotherapy, are significantly less likely to use analgesics. Our study confirmed this dependence, because after rehabilitation in more than 3/4 of respondents the pain was partially reduced.

Multifactorial etiology of lumbar disc herniation makes it difficult to study. Discopathy as a civilization disease of 21st century needs much more attention and thorough research. The interest in this disease to investigate the causes will help to develop preventive measures and bring many health and socio-economic benefits.

Conclusions

1. Patients diagnosed with lumbar disc herniation experience severe back pain.
2. Patients suffering from discopathy, during long working hours often stay in the forced sitting position or lift weights in the wrong way.
3. Patients with discopathy do not have knowledge about the prevention of this disease.

Implications for Nursing Practice

Lumbar disc herniation, due to the increasing prevalence especially in the group of relatively young (over 40 years old) professionally active population, presents a challenge for the entire therapeutic team who takes care of a patient with back pain ailments. Recognizing the most common causes of discopathy can help a GP/neurologist/neurosurgeon and nurses working in treatment rooms and clinics to take up effective preventive measures aimed at, through teaching proper health behaviors, prevention of recurrence of back pain and maintaining full independence for as long as possible.

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