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ORIGINAL ARTICLE

Prevalence of Spondyloarthritis Among Patients Who Underwent Lumbar Disc Herniation Surgery

Özgül SOYSAL GÜNDÜZ[1], Servet AKAR[2], Dilek SOLMAZ[2], Gerçek CAN[3], Fatoş ÖNEN[3], Nurullah AKKOÇ[1]

[1]*Department of Internal Medicine, Division of Rheumatology, Celal Bayar University, Faculty of Medicine, Manisa, Turkey*
[2]*Department of Internal Medicine, Division of Rheumatology, Katip Çelebi University, Faculty of Medicine, İzmir, Turkey*
[3]*Department of Internal Medicine, Division of Rheumatology, Dokuz Eylul University, Faculty of Medicine, İzmir, Turkey*

ABSTRACT

Objectives: This study aims to estimate the prevalence of spondyloarthritis (SpA) among patients who had been surgically treated for lumbar disc herniation (LDH), according to the modified New York (mNY) criteria for the diagnosis of ankylosing spondylitis and Amor, the European Spondyloarthropathy Study Group (ESSG), the Assessment of Spondyloarthritis International Society (ASAS) classification criteria for SpA.

Patients and methods: The study included 321 patients (142 males, 179 females; mean age 49±10.8 years; range, 18 to 79 years) who underwent LDH surgery between April 2008 and May 2012 in the neurosurgery clinic of our hospital. Patients were contacted by phone on at least two attempts. Totally, 123 patients accepted to come to the outpatient clinic, while the remaining 198 agreed to be interviewed on the phone. Patients who agreed to come to the outpatient rheumatology clinic underwent clinical examination, and pelvic X-ray and magnetic resonance imaging (MRI) scan of the sacroiliac joints when indicated.

Results: Inflammatory back pain was diagnosed in 108 patients (34%) and 40 patients (13%) according to Calin criteria and the ASAS criteria, respectively. Prevalence of SpA among all patients was estimated as 17.7% according to the ESSG criteria, and 8.7% according to Amor criteria. Five of the 308 pelvic radiographs had definite radiographic sacroiliitis as required by the mNY criteria. Four patients had a characteristic pattern of bone marrow edema on MRI examination in accordance with the ASAS definitions. The overall prevalence of sacroiliitis (MRI sacroiliitis+X-ray sacroiliitis) among the patients who came to the clinic was 7.3% ([4+5]/123).

Conclusion: The relatively increased prevalence of SpA among patients who underwent LDH surgery indicates the necessity of increasing awareness on the new concept of axial SpA for specialists treating patients with low back pain.

Keywords: Inflammatory back pain, lumbar disc herniation, spondyloarthritis.

Spondyloarthritis (SpA), being a group of diseases carrying common pathophysiological, clinical, radiological and genetic characteristics, is one of the most commonly encountered rheumatological diseases in society with an estimated standardized prevalence of 1.7%.[1] Ankylosing spondylitis (AS), the prototype of this group, has the longest diagnostic delay with a period of 5 to 10 years between the onset of symptoms and diagnosis.[2-5] Inability to diagnose AS early decreases the quality of life due to pain, stiffness and limitations and moreover, it causes a critical labor loss because of beginning in the early twenties, the most active phase of life.

The most prominent clinical feature of AS is chronic back pain (CBP), mostly in the form of inflammatory back pain (IBP). Inability of the first level health-care providers and the other

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Correspondence: Özgül Soysal Gündüz, MD. Celal Bayar Üniversitesi Tıp Fakültesi İç Hastalıkları Anabilim Dalı, Romatoloji Bilim Dalı, 45030 Yunusemre, Manisa, Turkey. Tel: +90 505 - 228 29 30 e-mail: soysalozgul@gmail.com

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specialists like orthopedists and neurosurgeons in recognizing IBP and other SpA symptoms is one of the main reasons accounting for the delay in the diagnosis of AS.[2,6] In clinical practices, disc disease is a common inaccurate alternative diagnosis determined for AS patients suffering from chronic low back pain.[7-9] Inappropriate overuse of lumbar spinal magnetic resonance imaging (MRI) examinations in these patients leads to an overdiagnosis of lumbar disc herniation (LDH) due to incidental findings on MRI, and it also infrequently results in unnecessary surgical interventions. Therefore, in this study, we aimed to estimate the prevalence of SpA among patients who had been surgically treated for LDH, according to the modified New York (mNY) criteria[10] for the diagnosis of AS and Amor,[11] the European Spondyloarthropathy Study Group (ESSG),[12] the Assessment of Spondyloarthritis International Society (ASAS)[13] classification criteria for SpA.

PATIENTS AND METHODS

There were 789 patients who underwent LDH surgery between April 2008 and May 2012 in the neurosurgery clinic of Dokuz Eylül University Hospital. We were unable to reach 468 patients (59.3%) despite at least two attempts of contact. All contacted and not-contacted patients had similar age (mean age 49±10.8 years and 48±11.5 years; p=0.344) and similar sex distribution (male: 44.2% and female: 39.3%; p=0.244). Patients we have contacted (n=321) (142 males, 179 females; mean age 49±10.8 years; range, 18 to 79 years) either accepted to come to our clinic (n=123) or to have a telephone interview (n=198). The study protocol was approved by the Dokuz Eylül University Hospital Ethics Committee (approval number: 137-IOC/2009). A written informed consent was obtained from each patient. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Patients were identified for contact by phone on at least two attempts, with one week apart (Figure 1). All contacted patients with or without current back pain were invited to the outpatient rheumatology clinic for clinical examination. Patients were evaluated using a standard questionnaire that provided detailed information on demographics and features of IBP according to the ASAS[13] criteria, the Calin criteria,[14] Berlin criteria,[15] and also all the features of SpA listed in the mNY,[10] Amor,[11] ESSG[12] and ASAS[13] criteria. For patients who were unwilling to come to the clinic but who accepted the phone interview, an appointment was set to administer the same questionnaire on the phone.

Information on demographics, signs and symptoms at presentation, clinical course and treatment data were obtained from patients and hospital records. The frequency of nonsteroidal anti-inflammatory drug (NSAID) usage before and after LDH surgery, and rates of NSAID responses were recorded. Patients who came to the clinic underwent all spinal measurements and a neurological examination. Functional status

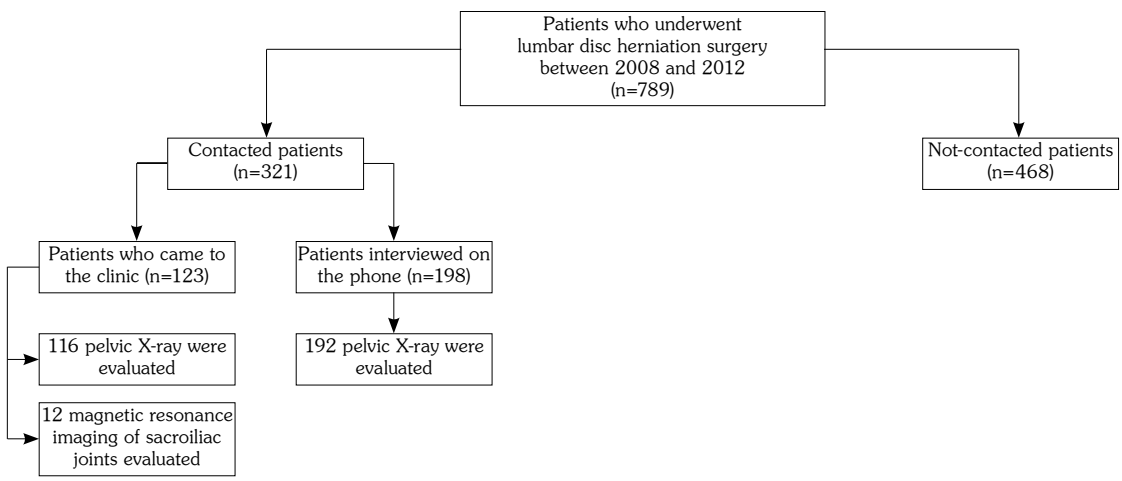

Figure 1. Flowchart summarizing the evaluation of patients with prior lumbar disc herniation surgery for fulfilling the various spondyloarthritis classification criteria.

was assessed by the Bath Ankylosing Spondylitis Functional Index,[16] and the activity of disease was assessed by the Bath Ankylosing Spondylitis Disease Activity Index.[17] Spinal mobility measurements were detected by using the Bath Ankylosing Spondylitis Metrology Index.[18]

The imaging scans of all patients obtained before and after LDH operation were examined from hospital image databank. Standard pelvic X-rays were performed to assess sacroiliac joints (SIJs) if the patients accepted face-to-face interview. We used the pelvic X-rays still available on the hospital image database for patients who were interviewed on the phone, or who came to the clinic but refused to undergo a new X-ray. MRI was performed on SIJs in patients with IBP according to the IBP criteria without radiographic sacroiliitis. Acute and chronic lesions on SIJs MRI were scored according to ASAS/The Outcome Measures in Rheumatology (OMERACT) MRI working group.[19] The pelvic X-rays and MRI scans were scored by one rheumatologist and one radiologist who were blinded for clinical information.

Statistical analysis

The statistical analysis was carried out using the SPSS version 13.0 software (SPSS Inc., Chicago, IL, USA). Values are presented as mean±standard deviation for continuous variables, and as percentage values for categorical variables. Student's t-test was used to compare the groups of continuous variables, while Chi-square test was used to examine the differences with categorical variables. A p value <0.05 was considered to be statistically significant.

RESULTS

The group of patients who came to the clinic and the group of patients interviewed on the phone had similar age, sex distribution and symptom duration. However, education level was significantly higher in patients who came to the clinic (9±4.4 years vs. 7±4.1 years; p<0.001), and they reported higher residual low back pain after surgery (68% vs. 51.7%; p<0.001). The mean age of all patients at the onset of low back pain was 34±12.5 years and it was 41±12.4 years at LDH diagnosis. Some of the demographic and clinical characteristics of the study groups are summarized in Table 1.

Inflammatory back pain was found in 108 patients (33.6%) according to Calin criteria,[14] in 51 patients (16.4%) according to Berlin criteria,[15] and in 40 patients (13%) according to ASAS criteria.[13]

A total of 308 pelvic radiographs were obtained. Totally, 116 of the 123 attending patients had new pelvic X-rays, and 192 of the 198 non-attending patients had a standard pelvic X-ray archived in the hospital's image database (Figure 1). (1.5%=5/321) of the patients with

Table 1. Demographic and clinical characteristics of patients who underwent lumbar disc herniation surgery

	All patients (n=321)		Patients who came to the clinic (n=123)		Patients interviewed on the phone (n=198)		
Characteristics	%	Mean±SD	%	Mean±SD	%	Mean±SD	p
Age (year)		49±10.8		49±11.4		50±10.5	0.344
Males	44.2		48.4		41.7		0.244
Smoking	51.7		54.9		49.7		0.368
Education level (year)		7±4.3		9±4.4		7±4.1	<0.001
Age at onset of back pain (year)		34±12.5		34±13.0		34±12.3	0.771
Age at diagnosis of LDH (year)		41±12.4		41±12.3		41±12.5	0.671
Symptom duration (year)		14±10.2		14±10.7		14±9.9	0.865
Residual low back pain after surgery	58		68		51.7		0.013
Requirement of NSAIDs after surgery	26		31.7		22.7		0.186

SD: Standard deviation; LDH: Lumbar disc herniation; NSAIDs: Nonsteroidal anti-inflammatory drugs.

Table 2. Prevalence of inflammatory back pain, spondyloarthritis, ankylosing spondylitis and axial spondyloarthritis based on different classification criteria sets

	All patients (n=321)			Patients who came to the clinic (n=123)			Patients interviewed on the phone (n=198)			
	n	%	95% CI	n	%	95% CI	n	%	95% CI	*p*
IBP (Calin)	108	34	28-38	37	30	22-38	71	36	29-42	0.266
IBP (Berlin)	51	16	12-20	20	16	10-22	31	16	11-21	0.844
IBP (ASAS)	40	13	9-18	14	11	7-16	26	13	8-18	0.624
SpA (ESSG)	57	18	3-22	26	21	14-29	31	16	11-21	0.082
SpA (Amor)	28	9	6-12	15	12	7-19	13	6.6	5-12	0.219
AS (mNY)	5	1.5	0.6-3	4	3.3	1-8	1	0.5	0.09-2	0.059
Axial SpA, imaging arm (ASAS)	9	2.8	1-5	8	7.3	3-12	1*	0.5	0.09-2	0.002

CI: Confidence interval; IBP: Inflammatory back pain; ASAS: Assessment of Spondyloarthritis International Society; SpA: Spondyloarthritis; ESSG: European Spondyloarthropathy Study Group; AS: Ankylosing spondylitis; mNY: Modified New York criteria; * Sacroiliac magnetic resonance imaging could not be obtained in this group.

IBP had radiographic sacroiliitis and they were classified as AS according to the mNY criteria.[10] MRI of sacroiliac joints could be performed in 12 out of 34 patients who had IBP, but not radiographic sacroiliitis since eight patients denied to undergo MRI and 14 patients could not come to their appointment. Four patients had a characteristic pattern of bone marrow edema on MRI examination in accordance with the ASAS definitions (Table 2).[13]

The overall prevalence of sacroiliitis (MRI sacroiliitis+X-ray sacroiliitis) among all patients was 7.3% ([4+5]/123). These nine patients (7.3%) were classified as axial SpA according to the imaging arm of the ASAS axial SpA criteria.

The prevalence of SpA was estimated as 17.7% (57 patients) and 8.7% (28 patients) according to the ESSG[12] and Amor criteria,[11] respectively. Twenty patients meeting both ESSG and Amor criteria sets did not have radiographic sacroiliitis. In total, 62 of the 321 patients (19.6%) were classified to have SpA according to all SpA criteria sets. Majority of SpA patients who met ESSG criteria (n=57) had enthesopathy (n=37) with IBA

Table 3. Comparison of spondyloarthritis and non-spondyloarthritis patients

	SpA patients (n=62)			Non-SpA patients (n=259)			
Characteristics	n	%	Mean±SD	n	%	Mean±SD	*p*
Age (year)			46.8±10.2			50±10.8	0.017
Males	21	33		121	46.9		0,05
Smoking	34	54.0		132	51.2		>0.05
Education level (year)			8±4.3			7.7 ±4.3	>0.05
Age at onset of back pain (year)			30±10.4			35 ±12.7	0.004
Residual low back pain after surgery	45	71.4		141	54.7		0.016
BASFI			2.6±2.2			2.5±2.5	>0.05
BASDAI			3.7±2.4			2.6±2.4	0.030
BASMI			2.4±1.0			2.5±0.9	>0.05
Patients who have had at least two operations	18	32.3		35	13.5		0.013

SpA: Spondyloarthritis; SD: Standard deviation; BASFI: Bath Ankylosing Spondylitis Functional Index; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASMI: Bath Ankylosing Spondylitis Metrology Index.

or arthritis. The other symptoms of SpA in our patients were alternating buttock pain (n=12), positive family history (n=10), psoriasis (n=5), and uveitis (n=4).

All patients diagnosed with AS had chronic IBP. Residual back pain after surgery was significantly higher in patients diagnosed with SpA (p=0.016). Fifty-three of all patients (16.5%), three of five AS patients (60%) and 18 of 62 SpA patients (32.3%) had underwent LDH surgery at least twice. Furthermore, the patients classified to have SpA according to any SpA criteria sets and non-SpA patients were compared (Table 3).

DISCUSSION

In this study, IBP was determined in 108 patients (33.6%) according to Calin criteria[14] in a total of 321 patients who had recently undergone LDH surgery. Patients with IBP according to Calin criteria fulfilled Amor and ESSG criteria for SpA, with prevalence levels of 8.7% and 17.7%, respectively. These prevalence levels are roughly in agreement with the levels reported in a number of studies investigating referral strategies for early diagnosis of axial SpA.[20-22] In those studies, axial SpA was diagnosed in 16.2 to 33.3% of patients when IBP was used as the only referral parameter.[20-22] Therefore, differentiating IBP from mechanical back pain is of critical importance to be able to choose the most appropriate laboratory tests for a timely and accurate diagnosis in patients suffering from low back pain in order to avoid unnecessary interventions.

An estimated 80% of the population will suffer from low back pain at some time in their lives. CBP is the most important activity-limiting factor in young adults under the age of 45; therefore, it is not only a health issue, but also a socio-economic challenge.[23] However, most patients with back pain recover quickly and without residual functional loss. Overall, 60-70% recover in six weeks, and 80-90% in 12 weeks.[24] Ultimately, current clinical guidelines do not recommend early imaging in the absence of historical or clinical features suggestive of a serious underlying condition, such as fracture, inflammation, infection or tumor.[25,26] In addition the fact that routine imaging is not associated with significant clinical benefit; it may also inadvertently lead to an overdiagnosis of LDH. The relationship between structural abnormalities of the lumbar spine on MRI and low back pain has been controversial. Positive findings such as disc height loss, bulging disc and herniated discs are common in asymptomatic people.[27-29] Moreover, increased frequency of lumbar MRI is associated with higher rates of spine surgery, without clear differences in patient outcomes.[30,31]

Axial SpA, another cause of CBP, has an age distribution similar to that of LDH, which may also be complicated by an incorrect diagnosis of LDH by incidental findings seen on unnecessarily performed spinal MRI exams. A previous observational multi-center study showed that approximately one third of AS patients reported a prior diagnosis of LDH with 7% having undergone surgery for that reason.[9] The same study found that prior history of LDH and having undergone operation for LDH were independent predictors of the delay in the diagnosis of AS.[9] The results of this current study, which indicates relatively high prevalence of SpA among patients who had recently undergone surgery for LDH, are rather in line with the results of the above mentioned study.

All the patients classified to have SpA in our study continued to suffer from back pain after the LDH operation. Of note, 60% of patients with AS and 32% of patients with SpA were operated at least twice, whereas the rate of second operation in the remaining patients was 13.5% (p=0.013). These findings suggested that diagnosis of SpA should be considered in patients with persisting back pain after the first LDH surgery, if not before.

It should be noted that this is the first clinical trial designed among patients who underwent LDH surgery in rheumatology. The main limitation of the current study is that all of the targeted patients did not undergo a full clinical and diagnostic examination for AS and SpA. Among the 321 patients who were invited to come to the clinic, only 38% agreed to come. However, all of the remaining 198 patients agreed to be interviewed on the phone using a structured questionnaire regarding clinical features of IBP and SpA. We have recently shown that Calin criteria can be used for screening IBP on the phone.[32] Moreover, 192 of 198 patients who

did not come to the clinic had a standard pelvic X-ray archived in the hospital's image database, which could be assessed for the presence of radiographic sacroiliitis. Nevertheless, new axial SpA concept also includes patients without radiographic sacroiliitis who can be recognized when they have active sacroiliitis on MRI plus one SpA feature or human leukocyte antigen (HLA)-B27 gene plus two SpA features. However, MRI examination of sacroiliac joints could be obtained in only one third of the patients who came to the clinic and who were suspected of having SpA. HLA-B27 testing could not be performed in any of the patients due to its non-availability at our hospital at the time of this study. However, despite the limited use of laboratory instruments required for a complete diagnostic assessment of axial SpA, the determination of a relatively high prevalence of AS (1.5%) and axial SpA (2.8%) between patients is noteworthy, including those who did not come to the clinic. Whereas an epidemiologic study in our region has reported the prevalence of AS as 0.49% and SpA as 1.05% for Turkish population.[33]

In conclusion, the relatively high prevalence of SpA among patients who have received a recent surgery for LDH as well as the relatively high prevalence of second operation in these patients, particularly in those with AS, suggest that some of these patients may have been misdiagnosed to have LDH and received unnecessary surgical treatment. Therefore, it is of utmost importance to increase the awareness and knowledge of physicians, who are commonly consulted for the management of CBP, about the features of IBP and the new concept of axial SpA, which also includes patients without radiographic sacroiliitis.

Declaration of conflicting interests

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