IS THE LASÈGUE SIGN A PREDICTOR OF OUTCOME IN LUMBAR DISC HERNIATION SURGERY?

O SINAL DE LASÈGUE É UM PREDITOR DO RESULTADO DA CIRURGIA DE HÉRNIA DE DISCO LOMBAR?

¿LA SEÑAL DE LASÉGUE ES UN PREDICTOR DE RESULTADO EN LA CIRUGÍA DE HERNIA DE DISCO LUMBAR?

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ABSTRACT

Objective: Evaluate the predictive value of the Lasègue sign on self-reported quality of life measures (HRQoL) in patients who undergo microdiscectomy. Methods: 95 patients with clinical and radiological diagnosis of LDH who underwent microdiscectomy were included. The patients were assessed by a neurological examination and answered validated instruments to assess pain, disability, quality of life, and mood disorder in the preoperative period, and 1, 6 and 12 months after surgery. Results: Preoperative Lasègue sign was identified in 56.8% (n=54/95) of the cases. There was no difference between the groups in the preoperative period regarding HRQoL. At one year follow-up no statistically significant difference in HRQoL was observed in the Lasègue group. The discrimination capacity of the preoperative Lasègue sign to determinate variations in HRQoL outcomes one year postoperatively was low. Conclusion: Lasègue sign is not a good predictor of outcome after microdiscectomy for LDH.

Keywords: Intervertebral disc displacement; Quality of life; Prognosis; Spine/surgery.

RESUMO

Objetivo: Avaliar o valor preditivo do Sinal de Lasègue em medidas de qualidade de vida (HRQoL) em pacientes submetidos a microdiscectomia. Métodos: 95 pacientes com diagnóstico clínico e radiológico de HDL submetidos à microdiscectomia foram incluídos. Os pacientes foram avaliados por exame neurológico e responderam instrumentos validados para medir dor, incapacidade, qualidade de vida e transtornos do humor no período pré-operatório e 1, 6 e 12 meses após a cirurgia. Resultados: O sinal de Lasègue no pré-operatório foi identificado em 56,8% (n = 54/95) dos casos. Não houve diferença entre os grupos no pré-operatório em relação à HRQoL. Em um ano de pós-operatório não foi observada diferença estatística com relação à HRQoL no grupo com Lasègue. A capacidade de discriminação do Sinal de Lasègue pré-operatório para determinar variações na HRQoL em um ano de pós-operatório foi baixa. Conclusão: O Sinal de Lasègue não é um bom preditor de prognóstico após microdiscectomia na HDL.

Descritores: Deslocamento do disco intervertebral; Qualidade de vida; Prognóstico; Coluna vertebral/cirurgia.

RESUMEN

Objetivo: Evaluar el valor predictivo de la señal de Lasègue en medidas de calidad de vida (HRQoL) en pacientes sometidos a microdiscectomía. Métodos: Se incluyeron 95 pacientes con diagnóstico clínico y radiológico de HDL que se sometieron a microdiscectomía. Los pacientes fueron evaluados por examen neurológico y respondieron a instrumentos para medir dolor, incapacidad, calidad de vida y disturbios del humor en el periodo preoperatorio y 1, 6 y 12 meses después de la cirugía. Resultados: La señal de Lasègue en el preoperatorio se identificó en el 56,8% (n = 54/95) de los casos. No hubo diferencia entre los grupos en el preoperatorio en relación a la HRQoL. En un año de post operatorio no se observó diferencia estadística con relación a la HRQoL en el grupo con Lasègue. La capacidad de discriminación de la señal de Lasègue preoperatoria para determinar variaciones en la MCV en un año de postoperatorio fue baja. Conclusión: La señal de Lasègue no es un buen predictor de pronóstico post microdiscectomía en la HDL.

Descriptores: Desplazamiento del disco intervertebral; Calidad de vida; Pronóstico; Columna vertebral/cirugía.

INTRODUCTION

Lumbar disc herniation (LDH) is commonly associated with sciatic pain and may cause neurological impairment in the lower extremities. Treatment of this condition may be conservative or surgical depending on the severity of pain and neurological conditions.[1] In Western countries 5 to 10 of each 1,000 inhabitants develop sciatica every year.[2] The majority of patients will have a favorable outcome with conservative measures.[3] However, when pain is severe or incapacitating, or when other significant neurological impairments, such as acute and progressive motor or sensory deficits, and more rarely, sphincter abnormalities, are associated with lumbar disc herniation, surgery may be warranted with good results.[4] There seems to be no consensus regarding the precise importance and significance of the neurological impairment in determining the need for surgery.[4,5] Likewise, surgical outcome is not consistently related to the severity of the presenting neurological impairment.[6-8]

Clinical history and physical examination are important to guide decisions about imaging, laboratory tests, need for referral

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to a specialist and avoiding unnecessary surgical interventions.[9-11] Knowledge of prognostic factors in LDH surgery is crucial, since the indication for surgery should be reevaluated if a patient presents predictors of poor outcome.[12] Prognostic factors such as age, gender, duration of symptoms, smoking, level of operation and type of work appear to have a predictive value in the short-term results of LDH surgery.[9,11-17] One of the clinical signs that have been studied as a predictor of outcome after lumbar disc surgery is the Lasègue test, also known as the straight leg raising test (SLR).[10,14]

The Lasègue sign is frequently observed in patients with LDH.[10,15] There is evidence that the persistence of the Lasègue sign in the postoperative period is related to poor clinical outcome.[18] However, the clinical relevance of this sign in the preoperative period of LDH are controversial.[19,20]

The purpose of this study is to evaluate the predictive value of the Lasègue sign in patients who undergo microdiscetomy due to LDH, and to investigate its relation with the health-related quality of life (HRQoL) measures during one year follow-up.

METHOD

Clinical study design and sample

Following Institutional Review Board approval (protocol # 33708), from January 2006 to January 2010, a prospective consecutive cohort of adults with LDH associated with neurological impairment and sciatica who underwent microdiscectomy were included in the study. The inclusion criteria were the presence of an L4-L5 or L5-S1 posterolateral LDH on magnetic resonance image (MRI), clinical and radiological correlation, persistence of sciatica after clinical treatment for 4 to 8 weeks or progression of motor impairment in the inferior limb, accepting to participate in the study by signing the informed consent, and completing the one year HRQoL protocol. The exclusion criteria were lack of concordance between the symptomatology and lumbar MRI image, unrealistic expectations of the patient, previous surgery, disabling low back pain (LBP), lumbar instability and workers' compensation claims. All patients were assessed for neurological deficits and self-reported quality of life questionnaires preoperatively and 1, 6, and 12 months postoperatively.

Neurological examination

The neurological examination was conducted by the surgeons who participated in this study (AF, OR) preoperatively and at follow-up. Muscle strength was tested systematically from the foot to the thigh. The motor function of the fibular muscles, the common extensor of the toes, the sural triceps, the long extensor of the halux, the anterior tibial, the quadriceps, and the flexors of the hip were all tested. Motor function was visually estimated and determined as "normal" or "reduced". "Normal" was used when the test movement was performed with normal variation for both legs, regarding quality of movement and endurance. "Reduced" was used when the test movement was performed with an obvious difference between the legs in quality or endurance. The patellar and Achilles reflexes were assessed, bilaterally, using a neurological hammer. Sensory changes were tested by dermatome, using a pin. Hypoesthesia was defined as any sensory loss in a painful inferior limb.

The Lasègue test was performed with the patient in supine position with elevation of the inferior limb until 45 degrees of inclination without application of dorsiflexion of the ankle. The result was considered positive when during the test the patient recognized the presence or an increase of the irradiated pain to the leg elevated up to 45 degrees. According to the results of the Lasègue test, the patients were divided preoperatively into two groups: Lasègue positive and negative.

Surgical Technique

All patients underwent standard microdiscectomy via subperiosteal approach using a 2.5 magnification loupe, a frontal light source, and a self-retaining retractor by the same surgical team (AF, OR). All patients were kept in hospital for pain control for an average of 24 hours after surgery, and were encouraged to walk as soon as possible.

Health-related quality of life measures

The patients were evaluated with validated instruments preoperatively and at follow-up in 1, 6 and 12 months. Clinical assessment methods are described in detail elsewhere.[5] The patients answered the questionnaires by themselves using a computer questionnaire system and without any interference from a physician.

HRQoL measures included evaluation of pain, disability, mood disorders and quality of life in general. Leg and LBP intensity were assessed by Numerical Rating Scale of Pain (NRS).[21] Disability was measured with the Oswestry Disability Index.[22,23] The Short-form 36 (SF-36) was used to evaluate quality of life.[24] Mood disorders were assessed with the BDI.[25]

Statistical analyses

All statistical analyses were conducted using SPSS 20 (SPSS, Chicago, IL). The categorical variables were presented as proportion. The continuous variables were submitted to the Kolmogorov-Smirnov test to verify normal distribution and were presented as mean plus standard deviation or median plus interquartile interval, depending on distribution. The comparative analyses between the groups were conducted using the Chi-square test for categorical variables and Student's t test or Mann-Whitney test for continuous variables, when applicable. In order to verify the discrimination capacity for a one year variation of HRQoL measures in relation to the Lasègue sign alone or in combination with hypoesthesia, hyporreflexia or paresis, we calculated the area under the ROC curve (Receiver Operating Characteristic). The area under the ROC curve higher than 0.80 or 0.90, indicates appropriate levels of discrimination in a clinical context; the closer the area comes to 0.50, the higher the probability of random results in discrimination.

RESULTS

A total of 152 consecutive patients with LDH associated with neurological impairment and sciatica were surgically treated during the study period. During the enrollment process 57 patients did not meet the inclusion criteria. (Figure 1) The present study analyzed 95 patients who met the inclusion criteria.

The baseline characteristics of the 95 patients are summarized in Table 1. The Lasègue sign was found in 56.8% (n = 54) of the patients in the preoperative period and none in the postoperative period. Comparisons between the general features of the two groups did not identify statistically significant differences in relation to age, length of symptoms and level of disc herniation. Female gender was more prevalent in the Lasègue positive group, as well as the presence of hyporreflexia, despite the same proportion of motor and sensitive dysfunction between the groups. In the preoperative period, no difference was observed regarding HRQoL between the groups.

The postoperative course of HRQoL measures in the sample is described in Figures 2 to 5. No statistically significant difference

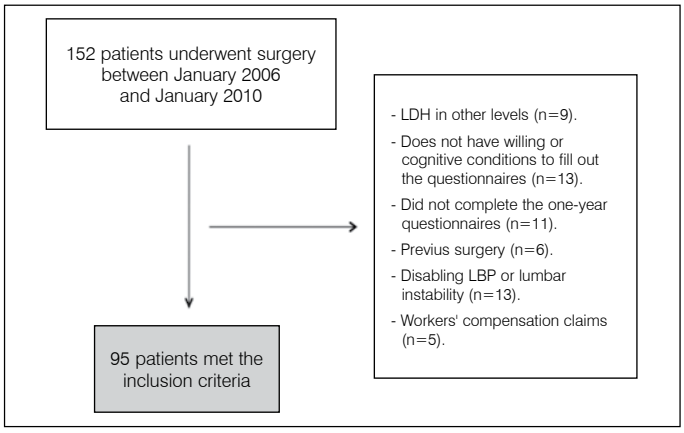

Figure 1. Lumbar disc herniation patients surgically treated and reasons for exclusion in this study.

in HRQoL was observed in the follow-up evaluations regarding the presence or not of a preoperative Lasègue sign. One year postoperatively 62.1% of patients reported minimal disability (positive Lasègue: 66.7%; negative Lasègue: 56.1%), 32.6% moderate disability (positive Lasègue: 29.6%; negative Lasègue: 36.6%), and 5.3% severe disability (positive Lasègue: 3.7%; negative Lasègue: 7.3%) due to spinal disorder (P = 0.511).

The discrimination capacity of the preoperative Lasègue sign in determining variation of HRQoL outcomes one year postoperatively was considered very low. Table 2 shows the area under the curve for the studied variables. When the Lasègue sign was studied in association with hypoesthesia, hyporreflexia or paresis the results still showed a very low capacity for discriminating the variation of patient-reported outcomes.

Table1. General features of the sample.

	Total (n = 95)	Positive Lasègue (n = 54)	Negative Lasègue (n = 41)	P
Female £	52 (54.7%)	23 (42.6%)	29 (70.7%)	0,006
Age (in years) €	45.27 (12.31)	45.85 (11.45)	44.83 (13.02)	0,691
Length of symptoms (in days) ¥	45 (25 - 90)	50 (28.75 - 90)	45 (25 - 90)	0,931
Hypoesthesia or anesthesia £	70 (73.7%)	39 (72.2%)	31 (75.6%)	0,710
Hiporreflexia or arreflexia £	53 (55.8%)	24 (44.4%)	29 (70.7%)	0,011
Motor dysfunction £	60 (63.2%)	31 (57.4%)	29 (70.7%)	0,182
Level				0,214
L4-L5	44 (46.3%)	28 (51.9%)	16 (39.0%)	
L5-S1	51 (53.7%)	26 (48.1%)	25 (61.0%)	
£ Chi-square				
€ Student's t test				
¥ Mann-whitney				

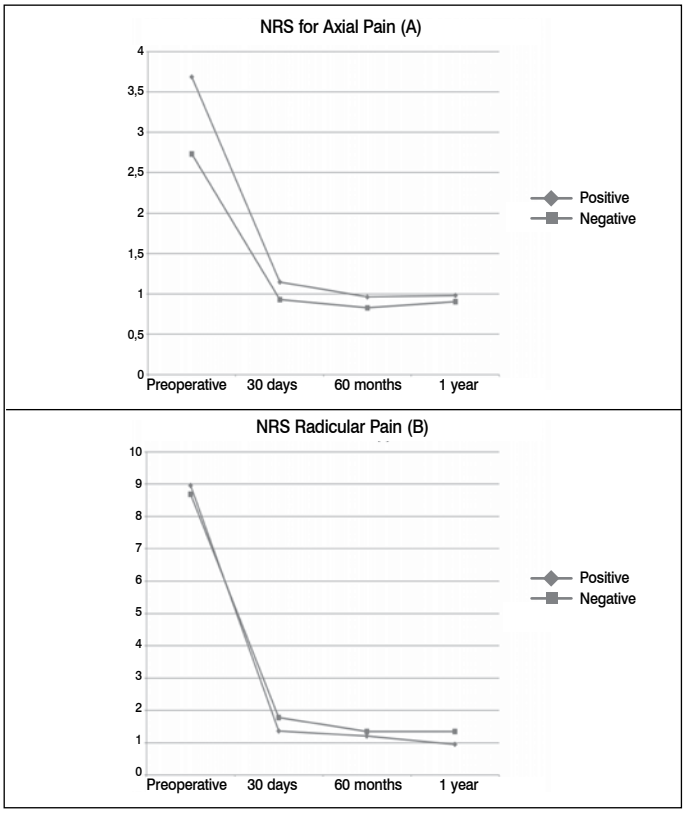

Figure 2. Evolution of axial (A) and radicular (B) pain measures by numerical rating scale of pain.

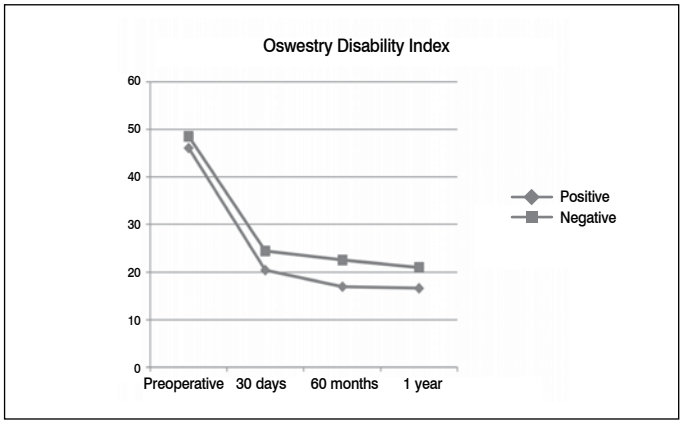

Figure 3. Evolution of Oswestry disability index.

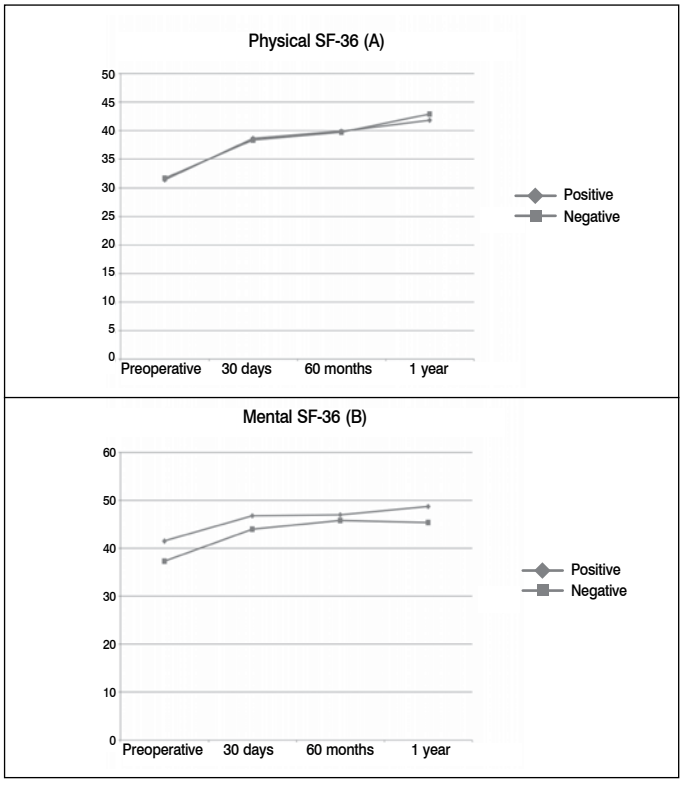

Figure 4. Evolution of the physical (A) and mental (B) component of SF-36.

DISCUSSION

This prospective analysis aimed to detect the clinical significance of the traditional SLR test as predictor of good results after LDH surgery. There was no correlation between the patients' self-reported HRQoL outcomes or neurological recovery and the presence of the Lasègue sign in the preoperative period. These findings indicate that this traditional sign of root compression is not a good predictor of improvement after surgery, and this absence should not be an exclusion criterion for root decompression as reported in the past.[12,26]

In patients with LDH, the Lasègue test is positive when the nerve root is irritated or compressed by intervertebral disk protrusion.[27] This maneuver is based on stretching the nerve root in the spine when it cannot move freely it causes compression and stimulation of the dural sheath causing pain.[19,20]

The prevalence of Lasègue signs in series of LDH are highly variable, varying from 27% to 94%.[15,26] This difference could be explained by the different definitions of what would be a positive Lasègue test, especially concerning the degree of leg elevation, so

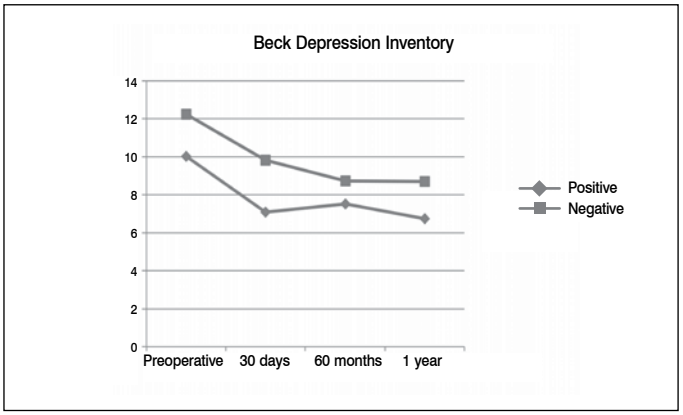

Figure 5. Evolution of beck depression inventory.

Table 2. Receiver operating characteristics analyses between preoperative Lasègue and variation of health-related quality of life measures.

	Area under the curve	95% confidence interval	P
Variation of NRS for axial pain	0.382	0.225 - 0.540	0.154
Variation of NRS for radicular pain	0.455	0.290 - 0.621	0.589
Variation of Oswestry	0.306	0.163 - 0.450	0.019
Variation of PC-SF36	0.464	0.299 - 0.628	0.661
Variation of MC-SF36	0.395	0.236 - 0.554	0.201
Variation of BDI	0.386	0.229 - 0.542	0.165

that comparing the studies becomes a challenge.[12,15] Millisdotter et al.[28] showed a positive SLR in 54 of 58 patients with LDH, but they considered the Lasègue sign as positive even at an 80-degree angle. Woertgen et al.[26] on the contrary, described 38% of patients with a positive Lasègue sign at an angle of less than 30 degrees. In our study, a positive Lasègue test was seen in only 54 patients (56.8%). We stablished positivity the patient recognized typical nerve root pain at up to 45 degrees. Another point that influences the variability in the prevalence of this sign is its low inter-observer reproducibility, with 33% and 96% of positive and negative concordance, respectively.[27] In our study, the neurological examination was systematically performed by the same two surgeons, reducing this rate of low reproducibility.

It is already established in the literature that the signs, symptoms and imaging test remain too weak to define the real state of the patient with LDH pain.[7,10,13] In general, it is agreed that the Lasègue sign is a highly sensitive and specific sign for surgically proven disk protrusion and that its persistence in the postoperative period correlates with an unfavorable surgical outcome.[18,27] Despite these findings, there is still doubt concerning the prognostic importance of this sign in the preoperative period.[12,29,30]

Junge et al.[12] in a prospective study with 12 months follow-up did not observe that a positive Lasègue sign in the preoperative period was not related to good or bad surgical outcomes. These findings are supported by Woergten et al.[26], who found that a positive SLR test (up to 30 degrees) was not predictive of a good outcome 3 and 24 months postoperatively. Xin et al.[20] reported that the pain distribution during the SRL test allows an accurate prediction of the location of the protrusion in 88.5% of the patients, but not its prediction with clinical outcome. Other studies, on the contrary, reported that a positive Lasègue sign in the preoperative period is a positive predictor of outcome.[29-31] The result of our study indicates that patients with a positive or negative Lasègue sign preoperatively appear to have the same results in pain, disability and quality of life in the postoperative period. Also, the analyses of discrimination capacity of that sign in predicting changes in HRQoL measures one-year postoperatively did not demonstrate good association either alone or in combination with the other clinical signs of nerve root impairment.

CONCLUSION

The Lasègue sign is one the most common signs in patients with LDH. However, different application methodologies make it difficult to compare studies and inter-observer reproducibility. According to our data, the Lasègue sign alone or in combination with other neurological dysfunctions was not predictive of clinical outcome one year after surgery.

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All authors declare no potential conflict of interest concerning this article.

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