CASE REPORT
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CASE SERIES OF 325 PATIENTS WITH LUMBAR DISC HERNIATION OPERATED ON AN EMERGENCY BASIS

SÉRIE DE CASOS DE 325 PACIENTES COM HÉRNIA DE DISCO LOMBAR OPERADOS EM CARÁTER EMERGENCIAL

SERIE DE CASOS DE 325 PACIENTES CON HERNIA DISCAL LUMBAR OPERADOS DE URGENCIA

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ABSTRACT

Lumbar disc herniation (LDH) is a common disease in medical practice, with high costs of medical care, long-term disability, and worsening quality of life. Demographic and case series studies are important for understanding diseases' natural history and associated risk factors. Analyze the clinical and demographic characteristics of a case series of 325 LDH operated on in a neurosurgery service in southern Brazil. This study enrolled patients with lumbar disc herniation who underwent surgery. Clinical and epidemiological data were retrieved from medical records and retrospectively characterized. Three hundred and twenty-five patients were selected for analysis. 51% of patients were men, with an average age of 46. Hypertension and smoking were the most prevalent comorbidities, with 16% and 21% respectively. Radicular pain was the most common clinical presentation (78% of cases). 92% of patients had median or postero-lateral LDH; the remaining were foraminal or extra-foraminal. Infectious complications occurred in 2.4% of cases, and liquoric fistula in 1.2%. The recurrence rate at the same level was 16%. Diabetes was the only statistically significant risk factor related to LDH reoperation. LDH is a prevalent pathology. The most common symptom is radicular pain due to median or posterolateral LDH. Initial management involves analgesia and other nonsurgical therapies. Lumbar microdiscectomy is performed when non-surgical management is unsuccessful. Diabetes is an important risk factor for the recurrence of LDH. ***Level of Evidence III; Retrospective study.***

Keywords: Intervertebral Disc Herniation; Intervertebral Disc Degeneration; Intervertebral Disc Displacement.

RESUMO

A hérnia de disco lombar (HDL) é uma doença comum na prática médica, com elevados custos de cuidados médicos, incapacidade a longo prazo e piora da qualidade de vida. Estudos demográficos e de séries de casos são importantes para a compreensão da história natural das doenças e dos fatores de risco a elas associados. Analisar as características clínicas e demográficas de uma série de casos de 325 HDL operados em serviço de neurocirurgia no Sul do Brasil. Este estudo incluiu pacientes com hérnia de disco lombar submetidos à cirurgia. Os dados clínicos e epidemiológicos foram obtidos dos prontuários e caracterizados retrospectivamente. Trezentos e vinte e cinco pacientes foram selecionados para análise. 51% dos pacientes eram homens, com idade média de 46 anos. Hipertensão arterial e tabagismo foram as comorbidades mais prevalentes, com 16% e 21% respectivamente. A dor radicular foi a apresentação clínica mais comum (78% dos casos). 92% dos pacientes apresentavam HDL mediana ou póstero-lateral, os restantes eram foraminal ou extra-foraminal. Complicações infecciosas ocorreram em 2,4% dos casos e fístula liquórica em 1,2%. A taxa de recorrência no mesmo nível foi de 16%. O diabetes foi o único fator de risco estatisticamente significativo relacionado à reoperação da HDL. A HDL é uma patologia prevalente. O sintoma mais comum é a dor radicular devido à HDL mediana ou póstero-lateral. O tratamento inicial envolve analgesia e outras terapias não cirúrgicas. A microdiscectomia lombar é realizada quando o tratamento não cirúrgico não tem sucesso. O diabetes é um importante fator de risco para recorrência de HDL. **Nível de Evidência III; Estudo retrospectivo.**

Descritores: *Hérnia de Disco Intervertebral; Degeneração do Disco Intervertebral; Deslocamento do Disco Intervertebral.*

RESUMEN

La hernia de disco lumbar (HDL) es una enfermedad común en la práctica médica, con altos costos de atención médica, discapacidad a largo plazo y empeoramiento de la calidad de vida. Los estudios demográficos y de series de casos son importantes para comprender la historia natural de las enfermedades y los factores de riesgo asociados a ellas. Analizar las características clínicas y demográficas de una serie de casos de 325 HDL operados en un servicio de neurocirugía del sur de Brasil. Este estudio inscribió a pacientes con hernia de disco lumbar que se sometieron a cirugía. Los datos clínicos y epidemiológicos se recuperaron de los registros médicos y se caracterizaron retrospectivamente. Se seleccionaron trescientos veinticinco pacientes para el análisis. El 51% de los pacientes eran hombres, con una edad

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media de 46 años. La hipertensión y el tabaquismo fueron las comorbilidades más prevalentes, con un 16% y un 21% respectivamente. El dolor radicular fue la presentación clínica más común (78% de los casos). El 92% de los pacientes tenían HDL mediana o posterolateral, el resto era foraminal o extraforaminal. Se produjeron complicaciones infecciosas en el 2,4% de los casos y fístula licorosa en el 1,2%. La tasa de recurrencia al mismo nivel fue del 16%. La diabetes fue el único factor de riesgo estadísticamente significativo relacionado con la reoperación de HDL. La HDL es una patología prevalente. El síntoma más común es el dolor radicular debido a la HDL mediana o posterolateral. El tratamiento inicial implica analgesia y otras terapias no quirúrgicas. La microdiscectomía lumbar se realiza cuando el tratamiento no quirúrgico no tiene éxito. La diabetes es un factor de riesgo importante para la recurrencia de HDL. ***Nivel de evidencia III; Estudio retrospectivo.***

Descriptores: *Hernia del Disco Intervertebral; Degeneración del Disco Intervertebral; Desplazamiento del Disco Intervertebral.*

INTRODUCTION

Spine-related diseases are among the most common clinical problems in daily clinical practice, being related to high costs of medical care, long-term disability, and worsening quality of life. Lumbar disc herniation (LDH) is a common disease in the population, with an estimated annual incidence of 5 cases per 1000 adults in Western countries.[1,2] The main clinical presentation of LDH is lumbosacral radiculopathy, defined as a "pain perceived as arising in a limb or the trunk caused by ectopic activation of nociceptive afferent fibers in a spinal nerve or its roots or other neuropathic mechanisms". The main form of lumbosacral radiculopathy in this topography is sciatica, which is radicular pain in the topography of the sciatic nerve and is a relatively common condition, with an incidence ranging from 13 to 40%. Although most of the time it presents insidiously, LDH may require emergency surgery when it develops with motor or sensory neurological deficit, cauda equina syndrome, or refractory and disabling radicular pain.[3] Many risk factors are linked to LDH, such as age, gender, occupational and environmental factors.[4-6]

Demographic and epidemiology studies are important for understanding diseases' natural history and associated risk factors, which is important for their treatment and prevention. Few studies specifically address the prevalence and incidence of sciatica, as well as the demographic characteristics of patients with LDH. Most of them are about low back pain, and in these studies, information about risk factors, epidemiology, and natural history of sciatica is included as a complement.[7]

The authors present a series of 325 cases of operated LDH from a neurosurgery emergency center in southern Brazil from 2018 to 2022, presenting the clinical and demographic characteristics.

MATERIALS AND METHODS

This retrospective study was conducted at the Hospital Cristo Redentor, Department of Neurosurgery, in Porto Alegre, Brazil. It enrolled patients with lumbar disc herniation who underwent open lumbar microdiscectomy surgery from 5 years (2018 to 2022). Clinical and demographic data were retrieved from electronic medical records and retrospectively analyzed.

The retrieved data included demographic information (name, gender, and age), diagnosis/disorder, clinical presentation, comorbidities, previous spine surgery, complications, and need for reoperation. An Informed Consent Form was not collected, considering the research is retrospective, non-interventionist, without physical and biological risks, since data collection will only be from the medical record, respecting patient anonymity. Statistical analysis was performed with SPSS statistical software version 23.0 (IBM).

RESULTS

The analysis included 325 patients with lumbar disc herniation who underwent microdiscectomy. Table 1 summarizes the clinical and demographic characteristics of the study.

Patient characteristics

More than half of them were men, 51% (166/325), with a mean age of 46 years (range 23 to 94). About 16% of patients (55/325) were active smokers, and diabetes and hypertension were present in 9.5% and 21%, respectively. Twenty patients had previously undergone other spine surgery, 17 lumbar surgery, and three cervical surgeries, and the remaining 305 were operated on for the first time.

Table 1. Clinical and demographic characteristics.

		N = 325	%
Sex	Male	166	51
	Female	159	49
Mean age (y)		46y (23 - 94)	-
Comorbities	Hypertension	68	21
	Smoker	55	16
	Diabetes	31	9.5
Previous spine surgery	Lumbar	17	5.2
	Cervical	3	0.9
	None	305	93.8
Clinical presentation	Radicular pain	256	78
	Motor deficit	67	20
	Cauda equina syndrome	24	7.3
LDH level	L5-S1	163	50
	L4-L5	129	39
	L4-L3	24	7
	L2-L3	9	4
Topography	Medial and posterolateral	302	92
	Foraminal and extra-foraminal	23	8
Complications	Infection	9	2.4
	CSF leak	4	1.2
Reoperation	Recurrence at the same level	52	16
	Decompression	26	8
	Decompression + Arthrodesis	26	8

Clinical presentation

The most common clinical presentation was isolated radicular pain in 78% of patients (256/325). Twenty percent (67/325) had radicular pain with motor deficits as symptoms, and only two patients had neurogenic claudication as symptoms. Cauda equina syndrome was the clinical presentation in 7.3% of patients.

Lumbar disc herniation level

LDH at the L5-S1 level was the most common, representing 50% of cases. The second most common was the L4-L5 level, with 39% of cases. Only 7% were at the L3-L4 level, and 4% were at the L2-L3 level.

Topography of disc herniation

Medial and posterolateral disc herniations represented 92% of cases, while 8% were foraminal and extra-foraminal disc herniations.

Complications

Infectious complications occurred in 2.4% of patients (9/325), with 6 requiring reoperations due to infection. CSF leak occurred in 1.2% of cases, and the length of hospital stay was, on average, nine days.

Reoperation

Recurrence of disc herniation at the same level as previous surgery occurred in 16% of cases (52/325), with 8% (26/325) requiring lumbar arthrodesis during reoperation.

Characteristics of patients who underwent reoperation at the same level and arthrodesis:

• Of the 52 patients who required reoperation at the same level, 9 were smokers (p=0.936), 16 were hypertensive (p=0.860), and ten were diabetic (p=0.019). Among the 26 patients who also required arthrodesis, 3 were smokers (p=0.624), eight were hypertensive (p=0.300), and seven were diabetic (p=0.005).

• The average age of patients who underwent reoperation at the same level was 49, compared to 46 of those who did not. The average age of patients who underwent arthrodesis was 46, identical to those who did not undergo arthrodesis.

DISCUSSION

Disc herniation involves the extrusion of the nucleus pulposus through a rupture of the annulus fibrosus. It may be protruded, extruded, sequestrated, or even migrated, and its location in the spinal canal may be medial, postero-lateral, foraminal, or extra-foraminal.[8]

Many changes in intervertebral disc biology may contribute to disc herniation, like local chronic inflammation and the production of inflammatory factors in degenerative changes that weaken the annulus fibrosus or acute traumatic episodes and spinal overloading, and thus can occur at different ages.[8,9]

The most common signs and symptoms of LDH are radicular pain, sensory abnormalities, and motor deficits in the distribution of lumbosacral nerve roots. Since the roots of L5 and S1 are the most commonly affected, pain radiating to the posterior and lateral aspects of the lower limb is the most common topography. Neurological deficits usually compromise foot mobility.[8,9] The cauda equine syndrome, a clinical condition arising from dysfunction of multiple lumbosacral nerve roots, occurs in only 1 to 2% of patients with LDH.[10] In our study, radicular pain was the most prevalent symptom, and cauda equina syndrome had a higher prevalence than reported in the literature, being present in more than 7% of cases. This difference could be justified by the fact that we analyzed only patients who underwent surgery with a higher incidence of cauda equina syndrome than cases managed clinically since it is a condition that requires urgent surgical intervention.

The risk of developing LDH is multifactorial and includes age, cigarette smoking, obesity, diabetes, osteoporosis, and abdominal and paraspinal muscle weakness.[11,12]

The most common LDH level is the L5-S1 segment (45 to 50% of cases), followed by the L4-L5 level (40-45%) and, more rarely, higher levels such as L3-L4 (<10%).[13] Medial and posterolateral LDH are the most common, with only 3 to 10% of LDH being classified as extreme lateral (foraminal and extraforaminal LDH). In our series, extreme lateral LDH represented 8% of cases.[14]

Although our case series is only of patients who underwent surgery, non-operative management is the first-line treatment for most patients with lumbar disc herniation.[15,16] It aims primarily at pain reduction using drugs, physical therapy, spinal manipulation, traction, or epidural steroid injections.[17]

The most common intraoperative complications of lumbar microdiscectomy are bleeding, dural injury, and nerve root lesions. Wound complications were identified in 33 studies. The wound complication rate of open lumbar microdiscectomy was 2.1% in a systematic review by Shriver et al., similar to the rates identified in our study of 2.4%.[18] Recurrent disc herniation is a possible post-operative complication, with a recurrence rate after surgery has been reported to vary between 5% and 15%.[19-22] In our case series, the recurrence rates were slightly higher, with 16% of patients requiring reoperation at the same disc level.

A higher rate of complications and recurrence of LDH can be explained by the fact that most surgeries are performed urgently in patients with pain greater than eight on the Visual Analogue Scale, motor deficit, or cauda equina syndrome. Such patients have a more advanced stage of degenerative disc disease, being subject to higher rates of recurrence and arthrodesis. Since these patients' access to the public health system is often delayed, they tend to have more prolonged presentations of the disease, with a more advanced degree of lumbar degenerative disease and consequently being more symptomatic, being often operated with disabling pain scales or some motor and sensitive deficits.

In our study, diabetes was the only statistically significant risk factor related to LDH reoperation at the same level for decompression and arthrodesis. The presence of diabetes is already known as a risk factor for discectomy failure,[21,23,] and worse functional outcomes.[24] Age was not a risk factor for LDH recurrence, as both groups were.

Limitations

Our study has some limitations. Since it only included patients who underwent surgery, patients with lumbar disc herniation treated conservatively were not included, which represents a large portion of patients despite many of them progressing to surgical treatment over time. As this was a retrospective study using medical records, many data could not be analyzed due to poor quality records, which may underestimate the prevalence of some characteristics of the studied population. Another limitation is that it has a sample that does not represent patients with LDH who are more common in medical practice but rather a sample of patients with more advanced degenerative diseases that needed hospitalization.

CONCLUSIONS

LDH is a prevalent pathology with great costs for the healthcare system. The most common symptom is radicular pain secondary to compression of the nerve root, usually due to median or posterolateral LDH. Patients who undergo emergency surgery commonly present a more advanced degree of degenerative disc disease, progressing with higher rates of reoperation and lumbar arthrodesis. Diabetes is an important risk factor for the recurrence of LDH.

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