Radiología. 2012;54(4):336–341

RADIOLOGÍA

www.elsevier.es/rx

ORIGINAL ARTICLE

Percutaneous Laser Disc Decompression for lumbar discogenic radicular pain☆

R. Duarte[a,b,*], **J.C. Costa**[a]

[a] *JCC-Diagnóstico por Imagem, Hospital Particular de Viana do Castelo, Portugal*
[b] *Department of Radiology, Centro Hospitalar Gaia/Espinho, Portugal*

Received 16 October 2010; accepted 21 February 2011

KEYWORDS
Interventional radiology;
Low back pain;
Laser therapy

Abstract
Purpose: The aim of our study was to directly evaluate the effectiveness of percutaneous laser disc decompression (PLDD) for the treatment of lumbar discogenic radicular pain.
Materials and methods: From June 2006 through July 2009, 205 patients with contained disc herniation demonstrated on computed tomography (CT) or magnetic resonance, concordance between the radicular pain and the nerve root compressed by the herniated disc, neurological findings referring to a single nerve root and no improvement after conservative therapy for a minimum of six weeks were enrolled. All patients were treated with PLDD under CT guidance and local anesthesia. Follow-up was scheduled at 1, 2 days, 3, 6 months. Subsequent follow-ups at 12, 24 and 36 months were carried out through visits or by telephone. Clinical outcome was quantified using the MacNab criteria.
Results: The age of patients ranged from 27 to 78 years (mean 58 ± 11 years). The levels of involvement were 18 cases at L3–L4, 123 cases at L4–L5 and 64 cases at L5–S1. Using the MacNab criteria, the results were as follows: 67% (n = 137) showed a good outcome and 9% (n = 18) a fair outcome. There were no serious complications in our series.
Conclusion: PLDD is effective treatment for lumbar discogenic radicular pain, associated with only minimal discomfort to the patient. This minimally invasive technique is a valid alternative for those patients not responding to conservative medical treatment, allowing in many cases to obviate the need of spine surgery.

PALABRAS CLAVE
Radiología intervencionista;
Dolor lumbar;
Tratamiento con láser

Descompresión percutánea discal con láser para el tratamiento del dolor lumbo-radicular de origen discal

Resumen
Objetivos: El objetivo de nuestro estudio fue evaluar la eficacia de la descompresión percutánea discal con láser (DPDL) en el tratamiento del dolor lumbo-radicular de origen discal.

☆ Please cite this article as: Duarte R, Costa JC. Descompresión percutánea discal con láser para el tratamiento del dolor lumbo-radicular de origen discal. Radiología. 2012;54:336–41.

* Corresponding author.
E-mail address: guerra.duarte@gmail.com (R. Duarte).

2173-5107/$ - see front matter

Material y métodos: Desde junio de 2006 hasta julio de 2009 se incluyeron en este estudio 205 pacientes con hernia discal contenida demostrada mediante tomografía computarizada (TC) o resonancia magnética (RM), que presentaban concordancia entre el dolor radicular y la raíz nerviosa comprimida por el disco herniado, con hallazgos neurológicos referidos a una única raíz nerviosa y que no mejoraron tras un tratamiento conservador de al menos seis semanas. Todos los pacientes fueron tratados con DPDL guiada mediante TC y con anestesia local. Se realizaron controles al primer y segundo día y a los tres y seis meses. Los controles posteriores fueron a los 12, 24 y 36 meses y se realizaron mediante visita o por teléfono. Para la valoración del resultado clínico se aplicaron los criterios de MacNab.
Resultados: El rango de edad fue de 27-78 años (media: 58 ± 11 años). La afectación fue en 18 casos a nivel de L3-L4, en 123 casos a nivel de L4-L5 y en 64 casos a nivel de L5-S1. Siguiendo los criterios de MacNab, los resultados fueron: un 67% (n = 137) mostraron un resultado bueno y un 9% (n = 18) un resultado aceptable. No hubo complicaciones importantes en nuestro estudio.
Conclusión: La DPDL es un tratamiento efectivo para el dolor lumbo-radicular de origen discal, que solo causa ligeras molestias al paciente. Esta técnica mínimamente invasiva es una alternativa adecuada para aquellos pacientes que no responden al tratamiento médico conservador, obviando en muchos casos la necesidad de intervenir la columna quirúrgicamente.

Introduction

The lifetime prevalence of chronic low back pain has been reported as high as 80%.[1] Discogenic lumbar radicular pain due to lumbar disc prolapse, protrusion, or herniation accounts for less than 5% of low back problems.[2] However, it is estimated that 90% of cases of radicular pain are due to disc herniation with nerve entrapment or compression.[3]

The majority of patients with acute sciatica recover within two to six weeks of conservative treatment and may avoid surgery.[4]

However, about 20% of patients do not respond to conservative treatment and usually undergo surgery.[5] Some absolute indications for surgery include bladder dysfunction and progressive muscle weakness, although fortunately these complications are rare.[6]

Minimally invasive intradiscal techniques have been developed in order to reduce tissue trauma and the relatively high rate of complications and the necessity of repeated surgery.

In the last two decades, more than 500,000 percutaneous disc decompression procedures[6] have been performed, including chemonucleolysis, automated and manual percutaneous discectomy, posterolateral endoscopic discectomy, laparoscopic discectomy and fusion, intradiscal electrothermal annuloplasty therapy (IDET®), percutaneous discectomy with the DeKompressor® probe, nucleoplasty using radiofrequency, intradiscal ozone therapy and percutaneous laser disc decompression (PLDD).[7]

PLDD was first introduced in the 1980s and the concept is based on the fact that a small reduction in volume of the nucleus pulposus results in a significant reduction in intradiscal pressure.[8] This is achieved by introducing an optical fiber into the intervertebral disc under image-guidance and local anesthesia and laser energy is released, vaporizing a small volume of the nucleus pulposus. Treatment of the first patient with PLLD took place in 1985[9] and from then until 2011, more than 30,000 patients have been treated with this procedure.[10] US Food and Drug Administration (FDA) approved PLDD in 1991.

The aim of this study is to evaluate the therapeutic effect of PLDD for the treatment of discogenic lumbar radicular pain, presenting the clinical outcome of a series of 200 patients.

Patients and methods

Patient population

This is an open uncontrolled nonrandomized prospective study of the clinical outcome obtained with PLDD used in the treatment of discogenic lumbar radicular pain. From June 2006 until July 2009, 205 patients with discogenic lumbar radicular pain who had been referred to our institution and that met the following inclusion criteria were enrolled: contained disc herniation demonstrated on CT or MR, regardless of the size of the herniation; concordance between the radicular pain and the nerve root compressed by the herniated disc; and neurological findings referring to a single nerve root with no improvement after receiving conservative therapy during a minimum of six weeks. Patients with spondylolisthesis, with more than 50% disc height loss, sequestered disc, pregnancy, or previous surgery at the indicated disc level were excluded.

Patients were first examined and evaluated by an orthopedic surgeon who took the clinical history and performed a standard neurological examination. Subsequently, the surgeon decided on the eligibility of the patient for PLDD based on the inclusion and exclusion criteria. Gender distribution was 117 male and 88 female with an age range of 27–78 years (mean 58 ± 11 years). The levels of involvement were: 18 cases at L3–L4, 123 cases at L4–L5 and 64 cases at L5–S1. Follow-up examinations were carried out at 1 and 2 days, and at 3 and 6 months. Subsequent follow-up examinations at 12, 24 and 36 months were carried out during an appointment or by telephone. The clinical outcome was quantified using the MacNab criteria (Table 1).[11]

The ethics committee of our hospital approved the study and all patients gave informed consent.

Percutaneous laser disc decompression procedure

A CT study was performed on a Somatom Emotion 6 with fluoroscopy (Siemens Medical Systems, Germany) in order to