GUIDELINES IN FOCUS

Lumbar herniated disc treatment with percutaneous hydrodiscectomy

Author: Brazilian Medical Association
Participants: Antonio Silvinato, Ricardo S. Simões, Renata F. Buzzini, Wanderley M. Bernardo
Final version: March 17, 2017

http://dx.doi.org/10.1590/1806-9282.64.09.778

The Guidelines Project, an initiative of the Brazilian Medical Association, aims to combine information from the medical field in order to standardize producers to assist the reasoning and decision-making of doctors. The information provided through this project must be assessed and criticized by the physician responsible for the conduct that will be adopted, depending on the conditions and the clinical status of each patient.

SUMMARY
Lumbar herniated disc are common manifestations of degenerative spine diseases, the main cause of radiated lower back pain. This guideline followed standard of a systematic review with recovery of evidence based on the movement of evidence-based medicine. We used the structured method for formulating the question synthesized by the acronym p.I.C.O., in which the p corresponds to the lumbar herniated disc, i to the treatment intervention with percutaneous hydrodiscectomy, c comparing with other treatment modalities, o the outcome of clinical evolution and complications. From the structured question, we identify the descriptors which constituted the evidence search base in the medline-pubmed databases (636 papers) and therefore, after the eligibility criteria (inclusion and exclusion), eight papers were selected to answer to clinical question. The details of the methodology and the results of this guideline are exposed in annex i.

INTRODUCTION
Lumbar herniated discs are common manifestations of degenerative spine diseases, being the main cause of radiated lower back pain. Conservative treatment with anti-inflammatory and physical therapy provides relief of pain in a significant proportion of patients, and surgery is indicated in nonresponsive patients after at least six weeks of conservative treatment to avoid irreversible structural changes in the nerve roots due to chronic compression. Microdiscectomy is the surgical intervention of choice for hernias that cause root symptoms, not relieved by conservative treatment. Percutaneous hydrodiscectomy was developed as a less invasive alternative for traditional microdiscectomy. The procedure is performed under local anaesthesia with sedation, using an image guided technique and a 3.8 mm cannulated system to dilate the annular fibres in order to access the disc space. The core material of the disc is mechanically removed using a high speed (non-thermal) salt solution which sprays the tissue.
<table>
<thead>
<tr>
<th>Author</th>
<th>Type of Study</th>
<th>Publication Date</th>
<th>Publication Status</th>
<th>Participants</th>
<th>Study Length</th>
<th>Pre and post-op</th>
<th>Mac-Nab Criteria</th>
<th>Complications</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lo WC, et al.</td>
<td>Case series – retrospective</td>
<td>2012</td>
<td>Preliminary Report – pending</td>
<td>97 participants with HDL&lt;6 mm and radiculopathy confirmed through imaging. Extruded and sequestered discs were excluded.</td>
<td>6 months</td>
<td>8.2±1.1 2.8±1.0 (p&lt;0.05)</td>
<td>6.5±1.7 2.9±1.2 (p&lt;0.05)</td>
<td>88% excellent and good</td>
<td>n/r</td>
</tr>
<tr>
<td>Han HJ, et al.</td>
<td>Case series – retrospective</td>
<td>2009</td>
<td>Preliminary Report</td>
<td>12 participants with lower back pain (LBP) and radiculopathy, and 1 with back pain only. Extruded and sequestered discs were excluded.</td>
<td>6 months</td>
<td>8.5±1.1 2.7±1.0 (p&lt;0.05)</td>
<td>6.2±1.9 3±1.4 (p&lt;0.05)</td>
<td>n/a</td>
<td>n/r</td>
</tr>
<tr>
<td>Hardenbrook MA, et al.</td>
<td>Case series – retrospective</td>
<td>2013</td>
<td>Source – Internet J of Spine Surg</td>
<td>50 participants with lumbar HNP secondary radiculopathy confirmed through MRI in 1-2 levels. Excluded: free fragment, central stenosis or bone holding.</td>
<td>Mean of 4.6 months</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/r</td>
</tr>
<tr>
<td>Kowalkowski, et al.</td>
<td>Case series – retrospective</td>
<td>2013</td>
<td>Abstract Accepted by ASIPP; June, 2013</td>
<td>15 participants with subligamentous lumbar HNP secondary radiculopathy in a single level.</td>
<td>4 months</td>
<td>60 52 (p = 0.032)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/r</td>
</tr>
<tr>
<td>Jasper, et al.</td>
<td>*Case series – retrospective</td>
<td>2013</td>
<td>Pending - ePlasty</td>
<td>30 participants with herniated disc in levels 1-3 confirmed through imaging. Excluded: sequestrated disc, &gt;50% loss of disc height, severe DDD or osteophytes spinal stenosis and vertebral instability.</td>
<td>12 months</td>
<td>n/a</td>
<td>n/a</td>
<td>73% excellent and good</td>
<td>There was a reduction in the pain score in 26 of the 30 participants (87%).</td>
</tr>
<tr>
<td>Borshchenko I, et al.</td>
<td>Case series - retrospective</td>
<td>2010</td>
<td>Pending (Abstract – pilot study)</td>
<td>16 participants with confirmed disc bulging (protrusion or small extrusion) in a single level. Large disc extrusion excluded.</td>
<td>6 months</td>
<td>n/a</td>
<td>n/a</td>
<td>88% excellent and good</td>
<td>n/r</td>
</tr>
</tbody>
</table>
### LUMBAR HERNIATED DISC – TREATMENT WITH PERCUTANEOUS HYDRODISCECTOMY

<table>
<thead>
<tr>
<th>Author</th>
<th>Type of Study</th>
<th>Publication Date</th>
<th>Publication Status</th>
<th>Participants</th>
<th>Study Length</th>
<th>Pre and post-op MI</th>
<th>Mac-Nab Criteria</th>
<th>Complications</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wang W, et al.11(B)</td>
<td>Case series – prospective</td>
<td>2010</td>
<td></td>
<td>69 participants with uncompli- cated HDL imaging by MRI or CT and that met the McCulloch criteria. Exclusion: stenosis of the mixed type canal, lumbar spondylolisthesis and sequestered hernia.</td>
<td>9 months</td>
<td>n/a</td>
<td>n/a</td>
<td>98.6% excel- lent and good</td>
<td>One case of infec- tion in the disc space</td>
</tr>
<tr>
<td>Cristante, et al.12(B)</td>
<td><em>RCT</em></td>
<td>2013</td>
<td>Pending</td>
<td>40 pts with MRI evidence of small herniated disc or protrusion on a single level were randomized for open lumbar microdiscectomy or percutaneous hydrodiscectomy.</td>
<td>12 months</td>
<td>There was a statisti- cally signif- icant improve- ment</td>
<td>No statisti- cally significant improve- ment</td>
<td>n/a</td>
<td>One with PO infection. One death related to underlying disease (HIV) 20% of patients had subsequent interventio- n.</td>
</tr>
</tbody>
</table>

MI = lower member; PO = postoperative; LHD = lumbar herniated disc; LBP = lower back pain; n/a = not available; n/r none reported; HNP = herniated nucleus pulposus; MRI = magnetic resonance imaging; DDD = disc degenerative disease; McCulloch Criteria = no improvement in symptoms after ≥ 3 months of conservative treatment; RCT = randomized controlled trial. * Data recovered at http://www.washawaybackpain.com/uploads/studies/Clinical%20Evaluation.docx (complete text not available).
DISCUSSION

Three characteristics are essential for a good systematic review of the literature: to gather all available evidence until the most recent moment; assess the quality of the studies individually and finally, summarize the results of the studies found. In this review on the use of percutaneous hydrodiscectomy in the treatment of lumbar herniated disc, we did not find any study in the scientific information databases consulted (Medline via PubMed, Central and Lilacs via BVS, Embase and Cinahl via Ebsco). With hand-searching accessing the grey literature, of the eight included studies, only three case series present full text, impairing the assessment of studies quality. Therefore, caution is advised in interpreting the results, as they may present distortions of reality. In a search in the Clinical Trials database (https://clinical-trials.gov/ - accessed on 11/18/2015), which registers protocols of studies to be conducted, we found a randomized controlled trial completed (NCT00384007 - “Last Update June 4, 2009” - no results available) and one in progress (NCT02414698).

RECOMMENDATION:

The available evidence related to percutaneous hydrodiscectomy in the treatment of lumbar herniated disc is very weak, and its clinical use, generalized and systemic, is not recommended at this time. Its use should be restricted to the clinical research environment, so that data on efficacy and safety are produced consistently and strongly.

(Oxford 2009

13

- Level of evidence 4 and Degree of Recommendation C; Grade

14

1D)

RESUMO

Hérnias discais lombares são manifestações comuns das doenças degenerativas da coluna, sendo a principal causa de dor lombar irradiada. Esta diretóżia seguiu padrão de uma revisão sistêmica com recuperação de evidências com base no movimento da Medicina Baseada em Evidências. Utilizamos a forma estruturada de formular a pergunta sintetizada pelo acrônimo P.I.C.O., em que o P corresponde à Hérnia de disco lombar, I à intervenção Tratamento com hidrodiscectomia percutânea, C comparando com Outras modalidades de tratamento, O de desfecho de Evolução clínica e complicações. A partir da pergunta estruturada, identificamos os descritores que constituíram a base da busca da evidência nas bases de dados Medline-PubMed (636 trabalhos) e, assim, após os critérios de elegibilidade (inclusão e exclusão), oito trabalhos foram selecionados para responder à dúvida clínica. Os detalhes da metodologia e dos resultados desta diretóżia estão expostos no Anexo I.

ANNEX I

Structured question

The clinical question is structured through the components of P.I.C.O.

TABLE 1 – PICO COMPONENTS

| P | Lumbar herniated disc in one or more levels |
| I | Treatment with percutaneous hydrodiscectomy |
| C | Other treatment modalities |
| O | Clinical evolution and complications |

(P (Patient); I (Intervention); C (Comparison); O (Outcome).

Evidence search strategy

The bases of scientific information consulted were Medline via PubMed, Central and Lilacs via BVS, Cochrane Library and Embase. Handsearch from references of selected papers was also performed.

PubMed-Medline

| TABLE 2 – SEARCH STRATEGY USED IN THE SCIENTIFIC INFORMATION DATABASES |
| Search 1: (lumbar herniated nucleus pulposus OR disc herniation OR disc hernia OR intervertebral disk displacement) AND (percutaneous lumbar discectomy OR percutaneous mechanical disc decompression OR percutaneous discectomy OR discectomy percutaneous OR hydro discectomy OR hydro surgical decompression OR spinejet OR percutaneous microdiscectomy) – 624 studies RECOVERED. |

Initially selected by the title, sequentially by the abstract, and finally by its full text, the latter being subjected to critical evaluation and extraction of the results related to the outcomes.

| TABLE 3 – NUMBER OF PAPERS RECOVERED WITH THE SEARCH STRATEGY USED FOR THE SCIENTIFIC INFORMATION DATABASES |
| Information base | Number of papers | Number of selected papers |
| Primary | 624 | 0 |
| Grey literature | 12 | 8 |

PAPERS RECOVERED (until 11/29/2015)
Inclusion criteria for the papers recovered

The selection of the studies, review of the titles and abstracts obtained with the search strategy in the consulted information bases was conducted by two researchers with skills in the preparing systematized reviews, independently and blindly, strictly following the inclusion and exclusion criteria established, thus selecting the papers with potential relevance.

According to the study designs

Narrative reviews, case reports, case series, papers presenting preliminary results were, at first, excluded from selection. Systematic reviews and meta-analyses were used with the principle of retrieving references that might have been lost at first in the initial search strategy. We included systematic reviews (SRs) of randomized controlled trials (RCTs) and randomized controlled trials not included in the SRs. The controlled clinical trials were evaluated according to the Jadad score and the Grade score.

Papers recovery

The papers recovered were evaluated by title, abstract and full text (when available), allowing the initial selection of studies to be critically evaluated. After the critical evaluation, we obtained the final selection of the studies (8), with or without full text, that provided the data for the overall synthesis. The main reasons for exclusion were: did not respond to PICO, cadaver study and case report.

REFERENCES