painDETECT Questionnaire and Lumbar Epidural Steroid Injection for Chronic Radiculopathy

Radoš, Ivan; Zdravčević, Šakić Katarina; Hrgović, Zlatko

Source / Izvornik: European Neurology, 2013, 69, 27 - 32

Journal article, Published version
Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

https://doi.org/10.1159/000338265

Permanent link / Trajna poveznica: https://urn.nsk.hr/urn:nbn:hr:239:674326

Rights / Prava: Attribution-NonCommercial-NoDerivatives 4.0 International

Download date / Datum preuzimanja: 2021-01-22

Repository / Repozitorij:

Repository UHC Osijek - Repository University Hospital Centre Osijek
painDETECT Questionnaire and Lumbar Epidural Steroid Injection for Chronic Radiculopathy

Ivan Rados\textsuperscript{a} Katarina Sakic Zdravcevic\textsuperscript{c} Zlatko Hrgovic\textsuperscript{b}

Departments of \textsuperscript{a}Anaesthesiology and Intensive Care and \textsuperscript{b}Gynecology, University Hospital Centre Osijek, Osijek, and \textsuperscript{c}Department of Anaesthesiology, Clinical Hospital Sveti Duh, Zagreb Medical School, Zagreb, Croatia

Abstract

\textbf{Background:} The painDETECT questionnaire (PD-Q) is a fast and uncomplicated way to ascertain the percentage of neuropathic pain in 'total pain' and is designed to detect neuropathic pain components in back pain. The purpose of this randomized, prospective study is to compare, with the assessment of the PD-Q, the efficacy of interlaminar (IL) and transforaminal (TF) steroid injections in patients with unilateral chronic lumbar radicular pain. \textbf{Methods:} Patients were treated fluoroscopically with epidural steroids, using the IL or TF method and with confirmation of the epidural space by contrast, using random computerized classification. The patients received a series of three IL or TF epidural steroid injections (ESI) at 2-week intervals. The patients were monitored for 6 months from the first steroid injection. \textbf{Results:} By analyzing the average values of the total sum of points in the PD-Q a dropping trend is confirmed for both groups. The trend equation ($y = -1.1393x + 25.269$) for the TF ESI shows a faster recovery than the IL ESI ($y = -0.8089x + 26.654$). The statistically significant difference in the two groups is proved between the first and the sixth visit (IL ESI, $p = 0.014$; TF ESI, $p = 0.001$). There is no statistically significant difference in the efficiency of the two dosages and the volumes of steroids between the IL and TF distribution of steroids. \textbf{Conclusions:} Steroids are efficient; besides alleviating the overall pain, they also reduce the neuropathic component in chronic lumbar radicular pain, whether it is distributed epidurally by the IL or TF approach.

Introduction

The pathophysiology of back pain is complex and nociceptive. Neuropathic pain-generating mechanisms are thought to be involved, which established the term 'mixed pain syndrome' \cite{1}. The painDETECT questionnaire (PD-Q) is a fast and uncomplicated way to ascertain the percentage of neuropathic pain in 'total pain', and it is designed to detect neuropathic pain components in back pain. Lumbar epidural steroids may be distributed via interlaminar (IL), transforaminal (TF) or caudal approach. Studies which prove the efficiency in decreasing radicular pain in the lower extremities exist for each of these paths of distribution of steroids \cite{2–5}. Recent studies on epidural distribution of steroids mainly include the classical IL approach \cite{6} (http://www.anesthesia-analgesia.org/cgi/ijlink?linkType=ABST&journalCode=rheumatology&resid=27/4/295).
The TF approach to epidural injections results in the deposition of steroids in the anterior epidural area, closer to the place of pathological cause of radiculopathy, and may require a lower steroid dose in comparison to the IL method, where the steroid is injected into the back epidural area [5]. Therefore, our hypothesis is that the epidural application of steroids by the TF approach will be more efficient in the treatment of chronic lumbar radicular pain (CLRP), as well as reducing the neuropathic components of the total pain. It is a prospective randomized study which aims at (1) proving or rejecting the effects of steroids on CLRP assessed with the PD-Q; (2) proving or rejecting the effects of epidural lumbar application of steroids (IL and TF approach) on the neuropathic component in CLRP assessed with the PD-Q, and (3) comparing the analgetic response in two different approaches of the epidural application of steroids with CLRP in various dosages (80 mg Depo-Medrol with the IL approach and 40 mg Depo-Medrol with the TF approach) assessed with the PD-Q, designated for the number of patients with CLRP with whom a clear component of neuropathic pain is present.

Materials and Methods

The randomized prospective research was approved by the ethical committee of the University Hospital Centre Osijek and the Medical School of the J.J. Strossmayer University in Osijek. In the longitudinal, cohort-controlled study the patients were divided into two groups, IL or TF, depending on the mode of application of the epidural steroids. The randomization was carried out until all 32 patients in the separate groups had been completely monitored. Patients who, for any reason, did not complete the monitoring during the six visits were not included in the statistical process. The patients were treated fluoroscopically with epidural steroids, IL or TF, with confirmation of the epidural space by contrast, using random computerized classification. In order to be included in the study, the candidates had to qualify according to the following criteria: aged 18–80 years; unilateral lumbar radicular pain which had not responded to traditional treatments within the last 6 months (pharmacotherapy and physical therapy); magnetic resonance imaging and electromyoneurographically confirmed pathology of the lumbar radicular pain; absence of a remarkable motor deficit or bowel/urine incontinence, and intensity of pain above 5 on the numerical scale 0–10. Exclusion factors in this study were: under 18 or over 80 years of age; pregnancy or nursing women or women of generative age without appropriate contraception; diabetes; progressive neurological disorders; bilateral radicular pain; prior surgery of the lumbar spine; history of allergic reactions to local anesthesia, opiates, contrast or steroids; epidural injections of steroids within the last year; history of opioid abuse or currently on long-term opioid treatment, and intensity of pain below 5 on the numerical scale 0–10. Patients complying with even one of the exclusion criteria could not be included in the study. The IL epidural steroid injection (ESI) is performed with a 20-gauge Touhy needle and with 80 mg Depo-Medrol (methylprednisolone), mixed with 8 ml of 0.5% lidocaine. The TF ESI is performed with a 22-gauge needle and with a solution of 40 mg Depo-Medrol in 3 ml of 0.5% lidocaine [7]. The patients received a series of three IL or TF ESIs, at 2-week intervals. During the observation period, the patients did not receive any anticonvulsants or antidepressants. For breakthrough pain, the patients received 50 mg tramadol as the rescue medication, as needed (with a daily maximum of 400 mg). The PD-Q was filled out by the patients before each ESI (baseline, 2 weeks and 4 weeks), 2 weeks after the third ESI (6 weeks), and also after 3 (12 weeks) and 6 months (24 weeks) from the first ESI.

The statistical analysis includes the basic methods of descriptive statistics. The differences in the categorical variables were treated with a χ² test. The Student t test or Mann Whitney U test were used for comparing means. The Wilcoxon test and the t test of differentiation were used in determining the differences between the two gaugeings. In ascertaining the differences by all measurements (visits) within each group, regarding the manner of injection of the steroids, analysis of variance (ANOVA) was used for the reoccurring measurements. Statistical analysis was completed by using of the SPSS program for Windows, version 9.0 (SPSS, Cary, N.C., USA) with a 0.05 significance level.

Results

By random selection, a total of 70 patients were included, and a total of 64 patients completed the study. No statistically significant difference in gender was noticed between the two groups. The average age of the patients was 49 years and there was no statistically significant difference in age between the two groups (table 1).

With the PD-Q, we were able to assess the intensity of the current, strongest and average pain during the previous 4 weeks with a numerical scale (fig. 1–3), as well as the percentage of neuropathic pain in each patient (tables 2, 3).

The trend equation of the average values of the current pain shows an equal drop in the assessed score on the strongest pain in both the TF ESI (y = –0.55x + 8.9) and the IL ESI (y = –0.54x + 8.41) groups.
The trend equation of the average values of the strongest pain in the previous 4 weeks shows a somewhat faster drop in the TF ESI ($y = -0.56x + 6.75$) than in the IL ESI ($y = -0.46x + 6.25$) group.

The trend equation of the average values of the average pain in the previous 4 weeks shows a somewhat faster drop in the assessed score on the average pain in the TF ESI ($y = -0.45x + 6.25$) than in the IL ESI ($y = -0.46x + 6.25$) group. Comparing the first and the sixth measurement, we reach a statistically significant difference in both groups (Mann Whitney, $p = 0.030$) with the assessment of average pain in the previous 4 weeks.

Analyzing the average values of the total sum of points in the PD-Q, a dropping trend is confirmed for both groups. The trend equation for the TF ESI ($y = -1.1393x + 25.269$) shows a faster recovery than the IL ESI ($y = -0.8089x + 26.654$). A statistically significant difference in the two groups is proved (IL ESI, $p = 0.014$; TF ESI, $p = 0.001$; ANOVA; table 2).
The number of examined patients who graded the neuropathic pain positively can be seen to decrease in both groups. The neuropathic pain was graded positively by 28 (87.5%) patients at the first visit in the IL group and by 27 (84.4%) in the TF group. During the sixth visit, 6 months after the first visit, the neuropathic pain was graded positively by 23 (71.9%) patients in the IL group and by 19 (54.9%) in the TF group (table 3).

### Discussion

In our study, we compared the efficiency of the two ESI methods for chronic radicular pain by using the PD-Q. All ESIs, in both groups, were performed by the same physician and in that way the risk of altering performance was lowered, in comparison to several physicians administering the ESI. The average age of our patients was 49 years of age, which is in accordance with the previous research of Awald and Moskovich [8], which proved that the peak of lumbar disc herniation is in the fifth decade of life. Currently, CLRP is the most common neuropathic pain syndrome. Chronic back pain is characterized by a combination of neuropathic and nociceptive mechanisms of pain generation [9]. Kelly [10] suggests that pressure on the nerve results in functional loss and is rarely linked to pain. Certain facts corroborate this. The pathology of the disc and spinal stenosis with compression of the disc are considered to be asymptomatic findings in the patient [11–13]. The potent inflammatory properties of the nucleus pulposus include the presence of inflammatory mediators which cause an inflammatory reaction in the area of nerve roots and lead to continuous ectopic break outs, demyelination, decreased blood inflow in the ganglia dorsal horn, augmented endoneurial pressure, and slower execution of nervous impulses [14, 15]. Inflammatory reactions usually lead to an immunological response, which may cause an abnormally large generation of antibodies attacking the nerve tissue. Adjudged, it may also be connected to the growth of chronic radicular pain. Such inflammatory process worsens when influenced by pressure on the nerve root. The lumbosacral nerve root seems, possibly by means of its singularly delicate drainage system, to be particularly sensitive to the effect of pressure, and even minimal compression may lead to an edema of the nerve root, intraneural inflammation and hyperalgesia [16]. Therefore, it is clear that steroids used as anti-inflammatory drugs definitely have their place in the treatment of CLRP. Patients who experienced radiculopathy for a period shorter than 6 months had a positive response to the ESI in 70% of the cases, and patients experiencing symptoms for a period longer than 1 year had a positive response to the ESI in 50% of the cases [17]. Butterman [18] has shown 42–56% treatment efficiency with patients who had an IL ESI, while the

---

**Table 2.** Average sum of points by the PD-Q by visits and group

<table>
<thead>
<tr>
<th>Visits</th>
<th>IL ESI mean</th>
<th>IL ESI SD</th>
<th>TF ESI mean</th>
<th>TF ESI SD</th>
<th>p t test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>26.03</td>
<td>6.92</td>
<td>26.63</td>
<td>6.38</td>
<td>0.723</td>
</tr>
<tr>
<td>2 weeks</td>
<td>24.96</td>
<td>7.70</td>
<td>26.50</td>
<td>5.79</td>
<td>0.373</td>
</tr>
<tr>
<td>4 weeks</td>
<td>23.75</td>
<td>8.23</td>
<td>25.41</td>
<td>7.87</td>
<td>0.414</td>
</tr>
<tr>
<td>6 weeks</td>
<td>22.90</td>
<td>8.03</td>
<td>23.28</td>
<td>6.98</td>
<td>0.831</td>
</tr>
<tr>
<td>12 weeks</td>
<td>22.50</td>
<td>6.55</td>
<td>23.41</td>
<td>6.52</td>
<td>0.581</td>
</tr>
<tr>
<td>24 weeks</td>
<td>22.00</td>
<td>6.98</td>
<td>21.47</td>
<td>7.39</td>
<td>0.769</td>
</tr>
</tbody>
</table>

**Table 3.** Distribution of neuropathic pain by group

<table>
<thead>
<tr>
<th>Visits</th>
<th>IL ESI Negative (&lt;15%) n (%)</th>
<th>IL ESI Unclear n (%)</th>
<th>IL ESI Positive (&gt;90%) n (%)</th>
<th>TF ESI Negative (&lt;15%) n (%)</th>
<th>TF ESI Unclear n (%)</th>
<th>TF ESI Positive (&gt;90%) n (%)</th>
<th>Total n (%)</th>
<th>χ² test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>1 (3.1)</td>
<td>3 (9.4)</td>
<td>28 (87.5)</td>
<td>0</td>
<td>5 (15.6)</td>
<td>27 (84.4)</td>
<td>55 (85.9)</td>
<td>0.468</td>
</tr>
<tr>
<td>2 weeks</td>
<td>2 (6.3)</td>
<td>5 (15.6)</td>
<td>25 (78.1)</td>
<td>0</td>
<td>3 (9.4)</td>
<td>29 (90.6)</td>
<td>54 (84.4)</td>
<td>0.247</td>
</tr>
<tr>
<td>4 weeks</td>
<td>3 (9.4)</td>
<td>5 (15.6)</td>
<td>24 (75.0)</td>
<td>2</td>
<td>3 (9.4)</td>
<td>27 (84.4)</td>
<td>51 (79.7)</td>
<td>0.645</td>
</tr>
<tr>
<td>6 weeks</td>
<td>2 (6.3)</td>
<td>7 (21.9)</td>
<td>23 (71.9)</td>
<td>2</td>
<td>7 (21.9)</td>
<td>23 (71.9)</td>
<td>46 (71.9)</td>
<td>0.989</td>
</tr>
<tr>
<td>12 weeks</td>
<td>2 (6.3)</td>
<td>7 (21.9)</td>
<td>23 (74.2)</td>
<td>2</td>
<td>5 (15.6)</td>
<td>25 (78.1)</td>
<td>48 (75.0)</td>
<td>0.776</td>
</tr>
<tr>
<td>24 weeks</td>
<td>3 (9.4)</td>
<td>6 (18.8)</td>
<td>23 (71.9)</td>
<td>4</td>
<td>9 (28.1)</td>
<td>19 (59.4)</td>
<td>42 (65.6)</td>
<td>0.570</td>
</tr>
<tr>
<td>Total</td>
<td>32 (100)</td>
<td>32 (100)</td>
<td>64 (100)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The number of examined patients who graded the neuropathic pain positively can be seen to decrease in both groups. The neuropathic pain was graded positively by 28 (87.5%) patients at the first visit in the IL group and by 27 (84.4%) in the TF group. During the sixth visit, 6 months after the first visit, the neuropathic pain was graded positively by 23 (71.9%) patients in the IL group and by 19 (54.9%) in the TF group (table 3).
The painDETECT Questionnaire and Epidural Steroid Injections

The authors have no conflicts of interest to disclose.
References


