OBJECTIVE: Compare the interlaminar blocking technique with the transforaminal blocking, with regard to pain and the presence or absence of complications. Methods: Prospective, descriptive and comparative, double-blind, randomized study, with 40 patients of both sexes suffering from sciatic pain due to central-lateral or foraminal disc herniation, who did not respond to 20 physiotherapy sessions and had no instability diagnosed on examination of dynamic radiography. The type of blocking, transforaminal or interlaminar, to be performed was determined by draw. Results: We evaluated 40 patients, 17 males, mean age 49 years, average VAS pre-blocking of 8.85, average values in transforaminal technique in 24 hours, 7, 21, and 90 days of 0.71, 1.04, 2.33 and 3.84, respectively; the average VAS post-blocking for interlaminar technique was 0.89, 1.52, 3.63 and 4.88. The techniques differ only in the post-blocking period of 21 days and overall post-blocking, with significance of p=0.022 and p=0.027, respectively. Conclusion: Both techniques are effective in relieving pain and present low complication rate, and the transforaminal technique proved to be the most effective.

Keywords: Intervertebral disc displacement; Lumbosacral region; Discectomy.

INTRODUCTION

Lumbar disc herniation is the displacement of the nucleus pulposus contained in the intervertebral disc through the fibrous ring. This displacement can lead to compression and irritation of the lumbar nerve roots and dural sac, and is clinically characterized by sciatic pain. The etiology of sciatic pain is multifactorial. It can be caused by mechanical compression of the intervertebral disc and by the presence of micromovements of the root and dural sac, as well as by chemical irritation due to the presence of substances that diffuse from the herniated disc.

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release of inflammatory and nociceptive mediators from the nucleus pulposus.\textsuperscript{2-5} It is estimated that between 2% and 3% of the population have herniated lumbar discs, with a prevalence of 4.6% in men and 2.5% in women aged over 35 years. It is the most common diagnosis among degenerative alterations of the lumbar spine, and the main reason for surgery.\textsuperscript{1}

Initial treatment of herniated disc is usually conservative. Surgical treatment is the exception, and is reserved only for cases of failure of adequate conservative treatment, progressive neurological deficit, or cauda equina syndrome.\textsuperscript{1,9} Of the different techniques described in the literature, minimally invasive surgeries are currently more valued because of less tissue aggression, shorter hospitalization times, lower risk of anesthesia, and an earlier return to work activities.\textsuperscript{1,8-10}

The root block is a good option among the minimally invasive techniques for the treatment of a herniated lumbar disc. Using this method, it is possible to reduce the inflammatory response, improve the pain profile, reduce the consumption of analgesics, continue work activities, and eliminate the need for surgery in most individuals.\textsuperscript{8,11-13}

In patients refractory to appropriate conservative care, radicular block may be indicated in an attempt to delay or even prevent surgery. This can be performed via interlaminar and transforaminal techniques or via the caudal approach (through the sacral hiatus).\textsuperscript{1,14,15}

There are few studies found in the literature that compare blocking techniques – interlaminal or transforaminal – to determine which is the safest and most effective. This study was conducted to clear up these doubts and contribute significantly to relieving the symptoms of herniated discs.

METHODS

Forty patients were evaluated in this prospective, randomized, double-blind study. The work was authorized in advance by the Institutional Review Board, under number 015/2012, and the participants signed an informed consent form.

The inclusion criteria for the sample selection were patients with lumbosciatalgia secondary to a herniated disc, in a posterolateral, foraminal, or extraforaminal location, whether contained or uncontained, who did not respond after 20 physiotherapy sessions, and without instability diagnosed in a dynamic radiograph of the lumbar spine. We considered instability to be an angulation of the vertebral plateaus of 18° and excursion of more than 3 mm in the dynamic lumbar profile radiographs.\textsuperscript{16}

The exclusion criteria were patients with lumbosciatalgia caused by factors other than herniated disc, those who responded to conservative treatment in 20 physiotherapy sessions, or those with dynamic instability observed in the radiograph.

The visual analog scale (VAS) was applied to all patients both pre- and postblock.\textsuperscript{4,6,17} The blocking technique to use was determined by random draw. The number 1 represented the transforaminal technique and the number 2, the interlaminar.

The transforaminal blocking technique was performed with the patient in ventral decubitus, with a cushion under the abdomen. All patients were submitted to blocking of at least one level. We used a fluoroscopy apparatus to obtain the anteroposterior image and to identify the desired level of the spine, followed by an ipsilateral oblique “Scotty dog” angle. The six o’clock position of the pedicle was marked and infiltrated with 1% lidocaine using a 25-caliber 1.5-inch needle. A 22-caliber 3.5-inch Tuohy needle was directed towards the spine, with intermittent fluoroscopic guidance in the neural foramina such that the tip rested on the triangle formed by the nerve root medially, the pedicle bone superiorly, and the lateral edge of the foramina laterally. The position of the needle was confirmed by observing the flow of 2 mL of 68% ioversol contrast medium with 320 mg/mL of iodine in concentration injected into each level. Once the placement was confirmed, a solution was injected consisting of 5 mL of betamethasone phosphate at 40mg/mL, 2 mL of neo-bupivacaine at 0.25%, and 5 mL of distilled water, to make up a total volume of 10 mL.\textsuperscript{3,5,6,12,18} (Figures 1 and 2)

Figure 1. Transforaminal block. Fluoroscopic image.

Figure 2. Transforaminal block (in profile – for adequate viewing of the distribution of the contrast). Fluoroscopic image.

For the patients who underwent the interlaminar technique, we used a position similar to that of the transforaminal technique. The upper edge of the inferior ipsilateral lamina was marked, and the skin and tissue covering the target location were infiltrated. A lack of resistance is the key sign for having entered the epidural space. Once inserted into the epidural space, a lateral fluoroscopic view was obtained to ensure that the point of the needle remained in the posterior epidural space and the same volumes of the same medications as described for the transforaminal technique were injected. (Figures 3 and 4)

Following the block, the patients used the same analgesic medication in the hospital and upon discharge. The medication of choice was dipyrone 500 mg every six hours in the event of pain. The patients were only referred for motor physical therapy 90 days after the block. The VAS was applied immediately before...
COMPARISON OF THE EFFECTIVENESS OF RADICULAR BLOCKING TECHNIQUES IN THE TREATMENT OF LUMBAR DISK HERNIA

RESULTS

Of the 40 patients analyzed, 17 were male; the average age was 49.45 years. Twenty patients underwent the transforaminal blocking technique and 20 underwent the interlaminar blocking technique. In the interlaminar block group the average age was 50.05 years and of the 20 patients, 10 were male (50%) and 10 were female (50%). In the transforaminal block group, the average age was 48.85 years, with 7 male (35%) and 13 female (65%) patients.

Comparing the pre-block VAS scores with those from the 24 hour, 7, 21, and 90 day periods for both techniques, we found statistically significant results (p<0.05) for the entire period, regardless of the technique applied, as shown in Figure 5.

Analyzing and comparing the average VAS scores for the specific periods, we observed that the transforaminal technique had better outcomes in all the periods analyzed, as shown in Table 1.

When we analyzed the average score of the pre-block VAS and the average final post-block score between the two techniques, we observed a statistical difference in both, as shown in Table 2.

In the comparison of the final post-block average VAS between the transforaminal and interlaminar techniques, we observed a statistically significant greater improvement in pain with the transforaminal technique, as shown in Table 3.

As regards the various existing complications, we cite only two: one

the analgesic block, after 24 hours, and at 7, 21, and 90 days. Complications such as headache, sudden pain, lower back pain, temporary motor deficit, permanent motor deficit, and leakage of cerebrospinal fluid were clinically evaluated and described in specific medical reports.19,20

The pre- and post-evaluators were not told which technique was used for the patient, and they worked independently during the post-block follow-up period.

We used statistical analysis with parametric tests to evaluate the data with normal distribution, such as the analysis of the results of the transforaminal technique while in cases without normal probability distribution we used non-parametric tests. In this case, the statistical analysis was applied to the analysis of the results for the interlaminar technique, and to the comparison of the results of two techniques. For the estimate of the post-block average, a new set of data was generated using the results from each period, for each patient.

Table 1. Comparison of the average VAS scores for the techniques, by period.

<table>
<thead>
<tr>
<th></th>
<th>Pre-block</th>
<th>after 24 hrs.</th>
<th>after 7 days</th>
<th>after 21 days</th>
<th>after 90 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transforaminal technique</td>
<td>8.81</td>
<td>0.71</td>
<td>1.05</td>
<td>2.33</td>
<td>3.84</td>
</tr>
<tr>
<td>Interlaminar technique</td>
<td>8.89</td>
<td>0.89</td>
<td>1.53</td>
<td>3.65</td>
<td>4.88</td>
</tr>
<tr>
<td>p value</td>
<td>0.74</td>
<td>0.492</td>
<td>0.256</td>
<td>0.022</td>
<td>0.195</td>
</tr>
</tbody>
</table>

Mann-Whitney Test (Comparison of two nonparametric independent samples).

Table 2. VAS averages – global pre- and post-block.

<table>
<thead>
<tr>
<th></th>
<th>Average pre-block VAS</th>
<th>Average post-block VAS</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.85</td>
<td>2.32</td>
<td>0.000</td>
</tr>
</tbody>
</table>

p – Wilcoxon Statistical Significance Test (comparison of two dependent samples).

Table 3. VAS averages – post-block by technique.

<table>
<thead>
<tr>
<th></th>
<th>Pre-block</th>
<th>Post-transforaminal</th>
<th>Post-interlaminar</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.85</td>
<td>1.97</td>
<td>2.71</td>
<td>0.027</td>
</tr>
</tbody>
</table>

p – Mann-Whitney Statistical Significance Test (comparison of two nonparametric independent samples).
case of lower back pain in the transforaminal technique group, and one case of headache in the interlaminar group. In the patient with the headache, the dura mater was not punctured during the procedure.

DISCUSSION

Radicular blocks can be a good propaedeutic in the relief of symptoms and the restoration of quality of life in patients with herniated discs.

Among the various techniques described, the interlaminar, the transformaminal, and the caudal approach are the most frequently used. In terms of effectiveness, several studies have unequivocally shown that epidural injections of steroids are effective for what they propose, although they offer only short- to medium-term benefits. 

In our study we found significant improvement in the post-block pain profile, regardless of the technique used. Most studies indicate greater safety and less lumbar discomfort as the advantages of the interlaminar technique, while the transformaminal technique is more effective in reducing pain in the long term. 13,15,18,22-24

In terms of the pain profile, we observed that even though there was an improvement from both techniques, the transformaminal technique was more effective in reducing the pain profile, especially after 21 days post-block, and this improvement continued through to the end of the study.

Regarding the safety of the procedure, both techniques proved to be safe in our study, and there were no significant complications. We believe that radicular blocks are a safe option, with good results for relief from sciatica caused by herniated discs in the medium term.

CONCLUSION

The transformaminal blocking technique was safer and more effective in the treatment of sciatic pain secondary to herniated lumbar disc, when compared to the interlaminar technique.

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REFERENCES