Patient Satisfaction After Transforaminal Epidural Steroid Injection: One Year Follow Up

Transforaminal Epidural Steroid Enjeksiyonu Sonrasında Hasta Memnuniyeti: Bir Yıllık Takip

ABSTRACT Objective: Patients whom were admitted to Algology clinic for radiculopathic pain due to herniated discs were determined and analysed prospectively. We analysed 30 patients prospectively with radiculopathy in order to assess the effectiveness of transforaminal epidural steroid injection. Material and Methods: Procedures were performed between the dates 01.11.2005-01.11.2006. The transforaminal injection was performed at the level of disc herniation. All patients received a combination of 80 mg triamcinolon acetate + 2 mL levobupivacaine HCL 2.5 % in total, a 4 mL volume was injected. All patients were evaluated at 2 week, 3, 6, and 12 months after their first transforaminal epidural steroid injection. Patients were asked to rate their pain on the Numerical Rating Scale (VNRS). Also, each patient rated their level of satisfaction according to a 4-point scale at the end of follow up period. Results: The most significant improvement in the pain score was seen at second week. VNRS was 5.03 ± 1.62 at the initial assessments and reduced to 2.06 ± 1.36 at the end of one year. 21 patient (70%) underwent only one injection, whereas 9 patient (30%) underwent for the second injection during one year period. Any complications have been observed at the patients. Conclusion: Transforaminal epidural steroid injections may offer significant pain reduction up to 3 months initiation of treatment in patients with radiculopathic pain and according to our first experience blunt needle may also help to reduce complications.

Key Words: Injections, epidural; radiculopathy; patient satisfaction


Anahit Kelimeler: Enjeksiyon, epidural; radikülopati; hasta memnuniyeti


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managing chronic spinal pain.\textsuperscript{1,2} In the recent years
the popularity of caudal, interlaminar, and trans-
foraminal epidural injections has been waxing and
waning as the most effective method in managing
low back pain.\textsuperscript{2,3}

One major concerns about lumbar and caudal
epidural steroids is that their true efficacy might
not be evident in clinical trials because the injecta-
tate fails to reach the desired target.\textsuperscript{3}

Increases emphasis is placed on fluoroscopi-
cally guided, target specific injections, guarantees
the proper injection and delivery of medication.
Therefore, modern study design focus on fluoros-
copically guided transforaminal injection techni-
ques. They have the theoretical advantage of
delivering the injectate to the site of the pathology
in the anterior epidural space.\textsuperscript{4}

This study was undertaken to assess the effec-
tiveness of transforaminal epidural steroid injec-
tions for radiculopathic pain after one year follow up
period prospectively.

\section*{MATERIAL AND METHODS}

ASA physical status I-II, 30 patients were admitted
to Algology clinic for radiculopathic pain due to
herniated discs. All patients underwent transfor-
minal epidural steroid injections after obtaining in-
formed consents. Procedures were performed in
Akdeniz University Faculty of Medicine, Depart-
ment of Anesthesiology Division of Algology be-
tween the dates 01.11.2005-01.11.2006. Patients
presenting with one or more of the following cri-
tera were excluded: 1) known allergy or contrain-
dications for steroid injections\textsuperscript{5} 2) previous lumbar
epidural steroid injections 3) previous lumbar spi-
ne surgery 4) unstable neurological deficits and ca-
uda equine syndrome, mental retardation 5) other
back pain disorders like spinal stenosis, failed back
surgery 6) diabetic patients 7) coagulation defects
and patients on anticoagulant therapy and 8) Infec-
tion at puncture site 9) disc protrusion more than
one level, 10) patients who have disc extrusion or
sequestration on magnetic resonance imaging
(MRI). 11) straight leg test less than 30° or more
than 70° on physical examination 12) pain radia-
ting both legs. All patients were examined and
imaging studies were reviewed prior to the injecti-
on by the same pain management physician. All
procedures were performed in the department of
Anesthesiology and division of Algology at Univer-
sity Hospital of Antalya/Turkey.

All of the patients had a previous MRI study
with positive findings. The level of the transfor-
minal injection was chosen depending of MRI find-
ings and physical exam. Before the procedure
patients were sedated with 1 mg midazolam intra-
venously. Standard monitoring (pulse oximetry,
non-invasive blood pressure and five lead electro-
cardiogram) was instituted before procedure. All
patients received oxygen 2 L min\textsuperscript{1} via nasal canu-
la. All procedures were performed with the patient
in prone position and under fluoroscopic guidan-
ce. After positioning the patient in the optimal po-
sition and cleaning the skin with povidone-iodine
solution and the skin overlying the target area was
anesthetized with lidocaine 1%.

For the transforaminal approach, a 22 gauge
curved blunt needle was used. We did not prefer
to use nerve stimulator because blunt needles are
less likely than sharp needles to enter vital structu-
res, nerves, and vessels.\textsuperscript{6} The needle was placed in
the superior and anterior aspect of the correspon-
ding neuroforamen under frequent fluoroscopic
guidance, using standard technique described in
the literature.\textsuperscript{5} The needle placement was confir-
mmed after injection of non-ionic contrast material
(Omnipaque 300), demonstrating the contrast go-
ing through the foramen. At any session, the trans-
foraminal injection was performed at the level of
disc herniation. After the needle was determined
radiographically to be in the appropriate position,
0.5-1 mL of non-ionic contrast material was injec-
ted to document appropriate contrast spread along
the spinal nerve into the epidural space without
intravascular uptake.

Next, a combination of 2 mL 80 mg triamci-
nal acetate with 2 mL levobupivacaine HCL
2.5% in total, a 4 mL volume was injected. The
curved blunt needle was then withdrawn and the
patients were transfered to the recovery area whe-
re they were observed 60 minutes prior to discharge home.

Satisfaction with pain control was measured at the end of follow up period using subjective 4-point scale, designed specifically for every cultural level of patients (not satisfied at all, only slightly satisfied, somewhat or partly satisfied, satisfied) in order to understand easily.

The satisfaction rating scale described above has not been validated. Therefore, verbal numerical rating Scale was also used and assessed. Within one hour before the procedure, the patients were asked to rate their pain on the Verbal Numerical rating Scale (VNRS, 0-10) by a nurse not involved in the performance of the procedures. All patients were followed up at 2nd week, and 3rd, 6th, 12th months period after their first transfomaminal epidural steroid injection. Only patients completed the follow up period (pre-injection, post-injection and follow-up) were included in the study.

DATA ANALYSIS
Mean and standard deviations of antropometric ve demographic datas were given. For VNRS comparisons, Friedman test was used, and Wilcoxons signed rank test with Bonferroni correction was applied. Significance was accepted at 0.05.

RESULTS
The study population included only patients with radiculopathy, who were then treated with transfomaminal epidural steroid injection under fluoroscopic guidance. The age, Initial VNRS, 2. week VNRS, 3. month VNRS, 6. month VNRS and 12. month VNRS and numeric rating scale scores are presented in Table 1. The most significant improvement in the pain score was seen at second week. VNRS scores showed significant decreases (P<0.05).

Using the 4-point rating scale as described above in the method section, we classified 70% patients were satisfied with the procedure and 30% were not satisfied after the procedure. Those 9 of the patient underwent for the second injection at the end of third month. 55.5% of these patient were somewhat or partly satisfied. After one year follow up those 5 patients were slightly satisfied (Table 2).

21 patients (70%) underwent one epidural steroid injection and they had no signs of pain radiation nor positive straight leg test on physical examination, 9 (30%) underwent for the second injection at the end of third month. Second injection was performed when the VNRS scores were four and above. 4 patients who did not have benefit from second transfomaminal steroid injection were sent to neurosurgery for consultation. No complications occur in any of the patients.

DISCUSSION
High levels of phospholipase A2, an enzyme involved in the production of prostaglandin and leukotrienes during inflammation, have been found in herniated discs, and may be involved in the generation of radiculopathic pain.7,8 Epidural steroid injection have been used to treat radiculopathic pain, with varying degrees of effectiveness.9,10

Transfomaminal lumbar epidural steroid injections have better profile in terms of therapeutic efficiency in managing radiculopathic pain than

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<th>TABLE 1: Descriptive statistics.</th>
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<td><strong>N</strong></td>
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<td><strong>AGE</strong></td>
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blind interlaminar epidural injections, as well as fluorooscopically directed caudal epidural injections.\textsuperscript{10,11}

Epidural steroid injection not done under fluoroscopy may fail to reach the target area in up to 30\% of cases, even in experienced hands.\textsuperscript{7,9,12} Results of studies with transforaminal epidural injections have been encouraging.\textsuperscript{11,13} The transforaminal approach has been the favourite approach by most interventional pain physicians for the treatment of lumbar radicular symptoms over the last several year. This is supported by some controlled trials.\textsuperscript{14,15,16}

The currently published standards indicate that ESIs should be performed under fluoroscopic guidance with contrast injection to ensure appropriate localization of the needle and confirmation of the appropriate delivery of the injectate to the target area.\textsuperscript{7,17}

Vad et al reported a 84\% “success” in patients with lumbosacral radiculopathy who underwent transforaminal ESI, compared to 70\% (21 patients) in our patients at first injection.\textsuperscript{14} After second injection our success rate increased up to 86\% (26 patients) which was similar to Vad’s study. Our study showed benefical effect in decreasing the pain scores. Karpin’s trial demonstrated fewer positive results.\textsuperscript{18}

26 patients had significant improvement of VNRS scores directly after injections, which was largely maintained also at follow-up. Our study partially supports the findings of Riew et al that transforaminal ESI decrease the need for further procedures or medications.\textsuperscript{15} However this study has obvious limitations: First, this study was performed prospectively and only one year follow up interval for pain improvement were analysed. However, it is commonly agreed that epidural steroid injections are particularly helpful for pain control in the first weeks after injection.\textsuperscript{19} Second, the sample size is small. For the purpose of the study, only patients with one level lumbar disc herniation were enrolled the study. This eliminates a large proportion of patients typically seen by other interventionalists because of this our clinic’s patient population is low according the other clinic’s. Thus, prospective randomised controlled studies which evalutes the different invasive treatment modalities must be performed in the future. Third, all procedured were performed by the same physician. The results of this study therefore reflect the experience of one practioner and may not be generalized.

The most common and worrisome complications and side effects of epidural injections are two types: Those related to the needle placement and those related to drug administration.

Complications related to needle have raised the issue of the safety of blunt vs. sharp needles for doing these procedures.\textsuperscript{20} The complications include paresis, paralysis and/or death associated with segmental root, facet joint and transforaminal injections. Furman and colleagues reported that the rate of intravascular injection was 21.3\% for S1 transforaminal epidural steroid injection attempts, 8.1\% for injections at the lumbar level and 19.4\% for cervical transforaminal injections.\textsuperscript{21,22} Heavner et al concluded that blunt needles are less likely than sharp ones to enter vital structures, especially those with a tough fibrous capsule or sheath (eg, kidney, nerve bundle) and/or produce hemorrhage.\textsuperscript{6} Thus, blunt needles may be preferable to sharp needles for performing interventional pain procedures.

Although we did not compare blunt needle with sharp needle this study reflects our first experience with blunt needles. Also, in our patient population we did not encounter any problem related with the use of curved blunt needle. None
of these complications listed below occur in our study group: dural puncture, spinal cord trauma, paralysis, paresis, infection, hematoma formation, abscess formation, subdural injections, nerve damage, intravascular injection, and effects of steroids.23,24

In conclusion, patients who received a transforaminal ESI for lumbar disc herniation had better pain improvement for short-term periods, but in most of the patients this outcome is not long lasting. Also, blunt needles may be preferable for performing transforaminal ESI to reduce the needle related complications. Further studies are necessary to determine which lumbar disc herniation patients may benefit from transforaminal approach and the comparison of blunt needles with sharp needles according to their advantages for performing injections.

REFERENCES


