Role of Caudal Epidural Corticosteroid Injection in the Management of Sciatica

**Objective:** To determine the effectiveness of caudal epidural corticosteroid injection in patients with sciatica.

**Study Design:** Descriptive Case series

**Place and Duration:** Orthopaedic Surgery Unit Mardan Medical Complex Teaching hospital Bacha Khan Medical College Mardan KPK from May 2010 to June 2011.

**Materials and Methods:** 42 patients of sciatica were injected with caudal epidural injection 80 mg of methylprednisolone in combination with 3 ml of 2% plain xylocaine and 3 ml of normal saline. Efficacy of the injection was determined by improvement in the Oswestry Disability Index (Version 2) and Visual Analogue Scale (VAS) measured pre-injection and at follow-up visit at 3, 6, 10 and 12 weeks. Patient with post-injection Oswestry Disability Index $\geq 40\%$ or pain score $\geq 5$ at 3 weeks were injected a second injection. No more than two injections were given to any patient presented.

**Results:** All the patients enrolled in our study had pre-injection mean Oswestry Disability Index 58.4% and pain score 4.5 on Visual Analogue Scale. Twenty four (57.1%) patients responded well to one injection and resulted in maximum improvement of Oswestry Disability Index(mean 10.4%) and pain score(mean 1) at 12th week.18(42.8%) patients however received another injection at 3rd week and resulted in improvement of Oswestry Disability Index(mean10.8%) and pain score(mean1.5) in 13(30.9%) patients while 5(11.9%) patients showed no improvement of Oswestry Disability Index (mean 59%) and pain score (mean 4.8) at all.

**Conclusion:** Caudally administered epidural steroid injection is an effective modality of treatment in sciatica with good results.

**Key words:** Epidural injection, corticosteroid, sciatica.

**Introduction**

Sciatica is defined as unilateral, well-localized leg pain which approximates to the dermatomal distribution of the sciatic nerve and normally radiates to the foot or toes. It is often associated with numbness or paraesthesia in the same distribution. The lifetime prevalence is at least 5.3% in men and 3.7% in women, representing 6% of total work disability. Rarely seen before the age of 20, incidence peaks in the fifth decade and declines thereafter. The first report of an epidural injection used to treat low back pain (and sciatica) was in 1901 by Cathelin who injected cocaine via the caudal route. In 1953, Lievre et al reported the use of epidural hydrocortisone in 20 patients. The effects of epidurally administered corticosteroids stem from their ability to inhibit the synthesis of prostaglandins, their anti inflammatory effects, and their ability to inhibit ectopic discharges from injured sensory nerves. Lumbar epidural steroid injection can be accomplished by one of three methods: caudal (C), interlaminar (IL), or transforaminal (TF). To ensure accurate identification of the epidural space, several authors have suggested that needle placement be performed under fluoroscopic guidance. However, this procedure is time-consuming and costly and requires specialized personnel and radiological facilities. The most frequently used technique to identify the caudal epidural space is based on feeling the ‘pop’ on penetrating the sacrococcygeal membrane, after the determination of the sacral hiatus by palpating the sacral cornua. Positive results from epidural steroids vary from 20% to 95% and may depend on route of injection. Many non-anesthetists prefer caudal approach to the epidural space for this injection because it carries a lower risk of inadvertent thecal sac puncture and intrathecal injection.

Despite the theoretical basis, and longevity of practice of epidural steroid for sciatica, there is still uncertainty about the efficacy of the procedure and a lack of consistency in outcomes in the studies that have been conducted in this area.. The aim of our study was to determine the effect of caudally administered epidural
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Material and Methods

All eligible patients of both gender and aged 20 to 70 years, presenting to the Out-Patient Department (OPD) / Accident and Emergency (A & E) Department of Orthopaedic Surgery Unit Mardan Medical Complex Teaching Hospital Bacha Khan Medical College Mardan KPK from May 2010 to June 2011 with a clinical diagnosis of unilateral sciatica and in whom conservative treatment of at least 6 weeks had failed were included in the study. Sciatica was defined as leg pain radiating below the knee, reduced straight leg raising (SLR), and a positive sciatic nerve stretch test. Pre-injection Oswestry Disability Index (Version 2) and Visual Analogue Scale (VAS) were calculated for each patient. The Oswestry Disability Index (ODI) is considered the “gold standard” of low back functional outcome tools.\(^{15}\) It is a widely used, ten-question paper and pencil measure of disability resulting from low back pain. Patients answered the Oswestry Disability Index questionnaire. The score ranges from 0 to 100 with 0% to 20% interpret minimal disability, 21%-40%: moderate disability, 41%-60%: severe disability, 61%-80%: crippled and 81%-100% bed-bound.\(^{16}\) Patients rated their pain on Visual Analogue Scale (VAS) of 0 to 10 with 0 representing no pain and 10 the worst pain they had ever experienced. No patient was included unless he had an Oswestry Disability Index of more than 20% or pain score of 3 or more. Exclusion criteria included spinal canal stenosis or previous lumbar spine surgery; epidural steroid injection; bleeding diathesis; spondylolisthesis, infection, pregnancy, allergies to steroids and use of anticoagulants. After patient informed consent and approval of the Ethical Committee of the hospital, relevant history, physical examination and X-ray Lumbosacral spine AP & lateral view were taken. The procedure of injection was performed in the operation room. The patient was positioned prone and routine preparation and draping were done in the sterile fashion. The needle puncture site at the sacral hiatus, was anaesthetized liberally from skin and subcutaneous tissues down to periostum with 2% lignocane 2 to 5 ml. Twenty –two gauge spinal needle, 3.5 inches (B. Braun, Melsungen Germany) was introduced into the sacral hiatus and advanced to cephalad direction 1.5 cm into the epidural space from the sacrococcygeal membrane. The needle position within the caudal epidural space was confirmed by loss of resistance and negative regurgitation of blood or cerebrospinal fluid while the patient was asked to perform Valsalva’s maneuver. Each patient received caudal epidural injection of 80 mg of methylprednisolone in combination with 3 ml of 2% plain xylocaine and 3 ml of normal saline. After the procedure each patient was transported to the recovery room where hemodynamic variables were monitored and recorded every 5 min for 30 min. The abilities to ambulate and void without any nausea and vomiting were documented in all patients before they discharge home. Each patient was reevaluated 3 weeks after initial injection. Patients with post-injection Oswestry Disability Index ≥40% or pain score ≥5 at 3 weeks were administered a second injection. No more than two injections were given to any patient. Subsequently, all patients were evaluated at 6, 10 and 12 weeks to determine the efficacy of injections. The data was analyzed using SPSS version 11. Mean, Mode, Median, Percentages, Frequencies and ratios were calculated where necessary. No statistical test was applied because the study design was descriptive. The data was presented in table where necessary.

Results

A total of 42 patients were included in our study. The mean age was 44.7 years (range 20-70) with mode 40 and median 45.\(^{17}\) Among these, 30(71.4%) were male and 12(28.5%) were female. Twenty five (59.5%) patients had sciatica of the right side while 17(40.4%) patients had left sided sciatica. All patients had pre-injection mean Oswestry Disability Index 58.4% and pain score 4.5 on Visual Analogue Scale. Twenty four(57.1%) patients(16 male, 8 female) responded well to one injection and resulted in maximum improvement of Oswestry Disability Index(mean 10.4%) and pain score(mean 1) at 12th week as shown in table 1.18(42.8%) patients however received another injection at 3rd week and resulted in improvement of Oswestry Disability Index(10.8%) and pain score(1.5) in 13(30.9%) patients(10 male, 3 females) while 5(11.9%) patients(4 male, 1 female) showed no improvement of Oswestry Disability Index(mean 59%) and pain score(mean 4.8) at all. There was no gross difference in gender response to methylprednisolone injections. The pain scores and Oswestry Disability Index also did not differ significantly between patient receiving single injection and those who received second injection after failure to achieve desired response from the first injection. No patients received a third injection. No major complications were observed.

Table I. Mean Oswestry Disability Index and pain score of 24 patients who received one Caudal epidural injection.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>3rd week</th>
<th>6th week</th>
<th>10th week</th>
<th>12th week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oswestry Disability Index(Mean)</td>
<td>32.3</td>
<td>24.5</td>
<td>18.2</td>
<td>10.4</td>
</tr>
<tr>
<td>Visual analogue Scale(Mean)</td>
<td>3.2</td>
<td>2.7</td>
<td>1.5</td>
<td>1</td>
</tr>
</tbody>
</table>

Discussion

Sciatica is a common condition that is a major...
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The role of epidural steroid injections in the treatment of sciatica has generated much discussion and debate over the last 50 or so years, and studies have produced highly variable results. In our study Twenty-four (57.1%) patients responded well to one injection and resulted in maximum improvement of Oswestry Disability Index (mean 10.4%) and pain score (mean 1) at 12th week while Singh and Kaur using post-injection Oswestry Disability Index and Visual Analogue Scale noted symptomatic improvement in 97.5% of the cases, with good results in 65% and fair results in 32.5% at third week. They concluded that caudally administered epidural steroid injections are a safe and effective modality of treatment in lumbar disc prolapse with good results in short term and possibly long term in some patients. A local study at Ghsurki Trust Teaching Hospital Lahore on 50 patients concluded that caudal epidural steroid injection is a safe and effective mode of treatment for low back pain in patients with lumbar disc herniation. It provides pain-free period to enable the patient for physiotherapy, which helps in early recovery. The treatment is not only effective clinically but also cost effective. In a prospective, double-blind, randomized, case-control study symptoms improved in 132 patients (72.1%) following caudal epidural steroid injection with outcome tool being Oswestry Disability Index. These authors concluded that caudal epidural injection containing steroid preparations demonstrated better and faster efficacy. In our study we used the caudal approach for epidural injection without image intensifier because using fluoroscopy or ultrasonography is not always possible due to time, cost-effectiveness and personnel availability. However in our study 57.1% patients improved with one injection, 30.9% patients improved with two injections while 11.9% patients did not respond favorably even with two injections. In a study by White, the authors reported successful placement of a needle in only 70% of cases of non-fluoroscopically guided (NFG) epidural steroid injections, whereas the reported success rate for blind caudal epidural steroid injections was only 48%. Stitz and Sommer reported a success rate, without fluoroscopy, of 74%. Ackerman and Ahmad reported that lumbar epidural steroid injection by the transforaminal approach is significantly more effective in providing pain relief than epidural steroid injection using the caudal or interlaminar approaches and they attributed this observation to a higher incidence of steroid placement in the ventral epidural space when the transforaminal method is used. A meta-analysis of 11 trials with a total of 907 patients on the use of lumbar epidural steroid injections for sciatica, using the end-point of near or total pain relief as a beneficial outcome, revealed the odd ratio for short-term benefit (up to 60 days) with lumbar epidural steroid injections for sciatica was 2.61, compared with placebo. Odd ratio for long-term benefit was reduced at 1.87. This beneficial effect was independent of the route of injection, with odd ratio for benefit being 3.8 for the caudal route and 2.43 for the lumbar translaminar route.

The post-injection follow-up period in our study was twelve weeks. One study, in 158 patients, showed that the benefit of epidural steroid, evident after 3 and 6 weeks had disappeared by 3 months and, after 12 months; there were no differences in incidence of back surgery between groups. Similarly The WEST (Wexsepo Epidural Steroids Trial) Study, a multicentre, double-blind, randomized, placebo-controlled on 228 patients documented that epidural steroid injections offered transient benefit in symptoms at 3 weeks in patients with sciatica, but no sustained benefits in terms of pain, function or need for surgery. This study had Oswestry Disability Index and Visual Analogue Scale as post-injection outcome tools like our study but had used 3 injections one week apart and had a longer follow up (52 weeks). Our results have been good and those patients who have not responded to conservative therapy have returned to their occupation and hobbies. This study thus offers encouraging results. However we feel that with a larger case series, a longer follow up and refinement of the procedure a fair conclusion can be drawn with regard to the efficacy and otherwise of this treatment modality.

Conclusion

Caudal epidural steroid injection is fairly safe, and complications are unusual. Based upon the results of our study we can conclude that caudally administered epidural steroid injection is an effective modality of treatment in sciatica with good results.

References