ORIGINAL ARTICLE

OUTCOME OF CAUDAL EPIDURAL INJECTIONS IN CHRONIC LOW BACK PAIN

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ABSTRACT

Background: Low back pain is a common problem. The aim of this study was to find the therapeutic efficacy of caudal epidural injections in chronic low back pain.

Methodology: This descriptive study was conducted at Department of Orthopedics, Khyber Teaching Hospital Peshawar, from January 2009 to October 2009. Patients of 20-70 years age with low back pain not responding to oral medications and physiotherapy were included in the study. Caudal epidural block consisting of 9 ml of bupivacaine 0.5% and 1 ml steroid were given. The initial pain response was assessed using multiple outcome measures which included Numeric Rating Scale, Oswestry Disability Index 2.0, MacNab and Prolo pain assessment criteria. Additional data including short-term effect (1 week) and medium-term effect (3 months), were collected by a structured proforma.

Results: Sixty patients were included in this study with average age 45 years, and male to female ratio of 2.8:1. Significant pain relief (>50%) was demonstrated in 43(71%) of patients and functional status improvement was demonstrated by a reduction of 40% in Oswestry Disability Index score in 49(81%) patients.

Conclusion: Caudal epidural injections of bupivacaine and steroid are effective in patients with chronic function-limiting low back pain.

KEY WORDS: Low back pain, Caudal epidural injection, Pain relief.

INTRODUCTION

Low back pain (LBP) is a common problem. Approximately 80% Americans experience LBP during their lifetime. An estimated 15-20% develop protracted pain, and 2-8% has chronic pain. Every year, 3-4% of the population is temporarily disabled, and 1% of the working-age population is disabled totally and permanently because of LBP. LBP is second only to the common cold as a cause of lost work time; it is the fifth most frequent cause for hospitalization and the third most common reason to undergo a surgical procedure. In United States acute LBP (also called lumbago) is the fifth most common reason for physician visits. About nine out of ten adults experience back pain at some point in their life, and five out of ten working adults have back pain every year.[1] Productivity losses from chronic LBP approach $28 billion annually in the United States. The most common area affected is low back because the lower back supports most of body weight.[2-4]

LBP is defined as chronic after 3 months because most normal connective tissues heal within 6-12 weeks unless patho-anatomic instability persists. A slowed rate of tissue repair in the relatively avascular intervertebral disc may impair the resolution of chronic LBP. Traumatic or degenerative conditions of the spine are the most common causes of chronic LBP. A number of anatomic structures of the lumbar spine have been considered as the origin of lower back pain.[5-9]

Many studies have shown significant improvement with caudal epidural injections with or without steroids in patients with chronic LBP.[10,11,12] In our set up, caudal epidural blocks are routinely used to support non-operative treatment for chronic LBP and our anecdotal perception is that a considerable proportion of patients report substantial pain relief after this procedure. However, there is a paucity of studies exploring the prediction of the therapeutic efficacy of a caudal epidural block. Selecting patients with chronic LBP who would benefit from a caudal epidural block would save health care costs.

The aim of this study was to find the short and medium-term therapeutic efficacy of caudal epidural bupivacaine and steroid injections in chronic LBP.

MATERIAL AND METHODS

This descriptive study was conducted in Department of Orthopedics, Khyber Teaching Hospi-

tal, Peshawar, over a period of 10 months, from January 2009 to October 2009.

Sampling method was of convenience. Patients more than 20 years and less than 70 years with chronic function-limiting low back pain of at least 6 months duration not responding to oral medications, short wave diathermy and physiotherapy, were included in the study. Patients with evidence of disc herniation and those who had undergone and failed to show positive response to facet joint nerve blocks were excluded. Patients with low back pain due to fractured vertebrae, pressure on nerve roots in spinal canal or uncontrolled psychiatric disorders, were also excluded from the study.

All patients included were examined and investigated after taking detailed history. History regarding demographic status, duration of LBP, and medications used, was recorded.

The severity of backache was assessed by using pain rating scores using the Numeric Rating Scale (NRS), and Prolo and Macnab criteria. Similarly, work status and functional status was assessed by Oswestry Disability Index 2.0 (ODI).

Informed consent was obtained from all the patients.

All injections were performed in orthopaedic operation theatre. The caudal block was performed with the patient lying prone. After appropriate disinfection, the skin over the caudal spine was anesthetized with 2-3 ml of xylocaine 2%. Subsequently, a mixture of 9.0 ml of local anesthetic (bupivacaine 0.5%) and 1mL of methyl prednisolone 40mg (depomedral) was injected through sacral hiatus by using 20 Gauge spinal needle. The position of needle was checked by injecting 2.0 ml of air and auscaltating with a stethoscope before i njecting medicines in the epidural space. The patients were kept under observation for at least 15 minute after termination of the caudal epidural block.

The patients were routinely followed up in the orthopaedics outpatient clinic, 6 weeks and 12 weeks. The initial (15-30 min) pain response was prospectively collected using a visual analogue scale. For immediate-term response analysis, we asked patients to score the degree of pain reduction in relation to the pain level before the caudal epidural block.

Besides patient age, sex, and marital status, the following general health indicators were asked: general life satisfaction, general health, and whether the patient smokes. In addition, patients were asked about other clinical variables including the first episode and the number of episodes of lower back pain, maximum pain level, influence of different provocation movements, and pain alleviation by motion. The following outcome variables were considered: pain reduction 15-30 min after injection (immediate effect); pain reduction for more than 1 week (6 week usually short-term effect); and pain reduction for more than 3 months (medium-term effect). Responders were defined as those who reported a reduction in pain of more than 50%.

Data was entered in software SPSS version 10.0. Descriptive statistics was used to calculate mean and standard deviation of age, gender, profession, and socio-economic status, severity of low back pain and effectiveness of injection therapy. Frequency and percentages were calculated for all categorical data.

RESULTS

Sixty patients with LBP between ages 20-70 years were studied. Out of these 44 (74%) were males and 16 (26%) females. Thirty-six (60%) patients belonged to poor families, 18 (30%) to average, while 6 (10%) to rich families.

The mean follow-up period was 3 months. Only one patient suffered from paraesthesia for 5-6 hours post injection, in the rest of the patients no complication was seen.

After 3 months (medium-term effect), pain relief of more than 50% persisted in 43 (71%) patients. While less than 17 (28%) of patients experienced no relevant immediate, short-term, or medium-term pain relief. Final over view of outcome of caudal epidural block in low back pain is given in Table 1.

Table 1: Pain relief outcome of caudal epidural injections in low back pain.

Time of review	Back pain relieved	
	Number of patients	Percentage
One week	47	78%
6 weeks	45	75%
12 weeks (3 months)	43	71%

Functional assessment results assessed by the ODI showed significant improvement in the functional status from baseline to 3 months. Reduction of ODI scores of at least 40% was seen in 81% of patients at 6 weeks, and then 12 weeks (3 months) as shown in Table 2.

Table 2: Functional outcome of caudal epidural injections in low back pain.

Time of review	Improvement in functional score	
	Number of patients	Percentage
One week	49	81%
6 weeks	49	81%
12 weeks	49	81%

DISCUSSION

Results of this study of 60 patients demonstrated significant pain relief over 12 weeks period. Similarly, ODI used for functional assessment showed significant improvement with at least 40% reduction in 81% patients. This study provides modest results with an average relief for 12 weeks with single epidural block injection. Strict criteria were incorporated into the study and the patients only judged not to have facet joint pain were included in the study, thus avoiding the criticism of including the patients with facet joint pain in the study contributing to the negative results.

With regards to medical necessity and indications of lumber epidural injections either by interlaminar approach or caudal approach, significant controversy exists. Multiple guidelines and systematic reviews have identified indications for caudal epidural injections in positive reports to treat radicular pain from herniated lumbar intervertebral discs. Two prospective evaluations[10,11] have shown positive results in patients without disc herniation or radiculitis, in chronic function-limiting LBP. In the present study it is illustrated that pain relief can be achieved with judicious use and appropriate evaluation in patients without facet joint pain. These results are similar to the patients receiving caudal epidural injections either with or without steroids with disc herniation and radiculitis,[13] but superior to patients suffering from spinal stenosis and post-surgery syndrome.[14,15] The results of this study reinforce and validate the previous findings in prospective evaluations, and are generalizable to interventional pain management settings with appropriate diagnostic techniques.

In the era of evidence-based medicine, pragmatic or practical clinical trials measuring effectiveness are considered more appropriate than explanatory trials measuring efficacy.[16-18]

The underlying mechanism of action of epidurally administered steroid and local anaesthetic injections is still not well understood. It is believed that the achieved neural blockade alters or interrupts nociceptive input, reflex mechanism of the afferent fibers, self sustaining activity of the neurons, and pattern of central neuronal activities.[19,20] Further corticosteroids have been shown to reduce inflammation by inhibiting either the synthesis or release of a number of pro-inflammatory mediators and by causing a reversible local anaesthetic effect.[19,21] In contrast, local anaesthetics have been described to provide short to long-term symptomatic relief based on various mechanisms. It has been described that multiple pathophysiologic mechanisms may be involved in chronic pain including noxious peripheral stimulation, excess nociceptive process resulting in the sensitization of the pain pathways at several neuronal levels[22] and excess release of neurotransmitters causing complex central responses including hyperalgesia or wind-up,[21] resulting in an increase in nociceptive sensitization of the nervous system[23,24] and phenotype changes which are also considered as part of neuronal plasticity.[23] Consequently, it has been postulated that local anaesthetics may provide analgesia by suppression of nociceptive discharge, the block of axonal transport,[25] the block of reflex sympathetic arc,[24] the block of sensitization,[22] anti-inflammatory effect 76, and blockade of axonal transport of nerve fibres at lower concentrations compared with those that are necessary for a block of a nerve conduction.[25] The long lasting effect of local anaesthetics in epidural injections has been demonstrated in a multitude of studies.[26]

Corticosteroids have therapeutic effects on radicular symptoms caused by lumbar disc herniation due to their anti-inflammatory function. Furthermore, corticosteroids reportedly ameliorate early vascular permeability increases in spinal nerve roots and inhibit reductions in nerve conduction velocity induced by epidural application of nucleus pulposus. Finally corticosteroids may exert anaesthetic like action on nociceptive C fiber condition independent of anti inflammatory properties.[27] However, corticosteroids are also known to possess direct neurotoxic effects on peripheral nerve tissue[28,29] unlike local anesthetics.

Overall, the evidence in this report demonstrates caudal epidural injections in patients negative for lumbar facet joint pain confirmed by controlled, comparative local anesthetic block with a criteria of 80% pain relief, which is not sustainable after prior painful movements for appropriate duration of action of local anesthetic, without disc herniation or radiculitis, may be treated with caudal epidural injection with steroids, providing approximately 12 weeks of relief with each procedure.

CONCLUSION

Caudal epidural injection of bupivacaine and steroid is effective in patients with chronic function-limiting low back pain without facet joint pain, disc herniation, or radiculitis in over 70% of patients.

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