Original Article

Epidural triamcinolone for management of low back pain with radiation- a comparative study of two dose regime

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Abstract:

Background: *Low back pain is a very common specially in elderly people. Relief of pain is associated with decrease in morbidity, shorten hospital stay and increase patients' satisfaction. Nerve block by epidural steroid and local anaesthetic is an acceptable method to reduce low back pain.*

Aim and objective: *The present study was performed to compare low dose (40 mg) and high dose (80 mg) Triamcinolone to see their effectiveness and side effects in controlling low back pain.*

Method: *This study was a randomized controlled trial. 60 patients with low back pain with radiation, and with positive CT/MRI support has been randomly selected by blind envelop method and divided into two groups, 30 patients in each. Group-A, patients received inj. Triamcinolone (40 mg) and Group-B patients received inj. Triamcinolone (80 mg) epidurally.*

Results: *Both dosage produced effective analgesia in low back pain as assessed by visual analogue scale (VAS) and verbal rating scale (VRS) for the period up to 30 days after administration. Haemodynamic changes showed no significant difference between the two drugs after 30 days. Both drugs produced significant rise of fasting plasma glucose and leucocytosis for the period up to 30 days after administration.*

Conclusion: *Low back pain can be effectively reduced by epidural low dose Triamcinolone (40 mg).*

Key Words: *Low back pain, triamcinolone, epidural*

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Introduction

Back pain is an extremely common complain and a major cause of work disability worldwide.[1] Common cause of low back pain are paravertebral muscle and lumbo sacral sprain / strain, intervertebral disc disease or herniated disc, facet syndrome, congenital abnormalities, tumour, infection, arthritis[2]. Approximately 80-90% of low back pain is due to sprain/strain associated with lifting heavy objects, falls, or sudden abnormal movement of the spine. Another important cause of low back pain is intervertebral disc disease. Intervertebral disc bear at least one third of the weight of the spinal column. Their central portion, which is called the nucleus pulposus, is composed of gelatinous material early in life. Disc pain may be due to (1) protrusion or extrusion of the nucleus palposus posteriorly or (2) loss of disc height resulting in the reactive formation of bony spurs from the rims of the vertebral bodies above and below the disc. Intervertebral disc disease most commonly affects the lumber spine because it is subjected to the greatest motion and the posterior longitudinal ligaments is thinner at lumbar.[2-5]

Over the past two decades, the biochemical contributions to low back pain have been the focus

of much attention. In the late 1970's the nuclear material of the vertebral disc was found to be antigenic and capable of producing an in vitro autoimmune reaction. It was hypothesized that a chemical radiculitis might explain radicular pain in the absence of a more mechanical stressor. Phospholipase A2 (PLA2), a potent inflammatory mediator, has demonstrated to be released by discs following injury. The anti-inflammatory and immunosuppressive effects of glucocorticoids are largely secondary to their inhibition of the immune responses of lymphocytes, macrophages, and fibroblasts. NSAIDs principally inhibit prostaglandin synthesis, corticosteroids interfere earlier in the inflammatory cascade by inhibiting PLA_2 actions and thereby curtailing both the leukotriene and prostaglandin mediated inflammatory response.[4]

Low back pain management may involve the following after full pain evaluation. Simple measures e.g. rest, exercise, heat and cold therapy, systemic drug therapy, nerve blocks, electrical stimulation and psychotherapy. Epidural steroid injections are most effective for symptomatic relief of pain associated with nerve root compression. Epidural steroid injection is clearly superior to local anaesthetics alone[4]. Methyl prednisolone and recently triamcinolone are most commonly used in low back pain through epidural route.

An epidural steroid injection delivers steroids directly into the epidural space in the spine. Sometimes additional fluid (local anesthetic and/ or a normal saline solution) is used to help 'flush out' inflammatory mediators from around the area that may be a source of pain.[5]

Considering the effectiveness of steroids and lack of any comparative study between 40mg and 80mg triamcinolone, present study was performed to compare these two dosing, and to see their effectiveness in decreasing low back pain and associated complications.

Methods

The present study comprised of 60 patients of low back pain with radiation and a positive CT/MRI support. The purpose of the study was clearly explained to each subject and recruited only after they had given written consent. Patients with known allergy to study drugs, with haemorrhagic diathesis, diabetes, and preexisting neurological, local skin infection were excluded. After being recruited for the study, all patients were randomly divided into two groups (30 patients each).

Group A: The patient received Inj. Triamcinolone 40 mg epidurally

Group B: The patient received Inj. Triamcinolone 80 mg epidurally

Protocol outline for epidural steroid injection [ESI]

The patients were placed in the lateral decubitus position with the involved side down. The loss of resistance technique was applied to identify the epidural space at the level of suspected or proven nerve root involvement. The patient will be warned that the injection might cause transient radicular pain.

The experimental drug was injected along with 1% lignocaine 5ml. The needle was clear of steroid with a small volume of lignocaine to avoid a fistulous track. The decubitus position was maintained for 10 minutes. Test for improvement was checked by straight leg raising test (SLR), 10 minutes after being moving the patient supine; this provides immediate feedback to the patient about the potential benefit for ESI.

Patients were told about the interval during which the local anesthetic effect wears off (30 to 90 minutes) and the steroid effect materializes (24 to 48 hours).

Haemodynamic, Blood sugar and leukocyte count were observed during and after ESI. Steroid increase blood sugar level and it has also anti-inflammatory action. So blood sugar and leukocyte count were monitored. Pain assessment was measured using visual analogue scale (VAS) and verbal rating scale (VRS).

Data were expressed as mean ± standard error of mean (SEM). Data were managed and analysed using computer program Statistical Package for Social Science (SPSS) for Windows, version 12.0. A p value less than 0.05 were considered significant.

Results

The mean (±SEM) of age, sex, height and weight of the subjects (are shown in Table 1). in Group A and Group B were similar. The VAS and VRS scores show that the pain reduces significantly in each group A from the base line value up to 30 days. But when compared between the groups, the VAS scores shows a lower value in Group A at all points up to 30 days but the difference is not significant (Table-II). But in VRS scoring system Group B shows a significant reduction of pain with low VRS scores up to 30 minutes after epidural injection (Table-III).

Table-I

Characteristics of the patients in two groups

Variables	Group A	Group B	Significance level
Age	52.70 ± 1.67	533.5 ± 1.95	NS
Sex (M:F)	35:15	39:11	NS
Height	164.63 ± 1.08	164.64 ± 0.96	NS
Weight	64.56 ± 1.12	65.70 ± 1.05	NS

Statistical analysis was done by student's't' test.

Legend: NS - non-significant

No difference was seen in the heart rate of patients at different duration of the same groups. And in between groups there were no significant differences. The Systolic and diastolic blood pressure showed gradual increase after epidural administration from baseline in each group. But no difference were observed between groups A and B. In Group A, the mean (± SEM) fasting plasma glucose of the subjects measured at baseline, after 10 min, 30 min, 1 hour, 24 hour, 3 days, 7 days and 30 days of epidural administration of triamcinolone showed significant rise over time. In Group B, the mean (± SEM) fasting plasma glucose of the subjects measured at baseline, after 10 min, 30mm, 1 hour, 24 hour, 3 days, 7 days and 30 days of epidural administration of triamcinolone also showed significant rise (Table-IV). But when compared between groups, the values were a little increased in group B than in group A, but not significant. Blood leukocyte count also showed a similar result like blood glucose.

Table-II

Visual Analogue scale pain score in two groups

Time	Visual Analogue scale pain score		P value
	Group A	Group B	
Baseline	7.50±0.11	7.10±0.12	0.0158
10 minutes	6.10±0.15*	5.80±0.16*	0.1745
30 minutes	4.48±0.13*	4.40±0.14*	0.6763
1 hour	3.82±0.14*	3.87±0.13*	0.7941
24 hours	3.90±0.15*	3.80±0.12*	0.6038
3 days	4.10±0.14*	3.92±0.13*	0.2977
7 days	4.50±0.19*	4.35±0.18*	0.2545
30 days	4.93±0.19	4.72±0.15	0.3878

Statistical analysis was done by student's 't' test.

Table-III

Verbal rating scale pain score

Time	Verbal rating scale pain score		P Value
	Group A	Group B	
Baseline	2. 18±0.05	2.15±0.06	0.7017
10 minutes	1.65±0.08*	1.40±0.09*	0.0405
30 minutes	1.10±0.08*	0.88±0.06*	0.0302
1 hour	0.83±0.05*	0.68±0.06*	0.0577
24 hours	0.80±0.05*	0.75±0.08*	0.5973
3 days	0.84±0.04*	0.79±0.07*	0.5366
7 days	0.93±0.09*	0.95±0.09*	0.8755
30 days	1.13±0.10*	1.10±0.09*	0.8240

Statistical analysis was done by student's't' test.

Table-IV

Biochemical changes in two studied groups

Time	Plasma Glucose			Leukocyte		
	Group A	Group B	pvalue	Group A	Group B	Pvalue
Baseline	5.60.12	5.700.18	0.6449	80166157.13	8136.66141.29	0.5712
10 minutes	5.80.11	5.90±0.19	0.6498	8043±155.11	8130.00±139.75	0.6778
30 minutes	5.90.13	6.38±0.18	0.0331	8305.33±137.47	8413.33±139.10	0.1386
1 hour	6.12±0.14	6.70±0.12	0.0022	8353.331138.02	7930.00142.06	0.0351
24 hours	6.17±0.12	6.850.14	0.0004	8405.33±138.02	8020.00±142.06	0.0546
3 days	6.10±0.11	6.30±0.12	0.2222	8353.33}138.02	8106.66±144.94	0.2207
7 days	6.09±0.15	6.150.19	0.8048	8200.30146.22	8112.66144.94	0.6713
30 days	5.96±0.15	5970.19	0.9671	8126.66±166.91	8156.66±137.77	0.8900

Discussion

Pain is a common phenomenon that almost everyone experiences in life. Acute pain is generally a short-term illness for which specific therapy over a limited period of time can result in total elimination of the symptoms and the cause. Appropriate therapy can be provided only after the patient has been evaluated and a diagnosis determined. When pain lasts longer than 6 weeks, the physical aspects of the persisting symptoms precipitate further, physical and nonphysical consequences that became progressively devastating. Whereas in acute pain the symptoms disappear with the use of specific therapy, patients with chronic pain require perpetual coordination of all modes of therapy. Even then the practitioner must realize that just eliminating pain is not the answer to all the patient's problems. The patient must participate actively in the treatment planning and all aspects of the therapeutic program. Even with maximal therapy, some chronic pain will not disappear: The best treatment then is to help the patient understand the condition and provide coping strategies. All those involved in the care of patients with chronic low back and lower extremity pain must be sensitive to the many factors that contribute to complaints of pain. They must also be willing to step outside the boundaries of their special training and appreciate the holistic attitude that is necessary to evaluate and treat these patients. [6]

Epidural steroid injections produce significant pain relief lasting 1-6 months in patient with chronic back pain. It also produces an improvement in functional activity and a general sense of well being. It is an effective alternative in the management of chronic non malignant back pain. Their use was predicated on the reality that something other than physical compression of a nerve root by a herniated disc or entophyte was contributing to complaints of radicular pain[6]. In the present study all the patients had nerve root irritation as suggested by the MRI reports. Low dose triamcinolone found to be effective as high dose triamcinolone, as seen by VAS and VRS, but the side effects of the high dose were more.

In our study, there was no significant difference in the effectiveness of the two dosing of triamcinolone in controlling pain as seen by VAS, but in VRS, triamcinolone showed significantly less pain for the initial 30 minutes. Corticosteroids are well known for their anti-inflammatory properties[7], and also stabilize neural membranes, suppress ectopic neural discharges[8], and may have direct anesthetic effect on small unmyelinated nociceptive C-fibers[9, 10]. Painful lumbar intervertebral discs are innervated by substance-P containing nerve fibers[11], unmyelinated C-fibers, and thinly myelinated $A_{ä}$ fibers[12] that provide a substrate on which corticosteroids and local anesthetics exert therapeutic benefit.

Changes (heart rate, systolic blood pressure and diastolic blood pressure) of low dose and high dose triamcinolone administration showed no significant difference.

In the present study low dose and high dose triamcinolone both produced significant rise of plasma glucose for the period up to 30 days after administration and then returned to normal levels. The dose of depo-steroids used is not inert in the body.[13] In some patients the depo steroids have an unexpectedly long half life and can lead to Addison's disease or Cushing's syndrome. Kay[14] showed that after repeated steroid injections the endogenous steroid production takes 1-3 months to return to normal.

Both low dose and high dose triamcinolone produced leucocytosis for the period up to 7 days after administration. This may be due to the local Anaesthetic effect but it reduced after 7 days showing the anti inflammatory effect of the steroids. The changes in blood leukocyte count after administration of low dose and high dose triamcinolone showed no significant difference.

Sample size of the study could not be matched to a statistically calculated one due to limited number of cases available during the period of study. But both dosing showed its efficacy in reducing the radicular low back pain which was comparable to the largest meta-analysis study.

Conclusion:

Low back pain can be effectively reduced low dosing technique, predictable side effects on glycaemic status.

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