
ORIGINAL ARTICLE**A Comparative study of Triamcinolone acetone with Methylprednisolone sodium succinate in the management of chronic low back pain**

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ABSTRACT

Background: Low back pain is the most common complaint of young adults in case of intervertebral disc herniation. Its incidence is high in India due to difficult working as well as living environment.

Objectives: The present study was carried out to compare the efficacy of injecting epidural triamcinolone with methylprednisolone sodium succinate in the management of chronic low back pain.

Patients and Methods: This study was carried on patients presenting with low back pain who had MRI proven lumbar disc prolapsed at different levels and were not responding to conservational management. The study was carried out on 50 subjects divided into 2 groups, Group A and Group B of 25 each. Group A was given injection triamcinolone 80 mg with 2 ml of 0.5%

bupivacaine diluted in 8 ml of normal saline into the lumbar epidural space. Group B was given injection methylprednisolone sodium succinate 80 mg with 2 ml of 0.5% bupivacaine diluted in 8 ml of normal saline into the lumbar epidural space.

Observations: The success rate in group A was found to be 68% and the success rate in group B was found to be 80%. The visual analog scale score in group A was decreased by 20% after one week and by 50 – 60% at the end of 6 months. However, in group B, the visual analog scale score decreased by 30% after one week and by 70-80% at the end of 6 months. **Conclusion:** Methylprednisolone sodium succinate was found to be more efficacious in the management of chronic low back pain than triamcinolone acetone.

Keywords- Triamcinolone acetone, Methylprednisolone, Low back Pain

INTRODUCTION

Low back pain (LBP) continues to be a leading cause of disability. Its life time incidence in the United States is 80% [1]. The data of prevalence in India is not available but the prevalence is high because of difficult working environment and living conditions. This is a disabling condition of young adults and is the most common cause of limitation of physical activity [1]. In most of the cases the pain will resolve on its own within a few weeks, but recent evidence indicates that the relief from 'self healing' is followed by a significant incidence of recurrence, usually in less than a year. It is an unfortunate fact that symptoms result from degenerative changes in the spine – an ongoing process that has no cure.

Lumbar disc herniation seems to be one of the most frequent cause of LBP, nevertheless it is well known that many patients, complaining of LBP as well as radiating leg pain suggesting sciatica, did not show lumbar disc herniation in magnetic resonance imaging (MRI) and computed tomography (CT) [2]. There is emerging evidence suggesting that this 'paradox' must be probably attributed to the fact that nerve root compression is not sufficient by itself to

cause nerve root pain [3], since painful radiculopathy may be the end result of a local chemical contribution from injured tissue [4]. Treating patients suffering from LBP can also be challenging and this is probably why so many treatment methods ranging from conservative management to surgical management have been introduced and are supported by literature [2].

Although the actual mechanism of action is not fully known, there is evidence that corticosteroids achieve pain relief by inhibition of pro inflammatory mediators namely neural peptides, phospholipase A, acid hydrolases, histamine and kinin. In addition to this they also cause a reversible local anaesthetic effect (decreased sensitivity of nerve roots to irritants) [5, 6].

The treatments used to correct this problem can be categorized as conservative management, epidural steroid injections and surgical intervention [7, 8]. Epidural steroid injection (ESI) is a non surgical treatment for management of low back pain as well as radicular pain caused by herniated lumbar disc. The low back pain of mechanical origin, accompanied by signs and symptoms of nerve root irritation, respond to ESI with

gratifying results. It relieves pain, improves function and reduces the need for surgical intervention; thus, being more cost-effective. Therefore longer acting ESI are being used and are being slowly but surely established as a reliable mode of minimally invasive treatment modality in many orthopaedic centres of the world as they are shown to provide analgesia for variable periods [9, 10].

In the present study, an attempt was made to study the efficacy of injecting epidural triamcinolone acetonide in the managements of chronic low back pain and its comparison with methylprednisolone sodium succinate – a commonly used treatment option for chronic low back pain

PATIENTS AND METHODS

This is a prospective comparison study, conducted over a period of one year from March – April 2014 to March – April 2015. This study was approved by the institutional ethics committee. Written and informed consent was obtained from each patient. During this period 50 patients presented to the hospital with the chief complaint of low back pain radiating to the legs not responding to conservative management (i.e. non steroidal anti-inflammatory drugs – NSAIDS),

antidepressants, oral steroids, transcutaneous electrical nerve stimulation (TENS), traction as well as ultrasound and MRI proven lumbar disc prolapsed at different levels were included in the study. The cases with motor deficit, prior lumbar disc surgery, diabetes, bleeding disorders and those who were not willing to participate in the study were excluded from the study.

This study was carried out on 50 subjects divided into two groups, Group A and Group B consisting of 25 cases each. Group A received Injection Triamcinolone 80 mg with 2 ml of 0.5% bupivacaine diluted in 8 ml of normal saline into the lumbar epidural space and group B received Injection Methylprednisolone sodium succinate 80 mg (single dose vial of 1 ml consisting of 40 mg of the drug; we used 2 such vials) with 2 ml of 0.5% bupivacaine diluted in 8 ml of normal saline into the lumbar epidural space.

After taking detail history and thorough clinical examination, the findings of straight leg raising test (SLR), motor and sensory deficit and deep tendon reflexes (DTR) were noted. Routine laboratory investigations including prothrombin time, bleeding time, clotting time, platelets and random blood sugar was done. The patients were randomly

selected to receive either Triamcinolone or Methylprednisolone sodium succinate. All patients were given ESI in sitting position. The ESI was given by a trained anaesthesiologist in operation theatre following painting and draping under aseptic precautions. During the procedure, peripheral venous access was secured in all the patients with 20 G intravenous cannula on the dorsum of hand. ECG, heart rate, non-invasive blood pressure (NIBP) and peripheral oxygen saturation of the patient were monitored.

The disc level for ESI was located by surface anatomy. Using strict aseptic techniques, 2 ml of 1% lidocaine was infiltrated into the skin and subcutaneous tissue for surface anaesthesia. An 18 gauge tuohy epidural needle was inserted into the epidural space of herniated lumbar disc through trans-lumbar route with the bevel upward and stylet in position. The epidural space was identified by loss of resistance to air technique.

After the procedure, patients were advised to lie supine in case of bilateral symptoms and to lie in left or right lateral position in case of isolated left or right sided symptoms respectively. During this period they were observed for any possible complications.

The patients were first reviewed after one week, and then further follow up was carried out at one month and six months after receiving the ESI.

During the follow up, visual analog scale (VAS) was used to evaluate the response to treatment. VAS score was used for assessment of current back and lower extremity pain, ranging from 0 (no pain) to 10 (worst pain). If a patient subjectively reported a decrease in pain within one week after a single injection, no more injections were administered. If the patient didn't have improvement within a week, a second injection was given. Patients with low back pain not responding to a second dose of ESI were considered for surgery. If the patient did not have subjective improvement even after a second dose of ESI, it was considered as failure of ESI. The success rate of ESI was presented as a percentage. All patients were advised to take mild analgesics (Tab. Diclofenac 75 mg oral 8 hourly for 1 day) during the post injection period. No special exercise program or other physical therapy was employed after the injection.

RESULT

In group A, out of 25 patients eight patients did not improve with ESI. Among them, six patients had to undergo surgery and two

patients did not come for follow up. Considering those who did not come for follow up as failures, the success rate in group A was 68%. All the six patients who underwent surgery had multilevel disc prolapse (L4-L5 and L5-S1) (Table 1).

In group B, out of 25 patients five patients did not improve with ESI. Among them three had to undergo surgery and two patients did not come for follow up. Considering those two patients as failures we found that the success rate in group B was 80% (Table 1). %. All the three patients who underwent surgery had multilevel disc prolapse.

The most common single level disc prolapse was L4-L5 followed by L5-S1.

In Group A, the VAS score decreased by approximately 20% after one week and by approximately 50 – 60% at the end of 6 months. In Group B, the VAS score decreased by approximately 30% after one week and by approximately 70-80% at the end of 6 months.

No complications were observed except for local pain over injection site in two patients.

Table 1: Comparative efficacy of Triamcinolone acetone with Methylprednisolone sodium succinate in the management of chronic low back pain

Group	No. of cases	No. of dropouts	No. of cases responded to treatment
A	25	02	17 (68%)
B	25	02	20 (80%)

Table 2: The mean VAS scores in group A and group B patients

Sr. No.	VAS in Group A	VAS in Group B
1.	After one week – 8	After One week – 7
2.	After One month – 5 to 6	After One month – 4
3.	After Six months – 4 to 5	After Six months – 2 to 3

DISCUSSION

Epidural steroid injections have been used for decades in the management of low back pain. It is minimally invasive and an effective treatment modality in many orthopaedic centers. The first reported use of epidural steroid was in 1952 by Robecchi and Capra [11] and it's still an integral part of non surgical management of low back and radiating pain. They used hydrocortisone in the first sacral route. Epidural steroid is found to be beneficial in

prolapse intervertebral disc, spinal canal stenosis and degenerative disc disease whereas it is found to have no benefits in non specific back pain, facet syndrome, metastatic and metabolic causes [12, 13].

ESI following epidurography (fluoroscopic guidance) is found to be superior to the blind technique [14]. It is found that in 30 – 70 % of the cases, there is inappropriate placement of the drug during ESI even with the hands of an experienced performer [14].

Though the short term effect i.e. less than 6 weeks is superior in the transforaminal method than the intralaminar or interspinous technique of epidural steroid deposition, the long term outcome is found to be similar [15]. There are several types of steroids being used for epidural steroid injections like hydrocortisone, betamethasone, triamcinolone and methylprednisolone. However, different studies have failed to prove superiority of one steroid above the other [16, 17, 18].

Methylprednisolone as it has a relatively longer duration of action [18]. Methylprednisolone sodium succinate has the same metabolic and anti-inflammatory actions as methylprednisolone. When given by parenteral route and in equimolar quantities, the two compounds are

equivalent in biological activity. The relative potency of methylprednisolone sodium succinate and hydrocortisone sodium succinate, as indicated by depression of eosinophil count, following intravenous administration, is at least four to one. It has been demonstrated that sodium succinate ester of methylprednisolone is rapidly and extensively converted to the active methylprednisolone moiety after all routes of administration.

In Bogduk series, out of 40 studies and more than 4000 patients on lumbar and caudal steroid injections, 36 studies recommended in favour of the use of ESI in lumbosacral pain [19]. Similarly Koes et al. reviewed 12 randomized controlled trials to assess the efficacy of epidural steroid injections for low back pain and found six studies confirming that ESI were indeed effective [20]. In several studies patients were followed after ESI for periods ranging from weeks to one year, showed to be beneficial [21, 22].

The treatment of low back pain with radicular involvement has remained a matter of controversy because of multifactorial etiology and varying therapeutic modalities. NSAIDS, antidepressants, parenteral steroids, transcutaneous electrical nerve

stimulation (TENS), traction and ultrasound have been used alone or in combination but without any proven efficacy [23]. Surgery is particularly indicated but its failure rate can be as high as 30%. The incidence of persistent back pain after surgery was found to be inversely proportional to the degree of herniation [24]. Hence, ESI was found to be an alternative treatment modality with good results in symptomatic herniated disc. The findings of present study are also quite similar to these earlier findings.

In our study, the use of methylprednisolone sodium succinate in group B for the management of low back pain showed significant decrease in symptoms of herniated discs as well as improvement in the functional status of the patients.

Methylprednisolone is a corticosteroid and is well known for its anti-inflammatory properties [25] and also stabilizes neural membranes, suppresses ectopic neural discharges [26], and may have direct anaesthetic effect on small unmyelinated nociceptive type C fibres [27].

In our study, in group A, we found that 17 (68%) cases showed improvement and in group B 20 (80%) cases showed improvement. Our findings are quite similar to Swerdlow et al. and Winnie et al. who

reported the success rate ranging from 63 to 80% [28, 29]. Also a significant decrease in VAS in Group B was observed. The decrease in VAS was 30% after one week and by 70-80% at the end of six months.

There are several factors for varied results like patient selection, technique of injection, dosage of steroid and follow up. In this study the patients who had to undergo discectomy had large herniated discs, multilevel disc prolapsed and obesity. In this study, only two patients reported with local pain at the injection site, which subsided without treatment.

Conclusion

The results of present study indicate that the ESI following lumbar radicular pain using methylprednisolone sodium succinate has a better outcome than Triamcinolone acetonid. However, the frequency of dose of ESI may vary depending upon the outcome of the procedure.

Conflicts of Interest: **None to declare**

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