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PV Margi
Associate Professor,
Department of Anesthesia,
Gadag Institute of Medical
Sciences, Gadag,
Malasamudra, Karnataka,
India

Swetha J Gouda
Associate Professor,
Department of Anesthesia,
Gadag Institute of Medical
Sciences, Gadag,
Malasamudra, Karnataka,
India

Corresponding Author:
Swetha J Gouda
Associate Professor,
Department of Anesthesia,
Gadag Institute of Medical
Sciences, Gadag,
Malasamudra, Karnataka,
India

Evaluation of epidural injection of steroid methyl prednisolone, Linocaine and normal saline through the lumbar epidural route in the management of low back pain

PV Margi and Swetha J Gouda

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Abstract

Background: Epidural injections have been used for decades for treatment of low back pain. The use of extradural medication to relieve back-ache has been studied in recent years and encouraging results have been published. The present study deals with the epidural injection of steroid methyl prednisolone, lignocaine and normal saline combination in the management of low back pain.

Method: The present prospective study was conducted on 50 patients with low back pain from Karnataka Institute of Medical Sciences Hospital, Hubli were selected. All the patients were admitted and referred from the orthopedic department of the Karnataka Institute of Medical Sciences, Hubli to the Pain Clinic of our Anesthesiology Department, after they failed to improve with two weeks of conservative therapy such as bed rest, skin traction and non-steroidal anti-inflammatory drugs. Out of 50 patients 36 were males and 14 were females (n=50). Study was explained to the patients and the informed consent was obtained from all the patients.

Result: The pain relief was assessed by VAS and the score was excellent in 23.91%, good in 47.82%, satisfactory in 15.22 and poor in 13.42%. There was a very mild fall of 10 mmHg of BP below pre-operative value in 5 patients and two patients complained of headache. Other than these no complications have been encountered.

Conclusion: Epidural injection of corticosteroids methyl prednisolone and local anaesthetic lignocaine is an excellent technique for the relief of chronic low back-ache. The side effects are few compared to surgical management. The success rate is high in comparison with other conservative methods. So it can be safely recommended for the relief of low back pain where conservative methods have failed to relieve the pain before embarking on surgical procedure (laminectomy).

Keywords: Low back pain, epidural injection, vas scale, steroid methyl prednisolone, linocaine

Introduction

Pain is the one of the commonest symptoms to lead a patient to seek medical advice and whatever the cause, it demands relief.

Pain is derived from the latin word, Poena, meaning a Penalty or Punishment and is defined by the International Association for the Study of Pain (IASP, 1979) as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage”. We need to note that pain is not just a physical sensation, the sense of helplessness or depression modify it. The patient is to be believed about his pain, if we are to succeed in relieving it. Hence the saying “the pain is what patient says hurts”. The fact that there is an emotional background to his pain is not the patient’s fault. If it is found difficult to tackle that emotional problem, we have to learn to look on it as an inadequacy on our part and not as the patient’s fault.

Physical, emotional, social and spiritual factors interact adding to the pain experience. Pain may serve a number of functions. It can be protective as the burnt fingers of a Hansens patient who cannot appreciate pain, being an example, it could be defensive as in the immobilization of a inflamed joint or it could be diagnostic as seen in acute abdomen. However there are many conditions such as carcinomatosis with bony meatastases where pain serves no useful function at all and only makes a sad situation harder to bear.

Though back pain is a problem which needs no introduction. It has haunted mankind since time immemorial. Its history can be traced back to the time when man evolved from the quadruped to the orthograd animal and the relatively straight spine of the former developed, forward and backward curves as it yielded to the forces of gravity.

The variety of its causes makes an accurate diagnosis possible only after careful history taking, detailed physical examination and investigations without ignoring any psychological background for the symptoms. Even after all this the diagnosis may still remain elusive. Low back pain and sciatica are accountable for important medical and socioeconomic problems [1].

Low back pain is the commonest symptom in orthopaedic and pain clinics. They are mostly idiopathic in nature. With increasing luxuries and sedentary life styles minimal use of muscles particularly those of the trunk and lower extremities and with faulty posture, the back becomes more susceptible to stress and degenerative changes of the back structures leading to low back pain. Due to its high prevalence (only second to common cold). It causes considerable disability and loss of working hours resulting in economic wreckage to the patient and the society at large. Since many surgical interventions provide disappointing long term results and with inherent risk of morbidity and mortality of any major operation, non-surgical. Semi-invasive, low cost, least time consuming therapeutic measures are obviously welcome.

Major causes of low back pain are, Idiopathic, Prolapse intervertebral disc, Osteoarthritis, Spondylolisthesis, Spondylosis, Spinal stenosis, Spina bifida occulta. Kuslich *et al.* identified intervertebral discs, facet joints, ligaments, fascia, muscles, and nerve root Dura as tissues capable of transmitting pain in the low back [2].

Epidural injections have been used for decades for treatment of low back pain. The use of extradural medication to relieve back-ache has been studied in recent years and encouraging results have been published. However, the efficacy of most interventions is often unclear [3].

This clinical study deals with the epidural injection of steroid methyl prednisolone, lignocaine and normal saline combination in the management of low back pain.

The aim of present study was to evaluate fifty cases of low back ache treated by epidural injection of steroid methyl prednisolone, lignocaine and normal saline through the lumbar epidural route.

Most patients with low back pain receive various types of conservative treatment. The duration of these and therefore the patient's discomfort was protracted. Their management may throw a considerable burden on general practitioners and hospital outpatient departments.

Epidural injection of steroids has been established valuable and widely used technique to relieve low back and radicular pain.

The purpose of this work is to evaluate the value of this procedure as one of the conservative methods currently available for the treatment of low back pain.

Methods

The present clinical study was undertaken to evaluate the efficacy of epidural injection of methyl prednisolone 80 mg along with 0.5% lignocaine 8 ml (2 ml of 2% lignocaine mixed with 6 ml of normal saline) for the relief of lumbosacral pain and sciatica without neurological involvement of bowel, bladder and lower limbs.

Approval from the institutional ethical committee has been obtained. The procedure has been explained to the patients and the informed consent was obtained from all the patients. 50 patients with low back pain from Karnataka Institute of Medical Sciences Hospital, Hubli were selected. All the patients were admitted and referred from the orthopaedic

department of the Karnataka Institute of Medical Sciences, Hubli to the Pain Clinic of our Anesthesiology Department, after they failed to improve with two weeks of conservative therapy such as bed rest, skin traction and non-steroidal anti-inflammatory drugs. Out of 50 patients 36 were males and 14 were females (n=50).

Preanaesthetic evaluation

During the pre-operative visit detailed history of low back pain was noted including radiation to lower limbs or not, aggravating relieving factors. The General Physical Examination, Cardiovascular system, Respiratory system and the Vertebral column were examined.

Examination of spine for any deformities, movements, their range and limitation, paraspinal spasm, tenderness was done. Examination of the lower limbs for the following was done.

1. Sensations
2. Gait
3. Muscular wasting
4. Power and tone of the muscles at different joints
5. Knee jerk, Ankle jerk and plantar reflexes.
6. Tone of EHL (Extensor Hallucis Longus) and FHL (Flexor Hallucis Longus)

Lasegue's Staigh Leg Raising Test was performed on both sides and any difference noted.

Routine Laboratory investigations were done along with X-ray of the lumbar spine-AP and Lateral view were done.

The physical status was determined according to ASA classification

Patients without systemic disease and female patients without pregnancy and gynaecological complaints were chosen for the study. All the patients selected for the study were either ASA grade I or II physical status.

Patients with Cauda syndrome, haemorrhagic diathesis, neurological disease and skin sepsis were excluded from the study.

Patients with low back pain or sciatica due to the

1. Lumbar disc derangement
2. Spondylosis
3. Spondylolisthesis
4. Facetal syndrome were chosen for this study.

Proceduce

All the necessary equipments, emergency drugs were checked and kept ready before starting the procedure. The patient was put on the table and pulse rate and blood pressure were recorded. Intravenous line was secured.

The patient was placed in the left lateral position and full length of back exposed. The part was painted and draped. A scrupulous aseptic precautions were ascertained. The site of the puncture usually L3-L4 space was marked with the thumb. The sterile epidural tray containing the following arranged;

1. 10 ml syringe filled with Methyl prednisolone 80 mg (2ml), Lignocaine 2 ml 2%, and Normal Saline 6 ml.
2. 10 ml syringe (Glass) to test the loss of resistance.
3. 5 ml syringe containing lignocaine 1% 1 ml for local infiltration.
4. 18 G Tuohy needle
5. Fenestrated towel
6. Cotton swabs
7. Sponge holding Forceps

8. Gallipot
9. Disposable Needles.

A skin wheal of local anaesthetic was raised at the skin mark using a fine hypodermic needle and the deeper tissues were infiltrated in the line of needle track. In order to locate the epidural space. Tuohy Needle is ideal, which is less likely to penetrate the dura. The Tuohy Needle No. 18 G was inserted in the midline through the skin wheal and advanced till the needle is steady. The stiletto is removed and air filled glass syringe was firmly attached to the hub of Tuohy Needle. Epidural space was identified by loss of resistance to injection of air technique of Dogliotti (1933). It was found that glass syringe is preferred whose plunger moves freely.

An aspiration test was done to exclude blood or CSF. 10 ml syringe containing medication was attached to the hub of the Tuohy Needle. An aspiration test to exclude the blood or CSF was carried out and then the drug is slowly injected through the needle. The needle is removed and a sterile dressing was fixed over the puncture site. The patient was put in supine position. The pulse rate, blood pressure and respiratory rate were recorded. The patients were observed for at least one hour after the injection for allergic reactions and other adverse reactions and then patient was shifted to the ward.

Pain was assessed subjectively and objectively. The Straight Leg Raising Test was repeated to find out any relief in the pain following the injection. Objectively pain was assessed on a Visual Analogue Scale.

The visual analogue scale

In this technique the patient is shown a scale of 10 cms line with a moveable rider and patient is told to represent at one end no relief at all ('0') and at the other end pain was completely relieved ('10') as he could possibly imagine and is asked to move the rider to the point on the line where his pain lies. This was measured after the administration of steroid.

Depending upon the degree of pain relief, the results were grouped into:

1. Excellent - more than 80% pain relief (VAS>8)
2. Good - 50-80% pain relief (VAS 6-8)
3. Satisfactory - 30-50% pain relief (VAS 4-5)
4. Poor - less than 30% pain relief (VAS <4)

In patients where the results were poor second injection was repeated at the interval of one week.

All the patients were examined after 24 hours of injection for pain relief and discharged. At the time of discharge they were advised mild analgesics whenever they feel pain.

Follow up was made for two months. After two months pain relief was assessed.

Statistical analysis

The results of continuous variables are given as mean \pm SD and proportion as percentage. The difference between the two groups was assessed by students-test and chi-square test. For all the tests a 'p' value of 0.05 and less was considered for statistical significance.

Results

A study of 50 patients with complaint of low back pain was under taken to evaluate the effectiveness of corticosteroid

i.e. methyl prednisolone with lignocaine 0.5% given into the epidural space through the lumbar epidural route.

Table 1: Basic characteristics

Characteristics	Frequency	Percentage
Age (years)		
21-30	7	14
31-40	22	44
41-50	15	30
51-60	5	10
>60	1	2
Sex		
Male	36	72
Female	14	28
Precipitating factors		
Occupation strain	25	50
H/o. of trauma	5	10
No obvious factor	20	40
Side involved in sciatica		
Right side	17	34
Left side	16	32
Bilateral	7	14
No Sciatica	10	20
Duration of pain		
<1 month	18	36
1-3 months	11	22
3-6 months	7	14
6-9 months	2	4
9-12 months	4	8
>12 months	8	16

The minimum age of the patient was 22 years and maximum age was 65 years. The majority of the patients belong to 31-40 years age group.

The study included both male and female and majority of them were males.

In this study 25 patients were found to be involved in occupational strain such as lifting heavy weight, strenuous manual activity. In 5 patients there was history of trauma to the back, while in 20 patients no obvious precipitating factor was involved.

In this study 17 patients had right sided sciatic, 16 had left sided sciatica, 7 had bilateral and 10 patients had no sciatica.

Duration of pain within 3 months was considered as acute onset of symptoms and was observed in 29 patients.

Duration of pain more than 3 months was considered as chronic onset of symptoms and was observed in 21 patients.

Minimum duration of pain was 8 days and maximum duration of pain was 4 years.

Table 2: Number of epidural injections

No. of injection	No. of patients	Percentage
Only one injection	45	90
Two injections	5	10
Total	50	100

All the 50 patients were given Epidural Steroid Injections through the lumbar epidural route after failure of conservative treatment. All patients received 10 ml of corticosteroid i.e. methyl prednisolone 80 mg in 2 ml + 8 ml of 0.5% lignocaine (2% lignocaine 2 ml + 6 ml of normal saline). 45 patients received only one injection and 5 patients received 2 injections.

Table 3: Degree of improvement of SLRT in whom SLRT was positive (below 45° and above 45°)

	SLRT before INJ.	Improvement after INJ.
Below 45°	15 Cases	12
Above 45°	20 Cases	13

Before injection SLRT was positive in 35 patients in which below 45° in 15 patients and above 45° in 20 patients.

After injection 25 patients got improvement in SLRT among 35 patients in which below 45° were 12 patients and above 45° were 13 patients.

Table 4: Visual analogue scale (VAS)

VAS	NO. of patients	Percentage
0-2	3	6
2-4	3	6
4-6	10	20
6-8	23	48
8-10	11	22
Total	50	100

The minimum was 0 and maximum was 10. Out of 50 patients 11 had excellent result i.e. VAS >8.

Table 5: Complications

Complications	No. of patients	Percentage
Dural puncture	-	-
Headache	2	4
BP changes	5	10
Shock	-	-
Total	50	100

Two patients had headache managed by analgesics. There was 10 mmHg fall in BP in 5 patients below preoperative value. With adequate observation and management, this was not a serious problem. In this study no serious complications encountered.

In this study patients were examined 24 hours after the injection for short term results and found that, 37 had short term success and 13 had short term failure.

Table 6: Result after two months-follow up

Result (grade)	No. of patients	Percentage	
Excellent	11	23.91	71.43
Good	22	47.82	
Satisfactory	7	15.22	28.64
Poor	6	13.42	

Out of 50 cases only 46 cases were available for follow up after 2 months, 11 cases had excellent (23.91%), 22 patients had good (47.82%), 7 patients had satisfactory (15.22%) and 6 patients had poor results (13.42%).

Overall 33 patients (71.73%) had benefit from the epidural steroid injection and 13 (28.64%) had no pronounced improvement.

The criteria taken for the success were relief of symptoms (complete or near complete), lack of recurrence within the follow up period and no requirement of further treatment.

Discussion

Pain has been one of the factors to affect the course of human events. Pain is as old as mankind perhaps even older. It has been a major concern of human kind since the

beginning and the subject of ubiquitous effort to understand and control it. Pain affects millions and millions of people world-wide and many patients with chronic pain are inadequately managed. Consequently acute and chronic pain continues to be most frequent cause of suffering and disability.

Low back pain is as common as its causes are obscure. Its cause in many cases is related to the degeneration of intervertebral discs, which occurs in the lumbar spine during normal life. The causes in few cases can be reliably identified as pathological processes. Many patients respond to conservative therapy like bed rest, analgesics and skin traction. Some do not respond until epidural injection of steroid has been given. A few patients require surgery.

Systemic administration of non-steroidal anti-inflammatory drugs (NSAIDs) and narcotics has long been the common method of pain relief, but this provided inadequate analgesia owing to inadequate dosage, delayed administration period due to the fear of respiratory depression and personal bias of those ordering and giving analgesics.

Epidural injection of corticosteroids, i.e. methyl prednisolone along with local anaesthetic i.e. lidocaine, is a well-established conservative method for low back pain relief and this method has been shown to be very effective for the relief of pain by many investigators since many years.

In this clinical study the patients who failed to respond to other forms of conservative therapy like bed rest, NSAIDs and skin traction were selected. Corticosteroid i.e. methyl prednisolone and along with lidocaine was injected into the epidural space through the lumbar epidural route to 50 patients with low back pain.

This technique is suitable for all cases of lumbosacral syndrome younger or old, with mild or severe symptoms or acute or chronic duration excluding only those patients with contraindications such as haemorrhagic diathesis, cauda equine syndrome, and neurological involvement.

Swerdlow *et al.* showed that there were better results with extradural medication with methyl prednisolone. This study correlates with the above i.e. better results with extradural methyl prednisolone [4].

Winnie *et al.*, in their of intradural and extradural corticosteroid showed that patients received steroid extradurally or intradurally have the success rate in identical manner. Our study correlates with the success rate of extradural steroid injections of above study [5].

In study conducted by White showed that 82% of patients had relief of their pain for one day, 50% had relief for two days, 16% for two months. This study showed higher rate of success with epidural injection of methyl prednisolone (71.73%) [6].

Dallas *et al.* showed that 83% of male population and 57% of female population were relieved of low back pain for the duration of 6-12 months with epidural steroid. Their data do support this study [7].

Sagar *et al.* showed that epidural steroid injection is a useful adjunct to conservative treatment of low back-ache and this study correlates these observations [8].

Singh *et al.* showed that 50% of patients were totally relieved and did not require any further treatment, 27% of patients got sufficient relief of pain, but needed either occasional lumbar traction or lumbar support to carry on their normal day to day activities. There were only 23% of patients who did not respond to this method of treatment. This study correlates with above results [9].

Popiolek *et al.* in their study of epidural steroid methyl prednisolone in the treatment of chronic sciatica in discopathy showed greater and earlier improvement. This study also correlates above findings^[10].

EL-Khoury *et al.* in their study described that epidural steroid injection is a therapeutic procedure commonly used in patients with low back pain and has been shown to be most effective which has also been confirmed in this study^[11].

A study conducted by Mom has shown excellent to good results in 83% of patients with low back pain with sciatica with subacute symptoms of less than 3 months duration. This study is in agreement with the above observations with the success rate of 71.73%^[12].

Sinha *et al.* in their showed the success rate of 62.19% with epidural injection for the treatment of low back pain, which is less than the success rate obtained in this study^[13].

Gupta *et al.* in their study have found that most of the patients were benefited by epidural steroid injection and a step ladder pattern of approach to patients with low back pain was devised. Initially intensive conservative treatment followed by epidural medication and lastly if both fail the patients were to be considered for surgery. A similar strategy was also adopted in this study and two patients underwent laminectomy^[14].

In the present study, we have not come across any complications.

In the present study of 50 patients, all patients received 10 ml of mixture of methyl prednisolone 80 mg 2 ml + lignocaine 2% 2 ml + normal saline 6 ml epidurally through the lumbar epidural route.

This series shows short term improvement of 74% and long term improvement 71.73% with hardly any complications. It is worthwhile trying this simple and effective conservative line of treatment which is cost and time effective less invasive with a high degree of success rate with an absence of severe complications.

Conclusion

Epidural injection of corticosteroids methyl prednisolone and local anaesthetic lignocaine is an excellent technique for the relief of chronic low back-ache. The side effects are few compared to surgical management. The success rate is high in comparison with other conservative methods. So it can be safely recommended for the relief of low back pain where conservative methods have failed to relieve the pain before embarking on surgical procedure (laminectomy)

A larger scale study, perhaps may be required to evaluate this technique as a standard technique.

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