



EFFICACY OF LUMBAR TRANSFORAMINAL EPIDURAL STEROID INJECTION IN CASE OF LUMBAR HERNIATED DISC WITH RADICULOPATHY

Orthopaedics

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ABSTRACT

Introduction- Low back pain with radiculopathy to lower limb are common conditions. It has been studied that most people experience neck and back pain at least once in their lifetime. Transforaminal epidural steroid injection (TFESI) under fluoroscopic guidance is becoming very effective therapy in mild to moderate grades of lumbar herniated disc. **Methods-** Patients fulfilling the inclusion and exclusion criteria were explained about the procedure and valid consent was taken. 1 mL of 2% lignocaine + 1 mL of 40 mg triamcinolone acetate is administered through Kambins triangle approach under fluoroscopy guidance. Numeric rating score was used to assess the efficacy of transforaminal steroid injection by using a questionnaire. **Results-** A total 49 patients underwent a follow up of 6 weeks. In our study the success rate is 77.6%. Patients having only radiculopathy without associated back pain have a better outcome. MRI changes with Pfirrmann grade 3 has better prognostic outcome. **Conclusion-** The study has come to conclude that single dose of transforaminal epidural steroid injection in appropriately selected patients can give pain relief which is statistically significant. The onset of action is almost instantaneous with no severe adverse effects. The fluoroscopic guidance gives anatomic landmarks for precise local delivery of drug. This technique increases local drug concentration at site of pathology and help reduce their systemic side effects.

KEYWORDS

Radiculopathy, Transforaminal Steroid, Disc Prolapse, Lumbar Spine.

INTRODUCTION

Low back pain with radiculopathy is a very common condition encountered in day to day practice by orthopaedicians' and pain specialists. Due to increasing life expectancy, a greater number of elderly patients with such symptoms are seen in outpatient clinics.

Radiculopathy is defined as pain and/or neurologic deficit in a specific nerve root distribution, including motor loss, sensory changes, and sometimes depression of reflexes [1].

The understanding of pathophysiology of lumbar radiculopathy has improved the treatment of this disorder. Besides conservative management such as use of non-steroidal anti-inflammatory drugs, muscle relaxants, physical therapy and spinal strengthening exercises-steroids have gained popularity for reducing inflammation at the site nerve irritation.

Multiple modes of steroid administration are available. Apart from systemic administration, local delivery of drug through translaminar, caudal or transforaminal injections have been described. Previous studies showed caudal steroid injections are no superior to local anaesthetic alone [2]. The transforaminal epidural steroid injections are considered better as it places the drug directly at site of pathology near the exiting nerve root.

This study was conducted in order to determine the efficacy of TFESI as a method for symptomatic relief for patients and aid in better rehabilitation. This study was also designed in order to determine the patients' that would positively respond to TFESI.

MATERIALS AND METHODS:

This interventional, prospective study was conducted in a tertiary care center. Local IRB approval was granted (IRB approval number-EC/257/2018). Patients presenting with symptoms of back pain with radiculopathy or radiculopathy alone were approached for the study. A total number of 45 patients were enrolled after analyzing the inclusion and exclusion criteria (Table 1).

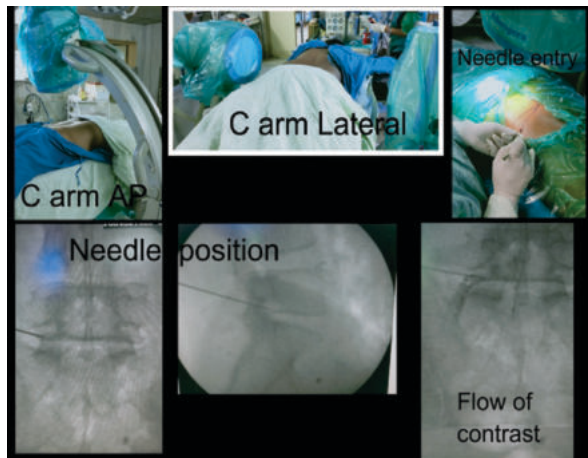
All patients were evaluated and the level of the TFESI were selected on the basis of the history, clinical examination findings and correlated with MRI images [3].

Method for block

Kambin's triangle [4] as explained by Parviz Kambin is a right-angle triangle over the dorsolateral disc. With the patient in prone position,

lying over bolsters to minimize lumbar lordosis. The parts are scrubbed and draped. The fluoroscopic projection is focused over epiphyseal plate of desired upper and lower vertebral body. C-arm cranio-caudal angulation is adjusted. The midline of vertebral column corresponding to spinous process is marked. The C arm is then rotated to 90 degree to see for lateral view of affected level. The entry for needle site is marked in lateral view. At this location, a 180 mm 22 Gauge spinal needle is inserted into the skin toward the lateral lower part of the superior articular process and the process is touched. The needle is then advanced upto 1 mm until loss of bony resistance is encountered.

This is the base of Kambin triangle. On anteroposterior view, the needle tip is seen just lateral to line passing through medial pedicular line. After the final location of the needle is secured, 1 mL contrast Iopromide (non-ionic dye) solution agent is administered. This shows the location and scope of contrast agent, and then 2 mL of prepared agent (2% lignocaine 1 mL + triamcinolone acetate 40 mg) is injected (Figure).



The Numeric rating score (NRS) was recorded. A successful outcome of TFESI was considered when two point or greater points improvement on NRS is presented by the patient at half hour post procedure. MRI changes were recorded on basis of Pfirrmann MRI grading scale. An assessment was done on patient factors and the same was compared to determine if these factors had any effect on outcome on Univariate analysis.

RESULTS

The Statistical analysis was performed by SPSS 23.0 version. Continuous variables were described as mean and variation of each observation from the mean value (Standard deviation) represented as mean $\pm$ SD. Categorical variables were described by taking percentages. Univariate analysis for factors affecting success was done using independent t test for continuous variable and chi square/Fisher's exact test for categorical variables. Analysis between pre-operative and 6 weeks follow up NRS score was done using paired t test. p value <0.05 was considered significant.

A total of 45 patients were recruited in the study and baseline variables were assessed (Table 2). The mean NRS score pre-procedure was found 7.27 ± 0.809 . The mean NRS score post procedure was 5.2 ± 1.61 . The p value on comparing the two NRS score was found to be <0.0001 (Table 3).

The success rate of the procedure in this study is 75.6%. Univariate analysis showed that patients having radiculopathy alone had a better outcome. Pfirrmann grade 3 change on MRI had a better prognosis to TFESI (Table 4).

Table 2: Baseline Variables

Baseline Variable			N = 45
Age		Mean $\pm$ SD	44.88 $\pm$ 8.24
Gender	Males	Number	19 (42.22)
	Females	(Percentage)	26 (57.78)
Side	Left		32 (71.11)
	Right		13 (28.89)
Level	L3 - 4		1 (2.23)
	L4 - 5		29 (64.44)
	L5 - S1		15 (33.33)
Complaints	LBP with Radiculopathy		34 (75.56)
	Radiculopathy		11 (24.44)
Pfirrmann MRI Grade	Grade 3		15 (33.33)
	Grade 4		30 (66.67)

Table 3: Comparison of NRS score

	NRS score	P value
Pre-procedure	Mean $\pm$ SD	7.27 $\pm$ 0.809
Post-procedure		5.2 $\pm$ 1.61

Table 4: Factors affecting success on Univariate analysis

Variable	P value
Age	0.431
Gender	0.736
Side	0.467
Level	0.833
Complaints	0.042
Pfirrmann MRI Grade	0.008

DISCUSSION

Low back pain with radiculopathy is a common entity which not only creates an excess load on the healthcare services but also a bearing of physical pain and suffering on the patient which causes financial burden and loss of good years of expected life. A study published by Ghahreman A et al [5] in 2010 demonstrated that patients treated with transforaminal steroids had long-term relief than other patients treated with intramuscular steroids or transforaminal normal saline. Chang M C [6] in his study on 47 patients reported that TFESI caused significant reduction in radicular pain regardless the severity of lumbar foraminal spinal stenosis (LFSS) for atleast 3 months after treatment. However, the outcome was superior in mild to moderate degree of LFSS. Lee J H et al [7] conducted a meta-analysis and recommended that there are better clinical benefits with TFESI than with caudal epidural steroid injection (CESI), possibly because TFESI had the ability to deliver medication directly into the target area. Because of a low level of evidence and no significant results on meta-analysis, TFESI could be weakly recommended over CESI.

Our study showed a statistically significant pain relief can be obtained after procedure. Age, gender, side of radiculopathy, level of disc herniation have no statistical significance- hence, they do not have any effect on the outcome of the procedure. Patients presenting with only radiculopathy have a statistically better prognosis. Pfirrmann grade III MRI changes holds a better prognosis than Grade IV. Also, the study

highlights that Grade I and II patients usually do not present with any signs of neural impingement. Grade V patients are not amenable to transforaminal steroid injections due to clinical assessment that the procedure would be a failure in such patients.

This study was conducted on small sample size and no randomization was done. Other modes of steroid administration such as systemic or intramuscular route was not tested. No direct comparison was made between TFESI and other forms of spinal injection. Patient related outcome scores such as Oswestry Disability Index or Macnab scale score are not recorded. All these being limitations, the study has however established the success rate of TFESI of 75.6%.

CONCLUSION

The study has come to conclude that single dose of transforaminal epidural steroid injection in appropriately selected patients can give pain relief which is statistically significant. The onset of action is almost instantaneous with no severe adverse effects. The fluoroscopic guidance gives anatomic landmarks for precise local delivery of drug. This technique increases local drug concentration at site of pathology and help reduce their systemic side effects. Another application of this study is to differentiate the pathological level of nerve root involvement in case of multilevel disc prolapse which is difficult to identify on MRI or by clinical examination.

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