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# Clinical Evaluation of Transforaminal Epidural Steroid Injection and Facet Block in Managing Degenerative Chronic Low Back Pain in Orthopaedic Patient

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This study aimed to evaluate the clinical transforaminal epidural steroid injections and facet block in the treatment of degenerative chronic lower back pain. This study uses study prospective analysis with 12 samples of those who had undergone Facet Block and Epidural Steroid Injection and were followed prior to injection, 6 weeks post-injection, and 3 months post-injection. Data were processed with SPSS version 22 with statistical methods Wilcoxon Signed Rank Test. The result of analysis obtained from 12 patients (four patients of Dr Wahidin Sudirohusodo, four patients from Unhas Hospital, and four patients from Awal Bros hospital) recorded from December 2015 to February 2016, with Joint Arthritis Facet and Disc ruptures/Disc herniation with radicular Pain symptoms. The number of injections on the left side of six people, the right side of three people, and two of three people. Disability and significant pain became better 6 weeks after treatment compared to earlier treatment from which there were no significant differences of disability and pain. There were significant differences in disability and pain between six weeks and three months after treatment.
**Keywords:** transforaminal, epidural steroid injection, facet block, degenerative chronic low back pain.

## 1. Introduction

Low back pain tends to occur in the population in general, affecting both genders and across all age groups and economic levels. Most patients recover quickly and without loss of

function. However, recurrence is also common. Furthermore, chronic symptoms can be found in 5%-10% of patients. As a result, the costs to individuals and society are enormous. (1), (3), (4) Treatment of Low Back Pain is challenging. A variety of interventional treatments are available, but no one modality is superior, and evaluations vary depending on the cause of the pain, individual, social and occupational factors. Scientific evidence supports the use of several non-operative treatments in patients with acute and chronic low back pain. (1)

Various types of non-operative treatment exist for acute and chronic low back pain. Patients must receive adequate education regarding the condition of the low back pain they are experiencing, basic body mechanics, and the methods used (eg, exercise, changes in activities, changes in habits) that can reduce symptoms. Non-prescription medications are only effective for mild to moderate pain. Nonsteroidal anti-inflammatory drugs alone, or in combination with muscle relaxants, reduce pain and improve any symptoms of acute low back pain. Exercise Therapy has limitations for acute low back pain, but has evidence to support it in the treatment of chronic low back pain. Some evidence supports the use of manipulation in acute back pain. Weak evidence for epidural corticosteroid injections in patients with acute low back pain, strong evidence for short-term relief of chronic low back pain, and limited evidence for long-term chronic low back pain. The use of Facet Injection in the treatment of acute low back pain is not supported by evidence, nor is the effectiveness of orthoses, traction, magnets and acupuncture. Trigger Point Injection is not indicated for acute and chronic nonspecific low back pain, and sacroiliac joint injection is not indicated for routine management of low back pain. Conflicting evidence exists regarding the use of transcutaneous electrical nerve stimulation. (1)

Low back pain is a public health problem that affects all age groups and socioeconomic levels. Understanding the basis of the condition is helpful in finding appropriate treatment and providing the right information to patients. Patients must understand the prognosis and goals of each recommended treatment. More than 70% of people in developing countries will experience low back pain in their lifetime, the annual incidence ranging from 15% to 45%. Back pain occurs at the same frequency in men and women. Although low back pain occurs in all age groups, those aged between 35 and 55 years are most affected. The use of health services is widely distorted, where less than 25% of cases use more than 75% of the budget. Back injuries affect 2% of the workforce each year, resulting in workers' compensation exceeding $20 billion. In 1998, total health care expenditures incurred by patients with back pain in the United States reached 90.7 billion US dollars. (1)

Recurrence is part of the course of low back pain, occurring in 20%-72% of patients. Most patients recover quickly from loss of function. As many as 60%-70% of patients with symptoms that are severe enough require absence from work and require 6 weeks to return to work, 80%-90% return after 12 weeks. After 12 weeks of symptoms, return to work is usually slow. (1) In general, the course of chronic low back pain is characterized by many variants and changes rather than being predictable and stable. The continuation of back pain alone does not imply a less favorable outcome. Many patients continue to experience mild back pain or discomfort for more than 3 months after seeking treatment. Mild recurrence or chronic back pain Mild recurrence or chronic back pain has little impact on the patient's function or well-being. As a result, for determining outcomes in patients with back pain,

activity limitations are a better measure than pain level. (1)

Table 1 Alternative Non-Operative Treatment Options. (1)

**Nonsurgical Treatment Alternatives**

| Treatment | Subclassification |
|---|---|
| Education | — |
| Medication | Analgesics<br>Nonnarcotic<br>Narcotic<br>Topical<br>NSAIDs<br>Muscle relaxants<br>Corticosteroids<br>Antidepressants |
| Activity modification | — |
| Exercise therapy | — |
| Modalities | — |
| Magnets | — |
| Manipulation | — |
| Traction | — |
| Injections | Epidural<br>Facet<br>Trigger point<br>Sacroiliac |
| Orthoses | Braces<br>Corsets<br>Unloading corset |
| Transcutaneous electrical nerve stimulation | — |
| Acupuncture | — |

NSAIDs = nonsteroidal anti-inflammatory drugs

A wide variety of nonoperative alternative treatments are commonly used. Because the effectiveness of most of these interventions has not been proven in high-quality randomized controlled trials (RCTs), treatment options in patients with low back pain are also challenging. The goal is to educate patients, reduce pain, improve function, minimize any side effects, and prevent chronicity. Intending to recover completely, the aim of treatment is often also to improve what will later appear. This has consequences on numbers and costs and also makes intervention research on low back pain difficult to analyze, studies require large sample sizes because 70%-90% of patients will experience improvement in back pain regardless of treatment. (1)

## 2. Research Methodology

The research was conducted at the Orthopedics and Traumatology Department, Faculty of Medicine, Hasanuddin University – Dr. RSUP. Wahidin Sudirohusodo and Network, Makassar, South Sulawesi from December 2015 - February 2016.

The analysis method used was descriptive, aimed at obtaining a general description of the subject's age, gender and BMI. The statistical method used is calculating the mean value, standard deviation and frequency distribution. The analytical method aims to compare disability (ODI) and pain (VAS score) at the time of intervention with 6 weeks and 3 months after intervention. The statistical method used is the Wilcoxon Signed Rank test. Statistical test results are significant if the test p value is <0.05.

## 3. Results and Discussion

The subjects studied were 12 people suffering from low back pain (LBP) who were intervened using the Transforaminal Epidural Steroid Injection and Facet Block methods. The subjects' ages were between 19 – 67 years, with a mean of 45 ± 12 years. The complete analysis results are below.

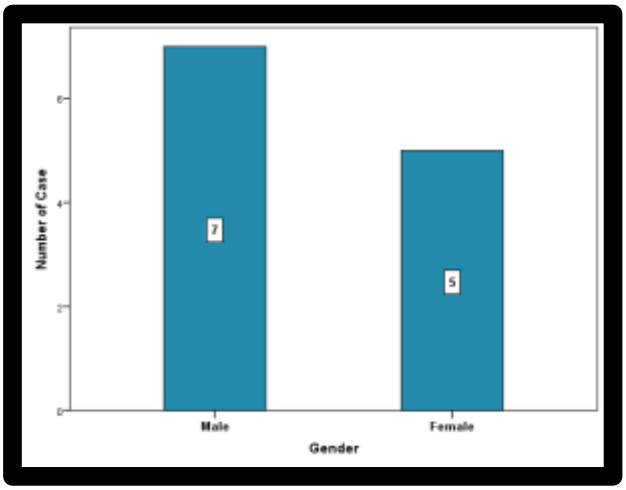


Figure 1. Distribution of Subject Gender

Figure 1 above shows that there were more male subjects than female subjects, namely 7 men (58.3%) and 5 women (41.7%). Based on BMI, 7 people were overweight and 5 people were normal (Figure 2).

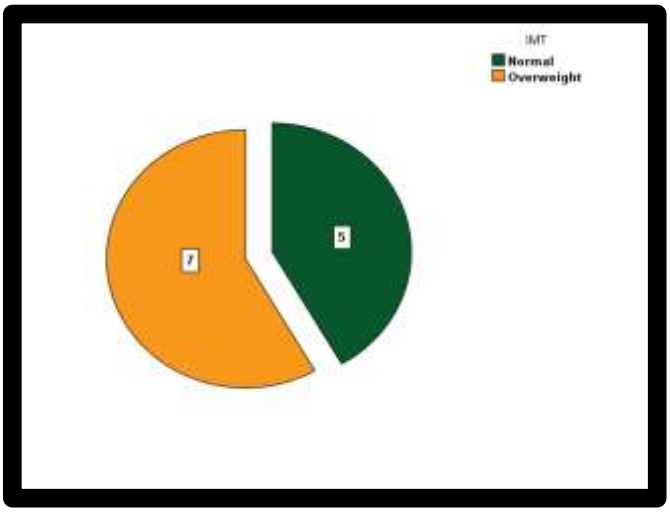


Figure 2. Distribution of Subjects' Body Mass Index

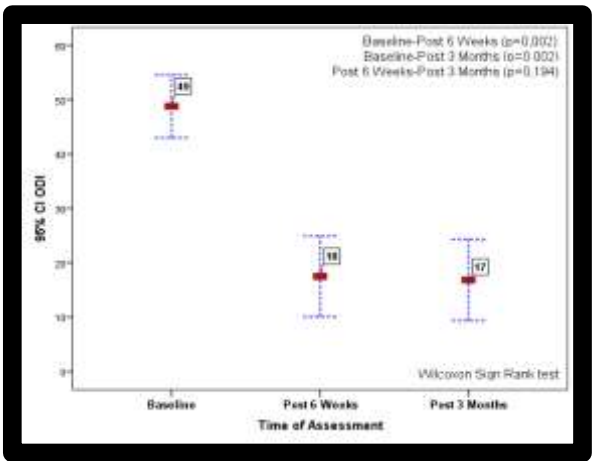


Figure 3. Comparison of ODI according to Measurement Time

Figure 3 shows that:

- The 6-week ODI was significantly lower than the initial ODI, namely 18 and 49 ($p<0.01$)
- The 3-month ODI was significantly lower than the initial ODI, namely 17 to 49 ($p<0.01$)
- There is no significant difference between 6 weeks ODI and 3 months ODI ($p>0.05$)

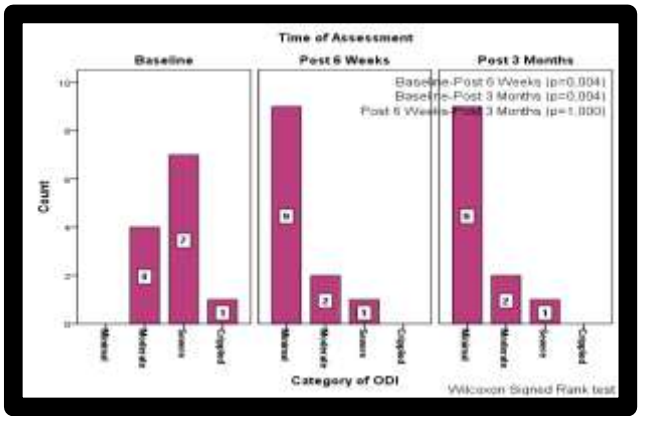


Figure 4. Comparison of ODI Categories according to Measurement Time

Figure 4 shows that:

- The distribution of the 6-week ODI category was significantly better than the initial ODI category ($p<0.01$). The number of subjects with minimal ODI increased to 9 (previously there were none), moderate ones decreased from 4 to 2 people, severe ones decreased from 7 to 1 person and none were crippled
- The distribution of the 3 month ODI category was significantly better than the initial ODI category ($p<0.01$). The number of subjects with minimal ODI increased to 9 (previously

there were none), moderate ones decreased from 4 to 2 people, severe ones decreased from 7 to 1 person and none were crippled

- The distribution of the 6-week ODI category and the 3-month ODI category is not different (p>0.05)

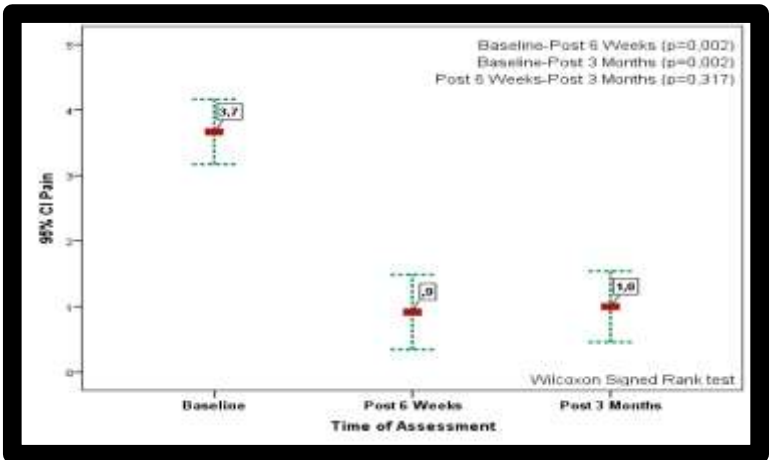


Figure 5. Comparison of VAS Scores according to Measurement Time

Figure 5 shows that:

- The 6-week VAS score was significantly lower than the initial VAS score, namely 0.9 to 3.7 (p<0.01). This shows that the degree of pain is significantly lower after 6 weeks compared to baseline

- The 3-month VAS score was significantly lower than the initial VAS score, namely 1.0 to 3.7 (p<0.01). This shows that the degree of pain is significantly lower after 3 months compared to the beginning

- There was no significant difference between the 6-week VAS score and the 3-month VAS score (p>0.05).

DISCUSSION

This study of twelve patients showed significant pain reduction in 91.67% of patients over three months performed by the same operator. In addition, measuring disability with the Oswestry Disability Index also shows significant changes with initial disability of 48.77% (Moderate Disability). Followed by 17.5% disability (Minimal Disability) after 6 weeks and becoming 16.83% (Minimal Disability). This is in accordance with the aim of this research that administering the injection will reduce pain and reduce disability in daily function by the effects of corticosteroids which stabilize cell membranes, inhibit the synthesis and activity of neuropeptides, suppress sensitization of the dorsal neural horn, and suppress neuronal output. Accurate injection location in the facet joint and safe triangle can be obtained with the help of the C-arm as a fluoroscopy guide for accurate needle tip placement.

Previous research by Borgohain3 showed a significant reduction in pain (>50%) and functional improvement (40%) 44 to 45 weeks in 1 year, requiring approximately 3-4

treatments with an average duration of 15 weeks. Research by Young5 concluded that using Epidural steroid injection was able to conclude several things. First, although serious side effects, although rare, can occur. Second, the use of fluoroscopy as a guide for accurate injection placement still allows for failure. Third, Epidural steroid injection is able to provide adequate symptom management, even though it is temporary, while waiting for resolution. Fourth, there is insufficient evidence that treatment requires repeated injections. Repetition is based solely on the individual's assessment of the accuracy and clinical response of the previous treatment.

## 4. Conclusion

Based on the detailed analysis provided, it is clear that the efficacy of the treatment intervention was significant in improving disability and pain levels at the 6-week mark when compared with baseline measurements. However, the data showed that the benefits achieved at the 6-week assessment were maintained up to the follow-up assessment point at 3 months post-intervention, indicating no statistically significant differences in disability and pain scores between these two time periods.

This consistent maintenance of intervention results from 6 weeks to 3 months post-intervention provides promising results, as it implies a lasting impact of the therapeutic approach in managing disability and pain in participants. It also emphasizes the importance of evaluating the effectiveness of treatment over a longer period to ensure the sustainability of the effect.

Further research may be needed to explore factors contributing to the observed sustained improvement and to investigate the potential long-term impact of treatment on levels of disability and pain beyond the 3-month assessment point.

Suggestion

The length of research time needs to be increased to be able to analyze progress up to 2 years for disabilities. This action can be performed in the area with the C-Arm modality. Apart from Orthopedics, the results of this research can be used in the disciplines of Anesthesia and Interventional Radiology.

## References

1. Shen FH, Dino S, Gunnar BJ. Andersson. Nonsurgical Management of Acute and Chronic Low Back Pain. American Academy of Orthopaedic Surgeons. 2006
2. Wong, David A. Classification of Low Back Pain and Alerts for Different Age Groups. Macnab's Backache, 4th Edition. Lippincott Williams & Wilkins. 2007
3. Dhruba, Borgohain, Clinical Evaluation Of Transforaminal Epidural Steroid Injection In Managing Chronic Low Back Pain With Radiculopathy. International Journal of Basic and Applied Medical Sciences. 2015
4. Manchikanti, Laxmaiah. Transforaminal Lumbar Epidural Steroid Injections. Pain Physician. Volume 3. 2000
5. Young IA, Garrett SH, Llewellyn N, Packia-Raj, Andrew JC. The Use of Lumbar Epidural/Transforaminal Steroids for Managing Spinal Disease. J Am Acad Orthop Surg

2007;15:228-23
6. Fairbank JCT, Couper J, Davies JB. The Oswestry low Back Pain Questionnaire. Physiotherapy 1980; 66: 271-273.
7. Greher M, Scharbert G, Karnolz L, Beck H, Gustorff B, Kirschmair L, Kapral S. Ultrasound-guided Lumbar Facet Nerve Block. American Society of Anesthesiologist. 2004. 1242-1248.
8. Assendelft WJJ, Morton SC, Yu EI,Suttorp MJ, Shekelle PG: Spinal manipulative therapy for low back pain:A meta-analysis of effectiveness relative to other therapies. Ann Intern Med 2003
9. Niemistö L, Kalso E, Malmivaara A, Seitsalo S, Hurri H: Radiofrequency denervation for neck and back pain: A systematic review within the framework of the Cochrane Collaboration Back Review Group. Spine 2003
10. Beebe FA, Barkin RL, Barkin S: A clinical and pharmacologic review of skeletal muscle relaxants for musculoskeletal conditions. Am J Ther 2005
11. Manchikanti L, Boswell MV, Singh V, Benyamin RM, Fellows B and Abdi S et al., (2009). Comprehensive evidence-based guidelines for interventional techniques in the management of chronic spinal pain. Pain Physician
12. Tarulli AW and Raynor EM (2007). Lumbosacral radiculopathy. Neurologic Clinics Vad VB, Bhat AL, Lutz GE and Cammisa F (2002). Transforaminal epidural steroid injections in lumbosacral radiculopathy: A prospective randomized study.
13. Williams AC de C, Davis HT and Chadury Y (2000). Simple pain rating scales hide complex idiosyncratic meanings. Pain
14. The Effect of Neuraxial Steroids on Weight and Bone Mass Density: A Prospective Evaluation
15. Fortin J. Precision diagnostic disc injections. Pain Physician 2000
16. Manchikanti L, Pampati RR, Fellows B et al. The diagnostic validity and therapeutic value of medial branch blocks with or without adjuvants. Current Review of Pain 2000;
17. Botwin K, Natalicchio J, Brown LA: Epidurography Contrast Patterns with Fluoroscopic Guided Lumbar Transforaminal Epidural Injections: A Prospective Evaluation
18. Botwin KP, Natalicchio J, Hanna A: Fluoroscopic guided lumbar interlaminar epidural injections: A prospective evaluation of epidurography contrast patterns and anatomical review of the epidural space. Pain Physician
19. Bartynski WS, Grahovac SZ, Rothfus WE: Incorrect needle position during lumbar epidural steroid administration: Inaccuracy of loss of air pressure resistance and requirement of fluoroscopy and epidurography during needle insertion. AJNR Am J Neuroradiol 2005
20. Price CM, Rogers PD, Prosser AS, Arden NK: Comparison of the caudal and lumbar approaches to the epidural space. Ann Rheum Dis 2000
21. Koes BW, Scholten R, Mens JMA et al. Epidural steroid injections for low back pain and sciatica. An updated systematic review of randomized clinical trials. Pain Digest 1999
22. Gureje O, Von Korff M, Simon GE et al. Persistent pain and well being. A World Health Organization Study in Primary Care. JAMA 1998
23. Loney PL, Stratford PW. The prevalence of low back pain in adults. A methodological review of the literature. Physical Therapy 1999
24. Peterson MK, Millar FA, Sheppard DG: Ultrasound-guided nerve blocks. Br J Anaesth 2002
25. Kullmer K, Rompe JD, Lowe A, Herbsthofer B, Eysel P: Ultrasound image of the lumbar spine and the lumbosacral transition: Ultrasound anatomy and possibilities for ultrasonically-controlled facet joint infiltration (in German). Z Orthop Ihre Grenzgeb 1997
26. Greher M, Scharbert G, Predescu A, Gustorff B, Kress HG, Kapral S: First experiences with ultrasonography-guided lumbar facet nerve block in a series of 146 cases (abstract). Eur J Anaesthesiol 2003