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Fluoroscopic Guided Epidural versus Cervical Facet Injection for Patients with Chronic Cervical Axial Pain in Terms of Visual Analogue Score and Neck Pain Disability Index

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Abstract

Background: Facet injections entail the administration of a steroid medication into the facet joints of the spine to alleviate inflammation and pain. This procedure is generally performed with the assistance of X-ray guidance. Conversely, epidural injections are minimally invasive procedures that involve the injection of a steroid medication into the epidural space of the spine. Both procedures are regarded as safe and effective treatments for chronic cervical pain, although there is no definitive consensus on which is more efficacious. **Methods:** Prospective randomized clinical trial. The sample size was estimated by performing a pilot study and the patients of the pilot study were not included. Group P was assigned to the individuals who would have cervical epidural injection, while Group F would receive a facet injection. **Results:** We evaluated pain using the VAS/PI scores and found no significant differences between the two groups at various follow-up intervals. Nevertheless, each intervention resulted in a significant improvement from baseline, with P < 0.001. In terms of the NDI, the overall scores did not differ significantly between the groups; however, each group demonstrated a significant improvement from baseline, with P < 0.001. **Conclusion:** The epidural and facet injections significantly improved VAS scores and NDI from the baseline. However, in comparing both groups, there was no significant difference in the efficacy and safety profiles.

Keywords

Facet Joint, Cervical, Injections, Epidural, Radiculopathy, Axial Neck Pain

1. Introduction

Chronic cervical pain is a common debilitating condition affecting millions worldwide. It is characterized by persistent pain in the neck, shoulders, and upper back that can last for weeks, months, or even years [1]. The exact cause of chronic cervical pain is often difficult to pinpoint. However, it is believed to be related to various factors, including poor posture, muscle strain, and degenerative disc disease [2]. One common cause of persistent neck and spinal discomfort is cervical disc herniation, which is typically treated with either surgery or epidural injections [2].

Among the main causes of chronic neck pain, cervical facet joint syndrome plays a fundamental role. It is characterized by the presence of neck pain, often radiating to the head, back and upper extremities, particularly the shoulders, and causing a drastic limitation in the neck's range of active motion [3].

Cervical epidural injection, a widely employed therapeutic choice for individuals enduring persistent cervical discomfort serves as an effective remedy by mitigating inflammation and alleviating pain experienced in the neck, shoulders, and arms [4]. Employing a minimally invasive approach, this procedure encompasses the administration of a corticosteroid medication into the epidural space of the spine [5]. By impeding the transmission of pain-inducing nerve signals, this injection significantly diminishes inflammation and assuages pain sensations. It is often used to treat chronic neck pain caused by conditions such as herniated discs, spinal stenosis, degenerative disc disease, and facet joint syndrome. The injection can provide relief for up to several months, allowing patients to return to their normal activities without any medications [6]. Noticing that patients may experience some soreness or discomfort in the area for a few days, but this should subside quickly with rest and over-the-counter medications if needed [7].

Facet joint injections, an intervention of minimal invasiveness, emerge as a therapeutic approach addressing chronic cervical pain. Through the administration of a steroid medication, these injections find their way into the facet joints nestled within the cervical spine. By doing so, relief from neck pain, stiffness, and various other symptoms linked to enduring cervical discomfort is achievable. These facet joints, positioned at the posterior aspect of the neck, play a crucial role in upholding spinal stability [8].

When these joints are affected by inflammation or irritation, the resulting pain and discomfort can be significant. However, facet joint injections have been shown to effectively alleviate chronic neck pain by reducing inflammation. This procedure is typically performed in an outpatient setting under local anesthesia and involves the precise insertion of a slender needle into the facet joint to administer

a small amount of steroid medication. This injection serves to diminish inflammation, thereby alleviating neck pain, stiffness, and other symptoms associated with persistent cervical pain [9].

In this double-arm study, we aimed to compare the cervical epidural versus cervical facet injection for patients with axial chronic cervical pain in terms of Verbal Numerical Rating Scale (VNRS) and Neck pain disability index.

2. Patients and Methods

2.1. Aim, Design, and Setting

To compare the cervical epidural versus cervical facet injection for patients with chronic axial cervical pain in terms of Verbal Numeric Rating Scale (VNRS) and Neck pain disability index. The study is a prospective Clinical trial. The research was conducted at Fayoum University Hospital, following approvals from the local Institutional Ethics Committee and the institutional review board.

2.2. Study Participants

Eighty patients were inclusively enrolled in the study. Group P was assigned to the individuals who would have cervical epidural injection, while Group F would receive a facet injection. With 40 patients per group.

2.3. Clinical Trials.gov Registration

The trial's information is transparent and easily accessible due to its registration with ClinicalTrials.gov, where it is identified by the number NCT04594876.

3. Outcomes

One of the main indicators used to assess outcomes is the preintervention Neck pain Disability Index (NDI), which is widely employed by doctors and researchers as the leading standard for evaluating self-reported impairment associated with neck pain. The NDI consists of 10 items, with scores ranging from 0 to 5 for each item, resulting in a maximum possible score of 50. To calculate a percentage score, the total score is multiplied by 2. In rare cases where a respondent fails to answer a specific question, the missing value is replaced by the average score of all the other items. The interpretation of the NDI scores is as follows: a disability range of 0 to 4 signifies minimal impairment, 5 to 14 represents mild to moderate impairment, 15 to 24 indicates severe impairment, and scores exceeding 34 reflect significant impairment.

Primary outcome metrics

- Neck pain Disability Index (NDI).

Secondary outcome metrics

- VAS Score (0 = no pain, 10 = extreme pain);
- Pain Intensity (PI);
- Preintervention opioid and non-steroidal drug use type;
- Opioid and non-steroidal medications used after intervention;

- The score for postoperative nausea and vomiting.

Inclusion Criteria:

- Age: Above 18 years;
- Patients with axial had cervical pain for at least three months before the operation;
- Failed medical therapy.

Exclusion Criteria:

- Systemic illness, skin infection, bleeding propensity, and coagulopathy, pregnancy, neurological problems, any deformities that impair the process, and prior cervical spine surgery are all grounds for exclusion.

Randomization

To establish unbiased group allocation, a computer-generated table was employed to randomly assign patients to either of the two research groups. To ensure the concealment of the randomization process, imperceptible sealed envelopes were implemented. Promptly following the recruitment of new participants and granting them access to the operating room, the researchers unsealed the envelopes, disclosing the assigned groups. The group's assignments were hidden from the assessors and data collectors.

Practice Procedure

The procedure is relatively simple and typically takes less than an hour to complete. For the procedural execution, prior to the injection itself, a local anesthetic is adeptly employed to induce numbness in the targeted region. Subsequently, a slender needle, guided by X-ray imaging, is utilized to precisely introduce the steroid medication into the epidural space of the spine. The determination of patients' eligibility for persistent cervical pain syndromes relied on their medical histories, symptoms, and imaging diagnoses. The patients were positioned in a prone posture and then placed in the oblique-prone position on the fluoroscopy table, with the skin of the posterior neck sterilized.

Patients in group (F) received a cervical facet injection:

Fluoroscopy was executed in the anteroposterior orientation with the patient's neck flexed anteriorly. To enhance the visualization of the cervical facet injection, the patient's head was slightly rotated to the opposite side. Using a C-arm for precise guidance and administering 0.25 mL of Omnipaque dye, the zygapophyseal joints in group (F) were successfully identified. In response to the patient's symptoms, injections of either 0.5 mL of 1% lidocaine and 1 mL of betamethasone disodium phosphate (6 mg/mL) were administered into the joints, either unilaterally or bilaterally.

Patients in group (P) received a translaminar or interspinous Cervical Epidural Block (CEB):

The preferred and safest method for cervical epidural insertion is believed to be the translaminar or interlaminar route. The patient lay in a prone position, and the treatment was conducted with the aid of fluoroscopic guidance. An Anteroposterior (AP) view was initially taken to localize the needle entry between the 7th

cervical vertebra and T1 thoracic vertebra. This choice is based on the general recommendation that the optimal vertebral level for injection is between C7-T1, where the ligamentum flavum is reliably present, minimizing the risk of inadvertent intrathecal or spinal cord puncture.

Subsequently, a lateral view is essential to determine the depth of the needle tip, ensuring it does not pass the J Line to avoid puncturing the dura. Optimizing patient positioning and fluoroscopic imaging is crucial for safe performance. The key image is the lateral view, providing the best visualization of needle depth and preventing inadvertent puncture into the thecal sac or spinal cord. With the assistance of fluorescence guidance, the midline of the selected interspace will be located, and lidocaine will be utilized to mark the target location of skin entry. The skin and subcutaneous tissues were numbed using up to 1 mL of lidocaine. Precisely, a 25-gauge, 2-inch needle was inserted into the desired midline. After local anesthesia, the needle was firmly held at the hub by the left thumb and index finger. The left hand, supported by the palm firmly pressed against the patient's neck, stabilizes, protects, and controls the needle's trajectory and entry timing, minimizing the impact of any unexpected patient movement.

The needle was advanced using the left hand, firmly held between the left thumb and fingers, braced against the neck. Resistance was measured with an air-filled syringe held by the right hand. Slow and methodical forward movement of the needle and syringe was facilitated by gentle thumb pressure on the syringe plunger. Care was taken to avoid crossing the J line visible during fluoroscopic imaging of the facet joints, as it represents a crucial boundary. This line becomes apparent as the needle bevel passes through the ligament flavum and enters the epidural space.

Upon successful positioning of the needle within the epidural space, fluoroscopic verification was performed. This was followed by the repetition of the loss-of-resistance technique and the administration of 0.5 - 1 mL of Omnipaque dye. The cervical epidural region should readily accommodate 0.5-1 mL of air or sterile, preservative-free saline without encountering resistance. It is imperative that excessive force is not applied when depressing the plunger; only sufficient pressure to overcome the needle's resistance should be exerted.

In instances of significant pain or a sudden increase in resistance during the injection, the procedure was suspended, and fluoroscopy was employed once more to evaluate the needle's position. To ensure accurate needle placement and the absence of patient discomfort, gentle aspiration was conducted to verify that the needle was neither intravascular nor in the subarachnoid space. If Cerebrospinal Fluid (CSF) was aspirated, the block attempt was repeated in a different interspace. Similarly, if blood was aspirated after the needle was tightly rotated, the aspiration test was repeated. If blood aspiration persisted, the procedure was terminated due to the potential risk of developing an epidural hematoma and subsequent neurological damage. Once the needle was correctly positioned in the midline of the epidural space, an injection of 5 mL of 1% lidocaine and 2 mL of beta-

methasone disodium phosphate (6 mg/mL) was administered.

Sample size

Sample size was calculated using IBM SPSS 29 software for Windows (IBM Co., Armonk, NY, USA). Calculation of the sample size was based on the ability to detect a difference in the occurrence of the primary outcome, NDI at 12 months of follow-up, between the two groups based on the results of a pilot study. Calculation was based on the observed mean NDI of 17.90 ± 3.31 in the first group and 61.0 ± 2.11 in the second group. At least 35 patients are needed per group to detect this difference at α level of 0.05 and study power of 80%. We decided to recruit 40 patients per group to compensate for any possible loss of follow-up and increase the study power. The sample size calculation was based on the independent samples t test.

Statistical analysis:

IBM SPSS version 29 for Windows (IBM Co., Armonk, NY, USA) was used to perform the statistical data analysis. Descriptive statistics are presented in the form of means with standard deviations for numerical data variables, while frequencies and relative frequencies (percentages) are used for categorical data variables.

Mixed repeated measures ANOVA was used to study the change in numerical variables overtime between the two groups. P-values are reported for the main effect of group, main effect of time and the interaction between group and time. Comparison of categorical variables between the two groups was done using the chi-square test or Fisher's exact test as appropriate. P-value of 0.05 or less was considered statistically significant.

4. Results

In our study, we included 80 patients who suffered from chronic cervical pain. Forty cases were allocated to epidural injections; the other forty patients received facet injections.

Figure 1 shows CONSORT flow diagram of included participants.

Demographic characteristics among study group:

We illustrated that the mean age of study group was (44.86 ± 19.5) years old ranging between 20 and 75 years old. As regards sex distribution, male dominance is observed in both groups. (Table 1)

Analysis of outcomes

***Pain scores and Neck disability index* (*NDI*).**

We assessed the pain using the VNRS/PI scores. There was no significant difference between the two groups. However, there was a significant improvement from the baseline after each intervention P< 0.001. (Table 2, Figure 2 and Figure 3)

Concerning the domains of NDI, we found no significant difference between the groups in all domains of NDI, including Personal care, lifting, reading, headaches, concentration, work, driving, sleep, and recreation. The overall NDI did not show a significant difference between the two groups, while there was a significant improvement from the baseline. (Tables 3-7, Figures 4-13)

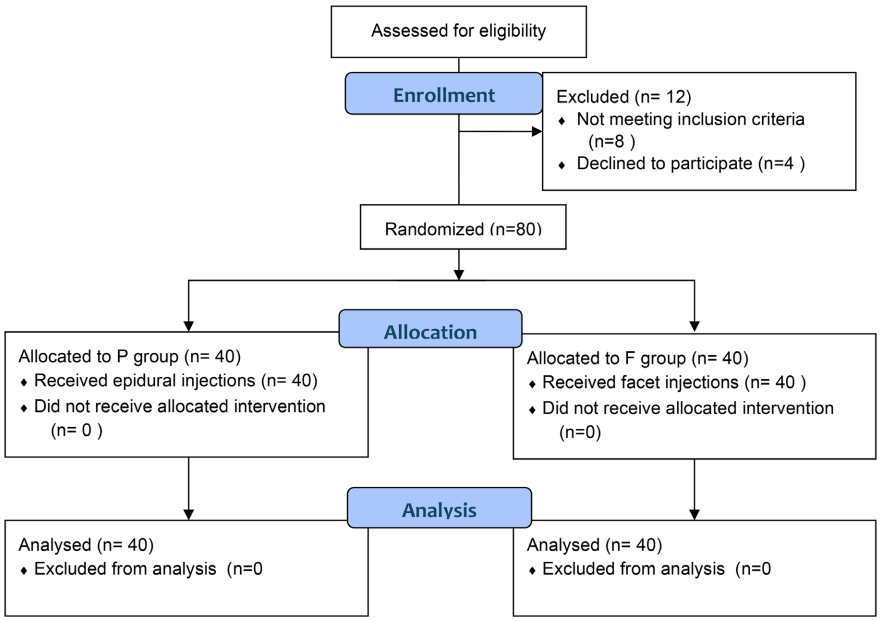

Figure 1. CONSORT Flow Diagram.

Table 1. Demographic characteristics between the Studied Groups.

Variables	Group P (Epidural)	Group F (Facet injection)
Age	23 - 74 yrs	28 - 68 yrs
Gender	Male: 27 Female:13	Male: 29 Female:11
Comorbidities		
Hypertension	5	9
Diabetes Miletus	4	3
Obstructive lung disease	2	3
Ischemic heart disease	3	2
Thyroid disorder	1	0
None	25	23

Table 2. VNRS/PI Differences between the Studied Groups.

	Group P (Epidural)	Group F (Facet injection)	P-value*
VRNS			
• **Baseline**	78.25 ± 8.6	77.63 ± 8.7	
• **1-week**	16.75 ± 1.1	17.01 ± 1.2	
• **1-month**	17.75 ± 0.9	18.88 ± 1.1	
• **3-months**	23.01 ± 1.3	24.25 ± 1.2	0.640
• **6-months**	32.01 ± 1.6	30.63 ± 1.3	
• **9-months**	39.88 ± 1.7	38.38 ± 1.5	
• **12-months**	52.38 ± 2.9	49.13 ± 1.8	
P-value**	**<0.001**		0.329$

Continued

PI			
• **Baseline**	3.95 ± 0.6	3.98 ± 0.1	
• **1-week**	0.53 ± 0.1	0.50 ± 0.1	
• **1-month**	0.60 ± 0.1	0.63 ± 0.1	
• **3-months**	0.88 ± 0.1	0.88 ± 0.1	0.937
• **6-months**	1.28 ± 0.5	1.25 ± 0.2	
• **9-months**	1.53 ± 0.7	1.50 ± 0.1	
• **12-months**	2.38 ± 0.9	2.35 ± 0.1	
P-value**	**<0.001**		0.990[$]

*Main effect of group; **Main effect of time; [$]Interaction effect between group and time.

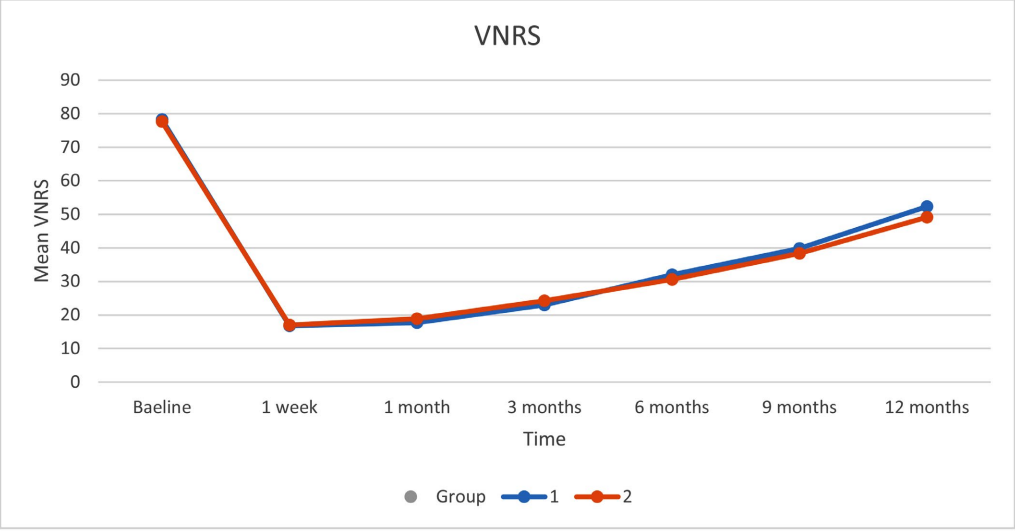

Figure 2. Difference in the mean VNRS over time between the Studied Sample.

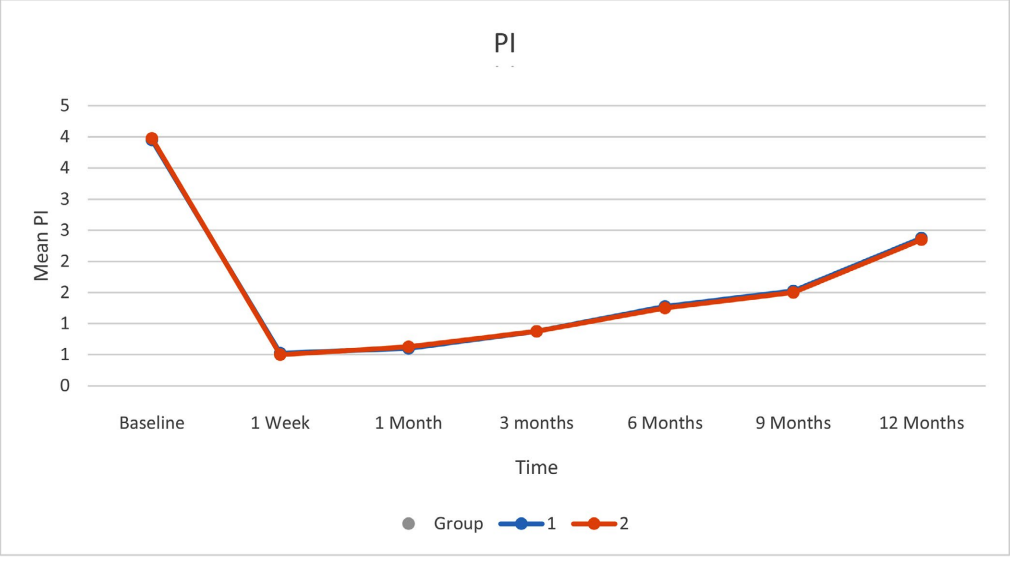

Figure 3. Difference in the mean PI over time between the Studied Sample.

Table 3. Care/Lifting differences between the Studied Groups.

	Group P (Epidural)	Group F (Facet injection)	P-value*
Care			
• **Baseline**	1.95 ± 0.4	1.95 ± 0.4	
• **1-week**	0.05 ± 0.2	0.05 ± 0.1	
• **1-month**	0.23 ± 0.1	0.18 ± 0.1	
• **3-months**	0.48 ± 0.1	0.38 ± 0.1	0.474
• **6-months**	0.73 ± 0.5	0.65 ± 0.2	
• **9-months**	0.95 ± 0.7	0.83 ± 0.1	
• **12-months**	1.33 ± 0.9	1.33 ± 0.4	
P-value**	**<0.001**		0.797[$]
Lifting			
• **Baseline**	1.80 ± 0.07	1.75 ± 0.09	
• **1-week**	0.20 ± 0.06	0.23 ± 0.07	
• **1-month**	0.25 ± 0.07	0.30 ± 0.07	
• **3-months**	0.55 ± 0.08	0.53 ± 0.08	0.966
• **6-months**	0.78 ± 0.08	0.75 ± 0.08	
• **9-months**	0.93 ± 0.07	0.95 ± 0.07	
• **12-months**	1.20 ± 0.07	1.23 ± 0.08	
P-value**	**<0.001**		0.918[$]

*Main effect of group; **Main effect of time; [$]Interaction effect between group and time.

Table 4. Reading/Headaches differences between the Studied Groups.

	Group P (Epidural)	Group F (Facet injection)	P-value*
Read			
• **Baseline**	2.63 ± 0.5	2.70 ± 0.4	
• **1-week**	0.23 ± 0.07	0.28 ± 0.07	
• **1-month**	0.35 ± 0.08	0.38 ± 0.09	
• **3-months**	0.45 ± 0.09	0.53 ± 0.09	0.435
• **6-months**	1.00 ± 0.07	1.03 ± 0.06	
• **9-months**	1.18 ± 0.08	1.25 ± 0.08	
• **12-months**	1.63 ± 0.1	1.78 ± 0.1	
P-value**	**<0.001**		0.884[$]
Headache			
• **Baseline**	3.38 ± 0.2	3.45 ± 0.1	
• **1-week**	0.40 ± 0.09	0.33 ± 0.07	
• **1-month**	0.60 ± 0.09	0.55 ± 0.09	
• **3-months**	0.85 ± 0.08	0.78 ± 0.08	0.613
• **6-months**	1.03 ± 0.08	0.90 ± 0.08	
• **9-months**	1.23 ± 0.08	1.20 ± 0.08	
• **12-months**	1.88 ± 0.5	1.78 ± 0.1	
P-value**	**<0.001**		0.732[$]

*Main effect of group; **Main effect of time; [$]Interaction effect between group and time.

Table 5. Concentration/Work differences between the Studied Groups.

	Group P (Epidural)	Group F (Facet injection)	P-value*
Concentration			
• **Baseline**	2.73 ± 0.1	2.13 ± 0.1	
• **1-week**	0.65 ± 0.08	0.70 ± 0.07	
• **1-month**	0.73 ± 0.08	0.83 ± 0.08	
• **3-months**	0.88 ± 0.08	0.90 ± 0.08	0.939
• **6-months**	1.23 ± 0.07	1.20 ± 0.06	
• **9-months**	1.40 ± 0.08	1.38 ± 0.08	
• **12-months**	1.78 ± 0.1	1.80 ± 0.1	
P-value**	**<0.001**		0.682$
Work			
• **Baseline**	2.53 ± 0.2	2.45 ± 0.2	
• **1-week**	0.70 ± 0.09	0.73 ± 0.09	
• **1-month**	0.85 ± 0.08	0.90 ± 0.07	
• **3-months**	1.00 ± 0.07	1.08 ± 0.07	0.787
• **6-months**	1.23 ± 0.08	1.78 ± 0.08	
• **9-months**	1.55 ± 0.09	1.60 ± 0.1	
• **12-months**	1.93 ± 0.1	1.93 ± 0.1	
P-value**	**<0.001**		0.895$

*Main effect of group; **Main effect of time; $Interaction effect between group and time.

Table 6. Driving/Sleep differences between the Studied Groups.

	Group P (Epidural)	Group F (Facet injection)	P-value*
Driving			
• **Baseline**	2.50 ± 0.1	2.58 ± 0.1	
• **1-week**	0.60 ± 0.08	0.58 ± 0.07	
• **1-month**	0.63 ± 0.08	0.60 ± 0.08	
• **3-months**	0.85 ± 0.08	0.90 ± 0.08	0.849
• **6-months**	0.93 ± 0.09	0.95 ± 0.06	
• **9-months**	1.28 ± 0.1	1.35 ± 0.08	
• **12-months**	1.80 ± 0.1	1.80 ± 0.1	
P-value**	**<0.001**		0.864$
Sleep			
• **Baseline**	2.03 ± 0.1	2.08 ± 0.1	
• **1-week**	0.28 ± 0.08	0.28 ± 0.01	
• **1-month**	0.30 ± 0.08	0.28 ± 0.02	
• **3-months**	0.58 ± 0.06	0.48 ± 0.04	0.972
• **6-months**	0.95 ± 0.1	1.03 ± 0.05	
• **9-months**	1.20 ± 0.08	1.20 ± 0.1	
• **12-months**	1.85 ± 0.1	1.55 ± 0.1	
P-value**	**<0.001**		0.766$

*Main effect of group; **Main effect of time; $Interaction effect between group and time.

Table 7. Recreation/NDI differences between the Studied Groups.

	Group P (Epidural)	Group F (Facet injection)	P-value*
Recreation			
• **Baseline**	1.78 ± 0.08	1.80 ± 0.09	
• **1-week**	0.85 ± 0.08	0.88 ± 0.05	
• **1-month**	0.95 ± 0.08	0.95 ± 0.04	
• **3-months**	1.18 ± 0.07	1.18 ± 0.09	0.923
• **6-months**	1.40 ± 0.09	1.40 ± 0.06	
• **9-months**	1.50 ± 0.09	1.48 ± 0.07	
• **12-months**	1.58 ± 0.09	1.58 ± 0.1	
P-value**	**<0.001**		0.973$
NDI			
• **Baseline**	24.73 ± 2.6	24.85 ± 2.8	
• **1-week**	4.48 ± 0.5	4.53 ± 0.7	
• **1-month**	5.48 ± 1.2	5.63 ± 0.8	
• **3-months**	7.68 ± 1.1	7.60 ± 0.9	0.941
• **6-months**	10.53 ± 1.1	10.43 ± 1.4	
• **9-months**	12.73 ± 1.3	12.73 ± 1.5	
• **12-months**	17.05 ± 2.6	17.10 ± 2.8	
P-value**	**<0.001**		0.962$

*Main effect of group; **Main effect of time; $Interaction effect between group and time.

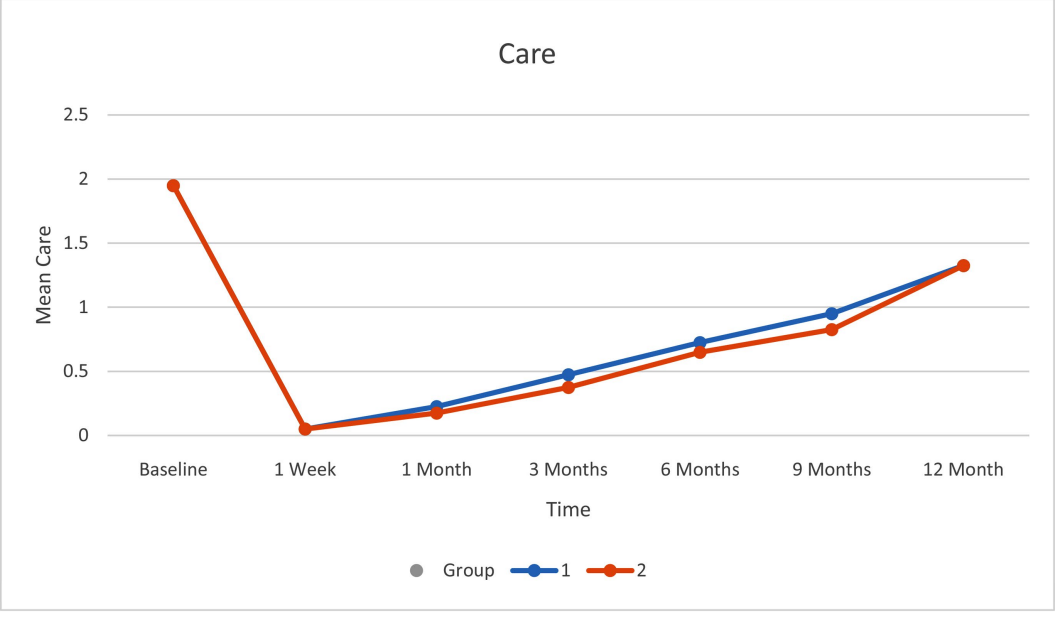

Figure 4. Difference in the mean Care over time between the Studied Sample.

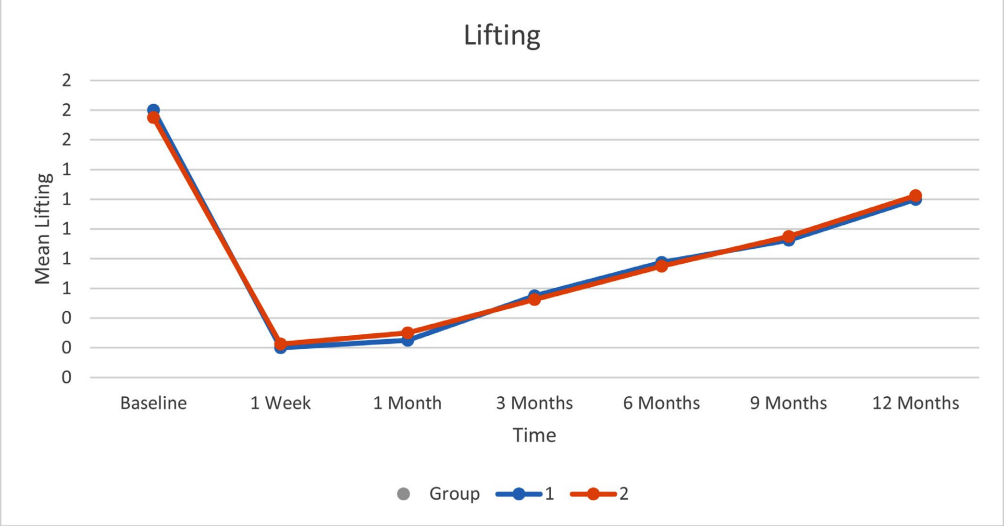

Figure 5. Difference in the mean Lifting over time between the Studied Sample.

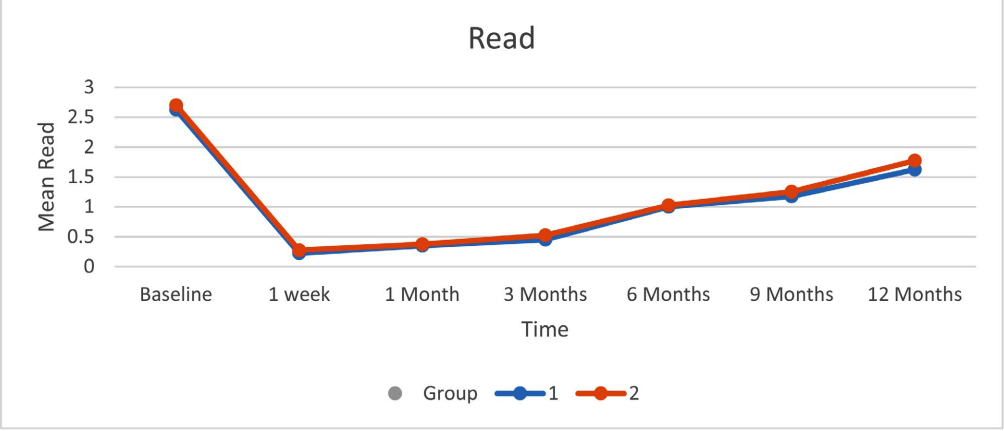

Figure 6. Difference in the mean Read over time between the Studied Sample.

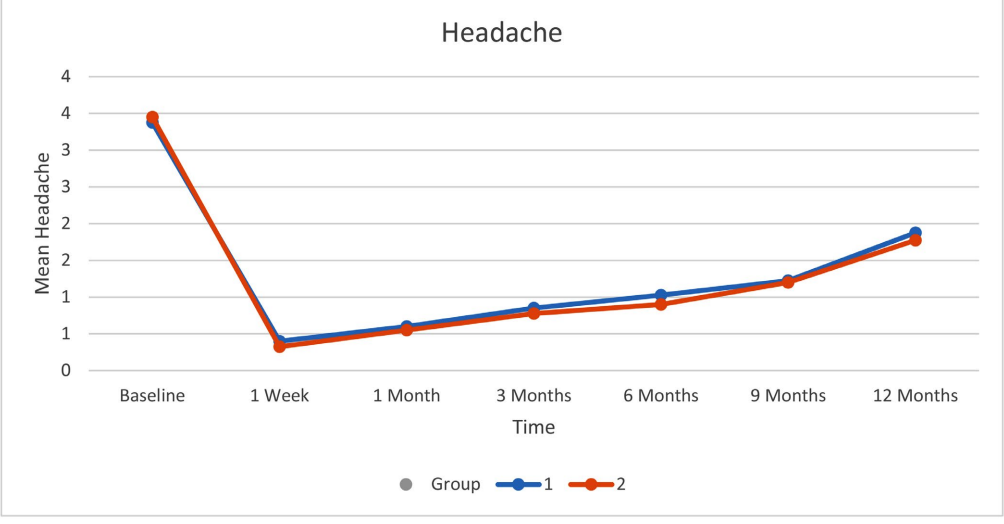

Figure 7. Difference in the mean Headache over time between the Studied Sample.

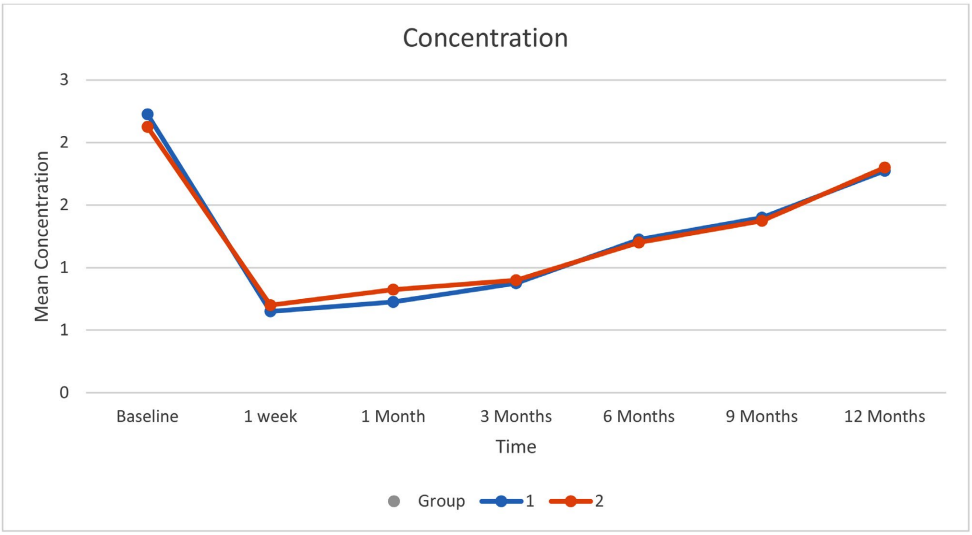

Figure 8. Difference in the mean Conc. over time between the Studied Sample.

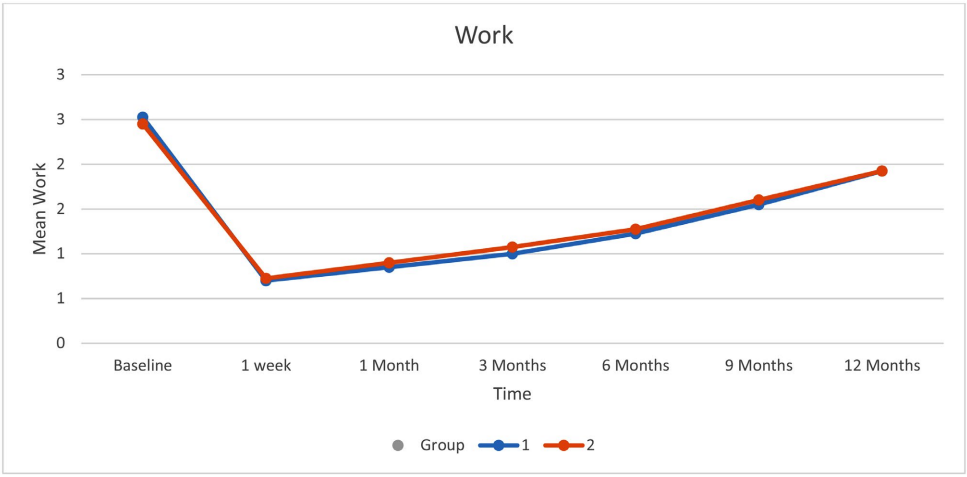

Figure 9. Difference in the mean Work overtime between the Studied Sample.

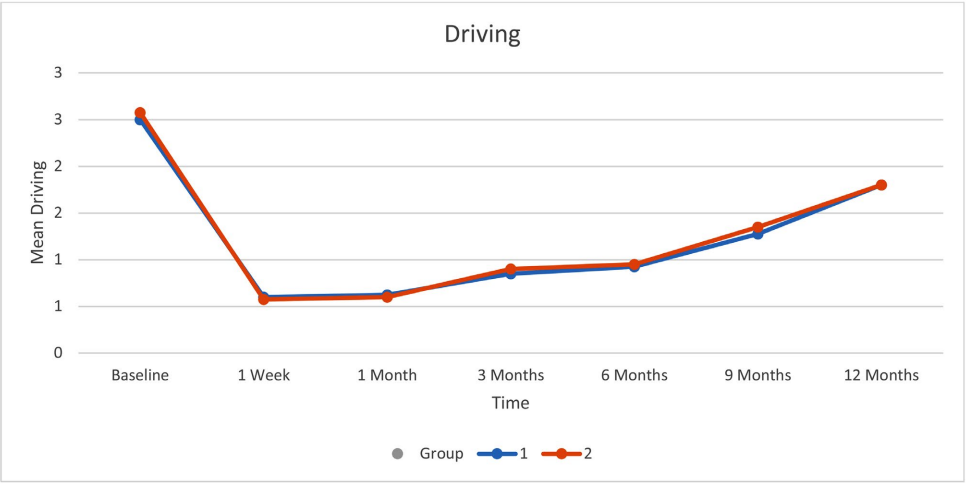

Figure 10. Difference in the mean Driving over time between the Studied Sample.

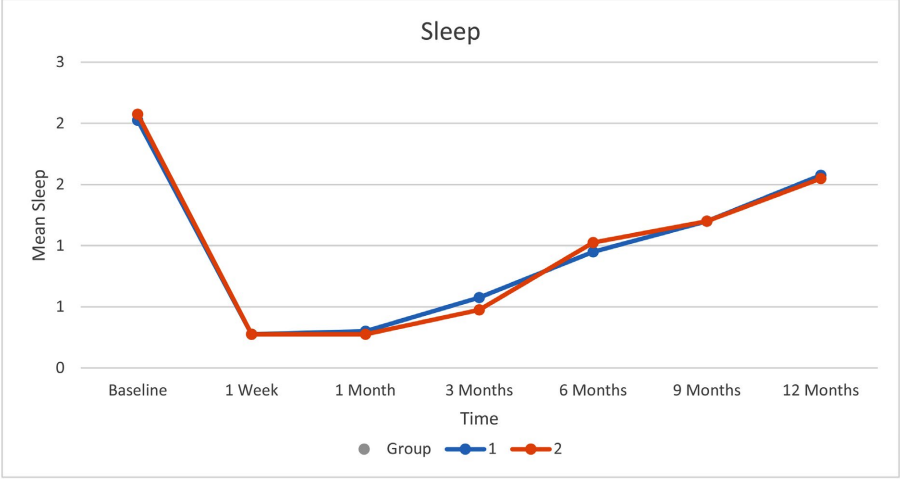

Figure 11. Difference in the mean Sleep overtime between the Studied Sample.

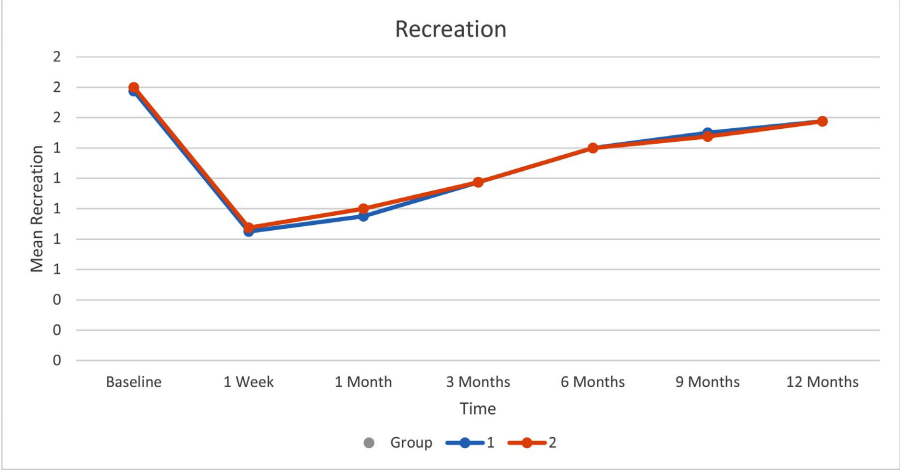

Figure 12. Difference in the mean Recreation over time between the Studied Sample.

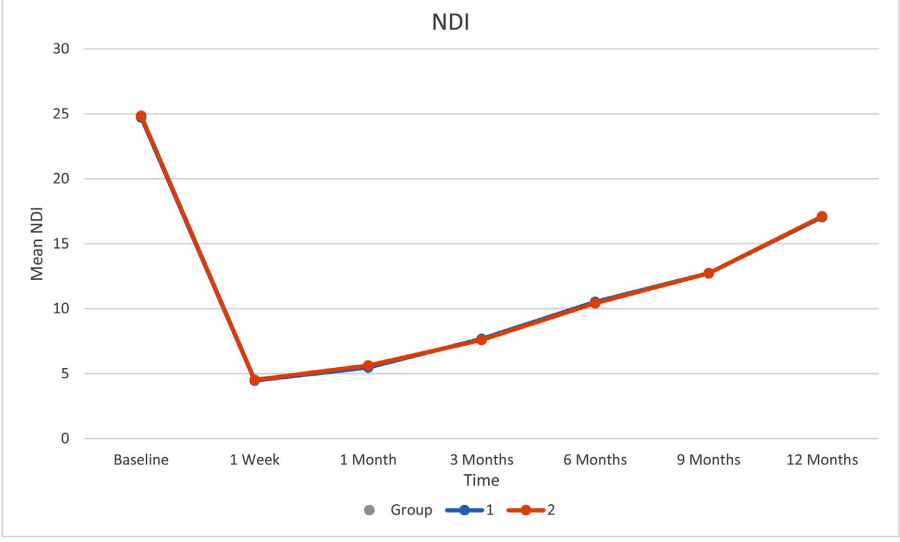

Figure 13. Difference in the mean NDI overtime between the Studied Sample.

Analgesic use

Six patients in each group were on regular doses of tramal before the intervention. However, after treatment, only three patients required tramal after one year of intervention and two patients required tramal use after nine months in each group, with no significant difference between the two groups. Concerning Non-Steroidal Anti-Inflammatory Drugs (NSAIDS) use, there was no significant difference between the two groups in the pre- and post-treatment period. (Tables 8-10)

Table 8. Type of opioid consumption between the Studied Groups.

Opioid Consumption		Group P (Epidural)		Group F (Facet injection)		P-value
		No.	%	No.	%	
Baseline	• No	34	85.0%	34	85.0%	>0.999
	• Tramal	6	15.0%	6	15.0%	
1 Week	• No	40	100.0%	40	100.0%	NA
	• Tramal	0	0.0%	0	0.0%	
1 month	• No	40	100.0%	40	100.0%	NA
	• Tramal	0	0.0%	0	0.0%	
3 months	• No	40	100.0%	40	100.0%	NA
	• Tramal	0	0.0%	0	0.0%	
6 months	• No	40	100.0%	40	100.0%	NA
	• Tramal	0	0.0%	0	0.0%	
9 months	• No	40	100.0%	40	100.0%	NA
	• Tramal	0	0.0%	0	0.0%	
12 months	• No	39	97.5%	39	97.5%	>0.999
	• Tramal	1	2.5%	1	2.5%	

*Chi-square test was used for the comparison of Frequency between groups.

Table 9. Types of NSAIDS consumption (pre-) differences between the Studied Groups.

NSAIDS consumption pre		Group P (Epidural)		Group F (Facet injection)		P-value*
		No.	%	No.	%	
Baseline	• No	26	65.0%	27	67.5%	0.947
	• Ketolac	5	12.5%	5	12.5%	
	• Ibuprofen	3	7.5%	2	5%	
	• Gabapetenoid	6	15.0%	6	15.0%	
1 week	• No	38	95.0%	38	95.0%	0.692
	• Ketolac	2	5.0%	2	5.0%	
	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	
1 month	• No	40	100.0%	40	100.0%	NA
	• Ketolac	0	0.0%	0	0.0%	

Continued

	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	
3 months	• No	40	100.0%	40	100.0%	NA
	• Ketolac	0	0.0%	0	0.0%	
	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	
6 months	• No	40	100.0%	40	100.0%	NA
	• Ketolac	0	0.0%	0	0.0%	
	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	
9 months	• No	40	100.0%	40	100.0%	NA
	• Ketolac	0	0.0%	0	0.0%	
	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	
12 months	• No	38	95.0%	39	97.5.0%	0.603
	• Ketolac	1	2.5%	0	0.0%	
	• Ibuprofen	1	2.5%	1	2.5%	
	• Gabapetenoid	0	0.0%	0	0.0%	

*Monte-Carlo exact test was used for comparison of Frequency between groups.

Table 10. NSAIDS consumption (post-) differences between the Studied Groups.

NSAIDS consumption post		Group P (Epidural)		Group F (Facet injection)		P-value
		No.	%	No.	%	
Baseline	• No	38	95.0%	38	95.0%	0.692
	• Ketolac	2	5.0%	2	5.0%	
	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	
1 week	• No	40	100.0%	40	100.0%	NA
	• Ketolac	0	0.0%	0	0.0%	
	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	
1 month	• No	40	100.0%	40	100.0%	NA
	• Ketolac	0	0.0%	0	0.0%	
	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	
3 months	• No	40	100.0%	40	100.0%	NA
	• Ketolac	0	0.0%	0	0.0%	
	• Ibuprofen	0	0.0%	0	0.0%	
	• Gabapetenoid	0	0.0%	0	0.0%	

Continued

6 months	• **No**	35	87.5%	37	92.5%	0.619
	• **Ketolac**	2	5%	2	5%	
	• **Ibuprofen**	1	2.5%	0	0.0%	
	• **Gabapetenoid**	2	5%	1	2.5%	
9 months	• **No**	31	77.5%	31	77.5%	0.464
	• **Ketolac**	4	10.0%	5	12.5%	
	• **Ibuprofen**	2	5%	1	2.5%	
	• **Gabapetenoid**	3	7.5%	3	7.5%	
12 months	• **No**	27	67.5%	26	65.0%	0.967
	• **Ketolac**	6	15.0%	6	15.0%	
	• **Ibuprofen**	3	7.5%	3	7.5%	
	• **Gabapetenoid**	4	10.0%	5	12.5%	

*Monte-Carlo exact test was used for comparison of Frequency between groups.

Complication

Regarding the epidural injection, twelve patients suffered numbness after the injection; ten patients suffered from dysesthesia, zero head dropping, fourteen patients had nausea, and sixteen patients suffered from vomiting. While in the facet injection group, ten patients suffered numbness after the injection; twelve patients suffered from dysesthesia, zero from head dropping, twelve had nausea, and fourteen had vomiting. Comparing the two groups, there was no significant difference in the incidence of complications. (Table 11)

Table 11. Postoperative complication differences between the Studied Groups.

After operation	Group P (Epidural)		Group F (Facet injection)		P-value
	No.	%	No.	%	
Numbness SE	12	30.0%	10	25.0%	0.617
Dyesthesia SE	10	25.0%	12	30.0%	0.617
Drop head SE	0	0%	0	0%	-
Nausea	14	35.0%	12	30.0%	0.633
Vomiting	16	40.0%	14	35.0%	0.644

*Chi-square test was used for comparison of Frequency between groups.

5. Discussion

In the realm of managing chronic cervical pain, cervical epidural and facet joint injections stand out as two widely employed therapeutic interventions [9] [10]. The essence of both treatments lies in the introduction of a steroid medication into the affected region, with the explicit goal of diminishing inflammation and assuaging pain. Cervical epidural injections primarily aim to alleviate neck pain originating from various sources, such as herniated discs, spinal stenosis, and nerve

compression complications, with a particular focus on treating cervical radicular pain [11]. Specifically, these injections are administered into the epidural space, strategically positioned between the vertebrae and the dura mater, which serves as the outermost layer encircling the spinal cord [1]. The steroid medication helps reduce inflammation in this area, which can help relieve pressure on nerves and reduce pain.

With regard to facet joint injections, they are used to treat neck pain caused by arthritis or degenerative disc disease. These injections are made directly into the facet joints, which are small joints between each vertebra in the spine [4]. Cervical epidural and facet joint injections can effectively treat chronic cervical pain. However, it is important to note that these treatments do not always provide long-term relief from symptoms. In some cases, additional treatments may be necessary to achieve lasting relief from chronic neck pain. Additionally, both of these treatments carry risks such as infection or nerve damage, so it is important to discuss all potential risks with your doctor before undergoing either procedure [12]. Our trial included 80 patients with chronic cervical pain and showed no significant difference in pain relief between groups at different follow-up periods. However, there was a significant improvement from the baseline after each intervention. Besides, the overall NDI did not show a significant difference between the groups, while there was a significant improvement from the baseline in each group. Both groups showed comparable results in terms of analgesic use and post-intervention complications.

Manchikanti *et al*. [4] performed a systematic review on the efficacy of cervical epidural injections in the management of chronic cervical pain with or without upper extremity pain. With a proper assessment of methodological quality and risk of bias, the review supported the benefits of cervical interlaminar epidural injections for different etiologies such as disc herniation, discogenic pain without facet joint pain or disc herniation, central spinal stenosis, and post-surgical syndrome. Pinto *et al*. [13] demonstrated the effectiveness of epidural injections in providing temporary pain relief. However, they did not show long-term effectiveness. The definition of "long term" is arbitrary; most studies classified it as lasting six months or more. They reported that epidural injections effectively provided short-term pain relief, especially in patients with sciatica.

Kim *et al*. [14] compared the results of cervical facet joint injections for individuals complaining of discomfort in the cervical zygapophyseal joint. This randomized, double-blind trial included 120 patients with discogenic neck pain treated with fluoroscopically guided cervical epidural injections. They reported that local anesthetics with or without steroids were beneficial in 75% of patients, improving pain and functional status.

They required an average of 3 - 4 procedures over a year. The successful group had pain relief for 37 - 39 weeks over the year of treatment.

Many studies investigated prognostic factors for cervical epidural injections (Kirpala ni & Mitra, 2011) [15]-[17]. Chronic opioid usage negatively predicted

the responsiveness to cervical epidural steroid injections in a previous retrospective study [15]. Moreover, some studies showed that opioid withdrawal was challenging [18] [19]. Another study, Strub *et al*. [17] found that individuals who needed opioids to control their symptoms before the operation had inadequate pain relief.

Concerning the facet injection, the target joint can be identified by the pain distribution and paramedian tenderness over the area of the facet joints [20]. Pain from C5-6 facet joints was focused above the spine of the scapula, mainly on the shoulder region. While pain from C6-7, facet joints were focused below the spine of the scapula, mainly in the thoracic region. The medial branches of the dorsal ramus above and below the joints supply the facet joints in the cervical spine below C2-3 [21].

Bogduk *et al*. [20] showed that the medial branch nerve blocks were superior to intraarticular injections because they are easier, less traumatic, and less risky. However, the posterior approach facet injections demonstrated a favourable learning curve and no risk of meeting with critical structures along the needle pathway.

6. Limitations

Immediate postoperative complications such as vagovagal and dizziness were not recorded. Therefore, a prospective study using a larger sample size should be further investigated. Analgesic drug doses used not recorded because patients not remembering the perfect dose used and when, only remembering the type of analgesic used. Additionally, patient satisfaction was not assessed. No control group was used in our study.

7. Conclusion

We concluded that during different follow-up periods, there is no significant difference in pain reduction between epidural injections and facet injections. However, each intervention resulted in a considerable improvement from the baseline. Moreover, the total NDI did not demonstrate a significant difference between the two groups, despite each group improving significantly from the baseline, but I can't claim that both groups exhibited equivalent results in terms of analgesic usage and post-intervention complications as mentioned in the limitation section, which we may need for larger sample size to decrease bias.

Ethical Considerations

Written informed permission from every patient was obtained prior to the conduction of this randomized clinical trial. The study was authorised by Ethics Committee and Institutional Review Board under the IRB number (D-228). The sample size was estimated by performing a pilot study and the patients of the pilot were not included. We registered our clinical trial on Clinicaltrial.gov with the identifier NCT04594876 and 1st posted on 19/10/2020. No financial support or

conflicts of interest. Group P was assigned to the individuals who would have cervical epidural injection, while Group F would receive a facet injection.

Conflicts of Interest

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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