The Effectiveness of Facet Joint Local Corticosteroid Injection in Diagnosis and Treatment of Facet Joint Syndrome

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Abstract

Objectives: To evaluate outcomes of lumbar facet joint injection with local corticosteroid in treatment of chronic low back pain according to Oswestry disability Index(ODI).

Patients and Methods: Interventional prospective study on 23 patients attended the outpatient clinic of Orthopedic Surgery in Cairo University Hospitalscomplaining of chronic low back pain not responsive to medical treatment and physiotherapy from September 2018 to august 2019.

Results: The mean age of the patients was 41.17 ± 9.74 years and 47.8% were males. Facet joint corticosteroid injection resulted in significant reduction of pain severity of patients as it ranged 5:10 (mean 7.3 ±1.5) pre-injection and improved to 0 :6 (mean 3.6 ± 1.7) 3-month post injection(Pvalue:0.001) while the ODI score ranged 26:80 (mean 47.4 ±15.7) pre-injection and improved to 4:46 (mean 28.8 ± 10.4) three months post injection(Pvalue 0.001).

Conclusion: intra-articular facet joint injection is crucial in the diagnosis and treatment of facet joint syndrome.

Keywords*: back pain, corticosteroids, facet joint, and injection.*

Introduction

Low back pain continues to be responsible for more years lived with disability than any other disorder [(1)]. Multipleinternational studies attest to the massive health care and societal costs of low back pain. Most of those affected have non-specific low back pain [(2)].

Facet joint pain is defined in a functional capacity as pain originating from any structure integral to both the function and configuration of the lumbar facet joints[(3, 4)]. Facet joint injury can occur from mechanical damage due to compressive forces or extensive stretching; degenerative changes such as osteoarthritis and inflammatory processesincluding rheumatoid arthritis [(5, 6)]. Facet joints are richly innervated by the medial branches from the dorsal rami above and below each joint[(7)].The prevalence of facet joint syndrome was 5:10% of patients with

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chronic LBP and it was determined by pain relieve more than 75% after intra-articular lidocaine and bupivacaine injection[8-10]. The diagnosis is mainly based on history and physical examination. The patient is presented with chronic LBP not responding to medical treatment more than 6 month that increase with rotational and extension maneuver and radiating to the groin region or thigh[11-13].

Corticosteroids are established anti-inflammatory agents with demonstrable, short-term, benefits when injected intra-articularly to treat shoulder impingement syndrome or osteoarthritis of peripheral joints [14, 15]

Despite the plethora of research and clinical emphasis on this disorder, almost every aspect of facet joint pain, from diagnosis to treatment, remains mired in controversy. Even among pain specialists, lumbar facet joint pain remains a misunderstood, misdiagnosed, and improperly treated medical condition. So in this study we aim to evaluate the outcomes of lumbar facet joint injection with local corticosteroid in chronic low back pain to reach better and less invasive method for treatment of low back pain.

Patients and methods

Study setting and population:

The study was carried out in the Department of Orthopedic Surgery in Cairo University Hospitals.

The study included patients attending the outpatient clinic of Orthopedic Surgery in Cairo University Hospitalscomplaining of chronic low back pain not responsive to medical treatment and physiotherapy from September 2018 to august 2019.

Study population: patients attending the outpatient clinic of Orthopedic Surgery in Cairo University Hospitalscomplaining of chronic low back pain not responsive to medical treatment and physiotherapy. The Sample size is 23 patients.

All patients were complying with the following inclusion and exclusion criteria:

· Inclusion criteria:

§ Age 20:60.

§ Both sexes.

§ LBP at least for 6 month duration exaggerated by external rotation and extension.

§ Failure to respond to conservative medical treatment and physiotherapy.

· Exclusion criteria:

§ History of allergy to local anesthetics or steroid

§ Coagulopathy.

§ Severe foraminal stenosis.

§ Progressive neurological disorders.

§ Pregnancy

§ radiculopathy

§ Acute lumbar Fracture.

Evaluation of pain severity & functional outcome:

Precise assessment of the severity of back and leg pain and the functional condition of the patient before the procedure was compared with the post injection results so we can evaluate the effect of the treatment or the procedure performed.

A) The Visual analogue scale:

It is a scale from 0 to 10 where is 0 means no pain at all and 10 means the worst pain you can imagine (Fig.2). Every patient chooses a number on the scale once for his back pain and another for his leg pain and to be repeated within 6 weeks and then within 3 months post injection.

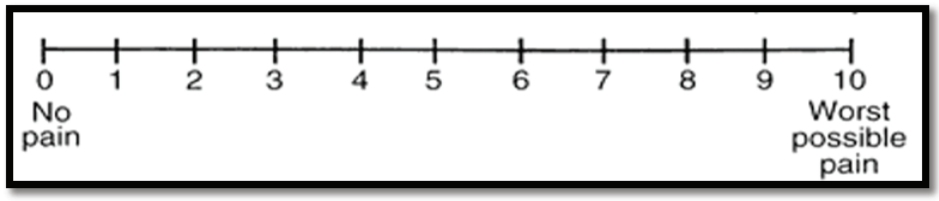

Fig.1: the visual analogue scale

B) The Oswestry Disability index:

It is used to evaluate the functional condition of the patient's back. Each section is scored on a 0–5 scale, 5 representing the greatest disability (Fig.2). The index is calculated by dividing the added score by the total possible score, which is then multiplied by 100 and expressed as a percentage. Thus, for every question not answered, the denominator is reduced by 5.

Oswestry Disability Index

Name _____ **Date** _____

Instructions: Please circle the **ONE NUMBER** in each section which most closely describes your problem.

Section 1 – Pain Intensity
0. The pain comes and goes and is very mild.
1. The pain is mild and does not vary much.
2. The pain comes and goes and is moderate.
3. The pain is moderate and does not vary much.
4. The pain comes and goes and is severe.
5. The pain is severe and does not vary much.

Section 2 – Personal Care (Washing, Dressing, etc.)
0. I would not have to change my way of washing or dressing in order to avoid pain.
1. I do not normally change my way of washing or dressing even though it causes some pain.
2. Washing and dressing increase the pain but I manage not to change my way of doing it.
3. Washing and dressing increase the pain and I find it necessary to change my way of doing it.
4. Because of the pain I am unable to do some washing and dressing without help.
5. Because of the pain I am unable to do any washing and dressing without help.

Section 3 – Lifting
0. I can lift heavy weights without extra pain.
1. I can lift heavy weights but it gives extra pain.
2. Pain prevents me lifting heavy weights off the floor.
3. Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently positioned, e.g., on a table.
4. Pain prevents me lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.
5. I can only lift very light weights at most.

Section 4 – Walking
0. I have no pain on walking.
1. I have some pain on walking but it does not increase with distance.
2. I cannot walk more than 1 mile without increasing pain.
3. I cannot walk more than ½ mile without increasing pain.
4. I cannot walk more than ¼ mile without increasing pain.
5. I cannot walk at all without increasing pain.

Section 5 – Sitting
0. I can sit in any chair as long as I like.
1. I can sit only in my favorite chair as long as I like.
2. Pain prevents me from sitting more than 1 hour.
3. Pain prevents me from sitting more than ½ hour.
4. Pain prevents me from sitting more than 10 minutes.
5. I avoid sitting because it increases pain immediately.

Section 6 – Standing
0. I can stand as long as I want without pain.
1. I have some pain on standing but it does not increase with time.
2. I cannot stand for longer than 1 hour without increasing pain.
3. I cannot stand for longer than ½ hour without increasing pain.
4. I cannot stand for longer than 10 minutes without increasing pain.
5. I avoid standing because it increases the pain immediately.

Section 7 – Sleeping
0. I get no pain in bed.
1. I get pain in bed but it does not prevent me from sleeping well.
2. Because of pain my normal nights sleep is reduced by less than one-quarter.
3. Because of pain my normal nights sleep is reduced by less than one-half.
4. Because of pain my normal nights sleep is reduced by less than three-quarters.
5. Pain prevents me from sleeping at all.

Section 8 – Social Life
0. My social life is normal and gives me no pain.
1. My social life is normal but it increases the degree of pain.
2. Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g., dancing, etc.
3. Pain has restricted my social life and I do not go out very often.
4. Pain has restricted my social life to my home.
5. I have hardly any social life because of the pain.

Section 9 – Traveling
0. I get no pain when traveling.
1. I get some pain when traveling but none of my usual forms of travel make it any worse.
2. I get extra pain while traveling but it does not compel me to seek alternate forms of travel.
3. I get extra pain while traveling which compels to seek alternative forms of travel.
4. Pain restricts me to short necessary journeys under ½ hour.
5. Pain restricts all forms of travel.

Section 10 – Changing Degree of Pain
0. My pain is rapidly getting better.
1. My pain fluctuates but is definitely getting better.
2. My pain seems to be getting better but improvement is slow.
3. My pain is neither getting better or worse.
4. My pain is gradually worsening.
5. My pain is rapidly worsening.

TOTAL _____

Fig.2: Oswestery disability index.

Equipment for facet injections:

· Appropriate syringe and needle for local anesthesia.

· Lidocaine 1% without epinephrine.

· Spinal needle, 22 or 25 gauge.

· Bupivacaine 0.25% (1ml).

· Injectable steroid (1ml triamcinolone 40 mg)

Positioning

· The patient lie prone on the table with a pillow placed under the front of the abdomen for comfort.

· Fluoroscopy should be placed in a direct postero-anterior orientation.

· Once the correct level is identified, tilting the X-ray beam caudally 20–30° allowing clearer delineation of the joint, described as a "Scotty-Dog" view.

Technique:

· In operation room at Cairo University Hospitals.

· Standard aseptic technique is mandatory. The skin is prepared above and below the level injected.

· The selected level is identified by palpation of the spinous processes, and confirmedradiographically. The joints lay midway between and lateral to adjacent spinous processes.

· Once the entry point is confirmed, the needle is advanced in the line of fluoroscopy until bone is contacted, and the position again checked radiographically to be directly over the joint.

· Therapeutic injection is then carried out.

· Withdraw the needle and apply a sterile dressing.

Follow up

Patients were followed for a period of 12 weeks. The first visit post-injection was at the second week to assess the immediate effect of facet joint injection, while the second and third visits at the 4^{th} and the 12^{th} weeks respectively to assess the short term effect. The improvement was assessed using the visual analogue scale (VAS) for back pain, and the Oswestry disability index (ODI) for functional outcome.

Results:

Demographic date: The mean age was 41.17 ± 9.74 years ranging from 25 to 60 years and according to gender distribution, they were 11(47.8 %) males and 12 (52.2%) females.

Low back pain characteristics

The low back pain duration among the participants was 22.1 ± 8.9 month ranging from 9- 36 months. The site of pain was felt in the midline by 6 (26.1%), para-median by 3 (13%) and at both sites by 14 (60.9%) patients. It was radiating in the right side in 6 (26.1%), in the left side in 7 (30.4%) and radiating bilaterally in 10 (43.5 %). the pain was aggravated by sitting in 15 (65.2%) patients, standing in 18 (78.3 %) patients, effort in 15 (65.2%) and by walking in 4 (17.4 %) patients. Night sleep was affected in 13 (56.5%) patients. Pain was relieved by rest in 14 (60.9%) patients. daily activities was interrupted mildly in 4 (17.4%) of patients, moderately in 13 (56.5%) and markedly in 6 (26.1%) patients.

Spine examination

During lateral bending , tenderness was felt on the right side in 3 (13%) patients, on the left side in 5 (21.7%) and bilaterally in 15 (65.3) patients. There was tenderness during extension all patients . There was tenderness during flexion in 13 (56.5%) patients. All patients have intact sensory , motor and reflexes .

Facet joint degeneration

Based on Magnetic Resonance Imaging and according to **Weishaupt classification** there were four (17.4%) patients G_0, eight (34.8%) patients G_1, six (26.1%) patients G_2 and five (21.7%) patients G_3.

Evaluation of pain severity and functional prognosis:

Pain severity assessment:

The severity of patient's pain was assessed using visual analogue scale. The pre-injection VAS ranged from 5:10 with mean 7.3 ±1.5. Immediately after injection its range became 0:4 with mean 2.3 ±1.2. One month later, the range was 0:4 with mean 3.1 ±1.7. After three months, the range was 0 :6 with mean 3.6 ± 1.7.There was significant decrease in pain severity after injection as P value was 0.001

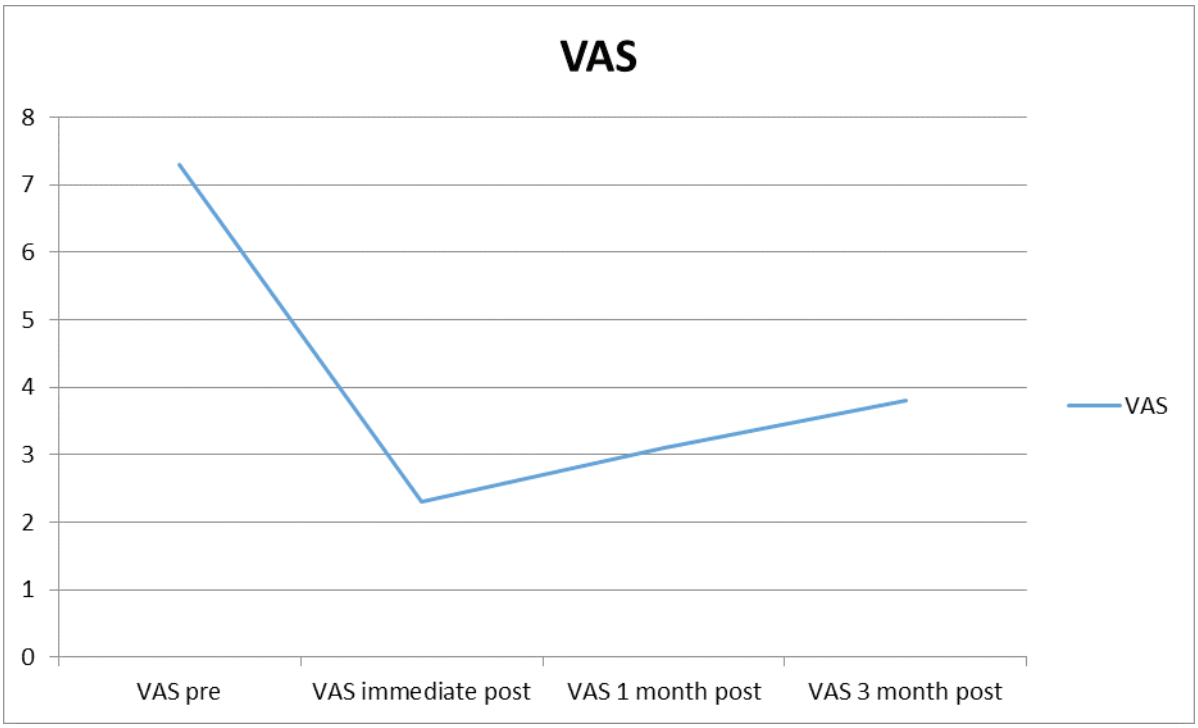

Fig.3: showing the VAS of patients' pre and post injection.

Functional evaluation:

Functional evaluation was done using ODI. The pre-injection ODI ranged from 26:80 with mean 47.4 ±15.7. One month later, the range was 4:40 with mean 21.1 ±9.6. At three month, the range was 4:46 with mean 28.8 ± 10.4.There was significance improvement in functional outcome as P value was 0.001.

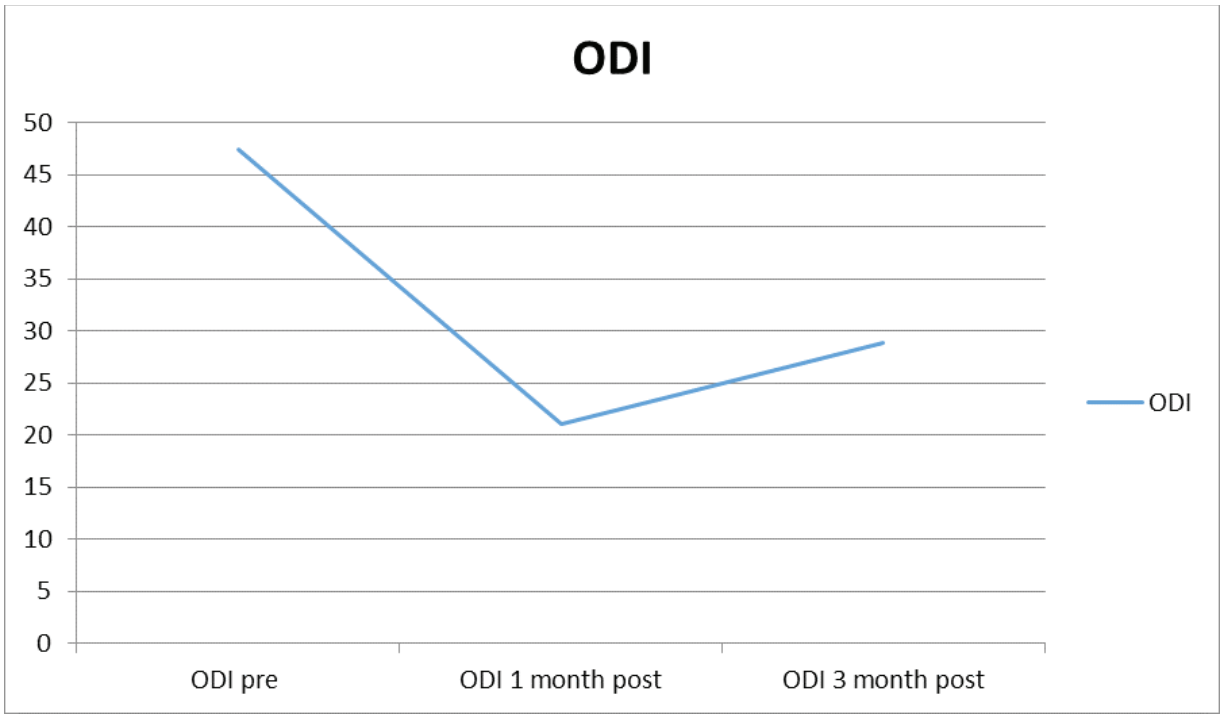

Fig.4: showing the ODI of patients' pre and post injection.

Relationship between facet joint arthritis and VAS:

Table 1: relationship between grade of facet arthritis and reduction in pain severity after injection

		G0	G1	G2	G3	P-value
VAS	Pre	8.5	7.25	6.83	7.17	0.233
	Immediate post	2.25	1.37	2.67	2.00	0.22
	1 month post	2.75	2.62	3.3	2.8	0.47
	3 months post	3.00	2.5	3.5	5.0	0.044

There was no statically significant difference among the patients before, immediately after injection and 1 month after injection. But three months post injection show statically significant difference as the patients with arthritis grade 2 & 3 start to develop pain.

Discussion

This study was carried out in Cairo University hospitals from august 2018 to august 2019. It included 23 patients with chronic low back pain that were treated with lumbar facet joint injection. The mean age of the patients was 41.7 ±9.74 years. The male

to female ratio was 11:12. The number of patients is nearly comparable with the number of patients presented by **Kawu**et al.,[16]**Celik** et al.[17] and **Carette et al**.[18]**(table 2)**. The number of patients in our study is limited by rate of cases available in our causality during the time of our work; other studies with higher patient number were retrospective and lasted for longer time.

The inclusion and exclusion criteria of our study are similar to the inclusion criteria of **lilius** et al[19], **Carette** et al.[18], **Celik** et al.[17], while it differs from the study of **Kim** et al.[20]; as he accepted patients with positive straight leg raise test and the study of **Proietti**et al.[21]who only accepted patients older than 45 years.

The mean age of this study is comparable with the study of **Lilius et al.,** [19]**Carette** et al.[18], **Celik** et al.[17], and **Kawu** et al.[16]. However, this is less than the age presented with**Proietti et al.**[21] and **Kim et al.**[20].

The sex distribution of this study was comparable with the study of **Lilius** et al.[19], and **Carette**et al.[18] while it differs from the sex distribution of the study of **Kim** et al.[20], **Kawu** et al.[16], and **Proietti**et al.[21]

Table 2:comparison between current study and other studies according to patient number, age and gender

Study	Number	Age	gender
Current study	23	41.2	47.8% males
Lilius	107	44	44.8 % males
Kim	244	68.2	23.4%males
Karrette	149	42.5	51% males
Celik	40	37.6	32.5% males
Kawu	10	42.3	60% males
Proietti	40	65	37.5% males

The low back pain duration among the participants was 22.1 ± 8.9 month ranging from 9- 36 months.

The pain severity was assessed by VAS and the functional status of the patients were assessed using ODI

We have assessed the pain using visual analogue scale. The pre-injection VAS ranged from 5:10 with mean 7.3 ±1.5. Immediately after injection its range became 0:4 with mean 2.3 ±1.2. One month later, the range was 0:4 with mean 3.1 ±1.7. After three months, the range was 0 :6 with mean 3.6 ± 1.7 with decrease in pain severity by 3.7. Our results were comparable with the results of **Carette**et al.[18] and **Celik** et al.[17] and better than the results of **Kawu** et al.[16] and **Proietti**et al.[21]may be due to the sample small size in**Kawu** and patient's age inclusion criteria of **Proietti**.

Table 3:comparison between current study and other studies according to VAS

	Pre-VAS	Immediate post VAS	1 month VAS	Three month post VAS
Current study	7.3	2.3	3.1	3.6
Carette	6.3	4.5	3.8	
Celik	8	2	1	3.2
Kawu	7.8		4	4.9
Proietti	8.5	4	5	6
Schulte et al	8	2.5	3.4	4

We have used the ODI to evaluate the Functional status. The pre-injection ODI ranged from 26:80 with mean 47.4 ±15.7. One month later, the range was 4:40 with mean 21.1 ±9.6. At three month, the range was 4:46 with mean 28.8 ± 10.4. Our results were better than the results of **Kawu** et al. [16]as the pre injection ODI was 58.6 ±6.8, one month later was 42.3±5.5 and after three months were 39.6±4.9

Our study has points of strength as it is a prospective study and the cases were done by the same team.

On the other hand, the limited number of cases and the short-term follow up are the two points of weakness of this study. The study assessed early outcomes only and there was no long-term follow up.

Conclusion

In conclusion intra-articular facet joint injection is crucial in the diagnosis and treatment of facet joint syndrome. It is an easy to perform and effective treatment for temporary pain relief. Grading lumbar facet joint degeneration by using Weishaupt classification helps to estimate the long term response to injection.

Ethical Clearance: Taken from kasrAl-Ainy ethical committee.

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Conflict of Interest: None to declare.

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