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A Study to Determine the Clinical Efficacy of Spinal Facet Joint Intervention with Medial Branch Block in Patients of Chronic Low Back Pain with Radiation Associated with Facet Arthropathy

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Abstract
Facetogenic back pain results from involvement of spinal zygapophyseal or facet joints. The common symptoms are diffuse back pain, localized tenderness at facet joints, reduced functionality. Lumbar radiculopathy due to facet hypertrophy is also a well known neurological condition. Facet arthropathy can be diagnosed clinically by local tenderness and quadrant loading test and by MRI with evidence of facet hypertrophy while the best known clinical test for lumbar radiculopathy is straight leg raising (SLR) test.
Nerve block with steroid and local aneasthetic at Medial Branch of dorsal rami, which supplies facet joint is a very common minimally invasive procedure in the treatment of facet arthropathy. The aim of our study was to observe the efficacy of Medial Branch Block (MBB) in the treatment of low back pain (LBP) with radiation associated with facet hypertrophy.
Twenty nine patients, included in the study as per inclusion criteria, were treated with MBB apart from getting other conventional pharmacological and non pharmacological conservative managements. They were assessed on the day of intervention and at two weeks follow up, for the parameters of back pain, facet joint tenderness, SLR and activity.
Finally twenty four patients completed the study and the resultant data was analysed with appropriate statistical tools. All the parameters had shown statistically significant improvement over follow up. SLR on the ipsilateral side has shown better improvement than contralateral side. This short term study indicates towards the efficacy of MBB in controlling both LBP and radiating pain in patients suffering from facet hypertrophy.
Keywords: *Facet Hypertrophy, Zygapophyseal Joint, Medial Branch Block, Low Back Pain, Facet Joint Intervention.*

Introduction

Low back pain (LBP) is a commonly encountered problem in the out-patient setting. Multiple structures in the lumbar spine including discs, facet joints, and sacroiliac joints have been considered the major sources of pain in the low back and/or lower extremities. Lumbar facet joints have been implicated as the source of chronic pain

in 21% to 41% (with an overall prevalence of 31%) in a heterogenous population with chronic low back pain.

The term zygapophysial joints refers to the joints formed by the small growths that posteriorly bridge consecutive vertebrae. This term is often replaced by the term "facet joints".

The facet joints (zygapophyseal joints) are diarthrodial, gliding joints with a synovial lining. Because of the laxity of their joint capsules, there is a considerable range of movement in different directions[1]. The width of the articular cartilage is 2.5-4 mm[2,3] and the cartilage is thickest toward the center of the joint[4]. The joint surfaces are slightly curved, the superior facets presenting a concave and the inferior facets a convex surface. The internal lining of the joints is made up by synovial membranes.

The facet joint of the lumbar spine, which forms the posterolateral articulations to connect the vertebral arches, receives dual innervations from medial branches arising from the posterior primary rami at the same level and one level above. It has generally been accepted that the lumbar facet joint is a potential source of low back pain, especially facetogenic back pain.

Patients of facetogenic back pain are initially managed conservatively with advice of pharmacologic and non pharmacologic management. Non pharmacologic management includes activity modifications, therapeutic exercises, modalities etc. but, when these conservative approaches fail to garner effective benefit, there are some minimally invasive interventions that may help in relief of facetogenic pain.

Various interventions that target the facet joint for the treatment of the pain have been referred to as facet joint injections. Among them, medial branch block (MBB) is a block of the nerves that innervate the facet joint. In clinical trials MBBs has shown great validity in the control of chronic low back pain (LBP) or even acute LBP from facet joint dysfunction.[5,6,7]

The objective of this technique is to reduce pain and improve function by injecting steroid and local anaesthetics around medial branch of the dorsal rami that supplies the facet joint. It gives valuable alternative to physical and drug therapy. Various studies have stressed on the fact that MBB procedure can help reduce pain and improve activity of patients with facetogenic LBP. But its effect on radiating pain associated with LBP due to facet hypertrophy needs evaluation. In this study we made an effort to observe the short term benefits of spinal facet joint intervention with medial branch block in patients with low back pain with radiating pain associated with facet arthropathy.

Aims and Objectives

This study has been conducted with the aim to observe the clinical efficacy of spinal facet intervention with medial branch block using steroid and local anaesthetics in patients with chronic LBP with radiation associated with facet arthropathy.

Materials and Methods

This Prospective Study was conducted in the department after taking approval from the Institutional Ethical Committee and informed consent from all patients included in the study were obtained. Twenty nine patients of clinically (back pain, radiation, facet joint local tenderness, SLR, quadrant loading or Kemp test[8]) and radiologically (MRI finding of facet hypertrophy[9,10,11]) diagnosed LBP with radiation due to facet arthropathy were included in the study. Patients with peripheral neuropathy, myelopathy, bone disorders, neuromascular conditions, inflammatory conditions, cardiac conditions, local or systemic infections, diabetes and patients having contra indications to steroid and local anesthetics were excluded from the study.

All patients were treated with NSAIDs, muscle relaxant, static spinal exercise and local heat. Patients were assessed as per assessment criteria. Back pain, facet joint tenderness, Straight Leg Raising test (SLR) and activity score were assessed.

All patients received fluoroscopy guided medial branch block at appropriate side and level depending upon clinical and MRI findings with steroid (triamcinolone acetonide) and local anaesthetics (bupivacaine 0.25%).

All fluoroscopic guided Medial Branch Blocks were performed on prone-positioned patients using a posterior approach. At the level L3 to L4, MBBs are done by targeting the junction of the upper border of the Transverse Process and Superior Articular Proces. The L5 dorsal ramus is blocked in the groove between the ala of the sacrum and the Superior Articular Process of S1. Spine needle 22-G with radio opaque head was placed on the anatomical target; 0.2mL of the nonionic contrast medium Omnipaque was injected for guidance. Ensuring there was no venous uptake, a mixture of 0.25% bupivaccaine and triamcinolone acetonide was injected near the target nerve.

The patients were assessed using outcome assessment tools as per study protocol before injection (0 week) and 2 weeks after injection.

Five patients dropped out during follow up. Finally, twenty four patients completed the study.

Resultant data were analysed in Statistica version6 software with appropriate statistical tools as applicable like Kolmogorov-Smirnov goodness-of-fit test, paired t test and frequency distribution.

Results

Twenty nine patients were initially included in the study but five patients dropped out during follow up and ultimately twenty four patients completed the study. Age of the patients ranged from 25 years to 65 years with mean age of 45.21 years. Symptom duration ranged from 6 months to 5 years with mean being 23.67 months. Among the twenty four patients fourteen are female and ten are male. Only three patients recalled history of trauma before onset of LBP.

Among twenty four patients, four complained of bilateral facet pain, eighteen patients presented with only left sided pain and other two patients complained of only right sided pain. Out of four patients with bilateral pain three patient received intervention on the right side and one on the left side depending upon which pain is more severe (Table 1). MBB was given on the side and level according to the site facet involvement. Nine patients received MBB at L_3L_4 facet joint level on the left side while another eight patients received MBB at L_4L_5 level also on the left side. Two patients each received intervention at left sided L_2L_3 level, right sided L_2L_3 level and right sided L_4L_5 level. One patient received it at right L_3L_4 level (Table 2).

All Five parameters of assessment such as back pain; facet joint tenderness; SLR of the intervention side; SLR of the opposite side; and activity score have shown statistically significant improvement from pre intervention to post intervention follow up (Table 3).

Improvement in SLR is observed in both the sides irrespective of the side of intervention but more improvement is seen on the ipsilateral side and this difference between ipsilateral and contralateral side is shown to be statistically significant (Table 4).

Table 1: Side of Pain

Side	BL	RT	LT	Total
No.	4	2	18	24
Row %	16.67%	8.33%	75%	100%

Table 2: Site of Intervention

Site of intervention	Count	Percentage
RT L_3L_4	1	4.17%
RT L_4L_5	2	8.33%
LT L_4L_5	8	33.33%
LT L_3L_4	9	37.50%
RT L_2L_3	2	8.33%
LT L_2L_3	2	8.33%

Table 3: Before-after comparison of numerical variables – paired t test

Table 3	Mean	Std. Dv.	N	Diff.	Std. Dv. diff	t	df	p
PainBack_1	6.00	0.933	24	2.500	1.216	10.073	23	0.000
PainBack_2	3.50	0.780						
PainFacet_1	4.58	1.692	24	2.250	1.032	10.680	23	0.000
PainFacet_2	2.33	0.963						
SLR_Int_1	50.83	17.425	24	-14.167	9.743	-7.123	23	0.000
SLR_Int_2	65.00	11.421						
SLR_Opp_1	67.50	8.470	24	-5.833	5.036	-5.675	23	0.000
SLR_Opp_2	73.33	6.370						
ScActive_1	3.42	0.654	24	-2.667	0.963	-13.565	23	0.000
ScActive_2	6.08	0.776						

Table 4: Comparison between Intervention Side and Opposite Side

Table 4	Mean	Std. Dv.	N	Diff.	Std. Dv. Diff.	T	df	P
SLRChIntSide	14.17	9.743	24	8.3333	10.90140	3.744915	23	0.001
SLRChOppSide	5.83	5.036						

Discussion

Twenty nine patients with low back pain associated with radiation due to facet arthropathy were selected for the study. After five patients dropped out of the study, finally twenty four patients completed the study.

The age of the patients ranged from 25 years to 65 years with mean age being 45.21. This indicates that facetogenic back pain is primarily a complain of middle aged to elderly people with incidence in younger age group being relative low. The obvious reason for this may be degenerative changes associated with increasing age. But other possibilities cannot be ruled out completely.

In a similar study of medial breanch block in facet arthropathy by manchikanti et al[12] in 2008, they found similar results in age distribution of the total patients in the study. In two groups of that study mean age of the patients were 46 years and 43 years. That corroborates with our findings that the incidence of facet arthropathy is seen mostly in the middle age group patients in their mid forties.

In another study by manchikanti et al[13] in the same domain in 2010, they found similar result with mean age of 46 years and 48 years in 2 groups.

In their study on medical branch block in facet joint pain, rocha et al[14] found mean age at 49.56 years in their study population of 104 patients.

Ospina et al[15] in their study of medial branch block with 232 patients found mean age at slightly higher range at 56.9 years.

Among those twenty four patients fourteen were female which 58.33% of the sample size, clearly showing a female preponderance in incidence of facetogenic back pain. This finding corroborates with findings in similar studies.

Manchikanti et al[12] in their 2008 study found the male female ratio skewed towerds female as 68% and 80% patients in the two groups were female. In their 2010 study[13] they found relatively less skewed male female ratio with 65% and 55% of patients in two groups being female.

Lee et al[16] in their study of facet arthropathy in elderly patients found 66.1% female patients.

All these findings in similar studies point to a general preponderance of incidence of facetogenic back pain in female patients. Coupled with the average age distribution in similar studies around 5^{th} to 6^{th} decade of life, it can be assumed that women in their mid to late forties and fifties are at high risk of developing facetogenic pain. This particular post menopausal age group females may be susceptible to facet arthropathy due to post menopausal degenerative changes and osteoporosis. But this inference needs to be evaluated further.

The symptom durations of the patients in our study also varied greatly. It ranged from 6 months to as long as 5 years. But the mean duration is

around 2 years indicating at the chronicity of the condition.

Ospina et al[15] also found similar results in their study with 40% of the patient population gave history of symptoms for around 2 years.

In twenty four patients, eighteen complained of left sided pain, four presented with bilateral pain and two patients had right sided pain. This shows a clear inclination to left side to be involved more often due to facetogenic pain. Relatively greater biomechanical loading on left sided facet joints due to the predominance of right sided hand dominance may explain this.

Irrespective of sides, 10 patient each received MBB intervention at L_3L_4 and L_4L_5 facet joint level and remaining 4 patients received MBB intervention at L_2L_3 level. That highlights the fact that lower lumbar spinal facets are more prone to lead to arthropathy and facetogenic back pain.

In their study ospina et al[15] found presence of facet arthropathy needing intervention in whole of lumbar spine without much preference for upper or lower lumbar levels.

All the parameters of the study, back pain; facet tenderness; activity score and SLR showed significant improvement over time underlining the efficacy of MMB intervention in the treatment low back pain with radiation due to facet arthropathy.

In their study of medial branch block, park et al[17] were able to elicit effective outcome just after 2 weeks of medial branch block in patients with facetogenic back pain.

In similar studies, manchikanti et al[13] found favourable results in 3 moths follow up. In their study, ospina et al[15] also found effective improvement of pain and functionality after medial branch block in patients of facet arthropathy.

Rocha et al[14] also in their study demonstrated significant improvement after medial branch block in 3 months follow up in patients of facetogenic back pain.

Though SLRs of both sides have shown improvement, the ipsilateral side has improved much more than the contralateral side. This is probably due to direct action of MBB on the ipsilateral side facet joint. Whereas the improvement in contralateral side may be either due to systemic action of steroid and local anaesthetic or due to biomechanical correction after relief of pain. The improvement in SLR clearly indicates towards the efficacy of MBB in controlling radiating pain associated with facetogenic LBP.

Conclusion

Significant improvement in follow up is seen in back pain, facet tenderness, activity score and most importantly, SLRs of both sides, which provides evidence of clinical efficacy of MBB on facetogenic LBP associated with raadiation. Most importantly SLR on ipsilateral side has shown better improvement than SLR on contralateral side. This fact indicates towards the direct local action of MBB on ipsilateral side providing much better improvement compared to the contralateral side. Also there is evidence of improvement of contralateral side, though in lesser magnitude compared to the ipsilateral side. Main reason for this may be the systemic action of steroid and anaesthetic or biomechanical correction due to pain relief achieved after medial branch block. It can be concluded that our short term study clearly shows the efficacy of MBB in controlling both LBP and radiating pain in patients suffering from facet hypertrophy.

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References

1. Morris JM. Biomechanics of the lumbar spine. In: Low back pain. Finnison BE. ed. Philadelphia: Lippincotf, 1980; 27-43.

2. Mooney V. Robertson J. The facet syndrome. Clin Orthop 1976; 115:149-156.
3. Carrera GF. Computed tomography of the lumbar facet joints. In: Computed tomography of the spine. Donavan Post MJ, ed. Baltimore: Williams & Wilkins, 1984; 485-491.
4. Lewin T. Osteoarthritis in lumbar synovial joints: A morphologic study. ACTA Orthop Scand 1964; 73(suppl.):1-111.
5. Bogduk N: Evidence-informed management of chronic low back pain with facet injections and radiofrequency neurotomy. The Spine Journal 2008; 8:56-64,
6. Cohen SP, Raja SN: Pathogenesis, diagnosis, and treatment of lumbar zygapophysial (facet) joint pain. Anesthesiology 2007; 106: 591-614,
7. Dreyer SJ, Dreyfuss P. Low back pain and the zygapophysial (facet) joints. Arch Phys Med Rehabil 1996; 77:290-300,
8. Stuber K, Lerede C, Kristmanson K, Sajko S, Bruno P. The diagnostic accuracy of the Kemp's test: a systematic review. *J Can Chiropr Assoc* 2014; 58(3): 258-67.
9. Carrino JA, Lurie JD, Tosteson ANA, Tosteson TD, Carragee EJ, Keiser J, Grove MR, Blood E, Pearson LH, Weinstein JN, Herzog R. Lumbar Spine: Reliability of MR Imaging Findings. *Radiology* 2009**;** 250(1): 161-170.
10. Gellhorn AC, Katz JN, Suri P. Osteoarthritis of the spine: the facet joints. *Nat Rev Rheumatol*. 2013 April ; 9(4): 216–224
11. Schellinger D, Wener L, Ragsdale BD, Patronas NJ. Facet joint disorders and their role in the production of back pain and sciatica. Radiographics 1987; 7(6): 923-44.
12. Manchikanti L, Singh V, Falco FJA, Cash KM, Fellow B . Evaluation of Lumbar Facet Joint Nerve Blocks in Managing Chronic Low Back Pain: A Randomized, Double-Blind, Controlled Trial with a 2-Year Follow-Up. *Int. J. Med. Sci.* 2010, 7(3): 124-35.
13. Manchikanti L, Singh V, Falco FJA, Cash KA, Pampati V. Cervical Medial Branch Blocks for Chronic Cervical Facet Joint Pain. A Randomized, Double-Blind, Controlled Trial With One-Year Follow-up. Spine 2008; 33(17): 1813–20.
14. Rocha ID, Cristante AF, Marcon RM, Oliveira RP, Letaif OB, Filho T. Controlled medial branch anesthetic block in the diagnosis of chronic lumbar facet joint pain: the value of a three-month follow-up. Clinics 2014;69(8):529-534
15. Ospina A, Campuzano D, Hincapie E, Vasquez LF, Montoya E, Zapata IC, Gomez M, Bareno J. Efficacy of facet block in lumbar facet joint syndrome patients. Rev Colomb Anestesiol. 2012;40(3):177–182.
16. Lee HS, Park SB, Lee SH, Chung YS, Yang HJ, Son YJ . The Effect of Medial Branch Block for Low Back Pain in Elderly Patients. The Nerve 2015;1(1):15-19.
17. Park KD, Jee H, Nam HS, Cho SK, Kim HS, Park Y, Lim OK . Effect of Medial Branch Block in Chronic Facet Joint Pain for Osteoporotic Compression Fracture: One Year Retrospective Study. Ann Rehabil Med 2013;37(2):191-201.