ISSN 2515-8260 Volume 09, Issue 02, 2022

Clinico-radiological outcomes of platelet rich plasma versus steroid via epidural route in patients with lumbar degenerative disc disease: A prospective triple blinded randomized control study

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Abstract

Introduction: Low back pain is one of the leading causes of physical disability in both old and younger age group. It has enormous effects on socioeconomic status and health of people. Inter vertebral disc degeneration is an active process which involve changes in cellular microenvironment and tissue that eventually leads to structural breakdown and impairment of inter vertebral disc function. These changes cause back pain. Epidural steroid injection is a well-established modality in providing pain relief and is widely practiced. PRP (Platelet rich plasma) is a new upcoming modality with promising regenerative effects. In recent literature its use in treatment of back pain is being encouragingly promoted and is under evaluation.

Aim:

- To evaluate clinical outcomes of Platelet rich plasma in patients of degenerative disc disease with predominant radicular pain.
- Subjective and objective comparison of effects of platelet rich plasma and dexamethasone with bupivacaine.
- To evaluate evolution of MRI changes post P-PRP/Epidural steroid injections.

Methods: Patients of radiating low back pain were included after 6 weeks of failed conservative management. They were divided into two groups A and B of 15 each. Group A were given epidural P-PRP (pure-PRP) (8ml) injection in epidural space and group B were given dexamethasone 2ml + bupivacaine 0.5% 2ml + 4ml Normal saline. Groups were evaluated on basis of VAS lower back, VAS leg pain, MODI score and Pfirrmann grade in MRI.

Results: A total of 30 patients were included in study. Mean age of patients in study was 48.87 years. Most commonly affected disc spaces were L4-L5. There was a decrease in VAS score lower back and VAS score leg pain with both PRP and steroid injections, the maximal efficacy in reducing VAS was seen at 4 weeks in both the groups. Thereafter in further follow ups both the groups showed gradual reoccurrence of pain. The reoccurrence of pain was

ISSN 2515-8260 Volume 09, Issue 02, 2022

much more severe in PRP group while it was minimally increased in steroid group. Both injections were effective in reducing MODI score significantly, the PRP group had a better relief compared to steroid group at 4 week post injection. Thereafter in further follow ups the PRP group showed reoccurrence of pain at 3 months which gradually increased over time. The steroid group showed gradual increase in pain over time. The reoccurrence of pain was much more severe in PRP group while it was minimally increased in steroid group. There were no Pfirrmann grade changes on MRI post injection in both the groups. A significant number of patients in PRP group experienced injection site pain which resolved on itself.
Conclusion: Epidural injection of PRP shows promising results in relieving back pain for a short duration of time but its long term benefits still needs further evaluation. Epidural steroid injections have somewhat more long lasting pain relief. No Pfirrmann grade changes were seen on MRI in this study after epidural injections. It is a developing as a safe, straightforward, and successful intervention for lumbar degenerative disc disease that is an alternative to spine surgeries. Further researches are needed in this field.

Keywords: Platelet rich plasma, PIVD, MODI score, lower back pain, degenerative disc disease

Introduction

Low back pain is one of the leading causes of physical disability in both old and younger age group. It has enormous effects on health and socioeconomic status. 80% of population suffer from an episode of low back pain once during their lifetime. According to Jella Ramdas *et al.*, among males, most common age group affected is 31-40 years with 38.6% prevalence, while amongst females, most common age group affected is 41-50 years with 38.1% prevalence [1].
Inter vertebral disc consist of central nucleus pulposus, and peripheral annulus fibrosus. Inter vertebral disc degeneration is an active process which involve changes in cellular microenvironment and tissue that eventually leads to structural breakdown and impairment of inter vertebral disc function. As Degeneration progresses, it results in dehydration of the NP and formation of fissures beginning in the NP that extend into the AF. There occurs loss of PG‟s; also changes in their type [2].
Degenerated disc is present in close proximity to nerves which gets compressed and thus causing mechanical back pain. As the nucleus pulposus tissue bulges into the epidural space, vascular endothelial cell changes trigger increased vascular permeability, vaso-dilation, the adhesion and migration of immune cells to the site occurs. These changes occurring in disc activate signalling pathways that causes increased expression of various cytokines of inflammatory pathways like interleukin [IL]-1β, tumour necrotising factor [TNF]-α, IL-6, IL-8, IL-17 and interferon [IFN]-γ. These inflammatory markers when released travel into the fission of the end plate or outer third of the annular fibrosus, stimulate pain receptors (free nerve endings), and thus causing chemical pain. These cause up regulation of systems of degradation such as apoptosis, matrix metalloproteinase (MMP) expression, and inflammatory pathways causing more tissue breakdown and disc herniation [3, 4].
Traditionally steroids are in use from many years for symptomatic improvement in degenerative disc disease patients. But Steroids as quoted by many studies just provide temporary symptomatic relief, and did not have any regenerative effects. Further steroids pose various complications which are well documented.
Currently there is growing trends of using orthobiologics as an alternative to steroids as they have properties of regeneration along with analgesic effects. Hence they might provide better disease prognosis.
Platelet rich plasma (PRP) an autologous blood component with high platelet concentrations, is being currently investigated for its role in inter vertebral disc degeneration treatment. PRP

stimulates proliferation, recruitment, and differentiation of cells involved in regeneration via many Growth Factors and proteins which platelets release. The growth factors released by platelets include platelet-derived growth factor (PDGF), epidermal growth factor (EGF), vascular endothelial growth factor (VEGF), transforming growth factor (TGF) β-1, basic fibroblast growth factor (bFGF), hepatocyte growth factor (HGF), connective tissue growth factor (CTGF), and insulin-like growth factor (IGF)-I, which contribute significantly to tissue proliferation. Platelets can also release chemokines and chemokine receptors, cytokines and thus, regulating the inflammatory responses and immunological aspects of tissue healing. Platelets also prevent excessive leukocyte recruitment by anti-inflammatory cytokines. Platelets contain antibacterial proteins and are capable of migrating to injury sites. In the skin during healing of wound, platelets bring disrupted cells closer together. Same way, platelets pull the edges of degenerated disc tears together, which leads to healed cells. These released growth factors, may restore the integrity of the extracellular matrixes of degenerating intervertebral discs. These analgesic and regenerative effects of PRP needs further studies to establish the results [5, 6].

Aims and Objectives of study

- To evaluate clinical outcomes of platelet rich plasma in patients of degenerative disc disease with predominant radicular pain.
- Subjective and objective comparison of effects of platelet rich plasma and dexamethasone with bupivacaine.
- To evaluate evolution of MRI changes post P-PRP/Epidural steroid injections.

Material and Methods

This was a Randomized controlled trial conducted in a triple blinded fashion at a tertiary level centre from June 2019 to December 2021. Prior institutional ethics committee approval was obtained-Ethics clearance number MMMCH/IEC/20/338. Patients presenting with complaints of lower back pain radiating to lower limb were evaluated using inclusion-exclusion criteria. Once found suitable for inclusion, written informed consents were obtained and the patients were enrolled in the study. Patients aged 30-60 years with predominant radicular pain in unilateral/bilateral lower limbs without any motor deficits in anti-gravity muscles with degenerative disc disease/high intensity zone on MRI and having failed 6 weeks of standardized and supervised conservative management were included in the study.
Patients with spinal deformity, lumbar canal stenosis, trauma, tumor, infective spinal pathology, raised intracranial tension, cauda equina syndrome, coagulation disorders, local infection at the site of injection, prior use of cortico-steroids (oral/parenteral route) within prior 2 weeks and those with known allergy to any product being used were excluded from the study.
The patients were randomly allocated into two groups using a computer generated sequence.

Group A: "PRP group" received 8 ml of P-PRP as Epidural injection.
Group B: "drug group" received dexamethasone 2ml + bupivacaine 0.5% 2ml + 4ml Normal saline as Epidural injection. Enrolment, assessment, randomization, intervention and was done in a blinded manner.

Investigator 1 was the point of first consult to confirm the diagnosis and assess eligibility criteria. He enrolled the patient to the study, took consent, examined and worked up the patient as required. As a part of evaluation each patient underwent complete neurological, radiological examination, VAS back pain and leg pain, m-ODI scoring. Radiological

ISSN 2515-8260 Volume 09, Issue 02, 2022

examination included lumbo-pelvic X-RAY's (AP and lateral view) and MRI of lumbo-sacral spine. MRI evaluation of patients in OPD included pathologies, PFIRRMANN grading, MSU classification, MODIC changes. Work up before intervention included a complete haemogram with erythrocyte sedimentation rate (ESR), random blood sugar (RBS), coagulation profile. Baseline Visual Analogue Scale (VAS) score, Modified Oswestry Disability Questionnaire (m-ODI) given by Fritz *et al.* [47] and straight leg raising test (SLRT) test before procedure were recorded.

Investigator 2 allocated the patient to one of the two groups based on computer software generated sequence. He prepared the injections, covered the syringes with opaque adhesives and provided the allocated syringe to the investigator 3 for epidural injection. Fresh P-PRP was prepared in blood bank using standard buffy coat method [7]. 9ml of Pure Platelet-Rich Plasma (P-PRP) was prepared in blood bank from standardized techniques. 1 ml Sample was sent to laboratory for platelet and WBC counts in PRP. Similar looking two 10ml syringes, 1st loaded with PRP (8ml), 2nd with 2ml dexamethasone (8mg) with 2ml bupivacaine 0.5% + 4ml Normal Saline injections were covered with opaque sterile adhesive. One of the syringes was given to investigator 3 based on group allocated to patient. Under strict aseptic conditions and precautions investigator 3 administered a single injection from 10ml syringe in the epidural space via interlaminar approach with 18G tuohy's needle with loss of resistance technique [8]. Investigator 3 was kept unaware of the content of injection provided to her. Investigator 4 analysed and interpreted the compiled data in a blinded fashion.

No post injection analgesics in form of steroids/NSAIDs were prescribed and the patients were followed up immediately after injection, at 1 hour, at 4 weeks, at 3 months, 6 months and at 1 year.

Primary outcome measures were VAS score of back and leg pain while secondary outcome measures were mODI score and Pfirrmann grade changes.

SPSS version 26 was used for analysis and p value of less than 0.05 was considered statistically significant.

Results

A total of 30 patients were included in study, 15 in each group. There were 8 females and 7 males in group A; and 7 females and 8 males in group B. Mean age of both groups was 48.87 years. 5 patients had degenerated discs at L3-L4, L4-L5 level, 18 patients had degenerated disc at L4-L5 level and 7 patients had degenerated discs at L4-L5, L5-S1.

Mean VAS score lower back baseline was 7.67 ± 1.11 in group A and 7.13 ± 1.30 in group B. Scores were 4.87 ±3.25 ($P < 0.05$) in group A and 1.40 ±0.51 ($P < 0.05$) in group B at 1 hour post injection. Scores were 2.27 ± 0.70 ($P < 0.05$) in group A and 0.67 ± 0.49 ($P < 0.05$) in group B at 4 weeks post injection. Scores were 6.27 ± 0.88 ($P < 0.05$) in group A and 1.13 ± 0.35 ($P < 0.05$) in group B at 3 months post injection. Scores were 6.73 ± 0.88 ($P < 0.05$) in group A and 1.33 ± 0.49 ($P < 0.05$) in group B at 6 months post injection. Scores were 7.00 ± 1.25 ($P < 0.05$) in group A and 1.73 ± 1.16 ($P < 0.05$) in group B at 1 year post injection (Table-1).

Mean VAS score leg pain baseline was 7.67 ± 1.11 in group A and 7.27 ± 1.03 in group B. Scores were 1.60 ± 0.51 ($P < 0.05$) in group A and 0.67 ± 0.62 ($P < 0.05$) in group B at 1 hour post injection. Scores were 0.73 ± 0.70 in group A and 0.67 ± 0.49 in group B ($P = 0.906$) at 4 weeks post injection. Scores were 5.07 ± 0.88 ($P < 0.05$) in group A and 0.67 ± 0.62 ($P < 0.05$) in group B at 3 months post injection. Scores were 6.20 ± 0.41 ($P < 0.05$) in group A and 1.33 ± 0.49 ($P < 0.05$) in group B at 6 months post injection. Scores were 6.87 ± 0.92 ($P < 0.05$) in group A and 1.67 ± 1.05 ($P < 0.05$) in group B at 1 year post injection (Table-2).

Mean MODI score baseline in group A was 55.73 ± 6.58; and group B was 54.53± 5.15. Scores were 10.27 ± 2.37 ($P < 0.05$) in group A and 14.67 ± 3.60 ($P < 0.05$) in group B at 4

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weeks post injection. Scores were 44.93 ± 6.04 (P <0.05) in group A and 12.00 ± 3.12 (P <0.05) in group B at 3 months post injection. Scores were 51.47 ± 6.25 (P <0.05) in group A and 12.00 ± 4.07 (P <0.05) in group B at 6 months post injection. Scores were 52.80 ± 5.80 (P <0.05) in group A and 12.13 ± 4.50 (P <0.05) in group B at 1 year post injection (Table-3).
Before intervention 1 patient in group A and 1 in group B total 2 patients had Pfirrmann grade 1 disc. 3 in group A and 3 in group B total 6 patients had Pfirrmann grade 2 disc. 7 in group A and 8 in group B total 15 patients had Pfirrmann grade 3 disc. 4 in group A and 3 in group B total 7 patients had Pfirrmann grade 4 disc. No changes were seen in PFIRRMANN grading after epidural injection follow up (Table-4).
In group A out of 15 patients; 9 faced no immediate complications, 6 patients experienced diffuse pain at injection site. In group B all 15 patients did not faced any immediate complications (Table-5).

Table 1: VAS lower back

VAS lower back	Group A		Group B		T	p-value
	Mean	SD	Mean	SD		
pre injection	7.67	1.11	7.13	1.30	-1.248	0.212
post 1 Hr	4.87	3.25	1.40	0.51	-4.212	0.000
4 week	2.27	0.70	0.67	0.49	-4.453	0.000
3 month	6.27	0.88	1.13	0.35	-4.942	0.000
6 month	6.73	0.88	1.33	0.49	-4.820	0.000
1 year	7.00	1.25	1.73	21.16	-4.806	0.000

Table 2: VAS leg pain

VAS leg pain	Group A		Group B		T	p-value
	Mean	SD	Mean	SD		
pre injection	7.67	1.11	7.27	1.03	-1.182	0.237
post 1 Hr	1.60	0.51	0.67	0.62	-3.500	0.000
4 week	0.73	0.70	0.67	0.49	-0.118	0.906
3 month	5.07	0.88	0.67	0.62	-4.765	0.000
6 month	6.20	0.41	1.33	0.49	-4.934	0.000
1 year	6.87	0.92	1.67	1.05	-4.796	0.000

Table 3: MODI score

M-ODI	Group A		Group B		T	p-value
	Mean	SD	Mean	SD		
pre injection	55.73	6.58	54.53	5.15	-0.544	0.587
4 week	10.27	2.37	14.67	3.60	-3.419	0.001
3 month	44.93	6.04	12.00	3.12	-4.712	0.000
6 month	51.47	6.25	12.00	4.07	-4.683	0.000
1 year	52.80	5.80	12.13	4.50	-4.698	0.000

Table 4: PFIRRMANN grading

Groups	PFIRRMANN Grade	No. of patients pre injection	No. of patients post injection
Group A	I	1	1
	II	3	3
	III	7	7
	IV	4	4
Group B	I	1	1
	II	3	3
	III	8	8
	IV	3	3

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Table 5: Complications encountered

		Group		Total
		Group A	Group B	
Complications immediate	N	9	15	24
	pain injection site 1 hr	6	0	6
Total		15	15	30

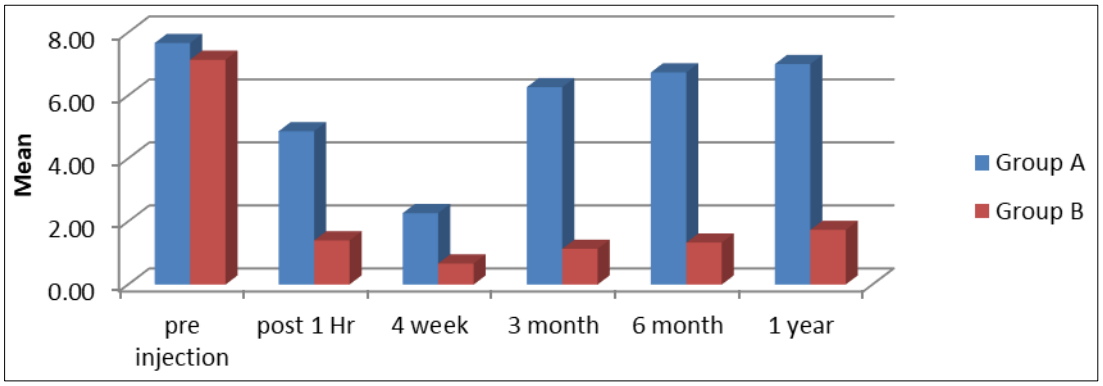

Chart 1: VAS score lower back.

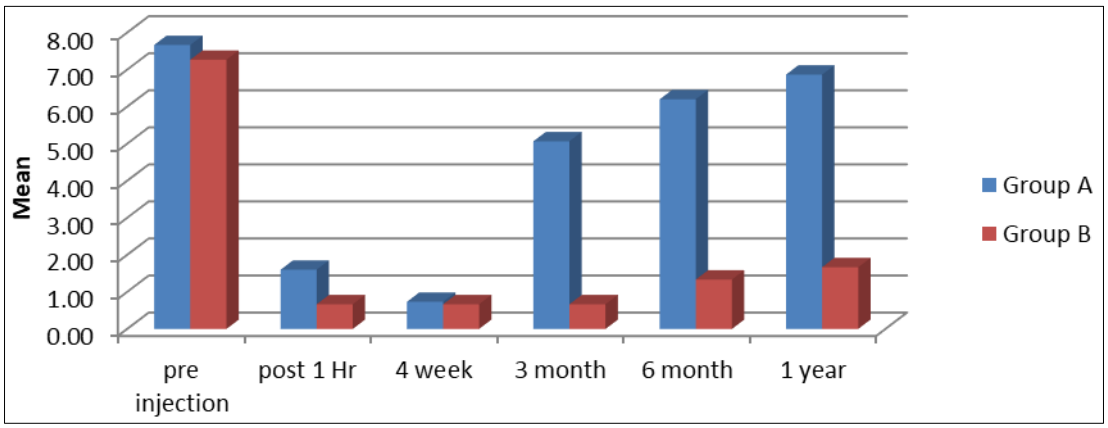

Chart 2: Vas score leg pain.

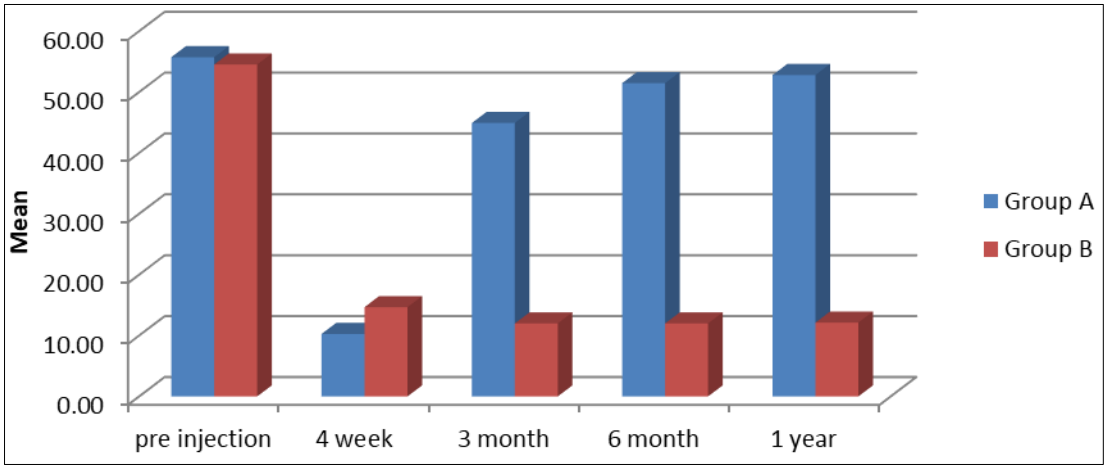

Chart 3: MODI score variations.

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Discussion

Low back pain is one of the leading causes of physical disability in both old and younger age group. Degenerative disc disease is a major cause of low back pain in Indian population, which causes has enormous effects on health and socioeconomic status [1].

Degenerative disc disease is an active process which involves changes in cellular microenvironment and tissue that eventually leads to structural breakdown and impairment of inter vertebral disc function. As Degeneration progresses, it results in dehydration of the nucleus pulposus and formation of fissures beginning in the nucleus pulposus that extend into the annulus fibrosus. There occurs loss of prostaglandins; also changes in their type [2]. As the nucleus pulposus tissue bulges into the epidural space, vascular endothelial cell changes trigger increased vascular permeability, vaso-dilation, the adhesion and migration of immune cells to the site. These changes occurring in disc activate signalling pathways that causes increased expression of various cytokines of inflammatory pathways like interleukin [IL]-1β, tumour necrotising factor [TNF]-α, IL-6, IL-8, IL-17, and interferon [IFN]-γ causing chemical pain. These cause up regulation of systems of degradation such as apoptosis, matrix metalloproteinase (MMP) expression, and inflammatory pathways causing more tissue breakdown and disc herniation [3, 4].

Patients can be managed conservatively with a combination of various pharmacological and non-pharmacological measures without needing surgical or invasive procedures [9]. Conservative treatment includes bed rest, analgesic medications such as Nonsteroidal anti-inflammatory drugs (NSAIDs) and paracetamol, muscle relaxants, oral or parenteral steroids, opioids as well as therapeutic exercises [10]. When such conservative measures fail, lumbar epidural steroid injections can be administered for management of pain. Traditionally steroids are in use from many years for symptomatic improvement in degenerative disc disease patients. But Steroids as quoted by many studies just provide temporary symptomatic relief, and did not have any regenerative effects. Further steroids pose various complications which are not encountered when using orthobiologics.

PRP and other biologics are being currently investigated for their role in degenerative disc disease. PRP stimulates proliferation, recruitment, and differentiation of cells involved in regeneration via many growth factors and proteins which platelets releases. Platelets can also release chemokines and chemokine receptors, cytokines and thus, regulating the inflammatory responses and immunological aspects of tissue healing. Platelets prevent excessive recruitment of leukocytes by anti-inflammatory cytokines.

Benoist M *et al.* [11] It has then been postulated that local injection of potent anti-inflammatory drugs could reduce inflammation by inhibiting the formation and/or release of the inflammatory cytokines and thereby reduce pain. Hence the clinical use of Epidural Steroid Injections, Platelet Rich Plasma in the treatment of lumbar radiculopathies has a strong pathophysiologic basis. For the low back pain patients who did not respond to intensive conservative treatment, an idea has been put forward by Gupta AK *et al.* [12]. Their aim was to develop standardized strategy for the treatment of low back pain in the form of epidural medication prior to considering them to surgery to prevent unnecessary incidence of "failed back". In our study, patients with chronic low backache who took conservative treatment for > 6 weeks, but did not get adequate pain relief were considered for epidural injections.

In our study the patient's age ranged from 31-58 years, the mean age of the group A was 48.87 years and of group B was 48.87 years. Shows both groups are comparable without any significant difference. Out of the total 30 cases, there were 8 females and 7 males in group A; and 7 females and 8 males in group B. P value 0.715 shows two group do not have significant difference and are comparable. According to Jella Ramdas *et al.* [1], among males, most common age group affected is 31-40 years with 38.6% prevalence, while amongst females,

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most common age group affected is 41-50 years with 38.1% prevalence. Our study is in accordance with previous studies.

The diagnostic workup should focus on evaluation for evidence of systemic or pathologic causes. In our study patient were included after exclusion criteria; which rules out diagnosis other than degenerated disc disease. We found patients can present with both single level disc involvement and with multiple level disc involvement with similar symptoms. Pain may radiate to unilateral leg or bilateral leg depending upon site involved. In our study in group A out of 15 patients, two patients had multiple level disc prolapse at L3-L4, L4-L5. Four patients had multiple level disc prolapse at L4-L5, L5-S1 level. Nine patients had single level disc prolapse at L4-L5. In group B out of 15 patients, three patients had multiple level disc prolapse at L3-L4, L4-L5. Three patients had multiple level disc prolapse at L4-L5, L5-S1 level. Nine patients had single level disc prolapse at L4-L5. P value 0.952 came out to be non-significant. It shows two groups were similar and comparable without any significant difference. Mustafa *et al.* [13] published paper on Adolescent lumbar disc herniation: Impact, diagnosis, and treatment. They retrospectively did a review of medical records. To detect lumbar disc degeneration, we used the modified Pfirrmann grading system with MRI. In their study the most common disc level was L4-L5 in 38 (54%) patients and the second was L5-S1 in 24 (34%) patients. Results in our study are in accordance with previous studies.

Degeneration progresses in inter vertebral disc results in dehydration of the nucleus pulposus and formation of fissures beginning in the nucleus pulposus that extend into the Annulus Fibrosus. This degeneration of nucleus pulposus has been classifies by Pfirrmann grading [14] system into five types. It is graded on MRI T2 weighted images. Griffith *et al.* [15] gave modified Pfirrmann grading in 2007 which has 8 grades, can be used in elderly patients. In our study before intervention 1 in group A and 1 in group B total 2 patients had Pfirrmann grade 1 disc. 3 in group A and 3 in group B total 6 patients had Pfirrmann grade 2 disc. 7 in group A and 8 in group B total 15 patients had Pfirrmann grade 3 disc. 4 in group A and 3 in group B total 7 patients had Pfirrmann grade 4 disc. P value 0.976 shows no significant difference between two groups. In our study after intervention 1 in group A and 1 in group B total 2 patients had Pfirrmann grade 1 disc. 3 in group A and 3 in group B total 6 patients had Pfirrmann grade 2 disc. 7 in group A and 8 in group B total 15 patients had Pfirrmann grade 3 disc. 4 in group A and 3 in group B total 7 patients had Pfirrmann grade 4 disc. P value 0.976 shows no significant difference between two groups. While comparing results at 6 months with pre intervention scores, no changes was observed in Pfirrmann grading on MRI. Thomas *et al.* [16] published paper on Magnetic resonance imaging of the lumbar spine after epidural and nerve root injection therapy: evaluation of soft tissue changes Patients underwent injection protocol to nerve root/epidural space. The MRI was done before and after treatment. They concluded Normal tissue changes after injection therapy of lumbar radiculopathy include wedge-shaped tissue edema at the injection level. In a minority of patients, small hematomas may occur, and not any other changes.

Post intervention, the patients were monitored. The mean VAS score low back in PRP group A was higher pre-intervention (7.67±1.11) than at 1 hour (4.87±3.25), 4 weeks (2.27±0.70), 3 months (6.27±0.88), 6 months (6.73±0.88), and 1 year(7.00±1.25) showing that the patient's function had improved. The mean VAS score back pain in steroid group B was higher pre-intervention (7.13±1.30) than at 1 hour (1.40±0.51), 4 weeks (0.67±0.49), 3 months (1.13±0.35), 6 months (1.33±0.49), and 1 year(1.73±21.16) showing that the patient's function had improved.

The mean VAS score leg pain in PRP group A was higher pre-intervention (7.67±1.11) than at 1 hour (1.60±0.51), 4 weeks (0.73±0.70), 3 months (5.07±0.88), 6 months (6.20±0.41), and 1 year(6.87±0.92) showing that the patient's function had improved. The mean VAS score leg pain in steroid group B was higher pre-intervention (7.27±1.03) than at 1 hour (0.67±0.62), 4 weeks (0.67±0.49), 3 months (0.67±0.62), 6 months (1.33±0.49), and 1 year (1.67±1.05)

showing that the patient's function had improved. In our study in group A PRP group VAS leg pain was significantly reduced post epidural injection; effect lasted for around 1 month, then gradually diminished over time. On 3 months follow up there was not much difference between pre injection vas of 7.67 and 3 months vas of 5.07, similarly with 6 months and 1 year vas. In group B steroid group, VAS leg pain was significantly reduced post epidural injection; effect lasted for long till 1 year follow up. Carette *et al.* [20] in a randomized trial to study the efficacy of epidural steroid injections in patients with sciatica concluded that epidural injections may provide short- term improvement in leg pain. Lutz *et al.* [17] in their study on transformational epidural injections concluded 75.4% had a successful long-term outcome in terms of pre and post injection pain scores (VAS). Bhatia *et al.* [18] conducted pilot study on 10 patients. They injected PRP in epidural space and concluded autologous PRP provide good pain relief in terms of VAS for 3 months.

In our study before intervention mean MODI (Modified oswestry disability index score) score in group A was 55.73 and 54.53 in group B. At 4 week post injection mean MODI score in group A was 10.27 and 14.67 in group B. Difference in MODI scores from pre injection to post injection 4 week MODI was 45.47 in group A and 39.87 in group B. At 3 months post injection mean MODI score in group A was 44.93 and 12.00 in group B. Difference in MODI scores from pre injection to post injection 3 months MODI was 10.80 in group A and 42.53 in group B. At 6 months post injection mean MODI score in group A was 51.47 and 12.00 in group B. Sylvian *et al.* [19] compared CT guided epidural platelet rich plasma versus steroid injection in patients with lumbar radicular pain. A total of sixty patients were included in study. Patients were assessed using numerical rating scale and Oswestry Disability Index before and 6 weeks after treatment. After 6 weeks a statistically significant improved scores were found in both groups, however no significant difference was seen between two groups at six weeks follow up. Finding in our study are comparable with finding of the others.

In our study in group A PRP group MODI score was significantly reduced post epidural injection; effect lasted for around 1 month, then gradually diminished over time. On 3 months follow up there was not much difference between pre injection VAS of 7.67 and 3 months VAS of 5.07, similarly with 6 months and 1 year VAS. There are numerous versions of Oswestry Disability Index (ODI) scores being used in current practice [20]. Modified ODI score by Fritz *et al.* was used in this study.

Minor side effects like injection site pain which resolved itself in sometime were noted in PRP group in 6 out of 15 patients.

Conclusion

Epidural injection of PRP shows promising results in relieving back pain for a short duration of time but its long term benefits still needs further evaluation. Epidural steroid injections have somewhat more long lasting pain relief. No Pfirrmann grade changes were seen on MRI in this study after epidural injections. It is a developing as a safe, straightforward, and successful intervention for lumbar degenerative disc disease that is an alternative to spine surgeries.

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