



COMPARISON BETWEEN ULTRASOUND GUIDED PLATELET RICH PLASMA INJECTION AND INTRA-ARTICULAR STEROID INJECTION FOR THE TREATMENT OF CHRONIC HIP PAIN SECONDARY TO OSTEOARTHRITIS A RANDOMIZED CONTROLLED STUDY

Physical Medicine & Rehabilitation

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ABSTRACT

Objective:- To compare the efficacy of ultrasound guided platelets rich plasma injection and intra-articular steroid injection for treatment of chronic hip pain secondary to Osteoarthritis. **Methods:-** Forty eight patients with osteoarthritis (OA) of hip were included in a prospective, randomised controlled trial, which were distributed in two group. The study group received ultrasound guided platelets rich plasma (PRP) injection, while the control group received intra-articular steroid methylprednisolone 80 mg injection. Outcome measures used were VAS, WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) assessment were done at baseline, 4 weeks, 12 weeks and 24 weeks follow ups. **Results:-** All outcome measures in the study group and in the control group showed significant improvement from the baseline ($P < 0.05$). A comparison of the 2 groups indicated significantly greater improvement in the study group at all times in VAS and WOMAC (all $P < 0.05$). **Conclusions:** The study found that PRP injection and intra-articular steroid injection provided improvement in pain and function up to 24 weeks. However, PRP injection provide prolonged pain relief and functional improvement as compared to intra-articular injection. It might be a treatment of choice for managing pain and improving function in patients with osteoarthritis hip.

KEYWORDS

OA hip, Ultrasound guided PRP injection of hip

INTRODUCTION:

Osteoarthritis (OA) of hip is a chronic degenerative disorder characterised by cartilage loss leading to pain and stiffness of joint. It is highly prevalent in society and is a major cause of disability. It is important to treat osteoarthritis effectively using a multidisciplinary approach according to the patient's needs¹. Treatment is usually based on non-pharmacological and pharmacological. In non-pharmacological, it includes an exercise program, physical therapy, weight reductions, hot and cold treatments, proper footwear, bracing/joint supports/insoles and assistive devices.² In pharmacological treatment acetaminophen, diclofenac and etoricoxib are the most efficacious for pain relief in hip OA. Total hip arthroplasty (THA), hip arthroscopy and hip resurfacing are commonly used surgical procedures³. Corticosteroids have been shown to be effective in reducing pain associated with osteoarthritis (OA) of the hip. Intra-articular hip injections may be given using anatomical landmarks or image guidance³. Recently, platelet rich plasma (PRP) injections have been introduced for treatment of osteoarthritis⁴. It has been postulated that PRP promotes soft tissue healing by delivering a higher than normal concentration of platelets and, therefore, an increased concentration of platelet derived growth factors to the diseased area⁵. Since there has been no similar comparative study carried out before, so the aim of this study is to analyse the results obtained by two treatment modalities (platelets rich plasma and intra-articular steroid injection) in patients with hip pain secondary to osteoarthritis focussing on effectiveness, pain reduction and functional improvement.

METHODS:

This is a randomized clinical study. In this study, patients with Kellgren-Lawrence grade II and III of hip OA were included, and were randomly divided into two injection groups: inj PRP and steroid (methylprednisolone 80 mg). In either group, injections were performed into the hip joint under ultrasound guidance. Patients were assessed before the intervention, then at 4 weeks, 12 weeks and 24 weeks, using the visual analog scale (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).

Study Design:

This is prospective, randomised controlled study conducted in

Department of Physical Medical and Rehabilitation, Regional Institute of Medical Sciences, Imphal. During the period between January 2021 to February 2022.

Study population:

Patients with shoulder pain with stiffness attending the out-patient department (OPD) of Physical Medicine and Rehabilitation, Regional Institute of Medical Sciences, Imphal during the study period.

Inclusion Criteria

1. Age group 40-70 year
2. Patients with Hip Osteoarthritis who did not have relief of symptom after 6 months of conservative management
3. Hip osteoarthritis with Kellgren-Lawrence grade II and III

Exclusion Criteria

1. Infection of the joint
2. Pelvic tumour
3. Thrombocytopenia
4. Coagulopathy
5. Immunosuppressed (eg. Diabetes, HIV, autoimmune diseases etc)
6. Impaired cognition
7. Pregnancy
8. Distorted anatomy
9. Unwilling participants

Sample size:

Sample size is calculated by using the formula $N = (u + v)^2 (S_1^2 + S_2^2) / (m_1 - m_2)^2$ Where, $u = 0.84$ at 80% power $v = 1.96$ at 5% level of significance. Taking into consideration the study conducted by Dallari D et al in 2016⁶. Hence, 22 participants were needed to be studied per group giving a total of 44 patients. However, taking into consideration a dropout rate of 10%, the final calculated sample comes to 24 participants per group, giving a total sample size of 48.

Randomization:

It was done through computer generated table. Single blinding was done in which the assessor was blinded

Ethics approval:

The approval of the Research Ethics Board, Regional Institute of

Medical Sciences, Imphal was taken for this clinical study. Patients were informed about the nature of the study and willing participants were asked to sign the informed consent form.

Patients could withdraw from the study at any time.

OUTCOME MEASURES :

The outcome measures used were visual analogue scale(VAS) for hip pain and Western Ontario and Mc master University osteoarthritis index(WOMAC) for quality of life measured at baseline and follow-up at 4 weeks, 12 weeks and 24 weeks.

Pre-procedure:

All patients were subjected to complete history taking followed by physical examination and routine laboratory investigations. Visual analog score (VAS), WOMAC and were assessed before the procedure in all cases.

Intervention:

The procedure was performed in sterile conditions with linear probe aligned with the long axis of the femoral head and a 22-gauge spinal needle was inserted antero-inferiorly and PRP (4 ml) was injected at the base of the femoral neck in study group while intra-articular steroid methylprednisolone 80 mg given to control group. Patients were observed for 30 minutes after the procedure and there were no significant complications, such as pain, bleeding observed. Participants of both the group were discharged with advice for ice therapy every 2 hourly for 10 mins for 3 days and rescue drug 500 mg of paracetamol was given as and when required for 3 days.



Fig 1. showing linear probe aligned with the long axis of the femoral head for localization of base of the femoral neck



Fig 2. showing under sterile conditions 22-gauge spinal needle inserted antero-inferiorly and PRP (4ml) was injected

Statistical Analysis

Data were collected in a pre-tested proforma and entered in excel sheet. Data analysis was done by using IBM- Statistical Package for the Social Sciences (IBM-SPSS) 21 version (IBM.Armonk, NY, Inc). For descriptive statistics mean, frequency, percentage and standard deviation were used. Characteristics of the study participants for the continuous variable were analysed by student's t-test and categorical variables by chi-square test. ANOVA and paired t-test was used for within the group comparison and student's test for between the group comparison p value <0.05 was taken as significant.

RESULTS

The total numbers of participants in the study were 48, distributed in two groups. The study group received ultrasound guided PRP

injection, while the control group received ultrasound guided steroid injection in OA of hip. Assessments were done at baseline, 4 week, 12 weeks and 24 weeks post procedure. The control group consists of 10 males (41.7%) and 14 females (58.3%) with the mean age group of 58.94 ± 5.9 years, while the study group consists of 9 males (37.5%) and 15 females (962.5) with a mean age group of 61.76 ± 5.43 years. Table 1 shows the baseline characteristics of the two groups. Table 2 shows baseline outcome measures VAS, WOMAC scores. There were no significant differences between the groups in any of the measured baseline characteristics (p > 0.05). Table 3 and 4 shows comparison of mean changes of VAS score and WOMAC score between the groups in which there is significant improvement shown in PRP group at 12 weeks and 24 weeks of follow up (p < 0.05). Table 5 shows within the group comparison in which both the group shows significant improvement (p < 0.05).

Table 1: Comparison Of Baseline Characteristics Between The Study And Control Group (N=48)

Characteristics	Group		p- Value
	PRP (%) (n=24)	I/A Steroid (%) (n=24)	
Mean age years (59.33±6.30)	61.76±5.43	58.94±5.97	0.672*
Age			0.545*
40-50	3 (12.5%)	5 (20.8%)	
51-60	8 (33.3%)	7 (29.2%)	
61-70	13 (54.2%)	12 (50.0%)	
Gender			0.743*
Female	15 (62.5%)	14 (58.3%)	
Male	9 (37.5%)	10 (41.7%)	
BMI			0.896*
<18.5	2 (8.3%)	1 (4.2%)	
18.5 – 24.9	5 (20.8%)	6 (25.0%)	
25 – 29.9	6 (25.0%)	5 (20.8%)	
>30	11 (45.9%)	12 (50.0%)	
Side of affection			0.545*
Right	14 (61.9%)	12 (50.0%)	
Left	8 (33.3%)	8 (33.3%)	
Both	2 (4.8%)	4 (16.7%)	
Duration (months) (35.52±21.39)	37.33±21.43	33.71±21.73	0.590*

*Chi Square test

Table 2: Comparison Of Baseline Outcome Measures Between The Study And Control Group (N=48)

Outcome measures	Groups		Mean Difference	95% CI of difference		p- Value
	PRP (study) (Mean± SD)	I/A Steroid (control) (Mean± SD)		Lower	Upper	
VAS score	7.0 ± 0.775	7.62± 0.74	0.392	-0.092	0.853	0.121*
WOMAC score	77 ± 7.1	76.14± 0.851	1.286	- 2.817	5.389	0.430*

Independent t test, p-value < 0.05 taken as significant

Table 3: Comparison Of Mean Changes In VAS Score Between The Study And Control Group (N=48)

VAS	Mean changes from baseline		Mean difference	95% CI of difference		p- Value*
	PRP (Mean± SD)	I/A Steroid (Mean± SD)		Lower	Upper	
4 weeks	4.33± 0.795	4.18± 1.189	1.095	0.594	1.596	0.540*
12 weeks	4.09± 0.995	2.47± 0.679	-2.238	-2.745	-1.732	0.003*
24 weeks	3.52± 1.20	1.57± 0.507	-2.5471	-3.114	-2.029	0.000*

*Independent t test, p-value < 0.05 taken as significant

Table 4: Comparison Of Mean Changes In WOMAC Score Between The Study And Control Group (N=48)

WOMAC	Mean changes from baseline		Mean difference	95% CI of difference		p-Value
	PRP (Mean±SD)	I/A Steroid (Mean±SD)		Lower	Upper	
4 weeks	37.80±13.995	36.38±8.30	3.429	-3.042	9.899	0.651*
12 weeks	35.85±11.244	16.80±3.010	-29.857	-36.093	-23.621	0.002*
24 weeks	33.28±11.406	10.19±1.128	-31.286	-37.458	-25.113	0.002*

*Independent t test, p-value<0.05 taken as significant

Table 5: Comparison Of Outcome Measures Within The Group (N=48)

Outcome Measures	Group	Baseline	4 weeks	12 weeks	24 weeks	p-value*
VAS	PRP	7.0 ± 0.775	4.33±0.95	4.09±0.95	3.52±1.20	0.001*
	I/A	7.62±0.74	4.18±1.189	2.47±0.679	1.57±0.507	0.005*
	Steroid					
WOMAC	PRP	77 ± 7.1	37.80±13.99	35.85±11.24	33.28±11.406	0.001*
	I/A	76.14±8.5	36.38±8.30	16.80±3.010	10.19±1.128	0.004*
	steroid					

*Repeated measure ANOVA test p- value<0.05 is taken as significant

DISCUSSION:

According to the findings of the current study, both the groups show improvement in pain and function of patients with hip OA and shown significant differences in WOMAC, VAS at 12 weeks and 24 weeks after injections compared to the beginning of intervention. While comparing mean change between the two groups (at 12 weeks and 24 weeks), PRP shows significant improvement as compared to steroid group. This difference is indicative of the long-term superiority of the effect of PRP over steroid. Studies in recent years have reported that clinical improvements in PRP injections are time-related and on average are sustained for about 9 months, while having better and longer lasting results with lower amounts of articular degeneration⁷. Sanchez M et al⁸ showed an early pain reduction at 6-7 weeks, which was sustained at 6 months, and a parallel reduction of disability in patients with OA of the hip. Nouri F et al⁹ conducted a comparative study between PRP and hyaluronic acid (HA) with hip OA and found that improvement of pain and function in patients significantly higher in the PRP group and lasted longer (6 months). Our study showed that PRP injection provided greater and prolonged relief from pain, reduced disability when compared with steroid injection in OA hip maximum at 12 and 24 weeks of follow ups.

CONCLUSION:

Our study showed that PRP injection provided greater and prolonged relief from pain, reduced disability when compared with steroid injection in osteoarthritis of hip maximum at 12 and 24 weeks of follow ups. Therefore, it is suggested that it might be the treatment of choice in future for managing pain and disability in patients with osteoarthritis of hip. Nevertheless, a large sample size and longer follow up period are recommended.

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