

Mean Pain Score Reduction Following Intra-Articular Injection of Autologous Platelet Rich Plasma in Early Knee Joint Osteoarthritis

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ABSTRACT

Aim: To determine the mean pain score reduction on visual analogue score before and after intra-articular injection of autologous platelet rich plasma in early knee osteoarthritis.

Methods: This quasi-experimental study was conducted at Lady Reading Hospital, Peshawar over a period of one year from 1st July 2014 to 30th June 2015 and comprised 178 patients.

Results: There were 35% males and 65% female patients with mean age 60±2.77 years. Initially 90% patients had moderate pain (VAS score 5-7) and 10% patients had severe pain (VAS score >7) with mean pain score was 5.67±1.37 but after intra articular injection 10% patients didn't had pain, 50% patients had mild pain (VAS score 1-4) and 40% patients had moderate pain (VAS score 5-7) with mean pain score was 5.67±.37. Intra-articular injection reduces the pain from 5.67±1.37 to 5.67±1.37.

Conclusion: Intra-articular injection of autologous platelet rich plasma is an effective and safe method of treatment in term of reduction of pain in early knee osteoarthritis

Keywords: Pain score reduction, Intra-articular injection of autologous, Platelet rich plasma

INTRODUCTION

Osteoarthritis of knee is a chronic degenerative condition of joints especially knees in which cartilage degeneration occurs¹. New growth of cartilages and bone formation occurs at joint margin, cyst formation and sclerosis in sub-chondral bone also occurs². Pain is the most frequent complain of a patient, pain usually aggravates by walking and is relieved by taking rest and analgesics³.

Symptomatic knee osteoarthritis occurs in 10% men and 13% in women age 60 years or older.⁴ Swelling and tenderness over the joint is the cardinal sign of early osteoarthritis. X-ray of knee joint in standing, antero-posterior and lateral view are enough to diagnose osteoarthritis. Narrowing of joint space, sub-chondral sclerosis, marginal osteophytes, cyst and bone remodelling are the characteristic features of osteoarthritis on x-ray⁵.

Platelet rich Plasma injection is effective in relieving pain, stiffness and functional capacity of patients with knee osteoarthritis⁶. Platelet rich plasma is a user friendly. Therapeutic application is well tolerated and shows encouraging preliminary clinical result in active patients with knee osteoarthritis.

Platelet rich plasma is the new entity that controls the damage of osteoarthritis, enhances cartilage formation and prevents the patient from taking huge doses of analgesics for pain relief.⁷

Platelet rich plasma is the volume of plasma fraction from autologous blood with a platelet concentration above base-line count (200,000 platelets / μ L).

PATIENTS AND METHODS

This quasi-experimental study was conducted in the Orthopaedics Department of Lady Reading Hospital Peshawar, over period of one year from 1st July 2014 to 30th June 2015. All patients meeting the inclusion criterion and presenting with pain and tenderness over the knee joint was included in the study through OPD and Emergency Department departments. All patients were subjected to detailed history with clinical examination. All patients taking analgesia were asked to stop any oral analgesic being used as per previous prescription by prior physicians and surgeons. A week later, 20 ml of blood was taken from the patient and was centrifuged in laboratory to prepare platelet rich plasma. About 4 ml of platelet rich plasma was obtained which is then injected in to the osteoarthritic knee joint by supra-patellar approach under sterile aseptic condition. The patients were asked about knee pain using visual analogue scores just before the intra-articular injection and one month after the procedure. All the above mentioned information including name, age, and gender were recorded on a predesigned proforma. The surgeon performing the platelet rich plasma injection was blinded from study. Data was analysed in SPSS version 16.

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RESULTS

According to gender, there were 62 (35%) patients were male while 116 (65%) patients were female with mean age was 60 ± 2.77 years (Tables 1). Initial status of pain on VAS score was 160 (90%) patients had moderate pain (VAS score 5-7) while 18 (10%) patients had severe pain (VAS score >7). Mean pain score was 5.67 ± 1.37 (Table 2). Status of pain after intra-articular injection in VAS score, 18 (10%) patients didn't had pain, 89(50%) patients had mild pain (VAS score 1-4) while 71 (40%) patients had moderate pain (VAS score 5-7). Mean pain score was 5.67 ± 1.37 (Table 3). Intra-articular injection reduces the pain as the initial mean pain score was 5.67 ± 1.37 but after the treatment the mean pain score reduces to 5.67 ± 1.37 . Hence this method of treatment is safe and effective (Table 4).

Table 1: Frequency and %age of gender and age (n = 178)

Variable	No.	%
Gender		
Male	62	35.0
Female	116	65.0
Age (years)		
30 – 40	11	6.0
41 – 50	35	20.0
51 – 60	59	33.0
61 – 70	73	41.0

Table 2: Initial status of pain (VAS score) (n=178)

Initial pain score	No.	%
5-7 (moderate pain)	160	90.0
>7 (severe pain)	18	10.0

Table 3: Status of pain after intra-articular injection (VAS score)

Pain after intra-articular injection	No.	%age
0 (No pain)	18	10.0
1-4 (Mild pain)	89	50.0
5-7 (Moderate pain)	71	40.0
> 7 (Severe pain)	-	-

Table 4: Comparison of mean pain score (initial vs after intra-articular injection)

Mean pain score	Mean \pm SD	P value
Initial pain score	5.67 ± 1.37	0.003
After intra-articular injection	3.03 ± 1.26	

DISCUSSION

Osteoarthritis is the most common type of arthritis's and knee osteoarthritis is the most frequent type of osteoarthritis in the lower limbs. Knee osteoarthritis is one of the most prevalent joint diseases in the community. It is reported that one in two people will develop knee osteoarthritis before reaching the age of 85 years, with a risk approaching to two in three in people who are overweight thereby making

prevalence of knee osteoarthritis higher than diabetes in the community.

Our study shows that mean age was 60 ± 2.77 years. Thirty five percent patients were male and 65% patients were female. Initially 90% patients had moderate pain (VAS score 5-7) and 10% patients had severe pain (VAS score >7) with mean pain score was 5.67 and SD ± 1.37 but after intra-articular injection 10% patients didn't had pain, 50% patients had mild pain (VAS score 1-4) and 40% patients had moderate pain (VAS score 5-7) with mean pain score was 5.67 ± 1.37 . Hence our study shows that intra-articular injection reduces the pain from 5.67 ± 1.37 to 5.67 ± 1.37 . So this method of treatment is safe and effective.

Similar findings were observed in other studies as the clinical improvement in the VAS score from 4.54 ± 0.613 to 2.16 ± 1.54 has been noted.⁸ Goobi et al⁹ observed improvement in pain from 3.2 ± 1.4 to 1.9 ± 1.7 .

In another study conducted by Malchira¹⁰ there were highly statistically significant improvements in the patients perception of pain, knee function and quality of life, represented by the duration of inactivity stiffness, VAS and IKDC score. Better results were achieved in all the patients and those with short disease duration. This could be explained by the high percentage of living and vital cells and therefore the high response potential to the growth factors. BMI showed a significant correlation with VAS and a highly significant negative correlation with IKDC score after 6 PRP injections.

Sampson and colleagues evaluated the effect of 3 monthly doses of PRP in 14 patients with OA of the knee refractory to conservative treatment. They observed a linear improvement of VAS and knee injury OA outcome in 60% of patients at follow-up.¹¹ The same results were reported by *Wang and colleagues*.¹² More recently, improvement in all WOMAC parameters¹³ and pain scores¹⁴, clinical and functional scores¹⁵ was reported after three injections of PRP. Intra-articular PRP injections had a better response in younger patients and more active patients¹⁶ and those with low grade OA.¹⁷ It has been reported that better response rates are evident in OA patients treated with PRP injections than in those treated with hyaluronic acid and¹⁸ although a recent study reported that they have the same efficacy¹⁷.

Mitsuyama and colleagues¹⁸ reported that PRP promotes human chondrocyte proliferation, cells expanded with 30% PRP can express chondrocyte phenotype, and can serve as scaffold for autologous chondrocyte implantation that has potential availability for repair of osteoarthritis with chondral defects Regarding humans, an old case report has been described, where plasma rich in growth factors

was used to treat an articular cartilage avulsion in a soccer player. They reported an accelerated and complete articular cartilage healing.¹⁹ Recently, it has been stated that PRP has an anabolic effect on chondrocytes and bone marrow-derived stem cells with resulting increase in the cell proliferation and matrix production, as well as an anti-inflammatory effect via down regulation of known catabolic signalling pathways²⁰.

CONCLUSION

Our study concludes that intra-articular injection of autologous platelet rich plasma is an effective and safe method of treatment in term of reduction of pain in early knee osteoarthritis.

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