STUDY TO DETERMINE THE ROLE OF PLATELET RICH PLASMA INJECTION IN TREATMENT OF FROZEN SHOULDER IN TERMS OF IMPROVEMENT IN PAIN

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ABSTRACT:

In recent years platelet-rich plasma (PRP) techniques caught the attention of many researchers due to the highly successful treatment ratio. This low economic non-operative method is used to reduce pain, reduce hospital stay and minimize the risk of limb disability. This research aims to determine the role of platelet-rich plasma injection in the treatment of frozen in terms of improvement in pain.

Methodology: This descriptive case series study was conducted in the Department of Orthopedic Mayo Hospital Lahore, Unit-I within six months duration from Jan 2018 to June 2018. A total of 300 cases were included with an estimated 73.3% improvement in pain. We include patients of both genders with ages range 40-80 years old who suffered from 6 weeks frozen shoulder disorder.

Results: The mean reduction in pain after treatment was 64.57 ± 19.40% with minimum and maximum reduction as 0% and 88.89% respectively. In 267(87.5%) cases the improvement ≥ 50% was observed while 38(12.5%) cases had improvement < 50%. In cases with ≥ 50% improvement there were 172(64.4%) cases with age group of 40-65 years and 95(35.6%) cases were 66-80 years old and among cases who did not show ≥ 50% there were 22(57.9% were 40-65 years old and 16(42.1%) cases were 66-80 years old.

Conclusion: From the results, we concluded that the PRP method is way more effective to treat frozen shoulders than any other costly method.

Keywords: Frozen shoulder, adhesive capsulitis, pain

I. INTRODUCTION:

Around the world, every year total of 2-2.4% population is affected by frozen shoulder or adhesive capsulitis with 11.2 cumulative incidents per 1000 persons1-2. It is a glenohumeral joint disorder that restricted movement due to fibrosis occurs in the shoulder capsule3-4. Generally, 3-5% of cases of frozen shoulder are reported in the general population but its morbidity in diabetic patients became alarming in recent years with 20% of disease prognosis5. This self-limiting disorder commonly resolved in 1-3 years but in some studies, 20-50% of patients suffering from the frozen shoulder along with ROM deficits reported morbidity over one decade6. Researchers claim that it occurs in the 5th and 6th decades of human life and rare in 40 year age group. Women had high exposure to a frozen shoulder as compared to men7. Diabetic patients had a 2-4% high risk of the frozen shoulder for a lifetime along with other contributing comorbidities such as hypoadrenalism, Parkinson’s disease, cardiac disease, pulmonary disease, stroke8,9. The etiology of adhesive capsulitis is not defined yet but the inflammatory process of the subacromial burse was considered as the causative agent of disease10.

Adhesive capsulitis also called frozen shoulder usually treated with manual therapies and exercises. But proper management of frozen arm is not defined yet. Many operative and non-operative techniques are used to manage frozen shoulders. The basic purpose of these methods is to reduce pain and restore joint function. Conservative treatments such as therapeutic injection in the joint or manipulation under anesthesia or physiotherapy are widely used to treat adhesive capsulitis10-12. In recent years platelet-rich plasma (PRP) techniques caught the attention...
of many researchers due to the highly successful treatment ratio. This low economic non operative method is used to reduce pain, reduce hospital stay and minimize the risk of limb disability. Patients achieve quality life after achieving this method as the first treatment of the frozen shoulder13,14.

A very little literature was produced to evaluate the efficacy of the PRP method in patients with adhesive capsulitis. This research aims to determine the role of platelet-rich plasma injection in the treatment of frozen in terms of improvement in pain.

II. METHODOLOGY:

This descriptive case series study was conducted in the Department of Orthopedic Mayo Hospital Lahore, Unit-I within six months duration from Jan 2018 to June 2018. A total of 300 cases were included with an estimated 73.3% improvement in pain. We include patients of both genders with ages range 40-80 years old who suffered from 6 weeks frozen shoulder disorder. Patients with pain in shoulder joint >3 a on a visual analog scale with active and passive range of motion were included. Patients with 150 degrees of abduction, 180 degrees of forwarding flexion, 45-60 degrees of extension, rotation (elbow flexed to 90 degrees), External and internal rotation is normal at 90 degrees and 70-90 degrees respectively were also included. All the pregnant and lactation mothers were excluded. Patients with a previous history of frozen shoulder, systemic inflammation, and joints osteoarthritis were not part of this research. After taking informed consent patients were enrolled through OPD of the department of Orthopedic Mayo Hospital Lahore. Basic demographic information including clinical details of patients was observed. At the initial stage with the help of a double syringe 20ml of patient blood was drawn and centrifuged at 5000 rpm for five minutes to separate the blood into layers of red blood cells, a buffy-coat of leucocytes, and plasma. Furthermore, plasma was repeatedly injected into the subacromial bursa and intra-articular space for four weeks. In this phase, PRP was injected only into the GH joint. For data collection, two parts instruments were used. In the first part questions related to patients' age, sex was reported. The second part was based on a visual analog scale in which 0-10 grades were associated with pain events. These grades include information related to no pain (0), mild (1-3), moderate pain (4-7), and severe (8-10) pain. In past, many studies reported the validity and reliability of this visual analog scale. This research was performed with the ethical approval of the institution. We followed all the principles declared in the Helsinki protocol. Patients were well aware of the objectives and written consents were gathered from them before any intervention. The pain was monitored before and at the 6th week of treatment. After every injection patients were recommended to perform some little exercise.

For this research, we used SPSS 22.0 version for data analysis. Mean and Standard Deviation was used to analyze quantitative data e.g. age and pain score at 6 weeks whereas frequency distribution was used to analyze qualitative information such as gender and improvement in pain score. The comparison was conducted through the Chi-square formula. We set 0.05 as a statistically significant level of this research.

III. RESULTS:

The mean age of cases was 60.47 ± 11.55 years with minimum and maximum age as 40 and 80. There were 164(53.8%) male and 141(46.2%) female cases with higher male to female ratio. The mean pain before and after treatment was 6.56 ± 1.79 and 2.42 ± 1.71 respectively. The mean reduction in pain after treatment was 64.57 ± 19.40% with minimum and maximum reduction as 0% and 88.89% respectively. In 267(87.5%) cases the improvement ≥ 50% was observed while 38(12.5%) cases had improvement < 50%. In cases with ≥ 50% improvement there were 172(64.4%) cases with age group of 40-65 years and 95(35.6%) cases were 66-80 years old and among cases who did not show ≥ 50% there were 22(57.9%) were 40-65 years old and 16(42.1%) cases were 66-80 years old. The frequency of ≥ 50% improvement was statistically same in both age groups, p-value > 0.05. In cases with ≥ 50% improvement there were 144(53.9%) male and 123(46.1%) female cases and among cases who did not show ≥ 50% there were 20(52.6%) male and 18(47.4%) female cases.

The frequency of ≥ 50% improvement was statistically same in both genders, p-value > 0.05. In cases with ≥ 50% improvement there were 144(53.9%) cases with disease duration as < 12 weeks and 123(46.1%) cases disease duration since ≥ 12 weeks and among cases who did not show ≥ 50% there were 26(68.4%) cases with disease duration as < 12 weeks and 12(31.6%) cases had ≥ 12 weeks. The frequency of ≥ 50% improvement was statistically same regardless of duration of disease, p-value > 0.05. In cases with ≥ 50% improvement there were 94(35.2%) cases having baseline pain < 6 and 173(64.8%) cases had baseline pain as 610 and among cases who did not show ≥ 50% there were

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10(26.3%) cases who had baseline pain < 6 and 28(73.7%) cases who had baseline pain as 6 improvement was s10. The frequency of ≥ 50% statistically same regardless of baseline pain, p value > 0.05.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean ± SD</th>
<th>Total Range</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>60.47 ± 11.55</td>
<td>40</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>Score before pain</td>
<td>6.56 ± 1.79</td>
<td>5.00</td>
<td>4.00</td>
<td>9.00</td>
</tr>
<tr>
<td>Score after pain</td>
<td>2.42 ± 1.71</td>
<td>6.00</td>
<td>1.00</td>
<td>7.00</td>
</tr>
<tr>
<td>Reduction</td>
<td>64.57 ± 19.40</td>
<td>88.89</td>
<td>0.00</td>
<td>88.89</td>
</tr>
</tbody>
</table>

Table 2: Comparison of Improvement ≥ 50% with respect to age, gender, disease duration, and baseline pain

<table>
<thead>
<tr>
<th>Variables</th>
<th>Improvement ≥ 50%</th>
<th>Chi square</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.612</td>
<td>0.434</td>
<td>(Insignificant)</td>
</tr>
<tr>
<td>40-65</td>
<td>172 (64.4%)</td>
<td>22 (57.9%)</td>
<td></td>
</tr>
<tr>
<td>66-80</td>
<td>95 (35.6%)</td>
<td>16 (42.1%)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.023</td>
<td>0.880</td>
<td>(Insignificant)</td>
</tr>
<tr>
<td>Male (n=164)</td>
<td>144(53.9%)</td>
<td>20(52.6%)</td>
<td></td>
</tr>
<tr>
<td>Female (n=141)</td>
<td>123(46.1%)</td>
<td>18(47.4%)</td>
<td></td>
</tr>
<tr>
<td>Duration of disease</td>
<td>2.830</td>
<td>0.092</td>
<td>(Insignificant)</td>
</tr>
<tr>
<td>&lt;12 weeks</td>
<td>144 (53.9%)</td>
<td>26 (68.4%)</td>
<td></td>
</tr>
<tr>
<td>≥12 weeks</td>
<td>123 (46.1%)</td>
<td>12 (31.6%)</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>1.170</td>
<td>0.279</td>
<td>(Insignificant)</td>
</tr>
<tr>
<td>Before &lt;6 weeks</td>
<td>94 (35.2%)</td>
<td>10 (26.3%)</td>
<td></td>
</tr>
<tr>
<td>After 6-10 weeks</td>
<td>173 (64.8%)</td>
<td>28 (73.7%)</td>
<td></td>
</tr>
</tbody>
</table>

IV. DISCUSSION:

In the past, frozen shoulders were treated with manual therapy and exercises combined with physical therapy interventions. In our study, we reported that women were more prone to adhesive capsulitis with a peak age of 56 years. In 6-17% of patients of this study were again affected with a frozen shoulder after treated with their first one within a five-year timeframe. The majority of the patients were affected with nondominant shoulders. Usually, frozen shoulders are divided into primary or secondary categories. Radiographs of primary frozen shoulder seem normal and idiopathic whereas secondary frozen shoulder occurs due to systemic, intrinsic, or extrinsic diseases. The total duration of the frozen shoulder is in between 3 stages i.e freezing (also called painful inflammatory stage), frozen and thawing stages which end 12 to 18 months. Usually, 6 months are noted as the average timeframe of frozen shoulder but this may vary according to the patient's condition. In the inflammatory stage of frozen shoulder patients suffering from constant pain, with limited range of motion in a capsular pattern. In the second phase of shoulder stiffness, patients observed less pain but restricted in motion or function. However, in the last stage shoulder movements were regain with less discomfort. Traditionally the purpose of adhesive capsulitis treatment was to relieve pain, regain function and maintain motion. Physiotherapy consists of many modalities including exercises, electrotherapy, or massage. Literature claim that pain can be reduced by using massage deep heat, ice, ultrasound, TENS (transcutaneous electrical nerve stimulation), and LASER technique but the benefits of these techniques are little in practical. In many cases, ultrasonic therapy was used as an intervention due to its physiological effects including blood flow augmentation, high capillary permeability, and tissue metabolism, increased tissue extensibility, reduction in pain threshold. In the past, treatment of frozen shoulder became advanced due to its high morbidity ratio. In many regions, patients are now treated with Intra aortic corticosteroid injection because of its high availability and affordability. PRP method gains attention after achieving successful outcomes in terms of soft tissue revascularization and enhances the concentration of growth factors to improve and accelerate tendon healing. The recent case study reported a 60% improvement in the frozen shoulder after the first injection of PRP. With the help of these results, we
conducted a pilot study on 15 cases at the 6th week of disease. In 11 (73.3%) cases positive outcomes in terms of reduction in pain ≥ 50% were observed. After these successful outcomes, we persuade our study with a total of 300 cases with mean age 60.47 ± 11.55. The maximums patient age was 80 years and the minimum was 40 years in that group. Total 267 (87.5%) patients reported improvement in pain reduction ≥ 50% whereas 38(12.5%) cases had improvement < 50%.

A recent study described the efficiency of platelet-rich plasma (PRP) treatment for painful shoulder syndrome. They administer PRP injection at 7-day intervals along with a Quick Dash questionnaire to access the outcomes of treatment. Their study was conducted thee a one-year time frame. Before PRP administration the Quick dash score of pain was reported as 42 (35-52) after treatment score was decreased up to 18 (13-26) to 13 (11-23) after one to 3 months timeframe. They concluded that PRP treatment also helps to reduce the subjective difficulties of patients and leads towards complete recovery. These results are in line with our outcomes. Another study reported successful outcomes of PRP treatment within 12 weeks time duration without any adverse effect on the patient. They concluded that PRP is much better than corticosteroid and ultrasonic therapy. We observed active and passive range of motion after 12 weeks of PRP treatment.

V. CONCLUSION:

From the results, we concluded that the PRP method is way more effective to treat frozen shoulders than any other costly method. Easy availability of PRP injections and low cost reduce hospital burden with minimum risk of limb disability.

REFERENCES: