Platelet Rich Fibrin for the Repair of Tympanic Membrane

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ABSTRACT

1. INTRODUCTION

Objective: The aim of our study is to investigate the effect of the Choukroun's platelet-rich fibrin (PRF) on the acute tympanic membrane perforations due to trauma without the application of any tympanoplasty procedure.

Methods: This prospective controlled study was conducted at Umranieye Hospital between April-December 2011. 32 subjects with acute tympanic membrane perforations due to trauma were included in the study, 14 of these were assigned to the PRF study group (study:14, control:18). In the study group, PRF was used to repair tympanic membrane perforations. In the control group, no manipulation was performed.

Results: Mean area of perforation was 10.05±4.02 mm² in the study group and 10.05±4.02 mm² in the control group at the first month examination. At the end of the first month, the mean area of the perforation in the study group was 10.93±3.58 mm² and in the control group it was 10.93±3.58 mm². Although, there has been limited researches in otolaryngology literature about this issue, PRF is a blood clot which is an autologous inexpensive material, can easily be prepared.

Conclusion: PRF application in the repair of tympanic membrane perforations due to trauma was safe and effective and could be used instead of tympanoplasty procedure.

2. METHODS AND MATERIALS

2.1. Patients

This prospective controlled study was conducted at Umranieye Hospital, between April-December 2011. The study included 32 patients with acute tympanic membrane perforations due to trauma. Subjects were randomly divided into two groups: PRF was used to repair tympanic membrane perforations in 14 patients. In the control group (18 patients), no manipulation was performed. Patients with total perforation, less than 2 mm perforation of the tympanic membrane, trauma to the ear more than 24 hours, patients with previous ear disorders and systemic diseases were excluded from the study.

Microscopic examination of the ear was performed in all patients. Short and long axis of the perforation were calculated for each patient. All patients were followed up for two months. At the end of the first and second months, size of the perforations were recalculated. Finally, comparison of the data between the groups were made for statistical analysis.

2.2. Statistical Investigation

Statistical analysis was performed using the Student t-test, and Multivariate Analysis of Variance (MANOVA) was used to compare the mean areas of perforation in the study and control groups. Fisher's exact test was used to compare the results of the study groups. In the comparison of the data, the mean and standard deviation were calculated. P-values of less than 0.05 were considered significant. The findings were statistically analyzed using the Statistica software (StatSoft, Inc., Tulsa, OK, USA). Results were expressed as mean ± standard deviation.

3. RESULTS

Mean area of the perforation was 10.93±3.58 mm² in the study group and 10.05±4.02 mm² in the control group in the first examination (P<0.05). At the end of the first month, the mean area of the perforation was 10.93±3.58 mm² in the study group and 10.93±3.58 mm² in the control group (P>0.05). There was no significant difference between the study and control group when we compared the ratio of closure of TM perforation (P>0.05).

4. REFERENCES

Although the TM has a great ability for regeneration and spontaneous healing, some perforations may require repair. In the literature, there are many materials that can be used with different surgical procedures for the repair of TM perforation. Larger perforations may require more complex procedures. In our study, PRF was used to promote the healing of TM perforations. PRF is a blood clot which is an autologous inexpensive material, can easily be prepared. PRF which is a source of many growth factors, has been shown to accelerate wound closure (13,14). Also these growth factors may lead tissue regeneration (15). Navarrete Alvaro ML et al, in their pilot study, evaluated 3 patients with inactive central tympanic membrane perforations. They used PRF for the closure of their TM perforation using a modified tympanoplasty middle ear. According to their results, PRF led to the successful closure of TM perforation in these patients (16).

Elkele T. et al, investigated tympanic membrane perforation in 44 rats, and they found that PRF was effective in accelerating tympanic membrane perforation healing. Therefore, they claimed that PRF might be effective in human subjects, particularly in an autologous material (17).

In our study, we studied the effect of PRF on the healing of traumatic tympanic membrane perforation. In 9 of 14 patients with use of PRF, there were total closure of their TM perforations. In 5 of the 18 patients in the control group, there were total closure of the TM perforation in only 4 of 18 patients. In study group, at the end of the first month, 9.57±3.04 mm² closure area of TM were calculated, but in control group, only 9.01±3.74 mm² closure area of TM were calculated (P<0.05). However, at the second month, there was no significant difference between study and control group when we compared the ratio of closure of TM perforation (P>0.05).

Although, there has been limited researches in otolaryngology literature about this issue, results of our study were similar to the results of few previous studies, showing that PRF had a positive effect on TM perforation healing especially in early period.

CONTACT

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Table-1: Comparison of closure area After first month examination.

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean area of perforation (mm²)</th>
<th>Standard Deviation</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Group</td>
<td>10.93±3.58</td>
<td>0.493</td>
<td>10.00</td>
</tr>
<tr>
<td>Control Group</td>
<td>10.05±4.02</td>
<td>0.493</td>
<td>10.00</td>
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Table-2: Comparison of closure ratio at the en of second month.

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<th>Group</th>
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