

Original Article

**ROLE OF PLATELET-RICH PLASMA IN POST
TONSILLECTOMY PAIN**

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Abstract

Introduction: One of the most common surgery done by otorhinolaryngologist in India is tonsillectomy. Since tonsillectomy leaves a open wound in the pharyngeal wall causing post tonsillectomy pain. Inadequate post tonsillectomy pain control will lead to severe distress, dehydration, discomfort. PRP promotes healing by angiogenesis, matrix remodeling, and cell

proliferation. In this study we evaluated whether topical application of autologous platelet rich plasma in tonsillectomy fossa relieves post tonsillectomy pain.

Aim : To evaluate the effect of topical application of PRP in tonsillectomy fossa in reducing post tonsillectomy pain.

Study design: Quasi experimental (prospective) study

Methods and materials: The study included 30 patients, aged 4-18 years who presented with the signs and symptoms of chronic tonsillitis and were subjected to undergo tonsillectomy. 1 ml of platelet-rich plasma was topically applied to each tonsillectomy fossa for 5 minutes immediately after surgery. Patient is assessed for pain level measured by visual analogue scale (VAS).

Results: The mean VAS score was low consistently in PRP group compared to the control group and was statistically significant upto 7th post operative day ($p < 0.05$).

Conclusion: Per-operative topical application of autologous platelet-rich plasma reduces post tonsillectomy pain significantly.

KEYWORDS : Tonsillectomy, Post operative pain, Visual analogue scale, Platelet-rich plasma

INTRODUCTION

One of the most common surgery done by otorhinolaryngologist in India is tonsillectomy. Tonsillectomy involves complete removal of the palatine tonsil leaves a open wound in the pharyngeal wall causing post tonsillectomy pain due to damaged muscle fibers and exposed nerve endings¹. Postoperative pain in tonsillectomy is usually last 7 to 14 days. Inadequate post tonsillectomy pain control will lead to severe distress, dehydration, discomfort to patient post

operatively¹. Platelets promotes healing by angiogenesis, matrix remodeling, and cell proliferation². In this study we evaluated whether topical application of autologous platelet rich plasma in tonsillectomy fossa relieves post tonsillectomy pain.

METHODS AND MATERIALS

The study included 30 patients; aged 4-18 years who presented with the signs and symptoms of chronic tonsillitis were included in the study and were subjected to undergo tonsillectomy after getting assent from the patients below 18 years, Informed and written consent obtained from the patients parents.

In this study below 4 years and above 18 years of age, history of dysphagia or odynophagia due to causes other than tonsillitis, Patients with bleeding disorders, Patients undergoing tonsillectomy for reasons other than chronic tonsillitis were excluded from this study. After approval by the institutional ethics committee, this study was conducted in the Department of Otorhinolaryngology, Vinayaka Missions Medical College, Karaikal, from January 2021 for 18 months.

INTERVENTION

Group 1 (PRP) patients (n=15) received intervention (platelet-rich plasma group).

Three hours before surgery under sterile conditions 10 ml blood sample was obtained from a platelet-rich plasma group mixed with 1 ml anticoagulant (citrate phosphate dextrose adenine).blood sample taken at room temperature left for 1 hour. Samples were then subjected to soft spin centrifugation (1000 rpm for 10 min by separating into three layers: red blood cell bottom layer, Buffy coat middle layer - Platelet-rich plasma layer and top layer platelet-poor

plasma. upper and middle layers carefully aspirated into another container and let stand for 1 hour. The sample was spun at 3000 rpm for 10 minutes for platelet-rich plasma to settle down. It was aspirated aseptically and used for the study. Immediately after surgery once hemostasis achieved in operation theatre, 1 ml of platelet-rich plasma was topically applied to each tonsillectomy fossa for 5 minutes¹¹. Patients in group 2 (n=15) control group

OUTCOME

The primary outcome was to assess patient's pain level which is measured by **VISUAL ANALOGUE SCALE (VAS)** on post operative day 0, day 1, day 2, day 3, and day 7 and on follow up day 14.

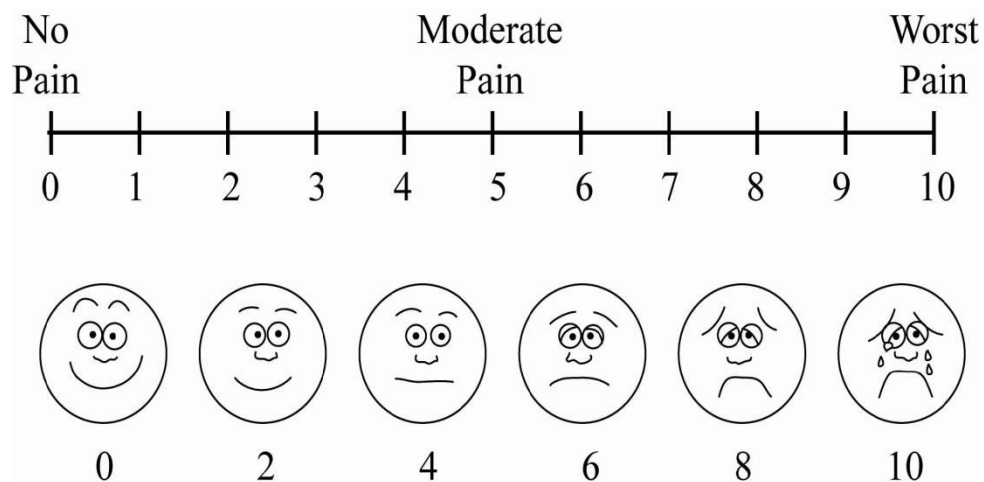


Figure 1: VISUAL ANALOGUE SCALE 0 -10 (VAS)

STATISTICAL ANALYSIS

Data were analyzed with the statistical software SPSS[®] (version 16). Continuous variable represented as mean \pm standard deviation. The associations between mean differences were analyzed by performing independent t-tests. The significance level was assessed as $p \leq 0.05$.

RESULTS

The mean age group of patients in the platelet-rich plasma group was 10.8 ± 3.6 years and in the control group was 13 ± 3.6 years, and the difference between the groups was insignificant ($p = 0.1$). The platelet-rich plasma group included 6(40 per cent) males and 9 (60 per cent) females, and the control group included 4 (26.6 per cent) males and 11 (73.3 per cent) females. The difference between the two groups based on gender was insignificant ($p = 0.4$).

ASSOCIATION OF VAS SCORE WITH PRP GROUP AND CONTROL GROUP

Association of VAS score with PRP and control group was calculated using mean and standard deviation, where p value continued to be significant from Day 0 to Day 7 and not significant on day 14.

Table 1: Comparison of VAS scores between PRP and control groups.

<i>Association of vas score with PRP treatment and control group</i>			
<i>VAS pain score</i>	<i>PRP group</i> <i>Mean \pm S.D</i>	<i>Control group</i> <i>Mean \pm S.D</i>	<i>Independent t test</i> <i>P value</i>
<i>Day 0</i>	7.6 ± 0.6	8.1 ± 0.6	0.02^*
<i>Day 1</i>	6.3 ± 0.7	6.9 ± 0.5	0.01^*
<i>Day 2</i>	4.4 ± 0.5	5.8 ± 0.4	0.00000002^*
<i>Day 3</i>	2.9 ± 0.7	4.1 ± 0.3	0.00003^*

Day 7	0.06 ± 0.2	0.4 ± 0.6	0.03*
Day 14	0	0.06 ± 0.2	0.3(NS)

*significant p value < 0.05, NS – not significant. Day 0 represents the day of surgery.

*Significant result. VAS = visual analogue scale; SD = standard deviation; PRP = platelet-rich plasma

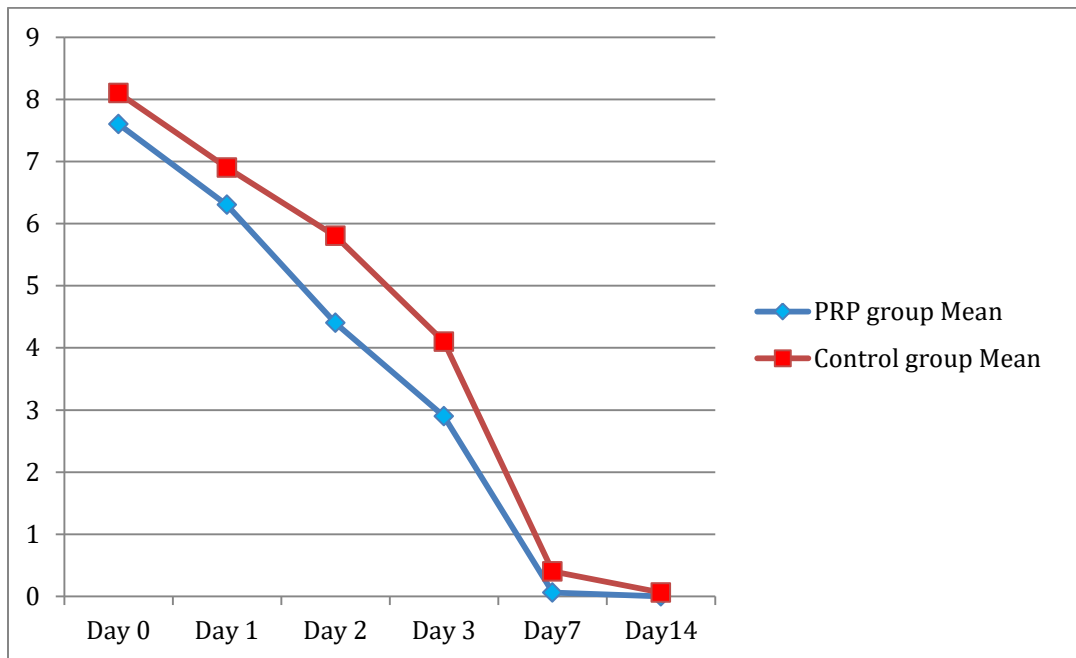


Figure 2: Graph showing association of VAS score with PRP treatment and control group

DISCUSSION

Managing post tonsillectomy pain is one of the important post operative care. Various modalities of treatment have been tried such as acetaminophen, NSAIDs, opioids, steroids, gabapentin, pregabalin, local infiltration of ketamine, clonidine ,oral magnesium. Non-pharmacological therapies used as adjunctive such as honey, aromatherapy, acupuncture, cold water irrigation. Genetic factors high BMI also play important role severity of pain and response to pain¹. In this

study we used topical application of autologous platelet rich plasma in post tonsillectomy patients. Since it is autologous platelet rich plasma is cost-effective, does not cause any hypersensitivity reactions, do not need any screening or cross matching test, spread of HIV, HBsAg or any other blood borne diseases prevented. The PRP is classified into Pure Platelet-Rich Plasma (P-PRP), Leucocyte- and PRP (L-PRP), Pure platelet-rich fibrin (P-PRF), Leucocyte- and platelet-rich fibrin (L-PRF)². PRP enhances wound healing by promoting the healing process by growth factors present in it. The growth factors of the PRP are Epidermal GF (EGF), Basic fibroblast GF (FGFb) ,Platelet derived GF (PDGF) ,Vascular endothelial GF (VEGF), Connective tissue GF (CTGF) ,Transforming GF β (TGF β)¹². Platelet rich plasma (PRP) is used in a variety of therapeutic settings for the treatment of burns¹⁰, heart bypass surgery⁹, chronic skin and soft tissue ulcerations³, periodontal and maxillofacial surgery⁴ and orthopaedic surgery⁵

M N Chettri et al¹³ conducted a study on PRP application in post tonsillectomy pain in 36 patients and concluded that pain score on the test side were lower than on the control side and findings were statistically significant .James D. Sidman et al¹⁴ conducted a study on PRP application in post tonsillectomy pain in 70 paediatric patients and concluded that PRP applied once at the time of tonsillectomy does not improve postoperative pain or recovery in pediatric patients which is contradictory to our results. S Nanditha et al¹⁶ conducted a study on PRP application in post tonsillectomy pain in 56 patients and concluded that significant decrease in the mean pain score up to day 7.

I Irakli et al¹⁵ conducted a study on PRP application in post tonsillectomy pain in 85 patients and concluded that Postoperative pain was evaluated by ten-grade visual-analog scales for each side separately. Pain scores reached statistical significance. There appears to be advantage to the

use of PRP in tonsillectomy. Ayman H et al¹⁷ conducted a study on PRP application in post tonsillectomy pain in 40 patients and concluded that topical application of PRP on the tonsillar bed once at the time of operation improves postoperative pain.

In our study compared to the control group, the mean VAS score in the platelet-rich plasma group was consistently lower, and pain levels were significantly lower up to day 7 after tonsillectomy ($p < 0.05$). The limited sample size and inability to evaluate the efficacy of different platelet-rich plasma concentrations were limitations of this study.

CONCLUSION

The pain experienced after a tonsillectomy is reduced by the per-operative topical application of autologous platelet-rich plasma in tonsillar fossae. PRP group has significant reduced pain when compared to the control group and mean VAS score was consistently low in PRP group than control group and was statistically significant upto 7th post operative day ($p < 0.05$) but 14th day is not statistically significant since all patients in both the groups did not have pain on day 14 except one patient in control group had pain.

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Dr.Srinivasa V and Dr.Muthu Ramanathan AN have equally contributed to this article.

Conflict of interest : Nil

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