

Comparison of different methods of local anesthesia for platelet rich plasma injections to scalp in patients with hair loss - A prospective study



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ABSTRACT

Background: Platelet-rich plasma injection (PRP) for hair loss is a widely accepted treatment modality at present. The most common problem with PRP is the pain that is associated with the procedure. The type of anesthesia is decided mostly based on preference rather than protocol. **Aims and Objectives:** The current study was undertaken to establish a standardized anesthetic protocol for PRP based on the response of the patients undergoing the treatment plan. **Materials and Methods:** The study included 60 patients who underwent four sittings of PRP at 1-month intervals for hair loss treatment. The modality of anesthesia was different during each of the sessions - topical anesthesia, vibration anesthesia, nerve block, and ring block. The order of anesthetic modality was different in each patient, to avoid bias. Responses by the patients for the following questions related to anesthetic pain during the procedure was recorded and analyzed based on the type of anesthetic procedure adopted. **Results:** Vibration anesthesia had the highest mean intra procedure numerical pain scale value. Nerve block was the least acceptable modality with maximal problems including the pain of the local anesthetic injection and the unsightly visible bulge in the supra orbital region. Post procedural pain was highest for vibration anesthesia and least for ring block. Highest acceptance was seen with the ring block technique. **Conclusion:** This is a preliminary study aimed at standardizing the anesthetic protocol for PRP. This modality of treatment involves multiple sittings with long total duration. Improving patient comfort with adequate anesthesia will improve compliance to a great extent.

Key words: Platelet-rich plasma; Hair loss; Scalp anesthesia; PRP anesthesia; Ring block; Scalp nerve block; Vibration anesthesia; Topical anesthesia

INTRODUCTION

Platelet-rich plasma (PRP) injection to scalp is at present one of the most accepted modalities for treatment of hair loss among patients. Absence of any major adverse effects that are associated with medications is an important reason for patient acceptability for PRP treatment.¹ However, among the minor side effects of PRP, the most common and most significant problem is the pain that is associated with the procedure, particularly because many physicians

do not use any type of anaesthesia.^{2,4} There are also reports of hyperalgesia following repeated injections of PRP which might make the procedure more uncomfortable.⁵ The various available modalities of anesthesia for PRP injections include - topical anesthetic creams, vibration devices, cooling devices, nerve blocks, and ring blocks.^{6,7} In practice, the decision of the type of anesthesia is mostly made based on patient preference and the physician preference rather than any recommended protocol. We undertook this research at our center to evaluate and

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compare the efficacy of these modalities, to help us arrive at a standardized anesthetic protocol for patients undergoing PRP injections.

Aims and objectives

The current study was undertaken to establish a standardized anesthetic protocol for PRP based on the response of the patients undergoing the treatment plan.

MATERIALS AND METHODS

This study was carried out over a period of 18 months. A total of 60 patients who underwent PRP treatment for hair loss were included in the study. All the patients were male, aged between 23 and 29 years. None of them had any other dermatological problems except hair loss. None of them had any other significant comorbidities. Any patient with Norwood stage 4 or higher was excluded from the study. All the patients underwent 4 consecutive sittings of PRP treatment at 1 month intervals. All the patients underwent a different modality of anesthesia during each of the sessions. To avoid bias from the previous experience, the order of anesthetic modality was different in each patient which was decided by random selection.

The technique of each modality was as follows:

- Protocol I (Topical anesthesia with Lidocaine - Prilocaine cream)
 - Scalp cleaned with Povidone solution and dried
 - Adequate amount of lidocaine prilocaine cream applied
 - Care taken to apply the cream on the scalp in between the hair
 - Scalp covered with a sterile disposable surgeon's cap for 40 min before the procedure.
- Protocol II (Vibration anesthesia without any medications)
 - Scalp cleaned with Povidone solution and dried
 - Vibration device sterilized in formalin chamber and cleaned using alcohol solution
 - Immediately after an injection, device is applied at a close proximity to the prick site for 3–5 s based on magnitude of pain.
- Protocol III (Nerve block)
 - Plain 2% Lignocaine injection is used (in view of close proximity to blood vessels)
 - Supra trochlear nerve, supra orbital nerve, zygomatico temporal nerve, and auriculo temporal nerve are blocked on both sides
 - Under sterile precautions 0.3 cc of LA medication is injected in the subcutaneous plane using a 30 g needle corresponding to the surface marking of each nerve
 - 15 min waiting time before the procedure

- Protocol IV (Ring block)
 - Lignocaine 2% with 1:200000 Adrenaline is used
 - Under sterile precautions, 0.2 cc of LA is injected in subcutaneous plane, approximately 3 cm apart from a vertical line drawn from the anterior border of pinna on one side to another. (approximately 10 pricks)
 - The injections are done within the existing hairline, to conceal the skin elevation caused by the infiltration.

The patients were randomly divided into four groups based on selection using lots. Each group had 15 patients to begin with. Four patients were lost to follow-up during the study period (2 from Group A, 1 from B and 1 from Group C). They were replaced with new inclusions. The newly included patients were included to the group from which the old patient dropped out. The order of anesthetic modality in each group is as follows (Table 1).

All the procedures were done during the evening and patients were advised not to wash their scalp until next day. Immediately after the sitting, the patients were requested to grade the pain of PRP injections using numerical pain scale. A follow-up phone call was made 24 h later with the following set of questions.

1. What were your problems during the process of anesthesia
2. For how long did the pain persist after the procedure
3. Would you undergo the same procedure again.

The following pro forma was filled with the answers given by the patients. The results were tabulated and analyzed (Table 2).

RESULTS

Numerical pain scale

The mean of the numerical pain scale during the procedure following each of the anesthetic modality was calculated.

Table 1: Order of anesthetic modality

Group	1 st sitting	2 nd sitting	3 rd sitting	4 th sitting
A	1	2	3	4
B	2	3	4	1
C	3	4	1	2
D	4	1	2	3

Table 2: Patient proforma

Hospital ID
Type of anesthesia
Numerical pain scale
What were your problems during the process of anesthesia
For how long did the pain persist after the procedure
Would you undergo the same procedure again

Topical anesthesia had a mean numerical pain scale value of 4. Vibration anesthesia had a mean numerical pain scale value of 6. Nerve block and ring block had a mean numerical pain scale value of 2.

Problems during the process of anesthesia

Waiting time and cost of anesthetic medicine were the problems reported during the topical anesthesia sitting. During the vibration anesthesia sitting a few patients had worsening of the initial injection pain due to an inadvertent application of the device directly over the prick site. More than 50% of the patients had problems during the nerve block sitting, which included the pain of the local anesthetic injection and the unsightly visible bulge in the supra orbital region. Pain of the local anesthetic medicine injection was also a problem in the ring block group but it was far less than the nerve block group (Table 3).

Post procedure pain

In the topical anesthesia group 25 patients had post procedural pain for more than 1 h. In the vibration anesthesia group 37 patients had post procedural pain for more than 1 h. Post procedural pain for more than 1 h was seen in 12 and 9 patients in the nerve block and ring block group, respectively. A statistical test for significance was conducted using a Chi-square analysis. The Chi-square statistic was 47.4411 with $P < 0.00001$. Difference between the post procedural pain in different types of anesthesia was significant. Better patient comfort was observed in the nerve block and ring block sittings (Table 4).

Acceptance for the same type of anesthesia for further sittings

Among the 60 patients, 41 were willing to undergo the procedure under the same anesthesia following the topical anesthesia sitting. Following vibration anesthesia 35 patients were willing to undergo the same type of anesthesia for next sitting whereas 25 people wanted a different type of anesthesia. In the nerve block sitting only 20 patients were willing for the same type of anesthesia in the next sitting and 40 patients wanted a change in the type of anesthesia. After the ring block sitting 51 of the 60 patients were willing to continue with the same type of anesthesia for further sittings.

DISCUSSION

Despite the extensive administration of PRP injections as a modality for treatment of hair loss, there is no approved¹⁻³ protocols for therapy with respect to the technique, frequency, and number of sittings required. Consequently, there is also paucity of protocols in the subject of the type of anesthesia for this procedure. The aspect of patient comfort contributes significantly to the their compliance

Table 3: Problems during the process of anesthesia

Type of anesthesia	Problems during the anesthesia process
Topical anesthesia	Waiting time of 40 min – 23 Cost of the anesthetic medication – 13
Vibration anesthesia	Occasional worsening of the prick site pain due to unintentional direct application of the vibration device on the prick site – 26
Nerve block	Pain of the anesthetic medication injection – 30 Visible bulge in the supra orbital region – 37
Ring block	Pain of the anesthetic medication injection - 12

Table 4: Post procedure pain

Type of anesthesia	Post procedure pain duration
Topical anesthesia	Up to 1 h – 35 patients Up to 2 h – 15 patients More than 2 h – 10 patients
Vibration anesthesia	Up to 1 h – 23 patients Up to 2 h – 32 patients More than 2 h – 5 patients
Nerve block	Up to 1 h – 48 patients Up to 2 h – 5 patients More than 2 h – 7 patients
Ring block	Up to 1 h – 50 patients Up to 2 h – 9 patients More than 2 h – 1 patient

in any kind of medical treatment.⁸ From this viewpoint, this study was undertaken as a pilot to identify a preferable type of anesthesia for PRP injections among the various widely practiced modalities at present.

The mean numerical pain scale value of pain during the actual course of PRP injection was least among the nerve block and the ring block groups and highest in the vibration anesthesia group. Similarly, the post procedural pain was significantly higher extending for a longer duration in the vibration anesthesia group. Despite a good outcome with respect to the parameters of procedural anesthesia and post procedural pain, nerve block was not preferred for the following sitting by majority of the patients. This was due the pain of the anesthetic medication injection and the visible unsightly bulges in the supra orbital region. Maximal acceptance was observed for the Ring block anesthesia. However, one possible bias could have been that in all the groups, ring block anesthesia sitting was administered as the immediate next one to the nerve block anesthesia sitting, which was the least preferred method. This contrasting experience could have been one reason for the increase in acceptance of the ring block anesthesia. Nevertheless, in comparison with other modalities ring block anesthesia had better outcomes with respect to intra procedure pain relief and post procedural pain duration. The next most acceptable method was the topical anesthesia with Prilocaine – Lidocaine cream.

Limitations of the study

Smaller sample size and the aforementioned bias in patient experience are the possible limitations of this study.

CONCLUSION

This is a preliminary study aimed at identifying a standardized preferable method of anesthesia at our for PRP injections to scalp for management of hair loss. We infer that Ring block anesthesia of the scalp is the most preferred method of anesthesia with good patient acceptance. We do understand these are preliminary findings. Continual research with further advancement of techniques is an essential part of improving patient comfort and compliance to PRP injections as quite often this modality of treatment involves multiple sittings with long total duration.

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VSR - Definition of intellectual content, literature survey, prepared first draft of manuscript, implementation of study protocol, data collection, data analysis, manuscript preparation, and submission of article; **SV** - Concept, design, clinical protocol, manuscript preparation, editing, and manuscript revision; **KS** - Design of study, statistical analysis, and interpretation.

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