



Platelet Rich Fibrin (PRF): An Autologous Biomaterial for Turbinectomy Healing Assistance

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Abstract

Introduction: Turbinate reduction is one of the most common surgical procedures performed in ENT. Post-operative hemorrhage is the most feared complication and crusting is a common occurrence in the weeks following the surgery, causing nasal obstruction, risk of nasal sinequias and nasal bleeding when debrided. To cover the turbinectomy site may contribute to decrease nasal crusting and facilitate the healing process. Platelet Rich Fibrin (PRF) is an autologous hemoderivative used in odontology to improve the oral mucosal healing in chronic wounds or dental implants. In this study we report a 52 case series of PRF use for covering turbinectomy site.

Methods: 52 patients submitted to nasal surgery that would include turbinate reduction surgery had their surgical site covered with an autologous PRF membrane manufactured in the operating room.

Results: In all cases was possible to perform the manufacturing of the PRF. There was no inflammation on the site and no case of hemorrhage that required surgical intervention. The crusting formation was low and required little intervention or cleaning in the office in the following weeks. The patients referred a remarkable improvement in visual scale measurement for nasal obstruction following 3 months of surgery.

Conclusion: Platelet Rich Fibrin (PRF) is a viable, autologous and relatively low cost resource for covering the turbinectomy site immediately after turbinate reduction surgery and may contribute to the healing process.

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Introduction

Turbinate reduction surgery is one of the most common surgical procedures in Otolaryngology [1]. Post-operative hemorrhage and nasal crusting might occur during the healing process and are frequent causes of discomfort to the patients. Severe nasal hemorrhage might lead to surgical reinterventions and intense nasal crusting can compromise the surgical outcome by leading to synechias if not properly debrided [2].

The exposition of the surgical site to the environment may play a role in the occurrence of such complications of turbinate reduction surgery. The air flow over the healing mucosa dries the surface of the surgical wound and promotes repeated crusting that occurs until the mucosal healing process is complete, which might take several weeks when a partial turbinectomy is performed.

There are many techniques that have been used to cover the surgical site in order to protect it and help to prevent nasal crusting. One technique is the confection of a mucosal flap from the

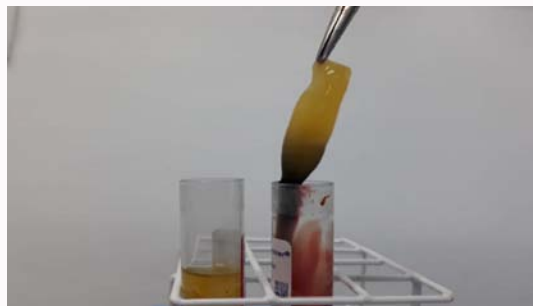


Figure 1: Platelet-Rich Fibrin (PRF) clot after centrifuge.



Figure 2: Platelet-Rich Fibrin (PRF) membrane after dehydration in surgical gauze.

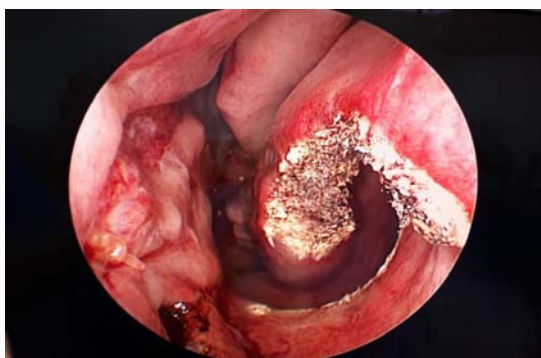


Figure 3: Surgical site immediately after partial anterior turbinectomy.

septal side of the nasal turbinate to cover the inferior turbinate bone and the meatal side of the turbinate mucosa after resection. Some artificial hemostatic materials might be used as hemostatic sponge (Gelfoam™), oxidized cellulose polymer mesh (Surgicel™) or carboxymethylcellulose foam (Sinu Foam™).

Recent developments of hemoderivative products have brought forth a series of different preparations of autologous resources that might have a role in promoting soft tissue healing and regeneration in a broader sense [3]. Among those resources are the Platelet Rich Plasma (PRP) and its variances, largely used in orthopedic and sports medicine to help healing muscular injuries and bone regeneration in orthopedic surgery.

In odontology and buco-maxilofacial surgery another kind of hemoderivative have been successfully used to help implant integration, bone and mucosal healing. The Platelet Rich Fibrin (PRF) is a variant of Platelet Rich Plasma (PRP), characterized by a rich content of fibrin that forms a tight mesh containing platelets and healing factors. PRF has been described by Choukroun in 2001 and can easily be shaped as a membrane or plug, suiting different applications [4,5]. The PRF confection is simpler than PRP's, requiring a single centrifuge process that can be done in the surgical setting (Figure 1).

Several studies have shown that PRF is rich in platelet-derived growth factors and platelets with healing enhancing effect on oral mucosa wound [6,7].

In this article we report a series of cases where PRF was used as a cover tissue to the surgical site of turbinate reduction surgery in order to protect the healing mucosa from the environment and from the nasal air flow (Figure 2).

Case Report

We used the PRF as an autologous graft for covering the turbinate

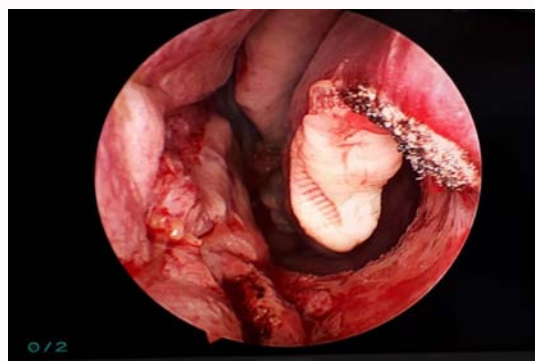


Figure 4: Platelet-Rich Fibrin (PRF) membrane applied at the surgical site.

Table 1: Turbinate reduction surgery (number of patients).

Partial Anterior Turbinectomy	43
Submucous Turbinate Reduction	9
Total	52

Table 2: Gender distribution (number of patients).

Masculine	31
Feminine	21
Total	52

Table 3: Age Distribution (years).

0 to 18 years	3
18 to 35 years	13
35 to 60 years	28
60+ years	8
Total	52

reduction surgery site in fifty-two (52) patients undergoing nasal surgery for chronic nasal obstruction. Forty-three patients (43) were submitted to anterior partial turbinectomy with resection of mucosal and bony aspects of the anterior portion of inferior turbinate's, while nine (9) patients underwent submucosal turbinate reduction with monopolar electrocautery (Table 1 and Figure 3). Sinusectomy was also performed in twenty seven (27) patients of this group, associated with the inferior turbinate reduction surgery. There were thirty one (31) males and twenty one (21) females (Table 2). Three (3) patients were younger than 18 years old, thirteen (13) were between 18 and 35, twenty eight (28) between 35 and 60 and eight (8) had more than 60 (Table 3).

The PRF was manufactured during the surgical act, in the surgical room following the protocol published by Choukroun. Twenty milliliters of blood were collected in dry tubes and processed through centrifugation at 3500 RPM for ten minutes. The fibrin clot formed at the top of the tubes was separated from the red cells at the bottom and dried in sterile surgical gauzes to form a thin membrane in order to fit the application. The PRF membranes were then applied through nasal endoscopy over the site of the turbinate reduction surgery.

After a 3 months follow up after the surgical procedures, no PRF membrane was accidentally eliminated, demonstrating a firm adhesion to the surgical site when assessed at the office 10 days after the surgery. No case of rejection, local inflammation or infection was registered. In the 3 month period of follow up only two debriding sessions at the office were performed and no case of nasal synechia

occurred. In these 52 cases of turbinate reduction surgeries no case of post-operative hemorrhage demanding surgical intervention was recorded (Figure 4).

Discussion

PRF (Platelet Rich Fibrin) is an autologous hemoderivative with reports properties to improve soft tissue healing and bone regeneration. It has been used in odontology for nearly fifteen years and has been consolidated as a practical resource to enhance healing of exposed surgical sites [8]. Recently it has been used also in rhinology to help the closure of spontaneous cerebrospinal fluid leaks and skull base defects following endonasal neurosurgery [9].

In this article we report a series of cases in which the PRF was used to protect the inferior turbinate reduction surgery site. We have achieved a good result in terms of feasibility, tolerance and adhesion of the graft. The rate of complications as post-operative hemorrhage, nasal synechias and nasal crusting was also very low. The PRF membrane might be a useful tool for nasal surgery post-operative care and should be further studied in future articles.

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