SCHOLASTIC:
Journal of Natural and Medical Education
Volume 3, Issue 2, Year 2024
https://univerpubl.com/index.php/scholastic

Article

Frequency of the Zygomatic-Orbital Fractures and Method of Using Fibrin Membrane

Shukhrat Boymuradov[1], Komiljon Iminov[2]

1 [1]DSc, Professor, Tashkent Medical Academy,
2 PhD student, Tashkent Medical Academy
* Correspondence: shuh69@mail.ru, koimnov215@gmai.com

Abstract:

In several medical fields, there are too many regeneration materials which prepared from blood one of them is platelet-rich fibrin (PRF)—have been extensively employed due to their significant ability to promote tissue regeneration. Platelets from whole blood were intended to be concentrated using PRP, which was initially proposed a specific restorative technique.

Keywords: Platelet-rich fibrin (PRF), Zygomatic-orbital complex, fractures, growth factors, tube, clot, recovery, immune system.

Citation: Boymuradov S. Iminov K. Frequency of the Zygomatic-Orbital Fractures and Method of Using Fibrin Membrane. Scholastic: Journal of Natural and Medical Education 2024, 3, 1-6..

Received: 7th Jan 2023
Revised: 9th Jan 2023
Accepted: 18th Jan 2023
Published: 20th Feb 2024

Copyright: © 2024 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

Vascular endothelial growth factor (VEGF), transforming growth factor beta (TGF-β), Platelet-derived growth factor (PDGF) and are just a few of the naturally produced autologous growth factors found in PRP. This group of growth factors is in charge of encouraging the angiogenesis (the development of new blood vessels) as well as the migration and proliferation of different cell types [1]. However, utilizing a centrifuge to sort out blood-derived growth factors and cells. after peripheral blood collection is straightforward and inexpensive, and it has long been recognized as an efficient and convenient way to extract natural growth influencing variables tissue regeneration. In order to remove anticoagulant, PRF was subsequently created as a second-generation platelet concentrate [2]. Because leukocytes are wanted to be included, this concentration is sometimes. Identified as leukocytes and platelet-rich fibrin (L-PRF). This is because a 700g for 12 min procedure is typically used [3-4]. The removal of anticoagulants causes blood in the blood collection tube to clot over time. As a result, centrifugation must be started as soon as possible by the treating physician in order to separate the blood layers. One significant benefit is fibrin plates generated in platelet rich fibrin, In contrast to PRP, this encourages the gradual and constant release of growth factors throughout time. [8]. Additionally, a liquid-PRF (injectable-PRF, or i-PRF) with a higher concentration of platelets and leukocytes was created by lowering centrifugation speeds and times [5]. It was recently revealed that, when compared to the outcomes of standard fixed-angle centrifuges used to create

solid-PRF, the horizontal centrifugation of PRF was superior in accumulating platelets and leukocytes. Platelet/leukocyte counts and/or concentrations were improved by up to 3.

2. Materials and Methods

Before collecting blood samples, 29 patients supplied prior permission. All methods involving human subjects in this study adhered to the ethical standards set by the organizational as well as national scientific committees. All blood samples were taken at the Tashkent Medical Academy and used in compliance with Medical Ethics Standards and Guidelines. Factors influencing Genetics, acquired factors (e.g., platelet activation, hyperhomocysteinemia, abnormal thrombin and factor XIII levels in plasma, blood flow, oxidative stress, hyperglycemia, medications, and cigarette smoking), and environmental factors (e.g., temperature, reducing agents, chloride and calcium ion concentrations) all contribute to fibrin clot formation and structure. All patients confirmed that they did not have any of the aforementioned conditions. Prior to the studies, the CBCs were analyzed to confirm conventional cell count ranges. The PRF was produced using an Dilab centrifuge. Each of the 29 participants supplied 29 vials of blood in normal 10 mL glass collection tubes (vacutainers) [7]. We lead to common blood test till preparing PRF membranes. Unique side of this method is we complete all steps PRF preparation. Moreover, those steps we do in operation theatre simultaneously with performing reconstruction zygomatic orbital complex. During this performance surgeon use titanium plates for reconstruction the floor of orbital after "blow-out" fractures [8-12]. Titanium plate covered with fibrin membranes and cytokines produce from PRF then they useful for recovery bone structures of ZOC and regeneration soft tissue.

3. Results and Discussion

As in the preceding group, all (n = 29) patients with varied SOC fractures who were treated with autologous fibrin membranes supplemented with platelets were classified strictly using the Manson 1990 classification.

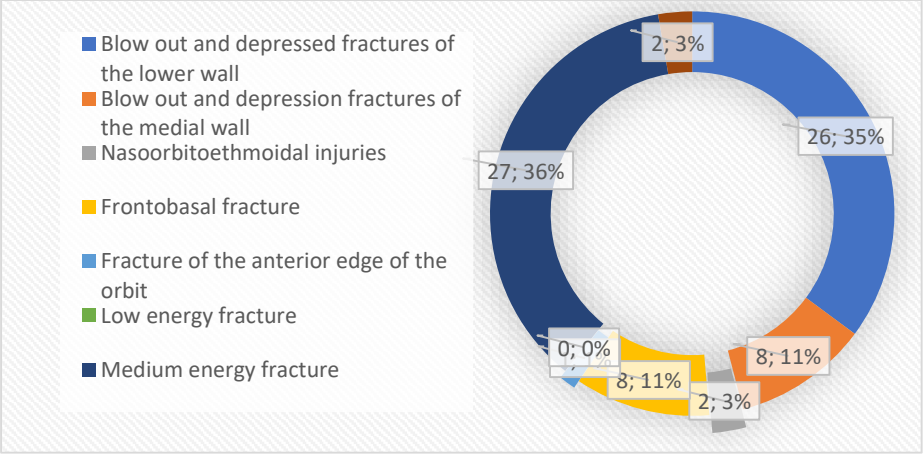

Figure 1. Distribution of patients with ZOC fractures. Treatment of ZOC with the use of autologous fibrin membrane enriched with platelets according to the Manson classification.

This figure shows number of patients with “blow out” and depressed fractures of the lower wall of the orbit in 26 cases (58%), fractures of the anterior edge of the orbit in 1 case (2%), “blow out” and depressed fractures of the medial wall of the orbit -8 (18%), and nasoorbitoethmoidal fractures in 2 patients (4%) in this group. One (3.4%) instance had high-energy fractures, whereas the other 28 (96.6%) had medium-energy fractures. It is significant to highlight that, due to the intricacy of the midface's anatomical features, fractures of the zygomatic-orbital complex occurred in combination.

Maxillofacial surgeons, ophthalmologists, and, if necessary, neurosurgeons examined the patients' conditions prior to surgery. In the second group (n = 29), all reconstructive procedures on the zygomatic-orbital complex were carried out making use of PRF membranes.

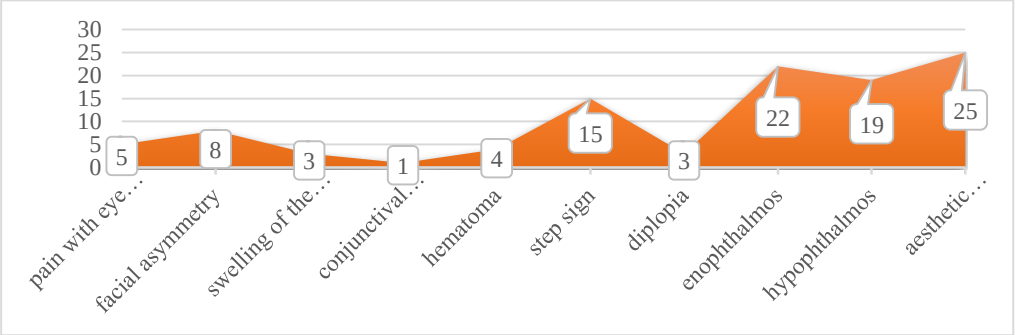

Figure 2. complaints of patients before surgery on the zygomatic-orbital complex.

The diagram shows that in the main group of the study, patients before the surgical period complained more than 25 about the aesthetic defect of the zygomatic-orbital complex, 22 complaints were related to enophthalmos, hypophthalmos was identified in 19 patients, the step symptom was identified in 15 patients, it is important to note that all complaints have a combined character. One of the features of our work, in addition to the general standard laboratory tests that the patient underwent in the emergency room, before each preparation of PRF membranes, we conducted a thorough general blood test with a detailed formula of 31 indicators on a hematological analyzer manufactured in 2022 by DF 50 DYMIND, which complies with the European standard in operating rooms. After an examination, the maxillofacial surgeon at the Tashkent Medical Academy's plastic surgery department orders laboratory and instrumental studies for patients, such as computed tomography with a 3D model of the skull (to determine the nature of the fracture, the volume of surgical manipulations which performed, and the size of the lower wall of the orbit). Laboratory tests include a general blood test (to determine the number of platelets, as it is difficult to obtain a high-quality fibrin membrane from a small number of platelets) and a coagulogram (particularly to determine the amount of fibrinogen, INR, and APTT), as well as standard studies such as blood biochemistry and blood tests for infection. An anesthesiologist is examined after obtaining anthropometric indicators by analyzing photographs of patients and MSCT data to determine the level of enophthalmos of the affected eye socket (enophthalmos is an ophthalmological pathology in which the eyeball sinks excessively into the socket in which the orbit is present). All SVC restoration procedures involve general anesthesia and tracheal intubation. The temperature in the operating

room is regulated to 21-220C once the patient is intubated (since ambient temperature is the most important component for separating fibrin membranes). The surgical field is processed, the surgical incision is made with a disposable surgery scalpel, exposing the fracture lines of the zygomatic bone along the zygomaticofrontal suture and the lower orbital edge through the skin incision, retreating 5 mm from the edge of the lower eyelash line, then coagulation of the vessels is performed, fixation of the upper edge of the surgical wound with a ligature, and this causes the muscle layer of the extraocular muscles to After reaching the bone structure of the eye socket, the eyeball is gently elevated using a short medical equipment to maximize visibility. Before administering anesthesia, venous blood is drawn from the ulnar region. After placing the tubes without anticoagulants at an angle of 450, immediately start the centrifugation stage with a volume of 9-10 ml. The centrifugation step lasts 8 minutes and takes place at 1300 rpm. After centrifugation, the test tube is placed on a stand, and the room temperature should be 21-22C0 to allow the fibrin plate to come into contact with oxygen in the air. The upper part of the resultant material, which is seldom plasma, must be removed using a syringe. Contact with oxygen must last at least 6 minutes. Using medical devices (tweezers), the fibrin membrane (PRF) with the red blood cell mass is gently pulled from the test tube, and the PRF is precisely separated from the red blood cell mass. Following separation, a liquid component may be visible in the fibrin membrane, which includes a considerable number of leukocytes. To achieve a pure fibrin membrane, PRF is compressed with a metal plate for 10-15 minutes.

4. Conclusion

Analysis the results of traditional methods treatment of injuries the zygomatic orbital complex shown a high level of postoperative complications (20%) such as paraorbital edema, a feeling of discomfort when moving the eyeball, and severe symptoms of inflammation, caused by insufficient administration of anti-inflammatory drugs in the postoperative period and features of the course diseases due to the development of dysfunction in the zygoma. The use of PRF membranes with titanium polymer compounds in ZOC repair has resulted in improved postoperative outcomes**.**

According to the literature research, no method for preparing a PRF membrane intraoperatively in reconstructive procedures on the zygomatic-orbital complex has been created.

The widespread use of PRF membrane intraoperatively in reconstructive procedures on the zygomatic-orbital complex reduces the percentage of postoperative complications and the proportion of radical operations on the ZOC, resulting in a 1.5-fold reduction in inpatient patient days in hospital.

References

1. Delaini F, Poggi A, Donati MB. Enhanced afnity for arachidonic acid in platelet-rich plasma from rats with Adriamycin-induced nephrotic syndrome. Thromb Haemost. 1982;48(3):260–2.
2. Miron RJ, Zucchelli G, Pikos MA, Salama M, Lee S, Guillemette V, Fujioka, Kobayashi M, Bishara M, Zhang Y, Wang H-L, Coi J. Use of platelet-rich fbrin in regenerative dentistry: a systematic review. Clin Oral Invest. 2017;21(6):1913–27.
3. Miron RJ, Choukroun J, Ghanaati S. Necessity for standardization of rela- tive centrifugal force values in studies on platelet rich fbrin; response to letter to the editor. J Periodontol. 2018;90:122–5.

4. Ehrenfest DMD, Rasmusson L, Albrektsson TJ. Tib: classifcation of platelet concentrates: from pure platelet-rich plasma (P-PRP) to leucocyte-and platelet-rich fbrin (L-PRF). Trends Biotechnol. 2009;27(3):158–67.
5. Kobayashi E, Fluckiger L, Fujioka-Kobayashi M, Sawada K, Sculean A, Schaller B, Miron RJ. Comparative release of growth factors from PRP, PRF, and advanced-PRF. Clin Oral Invest. 2016;20(9):2353–60.
6. Miron RJ, Fujioka-Kobayashi M, Hernandez M, Kandalam U, Zhang Y, Gha- naati S, Choukroun J. Injectable platelet rich fbrin (i-PRF): opportunities in regenerative dentistry? Clin Oral Invest. 2017;21:2619–27.
7. Miron RJ, Chai J, Zheng S, Feng M, Sculean A, Zhang Y. A novel method for evaluating and quantifying cell types in platelet rich fbrin and an introduction to horizontal centrifugation. J Biomed Mater Res, Part A. 2019;107(10):2257–71.
8. Nunes CR, Roedersheimer M, Simske S, Luttges M. Efect of microgravity, temperature, and concentration on fbrin and collagen assembly. Micro- gravity Sci Technol. 1995;8(2):125–30.
9. Ghanaati S, Booms P, Orlowska A, Kubesch A, Lorenz J, Rutkowski J, Landes C, Sader R, Kirkpatrick C, Choukroun J. Advanced platelet-rich fbrin: a new concept for cell-based tissue engineering by means of infammatory cells. J Oral Implantol. 2014;40(6):679–89.
10. Takahashi A, Tsujino T, Yamaguchi S, Isobe K, Watanabe T, Kitamura Y, Okuda K, Nakata K, Kawase T: Distribution of platelets, transform- ing growth factor-beta1, platelet-derived growth factor-BB, vascular endothelial growth factor and matrix metalloprotease-9 in advanced platelet-rich fbrin and concentrated growth factor matrices. J Investig Clin Dent 2019:e12458.
11. Miron RJ, Dham A, Dham U, Zhang Y, Pikos MA, Sculean A. The efect of age, gender, and time between blood draw and start of centrifugation on the size outcomes of platelet-rich fbrin (PRF) membranes. Clin Oral Invest. 2018;23:2179–85.
12. Varela HA, Souza JCM, Nascimento RM, Araujo RF Jr, Vasconcelos RC, Cavalcante RS, Guedes PM, Araujo AA. Injectable platelet rich fbrin: cell content, morphological, and protein characterization. Clin Oral Invest. 2019;23(3):1309–18