

ORIGINAL ARTICLES

Using Platelet-Rich Plasma to Promote Healing and Prevent Seroma Formation in Abdominoplasty Procedures

Robert F. Jackson, MD, FACS

Introduction: To evaluate the efficacy of platelet-rich plasma in promoting wound healing and preventing seroma formation, a 30-patient study was conducted between January 2001 and May 2003. The intent of the study was to evaluate the use of platelet-rich concentrate on patients undergoing either full abdominoplasty (4 patients) or crescent tuck abdominoplasty (miniabdominoplasty) surgery. This series of patients was contrasted with a 100-patient study with similar surgery accomplished between 1990 and 2000 and previously reported at the 17th International Congress of the French Society of Aesthetic Surgery and the 5th International Congress of the Society of Lipo-Plasty. In addition, during the 30-patient study, there were 6 patients studied who did not receive platelet-rich concentrate. Those 6 patients were also compared with the 30-patient platelet-concentrate group.

Materials and Methods: The platelet concentrate was prepared from 54 mL of blood drawn from the patient at the time of surgery. The anticoagulated volume of 60 mL was processed using a uniquely designed centrifuge system manufactured by Harvest Technologies (Plymouth, Mass). The separation process yielded 10 mL of platelet-rich plasma (PRP). This volume was combined with 1 mL of calcium thrombin in a spray that was applied to the surgical site. The calcium thrombin was used to activate the platelets and fibrinogen to form fibrin chains in order to achieve an immediate hemostatic seal on the tissue beds. The calcium thrombin was prepared by adding 5 mL of 10% calcium chloride to 5000 units of bovine thrombin. Only 1 mL of this mixture was used in the procedure. Prior to the application of the platelet concentrate/calcium thrombin to the tissue beds, absolute hemostasis is accomplished and both beds are blotted as dry as possible. Both the top and bottom layer are sprayed with approximately 4.5 mL of platelet concentrate/calcium thrombin. The tissue layers were approximated and the skin surface rolled to express any fluid from the location of the sutures. Sutures were then placed and the remaining PRP/calcium thrombin mixture was sprayed along the suture line. The formal abdominoplasty was done without liposuction in the upper or epigastric area of the

abdomen. The crescent tuck abdominoplasty used was the same as the previous 100-patient series.

Results: No seromas were found in the 30 patients studied as compared with a 7% seroma rate in the previous 100-patient series and 2 out of 6 of the patients who had abdominoplasty during the same time as the 30-patient group developed seromas. Anecdotally, the wounds seemed to heal much more rapidly with more esthetically pleasing incisions.

Discussion: The addition of platelet-rich plasma is now easily applied at the surgical site with a very easily usable technology that does not require expensive or complicated equipment. The application of platelet-rich plasma as a natural fibrin matrix delivers growth factors to the wound and seems to promote more rapid healing.

The application of platelet-rich plasma to promote wound healing and decrease seroma formation is appealing and has a good theoretical as well as scientific basis. The formation of seromas is one of the most common surgical dilemmas anytime a flap is raised. During the past 10 years, a multiplicity of techniques have been proposed to reduce the incidence of seroma formation.¹⁻⁶ A more recent approach to this problem has been the use of fibrin sealant. In both animal and clinical studies, this allogenic material has been shown to reduce drain output and reduce the incidence of postoperative seroma.⁷⁻¹⁵ However, some clinicians have been reluctant to use this material because it has been demonstrated to be a mechanical barrier to the early cell-mediated events involved in the wound repair process due to the markedly elevated fibrinogen levels.¹²

This study was undertaken in an effort to evaluate the effect of PRP on wound healing and seroma reduction accomplished through the release of multiple growth factors. A comparison was made with 30 patients who received platelet gel during full or partial abdominoplasty and 6 who underwent the procedure with the standard protocol without PRP during the same time period and 100 patients previously reported.

There have been several techniques presented in the literature that are intended to manage this problem.