Tom Browne. M .D.
Department of Vascular Surgery
Perth, Australia

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PLATELET GEL AS AN INTRAOPERATIVELY PROCURED PLATELET-BASED ALTERNATIVE TO FIBRIN GLUE

Sir:

We enjoyed reading the article by Kulher et al. about the use of fibrin sealant in the prevention of seromas in a rat model *(Plast. Reconst). Surg.* 99: 842. 199 7). We agree that the best managemeni of seromas is prevention. We would like to briefly describe the use of platelet gel as a wound sealant' and dural waterproofing agent that has been used successfully in numerous specialties at our institution for the past 18 months. Platelet gel is a platelet-based wound sealant that uses the concentrated platelets harvested by three-component centrifugal separation of autologous whole blood (Medtronic Sequestra 1000 autotransfusion system, Parker, Colo.) to create a platelet concentrate intraoperatively. One unit of whole blond. approximatelc 450 nil is drawn, either in the bolding area or tile operating room. into a standard labeled blood collection bag containing , citrate-phosphate-dextrose anticoagulant. The blood is centrifuged in the operating mom by using a dual-speed all auto tri to separate the huffy coat suspended in 30 nil of plasma from the reel blood cell pack and platelet-poor plasma fraction. This is the platelet concentrate used for the platelet gel. Depending tin initial platelet counts, it is common to achieve platelet counts of 3110,1)00 to I Million per from this three-(component separation technique. Thc bard spin /soft spin technique used is similar to the method that the blood bank uses, to separate platelets front whole blond.

The critical differences in composition between platelet 1e-| and fibrin glue are the presence of a high concentration of platelets and a naive concentration of fibrinogen in platelet gel. We behove that platelet gel oilers significant advantages mere previouly described fibrinogen-based wound sealnits. The inclusion of a buffy coat of platelet- and leukocyte-enriched plasma appears to have several beneficial effects.

With platelet counts of 500.000 to I million per nil, the various cytokines and mediators found in the platelet's alpha and dense- granules can promote angiogenesis and collagen -sythesis, thereby enhancing soft-tissue wound healing. Clever mediators include platelet-derived growth factor (PDGF) platelet-derived epidermal growth factor (PDEGF), fibroblast growth factor (FGF), transforming growth factor-beta (TGF-bi, and platelet-derived angiogenesis factor (PDAF).2-4" Platelet-derived growth factor and transforming growth factor-beta have been found to increase the collagen content and earls rate of gain of strength in wounds." Platelet-derived growth factor is known to be chemotactic for monocytes, macrophages, and fibroblasts: it is also an activator of collagenase within the later stages of wound healing. allowing lot remodeling of collagen to promote wound strength. transforming growth factor-beta is known to activate fibroblasts to form procollagen that results in collagen deposition within the wound. In human and animal trials. these mediators have been found in accelerate epidermal regeneration and angiogenesis and to enhance collagen synthesis in various models.`"' In addition to the growth factors elaborated by activated platelets. there is the local release of thrombin. thromboxane A.:. and adenosine dipbosphate from the platelet granules. These function in attracting additional platelets to the developing clot, thus enhancing the hemostatic response. Although currently speculative the high concentration of leukocytes in the buffs coat should add an antimicrobiai effect to platelet gel as well as elaborate additional regulatory factors that enhance the wound healing process. Finally, the native concentration of fibrinogen in platelet gel increases its working time. and once activated by calcified thrombin it imparts a gelatinous adhesive consistency to the gel. allowing for ease of injection into the surgical site.

The advantages of platelet gel over previously described biologic sealants include safes and convenience for the patient as well as improved support for tissue healing. Because the processing time required for separation of the autologous blood into the components by this technique is less than 30 minutes, the option exists for the anesthesiologist to return the remaining erythrocvtes and platelet-poor fractions to the patient before the induction of anesthesia. If an autologous alternative to fibrin glue is desired. the collection of blood in the immediate preoperative period avoids a time-consuming visit to the blood bank for the patient. Furthermore, use of autologous platelet gel eliminates the risk of clerical errors when the blood is predonated and mowed to a site distant from the patient. More patinets are eligible for this procedure which is performed in the perioperative period, because the strict criteria for blood bank donation do not have to be met. Given the monitored setting of the operating room and the presence of an anesthesiologist. we are now able to offer the option of autologous platelet gel to many patients who would not normally he candidates for blood bank predonation. This would include children as young as age 6 or weighing 25 kg or more. the elderly patients, patients with anemia, and those with medical conditions that would preclude the blood bank from withdrawing a unit of whole blood. The presence of platelets and leukocytes in the formulation adds hemostatic and antimicrobial support and brings cytokines and growth factors to the site of surgery in a manner that would not he found in fibrin glue. Thus, platelet gel offers an immediate) available surgical tool to provide wound hemostatis, lymphatic sealing, and a watertight dural closure, but perhaps more importantly. it further benefits the patient by offering a reconstructive growth factor matrix to promote wound healing. Formal studies are underway to proy(' scientifically the success we are experiencing clinically.

David Al. Green, A1.D.
Briar; Klinl:M.D.
60 MG/SGOSA
Anesthesia Service
David Grant Medical Center
10 1 Bo dn Circle
7 ravi.s A113. Calif. 94535-1800

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FAILURE OF SILICONE GEL BREAST IMPLANTS: ANALYSIS OF LITERATURE DATA FOR 1652 EXPLANTED PROSTHESES

Sir:

In recent correspondence, Goldberg et al.' aggregated silicone breast implant rupture data from a select number of clinical studies and produced what they called a failure rate master curye. Based on their analysis and resultant graph, they concluded that breast implants fail at an "extraordinary rate," on the order of 50 percent at 8 years. Unfortunately, in addition to being selective in their use of the literature, they ignored the selection bias inherent to those papers they did reference. As a result, their findings are meaningless.

Others. including some referenced by Goldberg et al., have acknowledged the problem of selection. For example, commenting on most explanation studies, including three'= ' used by Goldberg et al., Peters and associates" recently "emphasized that the majority of women in all of these explantation studies had requested surgery because they were having problems related to their implants. It is possible, therefore, that the implant failure properties of these patients may be higher than that of 'control' or 'asvmptomatic' patients who are not having problems related to their implants." Peters et al. also discussed some other limitations of the explant literature: confounding by implant generation, lack of suitable controls, and the paucity of denominator data.

Goldberg et al. appeared to be particularly influenced by the work of Robinson and colleagues,' calling it "the most extensive" and using multiple data points from that report in their master curve. However, the Robinson et al. work actually demonstrates how clinical research can go astray if fundamental concepts of data collection and analysis are ign„t and how important clinical decisions (i.e.. explantation) n,.,. be inappropriateh' influenced by such work. By way 01 e._ planauon. Robinson et al. started with 495 women, only 3!+4 of whom were Robinson's original patients (the remainder were implanted by other surgeons). Among the 495. onl 300 elected implant removal, and among these. 214 (71.3 percent of the 300) had "disrupted - implants. However, in sworn testimony ,l Robinson claims to have implanted not 300 p a. dents but more than 4000' Using 4000 as the denomin'u n, the "disruption" rate approximates 5 percent. The rate ' – fall lower still if all the women implanted by the otli geons were added. Limiting the calculations to those w,tt, ruptured implants or to the smaller number of those with clinically significant ruptured implants, as opposed to Rol)-inson's "disrupted" implants. would drive the rate even lower, quite possibly lower than the rates reported by Handel et al. - or Gabriel and colleagues. ' With due consideration for the potential morbidity associated with any surgery. a single-digit rupture rate does not warrant a policy of wholesale explan. tation, certainly not one encompassing all implanted women as Robinson recommends.

In summary, the failure rate master curve is a maite: failure. Goldberg et al. have taken data, some of which are valid albeit not for calculating true rupture rates, and deyeloped a flawed analysis. Consequently, thev have made interpretations that are also flawed and that appear to support policies that could have significant negatiye public health implications.

Ralph R *Cook, M.D., AI.P.H.*
RRC Consulting, SSC
Midland, *Mich. 48640*

Susan f. Hoshau', Ph.D.
Laura L. Perkins, *Ph.D.*
Dmn Corning Corporation
Midland. ,Mirh. 48686-0994

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