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Abstract

A comparative quantification in cellularity of bone marrow aspirated with two new harvesting devices, and the nonequivalent difference between a centrifugated bone marrow concentrate and a bone marrow aspirate as biological injectates, using a bi-lateral patient model.

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Abstract:
The first aim of this study was to examine the cellularity and quality of autologous bone marrow aspirates harvested with two novel FDA-cleared devices, the Aspire™ bone marrow aspiration system (AS-BMAS) and the Marrow Cellution bone marrow aspiration device (MC-BMAD). Compared to traditional bone marrow harvesting needle systems, both these devices have a closed distal tip, avoiding preferential marrow collection (peripheral blood aspiration), and the side holes facilitate more horizontal marrow extraction. The second aim was to demonstrate the effectiveness of mechanical centrifugation of a large volume of extracted bone marrow to produce a bone marrow concentrate (BMC). Finally, we directly compared bone marrow constituents aspirated with MC-BMAD with a BMC, generated by centrifugation of bone marrow harvested using the AS-BMAS. A bi-lateral patient model was used for all comparisons. All cellular analyses included the measurement of Colony-Forming Units-fibroblasts (CFU/f) levels, CD34+cells/ml, Total Nucleated Cells (TNCs)/ml, platelets/ml, and Red Blood Cells (RBCs)/ml. 12 patients consented to the study. In the direct BMA comparison, the AS-BMAS bone marrow yielded significantly higher CFU/f counts and TNC concentrations than the MC-BMAD (1,060/ml, 33.5 x 106/ml, and 610/ml and 28.6 x 106/ml, respectively), with comparable platelet and RBC concentrations. Data following BMA concentration to produce a BMC revealed highly significant cell yields, fewer RBCs, and lower hematocrit (HCT). A direct cellular comparison between the aspirate of the MC-BMAD and centrifugated BMC following marrow extraction showed highly significant differences in cellularity for all tested variables. We believe that concentrating bone marrow is a consistent and safe method to produce a BMC that has the potential to be clinically effective. Furthermore, data indicate a nonequivalent difference in BMC cellularity, when compared to a non-filtered and non-centrifugated BMA for clinical use.

Biography:
Dr. Everts completed his PhD from the University of Utrecht in the Netherlands, School of Medicine. He is the director of

Gulf Coast Biologics, a state-of-the-art Educational and Training Center in Regenerative Medicine, Fort Myers, FL. His responsibilities include clinical trials, educational (cadaver training) program development He has published over 50 papers or book chapters in the field of autologous biologics, like PRP, bone marrow and adipose mesenchymal/progenitor cells.

Publication of speakers:

- Peter A. Everts et al ; Bone Marrow Aspirate Concentrate Is Equivalent to Platelet-Rich Plasma for the Treatment of Knee Osteoarthritis at 1 Year: A Prospective, Randomized Trial, 2020 Feb 18
- Peter A. Everts et al ; Platelet-Rich Plasma and Platelet Gel: A Review, 2006 Jun 2
- Peter A. Everts et al ; Assessing clinical implications and perspectives of the pathophysiological effects of erythrocytes and plasma free hemoglobin in autologous biologics for use in musculoskeletal regenerative medicine therapies. A review, 2019 May 10
- Peter A. Everts et al ; Neisseria lactamica Arthritis and Septicemia Complicating Myeloma, 2010 Apr 21
- Peter A. Everts et al ; Endogenous Retinoic Acid Required to Maintain the Epidermis Following Ultraviolet Light Exposure in SKH-1 Hairless Mice, 2015 Jul 9

6th International Conference on Stem Cell Research, Cell and Gene Therapy; July 20-21, 2020; Paris, France.

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