Early Experience and Results of Bone Graft Enriched with Autologous Platelet Gel for Recalcitrant Nonunion of Lower Extremity

Reference:

Scientific Literature Review

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PODIATRIC RELEVANCE:
The use of autologous platelet gel (APG) has been studied for treatment of fractures and “hard to fuse” individuals with good results. It has been shown that APG helps increase the fusion process. However, little has been done to explore its use with non-unions. This study sets out to investigate the healing potential when APG is combined with bone graft.

METHODS:
In this article, a prospective study was performed investigating the use of autologous bone graft complex enriched with APG on non union in long bones. Inclusion criteria for the study included atrophic non unions, bone defect <2.5cm, prior procedures for fracture/non-union involving prior auto grafting, and at least 6 month interval between last procedure. There were four femoral fractures and eight tibial non unions. Each patient underwent the procedures indicated for their specific problems, including removal of hardware, debridement, soft tissue reconstruction and harvesting the necessary amount of autograft. The preparation of the bone graft and APG complex consisted of drawing blood from the patient and centrifuged down to platelets using the Smartprep platelelet concentration system. The platelet poor plasma and activator were mixed to form APG which was then sprayed onto bone graft. This complex was then sprayed onto the ends of the boney defect and then bone graft/APG complex was then cut to fit the defect. Of note, each patient was placed into an external fixation device post-operatively.

RESULTS:
Post-operatively, patient’s bone mineral density (BMD) was tested from the operative extremity and contralateral extremity at 3 days and then 1,2,3,6 and 12 months. Radiographs were also obtained monthly. At 32.4 months, 11 of the 12 patients achieved radiographic evidence of solid union. The twelfth patient required a second operation secondary to developing an infection. After the second attempt, fusion was noted at 21 weeks. BMD at non-union levels increased gradually over the 12 months and was consistently higher than contralateral leg. There was a significant increase in physical function, social function and pain after treatment.

COMMENTS:
This study evaluates the effectiveness of using APG in combination with bone graft for healing of non-unions. The addition of the APG was shown to aid in solid union and return to function in patients. Although this is a small study, it provides clinical evidence that APG is beneficial to bone healing. A larger study would be necessary to further investigate the enhanced healing potential.