Introduction

Autologous Bone Grafting (ABG) is commonly used to enhance bone healing in acute fractures, nonunions, and in arthrodesis surgery.

Due to the potential for increased pain and morbidity, and the increased surgical time alternatives to ABG have been developed.

Role of Growth factors in bone healing and growth

Growth Factors
Proteins that control or influence cell growth and division

Mechanism:
Bind to cell surface membrane receptors
Activate intracellular mechanisms
Lead to cell division

Growth Factors may be angiogenic, mitogenic, and chemotactic
Many different growth factors are involved in Bone healing cascade

Platelet Rich Plasma (PRP)
Derived from autologous blood
Volume of plasma with platelet concentration > 5X normal levels

Growth Factors in PRP
1. Platelet Derived Growth Factor (PDGF)
   Ability to initiate differentiation of osteoprogenitor cells towards becoming osteoblasts
2. Insulin-like growth factor-I (IGF-I)
   Stimulates osteoblastic cell differentiation and proliferation
3. TGF-β
   Stimulate differentiation of mesenchymal cells into cells with chondrocyte phenotype

Clinical Applications of PRP

1. Nonunions
2. Fusions

PRP obtained intraoperatively from quantity of patients own blood that is then spun down to obtain platelet concentrate

Concentrate then may be used either alone or with autograft or allograft

To date there is limited published data about the efficacy of PRP in foot and ankle surgery
Studies

Bibbo et al
62 pts undergoing 123 procedures with PRP with or without autograft
all high risk for nonunion
94% union rate at 41 days

Barrow & Pomeroy
20 total ankle replacements with syndesmotic fusions all treated with PRP
100% union rate

Coetzee et al
66 distal tibial syndesmosis fusions for TAR
all given PRP
97% union rate at 6 months

Collman et al
PRP did not improve Fusion rates for arthroscopic ankle fusions

Grier and Walling
Allograft with PRP equivalent to autograft for lateral column lengthenings

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