The Effect of Osteogenic Progenitor Cell Concentration on Foot and Ankle Fusion Rates

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Disclosure

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Our disclosures are in the Final AOFAS Program Book.
I have no potential conflicts with this presentation.
Background

• For years, foot and ankle surgeons have utilized biologics in many forms:
  – Demineralized Bone Matrix (DBM)
  – Cortico-cancellous Chips
  – Bone Marrow Aspirate (BMA)
  – Platelet-Rich Plasma (PRP)
  – rh-BMP-2
Bone Marrow Aspirate

- Harvested from multiple sites:
  - Anterior Inferior Iliac Crest (IC)
  - Medial Distal Tibia (T)
  - Lateral Calcaneus (C)

- Our investigations have concluded:
  - Concentration of Potent Cells Varies Amongst Sites
    - IC > T & IC > C (p<0.0001)
    - But No S.S. difference between T & C (p=0.9)\(^1\)
One Step Further

• Question: We know the concentration of potent cells at each site, but does it effect fusion rates in foot and ankle surgery?

Hypothesis

• Use of osteoprogenitor cells will positively affect the radiographic fusion rate
• Inherent low nonunion rate compared to historic controls
Methodology

• Retrospective chart review
• 33 patients included
  – Excluded revision surgeries
• Demographic data collected
• Procedure type
• Avg. # of Colony-Forming Units (CFUs) per Pt (IC + T + C)
• Single author reviewed X-Rays for trabecular bridging
Study Population

• 20 F; 13 M
• Avg. Age: 51 years old (23-84)
• 3 DM+, 8 Tobacco+
Nuts and Bolts

• 32 Unions (97%) @ 13+/- 6 wks (R: 8-30)
• 1 Nonunion (3%) (Non-DM, Non-Tobacco)

Average # CFUs

Patient

Unions

8.6+/-6.5 CFUs (0-25)

Nonunion

0.17 CFUs

P< 0.05
Clinical Relevance

- BMA has a high concentration of osteogenic progenitor cells
- Multiple authors have documented benefits of its use in foot and ankle reconstructions
- Hyer et al has reported no significant difference in potent cells from Distal Tibia and Calcaneus and a low harvesting complication rate\(^1\)
- Our research gives more “fuel to the fire” to support use of BMA in complicated cases
References

1. Hyer CF, Philbin TM, Berlet GC, Lee TH. Assessment of Ostegenic Progenitor Cells in Bone Marrow Aspirate Obtained from Different Anatomic Locations. Pending Publication in the *J Bone Joint Surg*


