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Inspired Care. Inspiring Science.

Efficacy of Autografts: Do Harvest Sites Matter?

Bone Grafting Symposium, Orthopaedic Trauma Association Basic Science Focus Forum 2013

TYPES OF AUTOGRAFT

- Autogenous Cancellous Bone
  - Iliac Crest (anterior or posterior)
  - Others (distal femur, proximal tibia, distal tibia, proximal humerus, distal radius)
- Autogenous Cortical Bone
- Autogenous Bone Marrow
- Intramedullary Reamings (RIA)
- Vascularized Grafts (fibula, iliac crest, rib)

CRITERIA FOR EVALUATING A BONE GRAFT

- **Critical Components of Fracture Healing**
  - Osteoconduction
  - Osteoinduction
  - Osteogenesis
  - Vascularity
- **Volume of graft obtainable**
- **Structural support**
- **Clinical Results**
- **Morbidity/Complications** associated with Harvest
- **Cost**

'THE GOLD STANDARD': AUTOGENOUS ILIAC CREST BONE GRAFT (AICBG)

- Contains all three of the critical components of fracture healing (osteoconduction, osteoinduction, and osteogenesis)
- Emerging evidence suggesting it also contains factors and cells that stimulate angiogenesis/vascularity (EPCs, VEGF, HIF1α)[1,2]
- In terms of volume of graft, the crest is superior to other conventional sites of harvest

'THE NEW STANDARD': REAMER-IRRIGATOR ASPIRATOR ® (RIA)

- A novel system for harvesting intramedullary reamings from the canal of the femur or tibia
- Emerging basic science evidence suggests that RIA possesses equivalent osteoconduction and angiogenic properties to AICBG with potentially superior osteoinductive and osteogenic properties[1-3]

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- The clinical evidence to date suggests the RIA harvest can produce larger volumes of graft with potentially less harvest site morbidity and, in particular, pain when compared to AICBG[4-7]
- The clinical evidence regarding RIA is currently limited to level IV studies and a single retrospective comparative study, suggesting that more investigation is needed
- The implant costs associated with RIA are an issue

RIA VERSUS AIBG

	RIA	AICBG
Osteoconduction	YES	YES
Osteoinduction	↑ BMPs, TGF, total protein	↓
Osteogenesis	↑ MSCs and osteogenic potential	↓
Angiogenesis	↑ EPCs	↑ VEGF and HIF1α
Volume	58 cc's (range 40.3-68)	30 cc's (range 5-72)
Major Complication	3.4%	4%
Minor Complications	2.6%	15.4%
Harvest Site Pain	Lower Acute/Int/Chronic	Higher Acute/Int/Chronic
Clinical Results	85-90% success	75-98% success
Implant Costs	~1100 (CAD)	~30 (CAD)

CONCLUSIONS

- With regard to conventional grafting sites, the Iliac Crest remains the preferred source
- There is mounting clinical and basic science evidence suggesting that RIA is an effective alternative to AICBG
- Prospective comparison of RIA and AICBG (including economic evaluation) is warranted

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