Autograft Harvest Site Pain after Bone Marrow Aspiration in Foot & Ankle Surgery

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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.
Bone Marrow Aspiration (BMA)

- Technique to harvest autologous stem cells
- Used as biologic augmentation for healing
- Donor site morbidity is common
- Validated as a safe adjunct for soft tissue and osseous augmentation in musculoskeletal surgeries
  
  - Iliac crest harvest has been reported to be the gold standard due to its active hematopoietic bone marrow
  - Donor site pain is a common complication
  - Iliac crest not practical for lower extremity surgeries
Where to Harvest in F&A Surgery?

Purpose of this study
• Compare pain scores (VAS) after bone marrow aspiration over a 12-week postoperative recovery period
• 3 BMA sites
  – Iliac crest
  – Distal tibia
  – Calcaneus
• Which site creates the most donor site morbidity?

Iliac Crest Harvest
Methodology

- Prospective study
- 40 patients
- Each patient had a BMA from three sites in conjunction with primary F&A procedure
  - Iliac crest
  - Distal tibia
  - Calcaneus
- Follow-up questionnaire forms
  - 2, 4, 8, and 12 weeks post-op
- Primary outcome measure
  VAS pain scores
- One-way ANOVA test
  - Compare group means at a 95% confidence level
## Results

<table>
<thead>
<tr>
<th>Weeks Post-Op</th>
<th>Iliac Crest</th>
<th>Distal Tibia</th>
<th>Calcaneus</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6.64 (18.33)</td>
<td>12.44 (21.87)</td>
<td>35.82 (34.53)</td>
</tr>
<tr>
<td>4</td>
<td>6.03 (15.20)</td>
<td>9.54 (20.73)</td>
<td>17.35 (27.79)</td>
</tr>
<tr>
<td>8</td>
<td>1.2 (2.3)</td>
<td>3.4 (9.9)</td>
<td>16 (25)</td>
</tr>
<tr>
<td>12</td>
<td>3.09 (13.87)</td>
<td>5.30 (18.03)</td>
<td>13.94 (26.39)</td>
</tr>
</tbody>
</table>

Mean and Standard Deviation VAS Scores
Results

• At all four time intervals, the mean VAS was lowest in the iliac crest and highest in the calcaneus
• Significant difference in pain scores was found at weeks 2 and 8
• No significant difference was found at weeks 4 and 12
• At 12 weeks
  – All sites were equal and without appreciable pain
• Patients available for follow-up
  – 39, 37, 37, and 33 at weeks 2, 4, 8, and 12, respectively
Discussion

• Our data suggests that donor site selection for BMA affects postoperative pain levels

• BMA from calcaneus
  – Significantly higher pain scores at weeks 2 and 8
  – Correlates with the immediate postoperative period (week 2) and the initiation of weight bearing (week 8)
Conclusion

• The VAS score for the calcaneus is likely confounded by the surgery in the ipsilateral foot.
• Further research is needed to determine the optimal site and technique for BMA harvest in foot and ankle surgery.
References
