Induced Membrane Technique of Masquelet: Unanswered questions remain

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Disclosures

• None
Case Report

- Now 13 y.o boy with CPT and NF-1
  - Dysplastic type
- Multiple surgeries beginning at 2+8 yrs
Patient at 2+8 years of age, following resection of pseudarthrosis and Ilizarov frame for bone transport.
Recurrence of pseudarthrosis with a valgus deformity at 6 years of age.
Acute correction of valgus deformity and arthrodesis of the distal tibiofibular joint at 9 years of age.
Soft tissue collection, malangulation, and recurrence of pseudarthrosis at 11 yrs
First stage of the Masquelet technique at 12 years of age

Second stage, 6 weeks later
6 months post IMT
12 mths post IMT: no clear signs of union proximally
IMT

• Described by Masquelet et al.\textsuperscript{1}
  – Massive segmental long bone defects
  – 2 step process
    • Thorough debridement and placement of a PMMA spacer, fixation
    • Careful removal of the spacer (keeping the induced membrane intact) and grafting morcellized cancellous auto- and allo- graft (4-8 wks later)
Mecanism of action$^{2,3}$

- Body’s response to a foreign material
- Induced membrane
  - Growth factors (including BMP 2)
  - Rich vascularization
  - Osteoinductive capabilities
    - Timing is key
      - Max effects 1 month

2-Olli-Matti et al. JBJS AM 2013
3-Pelissier et al. J. Ortho Res 2004
Uses

- Post traumatic large septic and aseptic long bone defects
  - Malignant bone tumour resection
  - CPT
IMT in CPT\textsuperscript{5,6}

- 2 studies
  - 6 pts

5- Gouron et al. JBJS BR 2010
6- Pannier et al. J. Child Orthop 2013
<table>
<thead>
<tr>
<th>Study</th>
<th>Cases</th>
<th>Mean age (mths) at OR</th>
<th>Follow-up (mths)</th>
<th>results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pannier et al (2013)</td>
<td>5</td>
<td>23</td>
<td>69</td>
<td>All united, 2 required additional intertibfib grafting</td>
</tr>
<tr>
<td>Gouron et al (2010)</td>
<td>1</td>
<td>14</td>
<td>30</td>
<td>Union, no LLD</td>
</tr>
</tbody>
</table>
Discussion

• Older child
• Multiple surgeries
• Infected pseudoarthrosis
Unanswered questions

• Use of antibiotic impregnated cement
• Optimal spacer material
• Addition of BMP’s to graft
• Proportions of auto-allograft
• Type of fixation
• Optimal timing of second stage
  – Optimal timing of surgery in CPT
  – What types of CPT are more favorable

Osteogenic capacity of IMT may be insufficient for an older pt with unhealthy bone
Thank you