Value of Bioabsorbable Antibiotic Impregnated Beads for Vascular Graft Infection
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Background: Graft Salvage
Non-absorbable antibiotic polymethylmethacrylate (PMMA) beads
- chronic osteomyelitis & prosthetic joint infections

PMMA impregnated beads for graft salvage
(17-36 month follow-up)
- 66-86% graft preservation
- 13-21% limb loss
- 12-20% reinfection rate

Investigate the rates of infection eradication, graft preservation and limb salvage with the use of bio-absorbable antibiotic beads for prosthetic graft infections

Presented at the 2015 SCVS annual meeting

Background: Antibiotic Beads
Disadvantages of Non-absorbable
- Removal of beads
  - 3-7 days
  - Difficult large cavitary or intra-abdominal infections
- Intense inflammatory reaction
  - Wound drainage
  - Hostile reoperative field

Bio-absorbable calcium sulfate antibiotic beads
- Chronic osteomyelitis in orthopedic surgery
  - No explanation
  - Minimal/no wound drainage
  - Decreased inflammatory reaction
  - 6 weeks of local antibiotics
    - 3-fold increased antibiotic concentration

Prosthetic Graft Infections: Traditional Management
- Complete Explant with Reconstruction (In situ or Extra-anatomic)
- Graft Salvage
  - No further bypass options
  - Medically prohibitive

Disclosures
Off-label use of Stimulan (Biocomposites Ltd, Wilmington, NC) bio-absorbable, calcium sulfate antibiotic beads for the treatment of prosthetic vascular graft infection


PMMA impregnated beads: 6-8weeks for complete explant with reconstruction
Methods

- Retrospective review of a prospectively collected database at UPMC (2012-2014)
- Prosthetic graft infection

**Graft Preservation**

**OR**

In Situ Reconstruction with Prosthetic Material

- Stimulan bio-absorbable (calcium sulfate) antibiotic beads for prosthetic graft infections
  - 1 gram vancomycin
  - 80-400 mg gentamycin
  - +/- 600 mg rifampin

Baseline Patient Characteristics

- 6 patients
- 50% Male
- 60-72 years old

Comorbidities:
- Hypertension (n=5)
- Hyperlipidemia (n=5)
- Tobacco Use (n=5)
- CAD (n=4)
- Diabetes (n=3)
- CVA/TIA (n=2)
- ESRD (n=1)

Graft Infection

**Infection Location**
- Intra-Abdominal (n=2)
- Extra-Cavitary (n=4)

**Graft Types**
- Aortobifemoral (Dacron)
- Aorto-SMA/hepatic (Dacron)
- Femoral-Femoral (PTFE)
- Iliac-Femoral (Dacron)
- Axillary-bifemoral (Dacron)

**Risk Factors**
- Ischemic bowel/gangrenous cholecystitis
- Urostomy/Colostomy
- Aortoenteric fistula
- Multiple revisions

**Time to presentation**
- 10 days – 11 years
- 5 patients within 3 months of last operation

Patient Presentation

**Signs & Symptoms**
- Intra-abdominal
  - Abdominal pain
  - Leukocytosis
  - Fever/Cramps
- Extra-cavitary
  - Groin pain
  - Erythema
  - +/- Drainage

**Diagnosis**
- CT scan
- Clinical Exam

Preoperative Management

- Broad spectrum IV antibiotics
  - Gram positive coverage (vancomycin)
  - Gram negative/anaerobic coverage (piperacillin-tazobactam; aztreonam & metronidazole; rifampin)
- Bedside cultures or ultrasound guided aspiration

**Pathogens**
- MRSA
- VRE
- Pseudomonas
- Serratia
- E. coli
- S.epidermidis
- Candida

Graft Management

**Intra-abdominal**
- Graft explant, in situ reconstruction
- Antibiotic bead at all anastomoses
- Tissue Coverage
  - RP
  - Sartorius Flap

**Extra-Cavitary**
- Graft Preservation
  - No further bypass options
  - Metastatic ovarian cancer
  - Unable to tolerate reconstruction
- Sharp debridement
  - Layer around graft
- Antibiotic beads along the graft
  - Sartorius Flap
  - Tissue Coverage
### Postoperative Management

- 6 week course of IV antibiotics
  - Based on sensitivities
- Suppressive oral antibiotics

### Patient Outcomes

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<thead>
<tr>
<th>Follow-up</th>
<th>Graft Status</th>
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<tbody>
<tr>
<td>Mean follow-up 7.3 months (3-24 months)</td>
<td>In Situ reconstructions patent</td>
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<tr>
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<td>Preserved grafts patent</td>
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<thead>
<tr>
<th>Complications</th>
<th>Limb Salvage</th>
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<td>No PSA, graft disruption, bleeding events, or wound drainage</td>
<td>100%</td>
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<tr>
<th>Infection Status</th>
<th>Survival</th>
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<td>100% resolution at follow-up</td>
<td>100%</td>
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</table>
  - Clinical exam
  - CT scan (intra-abdominal)

### Conclusions

- First series to describe the use of bio-absorbable antibiotic beads for the treatment of prosthetic graft infections
- On short term follow-up, there were no major complications with 100% infection resolution, limb salvage and survival
- Further clinical investigation & longer-term follow up is required to determine the role of absorbable antibiotic beads in the management of vascular prosthetic graft infections

THANK YOU. chaerra@upmc.edu

UPMC Heart and Vascular Institute