Is Polyethylene Particulate Debris Present in Osteolytic Cysts in Total Ankle Replacement?

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My disclosure is in the Final AOFAS Mobile App.
I have no potential conflicts with this presentation.
Introduction

- **Polyethylene (PE) debris** has been implicated as the major initiator for osteolysis in total hip replacement.
- The role of PE debris in osteolysis in total ankle replacement (TAR) is not well defined in the literature.
- **The purpose** of this study was to analyze the histopathology of osteolytic cyst material retrieved from TAR cases that underwent reoperation for either osteolysis or aseptic loosening to determine if PE debris was present.

**Figure 1.**
SPECT CT scan showing tibial, talar and fibular cysts 6 years following total ankle replacement in a 59 year old woman.
A retrospective review of all total ankle replacement cases that underwent a reoperation for any cause in a single surgeon’s practice was carried out.

Inclusion Criteria:
- Pre- or intra-operative diagnosis of cystic osteolysis and/or
- Metal component loosening

Of 45 TAR reoperations, 22 cases in 19 patients met the inclusion criteria. Detailed demographic data for all cases was collected. Pathology reports were available in 18 cases and the presence or absence of PE particle debris in the retrieved cystic material was noted for each case.
## Results

- **Demographics:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Male/Female</td>
<td>13/6</td>
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<tr>
<td>Mean interval from primary TAR to reoperation</td>
<td>4.1 years (1.5-10)</td>
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<tr>
<td>Implants’ manufacturer</td>
<td>Hintergra: 12, Star: 10</td>
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<tr>
<td>Indication for reoperation</td>
<td>Cystic osteolysis: 12, Implant loosening: 10</td>
</tr>
</tbody>
</table>
Results

- Pathology reports were available in 18 cases.
- PE particles or foreign body particles consistent with PE were present in 10 cases and absent in 8 cases.
- All 18 cases showed some degree of giant cell reaction along with fibrous material and necrotic tissue.
Our study is one of the two largest reported series of histopathological analyses of TAR-associated cysts to date.

Osteolysis in TAR seems to occur in the absence of any identifiable PE debris in almost 45% of cases in our series. This is in contrast to the study of Dalat et al, which showed presence of PE debris in 95% of their series of 25 revised ankle replacements.

However, our findings correlate well with those of Koivu et al whose review of histopathology in 10 AES-TAR cases showed that early osteolysis in TAR is caused by foreign body inflammation directed against necrotic autologous tissues, not implant derived particles.
Conclusion

- In contrast to osteolysis around hip arthroplasty, factors other than PE debris, such as reaction to necrotic tissue, may play a key role in osteolysis around TAR and further study is warranted.
References


2) Kobayashi et al. Ankle Arthroplasty Generate Wear Particles Similar to Knee Arthroplasty, CLINICAL ORTHOPAEDICS AND RELATED RESEARCH Number 424, pp. 69–72


4) H. Koivu et al. RANKL in the osteolysis of AES total ankle replacement implants. Bone 51 (2012) 546-552