A total ankle replacement (TAR) provides an alternative treatment option to arthrodesis for those suffering from an arthritic ankle. Initial attempts at TARs were fraught with high failure rates; however, recent studies have demonstrated improved outcomes attributed to advances in implant design and surgical technique. The purpose of this review was to evaluate the short-term outcomes in TARs and to assess if there was a correlation between patient factors or surgical technique with the incidence of post-operative complications.

Methodology & Hypothesis

A retrospective chart review over a 3-year duration revealed 31 TARs in 30 patients with an average follow-up of 12 months. Fixed-bearing modern total ankle prostheses were implanted from an anterior approach in 30 procedures and posteriorly in 1. The Fisher’s exact test was used to determine if there was an association between patient factors as well as intra-operative techniques and the development of post-operative complications. The following information was collected from each patient: age, BMI, duration of procedure, technique of ankle stabilization, pre and post operative pain level, pre and post operative ankle range of motion as determined with goniometer, closure technique, complications. In a small portion of patients both American Orthopedic Foot and Ankle Scores (AOFAS) Hindfoot/Ankle and Lower Extremity Functional Scale (LEFS) scores were obtained.

Results

Unlike arthritis of the hip or knee, which is typically of primary origin, end-stage ankle arthritis is more commonly posttraumatic, in 45% to 80% of cases. TAR has become a viable option to address end-stage ankle arthritis and this is reflected by the nearly 4-fold increase in the number of US hospitals performing this procedure, from 3.1% in 1991 to 12.6% in 2010. In regards to the modern TAR designs, short to mid-term results have been promising with survival rates up to 90%. Haddad et al performed a systematic literature review comparing outcomes of TAR and ankle arthrodesis and found mid-term outcomes to be similar. Gougoulias et al performed a systematic literature review reporting on the outcomes of modern TARs. Their study included 105 total ankle arthroplasties and found the overall failure rate to be 9.8% at 3.2 years. Complications were examined and revealed superficial wounds occurring in 0% to 14.7%, deep infections in 0% to 4.8%, and residual pain in 27% to 63%. Ankles with motion was also reviewed and revealed mean postoperative range of motion was equal to the preoperative level or improved by approximately 41 degrees. Outcomes and complications associated with TARs have been thoroughly detailed in the literature. The reported complication rates for TARs have been variable, ranging from 7% to 54%, with delayed wound healing seen in up to 40% and rates of infection ranging from 2% to 8.5%. The wide variations indicate a lack of consistency either in technique or in the reporting of complications. Whalen et al found the expense for treating patients who had wound necrosis and deep soft tissue loss was five times greater than the cost of a total ankle arthroplasty that healed without complication. Glazebrook et al noted that deep infection, albeit a likely complication to occur at 1.7% was associated with a high implant failure rate of 80.6%. Thus to minimize our risk of complication, we have supplemented our TARs with both LA-ICGA and a non-invasive skin closure device. Moyer et al utilized LA-ICGA to predict mepiostomy skin flap necrosis and found that a value of 0.28 with a cutoff test threshold of 0.38, to be a predictive value of removing healthy skin. As for non-invasive skin closure device, MicroStat et al compared this type of closure with conventional suturing. They found comparable aesthetic outcomes and also noted that both wound reapproximation and device removal took less time when compared to suturing.

Analysis & Discussion

Table 1: Patient Baseline Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall (n=30)</th>
<th>No Complications (n=24)</th>
<th>Complications (n=6)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, in years</td>
<td>63.9 (61.9, 66.0)</td>
<td>63.6 (61.9, 65.0)</td>
<td>64.8 (61.9, 66.0)</td>
<td>0.6876</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>30.9 (28.3, 33.5)</td>
<td>30.6 (28.3, 33.2)</td>
<td>32.4 (28.3, 36.5)</td>
<td>0.1624</td>
</tr>
<tr>
<td>Never Smoker</td>
<td>14 (47.2%)</td>
<td>12 (41.4%)</td>
<td>2 (33.3%)</td>
<td>0.7237</td>
</tr>
</tbody>
</table>

Figure 1: Patient suffered a wound dehiscence with localized signs of infection. Patient would return to the operating room for debridement and irrigation followed by local wound care with parenteral/oral antibiotics, and one procedure would ultimately require operative intervention, our successful limb salvage and implant salvage was 83.3%. In those requiring operative intervention, our successful limb salvage and implant salvage was 67%. Similarly, Patton et al in a retrospective review found that with operative intervention of an infected total ankle arthroplasty they were able to achieve limb salvage in 79% of cases and implant salvage in 66% of cases. Additionally, when highlighted the benefits of two novel techniques that have reduced our complication incidence. Although we believe these two novel techniques will help to reduce post-operative complications, it obviously goes without saying that meticulous planning, the delicate handling of soft tissue, and proper patient selection are critical to successful outcomes.

The hope is that when combining this with innovative techniques one may be able to further minimize postoperative complications.

References

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11. Although we believe these two novel techniques will help to reduce post-operative complications, it obviously goes without saying that meticulous planning, the delicate handling of soft tissue, and proper patient selection are critical to successful outcomes.
12. The hope is that when combining this with innovative techniques one may be able to further minimize postoperative complications.