Success of Transmetatarsal Amputation for Ulceration with and without Peripheral Arterial Disease Versus Peripheral Arterial Disease Alone

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Purpose

In the late 1940s to the 1970s, the first outcome studies of transmetatarsal amputation (TMA) in patients with peripheral vascular disease (PAD) were reported. Success rates ranged from 35% to 68% (1-6). At that time vascular status was assessed only by the presence or absence of palpable pulses. TMA was performed when gangrene was localized to the foot as a “trial” for limb salvage. Given the advances in vascular and endovascular surgery, it is hypothesized that TMA in patients with PAD is more successful today. This study was undertaken to compare the success of TMA in patients without PAD and ulceration/infection to those with PAD and ulceration/infection or digital gangrene.

Methods & Procedures

This is a single center, retrospective review of 39 consecutive patients who underwent TMA between November 2006 and May 2012. All patients were further divided into three categories: 1) patients with ulceration without PAD, 2) patients with ulceration and PAD, and 3) patients with PAD and digital gangrene. The mean follow up; time to complete healing, time to full weight-bearing, number of patients who underwent vascular intervention, and complications are reported.

### Table Legend

E – endovascular; F – female; FWB – full weight bearing; L – left; M – male; O – open bypass; R – right; 1 – 1 posterior heel ulceration which healed; 2 – 2 posterior heel ulcerations which healed; 3 – 1 posterior heel anterior ankle ulceration which healed; 4 – 1 non-ambulatory prior to surgery; 5 – 1 bilateral patient; 6 – 1 patient who initially healed; 7 – 1 anterior ankle ulceration; 8 – 1 open bypass > 3 months prior to amputation

<table>
<thead>
<tr>
<th>Study Group</th>
<th># of Patients (M/F)</th>
<th>Foot R/L</th>
<th>Mean Age (Years)</th>
<th>Mean Follow Up (Months)</th>
<th>Vascular Intervention (E-O)</th>
<th>Mean Time to Complete Healing (Months)</th>
<th># Who 1st Healed</th>
<th># Patients who Return to FWB/Time to FWB (Months)</th>
<th>More Proximal Amputation</th>
<th>Death</th>
<th>Lost to Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ulceration without PAD</td>
<td>14/5</td>
<td>7/12</td>
<td>69.0 ± 11.3 [range: 38-82]</td>
<td>6.8 ± 21.8 [range: 1-60]</td>
<td>0/0</td>
<td>2.7 ± 1.8 [range: 1-7]</td>
<td>15 (66.6%)*</td>
<td>15 (66.4%)+</td>
<td>2.7 ± 2.8 [range: 1-13]</td>
<td>1 (15.8%) due to progressive infection all Chopart*</td>
<td>0</td>
</tr>
<tr>
<td>2. Ulceration with PAD</td>
<td>7/0</td>
<td>3/4</td>
<td>71.0 ± 10.7 [range: 57-87]</td>
<td>11.8 ± 23.5 [range: 8-66]</td>
<td>3/1*</td>
<td>2.5 ± 1.5 [range: 2-4]</td>
<td>4 (57.1%)**</td>
<td>4 (57.1%)+</td>
<td>2.9 ± 2.7 [range: 2-6]</td>
<td>2 (28.6%) due to progressive necrosis 1 Chopart 1 Lisfranc*</td>
<td>0</td>
</tr>
<tr>
<td>3. PAD with Digital Gangrene</td>
<td>8/5</td>
<td>7/7†</td>
<td>7.0 ± 8.3 [range: 56-88]</td>
<td>26.6 ± 14.1 [range: 13-27]</td>
<td>4/7*</td>
<td>9.5 ± 21.1 [range: 2-34]</td>
<td>5 (38.5%)</td>
<td>4 (30.8%)**</td>
<td>6.4 ± 3.6 [range: 2-9]</td>
<td>5 (38.5%) due to progressive necrosis 1 Chopart 2 BKA 2 AKA†</td>
<td>1</td>
</tr>
</tbody>
</table>

Conclusion

- Despite advances in vascular and endovascular surgery, the results of this study are consistent with those performed > 4 decades ago (1-6).

- Patients with critical limb ischemia have a poor prognosis for limb salvage.

- A palpable pedal pulse is a favorable prognostic indicator, however, its absence does not preclude a successful result (6). None of the patients in this study who healed their TMA in the face of PAD with ulceration or digital gangrene had a palpable pedal pulse.

- All patients who healed their TMA maintained their ambulatory status. This increased rehabilitation potential is one of the reasons TMA was first performed for limb salvage (7).

- A 50% complication rate is to be expected in patients undergoing TMA (7). Practitioners must prepare themselves and their patients for a protracted post-operative recovery course.

References