Ultrasound-guided Access in CLI: First 650 Interventions from PRIME

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Disclosure

Larry J. Diaz, Sandoval, MD, FACC, FSCAI, FAHA, FSVM

I have the following potential conflicts of interest to report:

- Consulting: CSI, Cordis, Terumo.

These are not relevant to this presentation.
THANKS:
“Whenever you find that you are on the side of the majority, it is time to reform”.

Mark Twain
Peripheral Registry of Endovascular Clinical Outcomes

- First patient enrolled January 2013
- Prospective, multi-center
- Initial assessment → 36 month follow up
- Goals:
  - 3000 CLI patients
  - Describe clinical epidemiology, natural history, and management practices of CLI
MC arterial access: CFA.
- Palpation.
- Anatomical landmarks.
- Fluoro Guidance: Not superior to Palpation

US decreased (vs Fluoro):
- # of attempts.
- Time to access.
- Complication rates.

US (vs Palpation):
- No difference in complication rates.

Patients with CLI often require multiple access sites.

- Retrograde / Antegrade CFA
- Retrograde / Antegrade SFA
- Retrograde / Antegrade Popliteal
- Retrograde / Antegrade Tibial – pedal

US Guidance in CLI is feasible and safe in single center, retrospective study.

To study US guidance in CLI patients in a multicenter, prospective registry.

<table>
<thead>
<tr>
<th>DEMOGRAPHICS</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Age, yr</td>
<td>70 ± 11</td>
<td></td>
</tr>
<tr>
<td>Male gender</td>
<td>67%</td>
<td>271/405</td>
</tr>
<tr>
<td>Body mass index, kg/m²</td>
<td>29 ± 6</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CLINICAL PRESENTATION</th>
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<tbody>
<tr>
<td>Claudication</td>
<td>81%</td>
<td>326/405</td>
</tr>
<tr>
<td>Resting pain</td>
<td>39%</td>
<td>158/405</td>
</tr>
<tr>
<td>Edema</td>
<td>24%</td>
<td>96/405</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>6%</td>
<td>26/405</td>
</tr>
<tr>
<td>Osteomyelitis</td>
<td>6%</td>
<td>24/405</td>
</tr>
</tbody>
</table>
Access Site Distribution

- 896 access points

- CFA (R) - 34.6%
- CFA (A) - 33%
- AT - 12.1%
- PT - 12.1%

- Common Femoral Retrograde
- Common Femoral Antegrade
- Posterior Tibial
- Anterior Tibial
- Superficial Femoral Antegrade
- Dorsalis Pedis
- Brachial
- Radial
- Superficial Femoral Retrograde
- Peroneal
- Popliteal
CFA ACCESS:
<table>
<thead>
<tr>
<th>Access Site</th>
<th>Mean No. Attempts (min, median, max)</th>
<th>Median Time to Access (sec) (min, max)</th>
<th>Access Success (min, max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common femoral retrograde</td>
<td>1.2 (1, 1, 5)</td>
<td>39 (3, 1348)</td>
<td>99.4% (308/310)</td>
</tr>
<tr>
<td>Common femoral antegrade</td>
<td>1.2 (1, 1, 6)</td>
<td>45 (1, 1018)</td>
<td>97.3% (288/296)</td>
</tr>
<tr>
<td>Posterior tibial</td>
<td>1.5 (1, 1, 5)</td>
<td>41 (7, 922)</td>
<td>90.7% (98/108)</td>
</tr>
<tr>
<td>Anterior tibial</td>
<td>1.4 (1, 1, 4)</td>
<td>59 (2, 908)</td>
<td>92.6% (100/108)</td>
</tr>
<tr>
<td>Superficial femoral antegrade</td>
<td>1.2 (1, 1, 3)</td>
<td>20 (1, 554)</td>
<td>96.0% (24/25)</td>
</tr>
<tr>
<td>Dorsalis pedis</td>
<td>1.4 (1, 1, 4)</td>
<td>30 (1, 169)</td>
<td>78.6% (11/14)</td>
</tr>
<tr>
<td>Brachial</td>
<td>1 (1, 1, 1)</td>
<td>29 (15, 137)</td>
<td>100% (9/9)</td>
</tr>
<tr>
<td>Radial</td>
<td>1.1 (1, 1, 2)</td>
<td>49 (10, 128)</td>
<td>100% (8/8)</td>
</tr>
<tr>
<td>Superficial femoral retrograde</td>
<td>1.1 (1, 1, 2)</td>
<td>44 (13, 78)</td>
<td>87.5% (7/8)</td>
</tr>
<tr>
<td>Peroneal</td>
<td>3.0 (1, 2, 7)</td>
<td>52 (10, 147)</td>
<td>57.1% (4/7)</td>
</tr>
</tbody>
</table>
Femoral vs Tibials

P = NS
ANTERIOR TIBIAL ACCESS

ANTERIOR TIBIAL ARTERY
ANTERIOR TIBIAL ACCESS
<table>
<thead>
<tr>
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<th>PRIME Registry</th>
<th>Historical *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Attempts **</td>
<td>1.2</td>
<td>1.4</td>
</tr>
<tr>
<td>Time to Access, sec. **</td>
<td>74</td>
<td>153.9</td>
</tr>
<tr>
<td>Access Success</td>
<td>99.4%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Mean values

Antegrade Tibial Access
Antegrade Tibial Access
Access Combinations

Distribution of Access Combinations

- Femoral Antegrade: 29%
- Femoral Retrograde: 29%
- Dual Femoral/Tibio-Pedal: 20%
- Dual Femoral Retrograde: 11%
- Single Tibio-Pedal Retrograde ("TAMI"): 4%
- Other: 7%

*Other category includes rare or specific access combinations.
### Complications

<table>
<thead>
<tr>
<th></th>
<th>Common femoral retrograde (n=185)</th>
<th>TAMI (n=73)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast volume, cc *</td>
<td>196 (30,183,612)</td>
<td>57 (4,50,157)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fluoroscopy time, min *</td>
<td>25 (4,19,163)</td>
<td>17 (4,14,59)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Procedure time, min *</td>
<td>81 (7,73,278)</td>
<td>83 (24,62,860)</td>
<td>0.13</td>
</tr>
<tr>
<td>Procedure Success</td>
<td>172 (93.0%)</td>
<td>66 (90.4%)</td>
<td>0.61</td>
</tr>
<tr>
<td>Hospital stay, days *</td>
<td>1.3</td>
<td>0.9</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
DIGITAL ACCESS
CONCLUSIONS

• First study to analyze US guided access across multiple arterial beds in patients with advanced PAD & CLI.

• With US Guidance, arterial cannulation of “exotic” sites requires the same number of attempts and takes the same time as acquiring retrograde CFA access, with similar success rate.
CONCLUSIONS

◆ US-guided access decreases:
  ◆ Time to access.
  ◆ Access attempts.
  ◆ Complication rates.

REGARDLESS OF ARTERIAL ACCESS SITE

◆ US Guidance in CLI is feasible and safe in a multicenter, prospective study.

◆ Acquiring the skill is essential to the CLI specialist.
“The best way to predict the future, is to create it”

PETER DRUCKER
Nuevos Horizontes Cardiovasculares

Monterrey, Mexico

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