FLASH Presentation: Techniques and Results of Percutaneous Procedures for Leriche Syndrome

Andrew Holden
Auckland, New Zealand
Disclosure

Speaker name:

Andrew Holden

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

☒ I do not have any potential conflict of interest
Leriche Syndrome: TASC D Aorto-iliac Occlusion

- Surgical revascularization recommended by the TASC group
- Excellent patency (87-91% @ 5 years) but 30 day mortality of 3-4% and major complication rate of 12-15%

Gruppo M et al, Surgery 2012;151:882-8
Leriche Syndrome: Endovascular Options

- Kissing, double barrel stents
- Bifurcated endografts (EVR devices)
- Covered endovascular revascularization of the aortic bifurcation
Leriche Syndrome: Endovascular Options

- Kissing, double barrel stents
- Bifurcated endografts (EVR devices)
- Covered endovascular revascularization of the aortic bifurcation
Double Barrel Kissing Stenting

- May be a simple procedure
- Bilateral CFA access only may be used (unless chimney grafts are required)
- Smaller flow lumens may be associated with stent compression or kinking with reduced patency
Double Barrel Kissing Stenting

- Raising the “neo-bifurcation” may have hemodynamic consequences
- Re-entering the true lumen from two sub-intimal spaces may be problematic
- Kissing stent reconstruction of the aortic bifurcation may be associated with reduced patency (geometric mismatch, overlap of proximal stent ends etc)

Extensive aortoiliac disease
- Double barrel bare metal stents ± chimney in the renal arteries
- Use of AAA devices... endovascular reconstruction (CERAB) courtesy of Dr Mangialardi-Ronchey, San Filippo Neri Hospital, Rome
Double Barrel Kissing Stenting

- Limited evidence (largely single centre series)
- Single centre retrospective analysis – 25 patients
- SE stents used in most cases
- Technical success 96%
- Primary patency @ 36 months 76%, secondary patency 94%

Dohi et al, Cardiovasc Interv Ther 2013;28:327-332
Double Barrel Kissing Stenting

- Unpublished experience from the Vascular Surgery Unit @ San Filippo Neri Hospital, Rome presented by Sonia Ronchey
- 13 cases of aorto-iliac occlusion up to the renal arteries
- Usually used brachial approach to facilitate crossing
- Restored palpable distal pulses in 11/13 cases (improved ABI in 2/13)
- No major adverse events
- Primary patency @ 30 months mean follow up 91.7%

Presented @ ICON, 2014
Leriche Syndrome: Endovascular Options

- Kissing, double barrel stents
- Bifurcated endografts (EVR devices)
- Covered endovascular revascularization of the aortic bifurcation
Bifurcated Endografts

- Again evidence largely limited to case reports and single centre series
- Most cases have iliac occlusive disease associated with an abdominal aortic aneurysm
- Covered stents minimize the risk of arterial rupture and restenosis
- Large profile delivery systems a disadvantage
- Most create a neo-bifurcation
Endologix AFX in Occlusive Disease

- Endograft with anatomic fixation on the aortic bifurcation so no “neo-bifurcation”
- Avoids limb competition in a narrowed distal aorta
- Device developed for aneurysmal rather than occlusive disease
- Poor radial force stents often require adjunctive stenting
Endologix AFX in Occlusive Disease

- Multi-centre retrospective review
- 8 US/1 European Centres, 80 patients
- Almost all performed under GA
- High technical success
- Over 80% of patients experienced significant improvement in Rutherford score

Presented by Dr Thomas Maldonado, Dept of Vascular Surgery, NYU Langone Medical Center
Endologix AFX in Occlusive Disease

- 54% of patients required adjunctive procedures
- Mean follow up 350 days
- 92% freedom from secondary intervention
- Excellent graft patency at follow up

<table>
<thead>
<tr>
<th>Patency</th>
<th>30 d</th>
<th>6 mo</th>
<th>1 year</th>
<th>2 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>98.1%</td>
<td>93.1%</td>
<td>94.0%</td>
<td>100%</td>
</tr>
<tr>
<td>Assisted</td>
<td>98.1%</td>
<td>100%</td>
<td>96.7%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Presented by Dr Thomas Maldonado, Dept of Vascular Surgery, NYU Langone Medical Center
Leriche Syndrome: Endovascular Options

- Kissing, double barrel stents
- Bifurcated endografts (EVR devices)
- Covered endovascular revascularization of the aortic bifurcation
CERAB Technique

- Covered Endovascular Reconstruction of the Aortic Bifurcation
- Provides a reconstruction with BE covered stents to maximize lumen diameter and avoid stent compression, thrombus formation or re-stenosis
- Neo-bifurcation created just above aortic bifurcation
CERAB: In Vito Testing

- CERAB configuration associated with the best geometrical conditions, lowest radial mismatch and lowest total mismatch volume (TMV or dead space)

Results:
- Total mismatch volume: TMV or dead space
  - TMV BS: 949.67 mm³
  - TMV CS: 2384.2 mm³
  - TMV CERAB I: 31.26 mm³
  - CERAB II: 274.98 mm³

E. Groot Jebbink, University of Twente, Enschede, The Netherlands
CERAB in Extensive Aorto-iliac Occlusion

- 83 patients TASC C & D
- Technical success 94%

<table>
<thead>
<tr>
<th></th>
<th>6 mon</th>
<th>12 mon</th>
<th>18 mon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary patency</td>
<td>92%</td>
<td>83%</td>
<td>83%</td>
</tr>
<tr>
<td>Secondary patency</td>
<td>97%</td>
<td>94%</td>
<td>94%</td>
</tr>
</tbody>
</table>

Courtesy P. Goverdne, Antwerp, Belgium and M. Reijnen, Arnhem, The Netherlands
Leriche Syndrome: Brachial Approach

- A brachial approach is strongly recommended
- Generally easier CTO crossing than retrograde approach
- Facilitates CERAB technique and chimneys if necessary
- Avoids bilateral sub-intimal entrapment
- Used in the majority of reported cases using all techniques
Juxta-renal Aortic Occlusions: The Need for Chimneys

- Endovascular reconstruction of juxta-renal aortic occlusions frequently require parallel grafts to maintain visceral and renal artery patency

- Multi-centre audit of Chimney CERAB still to be published courtesy of Martijn Dijkstra, Michel Reijnen and Peter Goverdne
Case Example

- 53 year old male
- Severe obstructive apnea, obesity, previous left nephrectomy (RCC)
- Bilateral Rutherford 4 symptoms – severe claudication and rest pain
Case Set Up

- Percutaneous access left branchial artery, 7F sheath
- Surgical exposure both CFAs with surgical vessi-loop control of both SFA/PFAs (embolic protection)
- Initial intervention antegrade from brachial approach
- Aortic bifurcation at the L4 vertebral body level on pre-procedural CT
- 5F vertebral catheter
- Hydrophilic wire looped and directed down occluded LCIA, followed by the catheter

Recorded demonstration:
Endovascular Aortic reconstruction for Juxta/partially Supra Aortic Occlusion with renal salvage
Dr Andrew Holden
Co-axial vertebral catheter then used to steer an hydrophilic wire down occuded RCIA and retrieved through a sheath.
- Using retrograde access, balloon angioplasty of the occluded aorto-iliac segment performed
- Pre-dilated with 6mm angioplasty balloons
Solitary right renal artery then cannulated from above

Recorded demonstration:
Endovascular Aortic reconstruction
for Juxta/partially Supra Aortic Occlusion with renal salvage

Dr Andrew Holden
- Parallel graft technique to deliver renal and overlapping aortic i-Cast covered stents (Maquet Atrium V12s)
- 7mm renal stent, 16mm aortic stents
- Left groin guidewire withdrawn during this stenting
- CERAB technique to reconstruction aortic bifurcation
- 8mm iliac covered stents (i-Cast)
Recorded demonstration:
Endovascular Aortic reconstruction for Juxta/partially Supra Aortic Occlusion with renal salvage
Dr Andrew Holden
Conclusions

- Three different approaches to endovascular repair of extensive aorto-iliac occlusion – kissing stents, bifurcated endografts and CERAB
- Covered stents preferred
- Brachial access extremely useful in most cases
- Chimney grafts are often necessary
FLASH Presentation: Techniques and Results of Percutaneous Procedures for Leriche Syndrome

Andrew Holden
Auckland, New Zealand