Three-year Restenosis Rate and its Predictors after Endovascular Therapy for Leriche Syndrome

(1) Kansai Rosai Hospital, Cardiovascular Center, Amagasaki, Japan
(2) Kishiwada Tokushukai Hospital, Department of Cardiology, Kishiwada, Japan
(3) Kokura Memorial Hospital, Department of Cardiology, Kokura, Japan

K. Nanto\textsuperscript{1}, O. Iida\textsuperscript{1}, M. Fujihara\textsuperscript{2}, Y. Tomoi\textsuperscript{3}, Y. Soga\textsuperscript{3}, M. Asai\textsuperscript{1}, M. Masuda\textsuperscript{1}, S. Okamoto\textsuperscript{1}, T. Ishihara\textsuperscript{1}, T. Kanda\textsuperscript{1}, A. Sunaga\textsuperscript{1}, T. Tsujimura\textsuperscript{1}, S. Okuno\textsuperscript{1}, Y. Matsuda\textsuperscript{1}, K. Yanaka\textsuperscript{1}, T. Ohashi\textsuperscript{1}, T. Mano\textsuperscript{1}
According to an autopsy evaluation, the morbidity rate for Leriche syndrome is only 0.15%.


Current guidelines recommend that surgical treatments, such as bypass surgery and endarterectomy, have been considered the standard treatment modality for Leriche syndrome.

First line therapy

Aortobifemoral Bypass

<table>
<thead>
<tr>
<th>Patency at 5Y</th>
<th>85-94 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>0-7 %</td>
</tr>
<tr>
<td>Morbidity</td>
<td>26-43 %</td>
</tr>
</tbody>
</table>

Axilofemoral Bypass

| 71 % |
| 5-12 % |
| 7-38 % |

With recent developments in medical devices and technologies, the outcomes of **EVT for aorto-iliac occlusive disease (AIOD)** are clinically promising, despite the severity of this disease.

*Circ J. 2012;76:2697-2704.*

Although few reports have described the outcomes of EVT for Leriche syndrome, the primary patency rates at 1 and 3 years after EVT have been reported as 88.4% and 80.1%, respectively.

Circ J. 2012;76:2697-2704.
Objectives

We investigated the long-term outcomes of endovascular therapy for Leriche syndrome and established predictors for restenosis.
Study design

Multicenter, retrospective study

Subjects

EVT was performed in 64 patients with occlusive arteriosclerosis associated with total occlusion of the infrarenal abdominal aorta between September 2005 and March 2016.
**Methods**

- **Outcome measure**
  - A) Primary patency
  - B) Secondary patency
  - C) Independent predictors associated with restenosis

- **Definition**
  - Restenosis
    1. Decline in **ABI** on both sides by **0.15 or more**
    2. Documented stenosis of **50% or more** on **angiography**
  - Primary patency
    No re-stenosis and needed no further treatment
  - Secondary patency
    Patency was achieved after one or more successful additional percutaneous procedures
**Methods**

**Intervention procedure**

**Approach site**

Bi-common femoral artery (6Fr)

(Ante grade approach was added if it was needed)

**Selection of stent type**

A) *Balloon expandable stent*

B) *Self-expanding stent*

- S.M.A.R.T® (Cordis, Miami Lakes, FL)
- E-luminexx® (BARD, Murray Hill, NJ)
- Epic™ (Boston, Marlborough, MA)
- Zilver 518® (Cook Medical, Bloomington, IN)
### Results

Subjects: 61 patients who suffer from Leriche syndrome (2005-2016)

Duration: \(33 \pm 28\) months

<table>
<thead>
<tr>
<th>Patient baseline</th>
<th>Procedure results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Subjects: 61 patients who suffer from Leriche syndrome (2005-2016) |
| Duration: \(33 \pm 28\) months |

#### Patient baseline

- **Values are mean ± SD or n (%)**
- **Age, years**: 72.9 ± 9.2
- **Female gender**: 22 (36)
- **Risk factors**
  - Hypertension: 48 (79)
  - Dyslipidemia: 27 (44)
  - Diabetes mellitus: 22 (36)
  - Chronic kidney disease \(eGFR < 60\) ml/min/\(1.73m^2\): 31 (51)
  - Hemodialysis: 2 (3)
  - Smoking: 33 (54)
  - CAD: 24 (39)
  - CVD: 12 (19)

#### Procedure results

- **Rutherford criteria**
  - 2: 4 (7)
  - 3: 43 (70)
  - 4: 8 (13)
  - 5: 5 (8)
  - 6: 1 (2)
- **ABI before procedure**
  - Right: 0.50 ± 0.22
  - Left: 0.48 ± 0.21

#### Lesion distribution (proximal)

- Juxtarenal aorta type: 11 (18)
- IMA occluded type: 13 (21)
- IMA patent type: 37 (61)

#### Lesion distribution (distal)

- Solitary infrarenal aorta: 5 (8)
- IIA patent type: 26 (43)
- IIA occluded type: 24 (39)
- EIA occluded type: 6 (10)

#### Procedural approach

- Combined: 48 (79)
- Retrograde, from femoral arteries: 12 (20)
- Antegrade, from brachial arteries: 1 (1)

#### Procedural strategy

- **IVUS use**: 24 (39)
- **Thrombectomy**: 5 (8)
- **Distal protection**: 2 (3)
- **Stent implantation**
  - Kissing stents: 52 (85)
  - Combined stents: 6 (10)
  - Single aortic stent: 3 (5)

- **Operation time, min**: 92 ± 43
- **Amount of contrast media, mL**: 129 ± 65

- Antegrade and retrograde approach.
### Results

Subjects: **61症例** patients who suffer from Leriche syndrome (2005-2016)

Duration: **33 ± 28 months**

<table>
<thead>
<tr>
<th>STENT type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balloon-expandable stent</td>
<td>22 (10)</td>
</tr>
<tr>
<td>Self-expandable stent</td>
<td>192 (90)</td>
</tr>
<tr>
<td>S.M.A.R.T</td>
<td>70 (33)</td>
</tr>
<tr>
<td>E-Luminexx</td>
<td>73 (34)</td>
</tr>
<tr>
<td>EPIC</td>
<td>43 (20)</td>
</tr>
<tr>
<td>Zilver</td>
<td>6 (3)</td>
</tr>
</tbody>
</table>
Results

<table>
<thead>
<tr>
<th>Month</th>
<th>0</th>
<th>12</th>
<th>24</th>
<th>36</th>
<th>48</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>at risk</td>
<td>61</td>
<td>39</td>
<td>27</td>
<td>16</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>%</td>
<td>100</td>
<td>88</td>
<td>82</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>SE</td>
<td>0.000</td>
<td>0.048</td>
<td>0.059</td>
<td>0.082</td>
<td>0.082</td>
<td>0.082</td>
</tr>
</tbody>
</table>
Results

<table>
<thead>
<tr>
<th>Month</th>
<th>0</th>
<th>12</th>
<th>24</th>
<th>36</th>
<th>48</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>at risk</td>
<td>61</td>
<td>44</td>
<td>31</td>
<td>20</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>%</td>
<td>100</td>
<td>98</td>
<td>95</td>
<td>87</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td>SE</td>
<td>0.000</td>
<td>0.022</td>
<td>0.034</td>
<td>0.063</td>
<td>0.088</td>
<td>0.088</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Univariate analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hazard Ratio</td>
</tr>
<tr>
<td>Age, years</td>
<td>1.04</td>
</tr>
<tr>
<td>Female gender</td>
<td>1.88</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>2.15</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>0.90</td>
</tr>
<tr>
<td>Chronic kidney disease (eGFR &lt;60 ml/min/1.73m²)</td>
<td>1.09</td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>5.22</td>
</tr>
<tr>
<td>Severe calcification</td>
<td>1.84</td>
</tr>
<tr>
<td>Combined stenting</td>
<td>2.64</td>
</tr>
</tbody>
</table>

**Type of stent**

<table>
<thead>
<tr>
<th>Type of stent</th>
<th>Hazard Ratio</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balloon-expandable stent</td>
<td>1.26</td>
<td>0.33-4.77</td>
<td>0.74</td>
</tr>
<tr>
<td>S.M.A.R.T</td>
<td>1.06</td>
<td>0.32-3.49</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>E-Luminexx</strong></td>
<td><strong>4.41</strong></td>
<td><strong>1.05-20.44</strong></td>
<td><strong>0.038</strong></td>
</tr>
<tr>
<td>EPIC</td>
<td></td>
<td>†</td>
<td></td>
</tr>
<tr>
<td>Zilver</td>
<td>1.96</td>
<td>0.78-4.93</td>
<td>0.15</td>
</tr>
</tbody>
</table>

CI; confidence interval
†: Calculation didn't converge
A multicenter, retrospective, observational study was conducted to investigate the long-term outcomes of EVT for Leriche syndrome and predictors for subsequent re-stenosis.

The primary patency rate at 5 years after EVT was 70%, while the secondary patency rate was 77%, demonstrating comparable results to surgical bypass therapy.

In the current study, the type of stent used was independently associated with loss of patency.
Conclusion

In this retrospective study, EVT for Leriche syndrome demonstrated favorable 5-year patency.
Three-year Restenosis Rate and its Predictors after Endovascular Therapy for Leriche Syndrome

(1) Kansai Rosai Hospital, Cardiovascular Center, Amagasaki, Japan
(2) Kishiwada Tokushukai Hospital, Department of Cardiology, Kishiwada, Japan
(3) Kokura Memorial Hospital, Department of Cardiology, Kokura, Japan

K. Nanto¹, O. Iida¹, M. Fujihara², Y. Tomoi³, Y. Soga³, M. Asai¹, M. Masuda¹, S. Okamoto¹, T. Ishihara¹, T. Kanda¹, A. Sunaga¹, T. Tsujimura¹, S. Okuno¹, Y. Matsuda¹, K. Yanaka¹, T. Ohashi¹, T. Mano¹