Management of the hypogastric artery during EVAR

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Disclosure of interest

- Professional fees
- Educational grants
- Research grant
Case selection

Hypogastric coverage
- with embolisation
- without embolisation

Hypogastric preservation
- Surgery
- CIA landing
- Branched iliac devices

What is the evidence?
Hypogastric coverage

Advantages

(A)lmost universally feasible
Technically simple in most cases
Cheap

Disadvantages

(Usuall)y irreversible

Complications

Buttock claudication
Sexual dysfunction
Type II endoleak
Colonic ischaemia
Buttock necrosis
Ischaemic lumbar plexopathy
Spinal cord ischaemia
Buttock claudication

After hypogastric coverage

<table>
<thead>
<tr>
<th>Study/year [ref. no.]</th>
<th>No. of patients</th>
<th>Buttock claudication (%)</th>
<th>Sexual dysfunction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mehta 2001</td>
<td>107</td>
<td>17 (16)</td>
<td>7/73 (10)</td>
</tr>
<tr>
<td>Yano 2001</td>
<td>103</td>
<td>21 (20)</td>
<td>–</td>
</tr>
<tr>
<td>Rhee 2002</td>
<td>49</td>
<td>14 (29)</td>
<td>–</td>
</tr>
<tr>
<td>Criado 2000</td>
<td>39</td>
<td>5 (13)</td>
<td>–</td>
</tr>
<tr>
<td>Mehta 2004</td>
<td>32</td>
<td>5 (16)</td>
<td>2/18 (11)</td>
</tr>
<tr>
<td>Razavi 2000</td>
<td>32</td>
<td>9 (28)</td>
<td>2/16 (13)</td>
</tr>
<tr>
<td>Lee 2000</td>
<td>27</td>
<td>5 (19)</td>
<td>–</td>
</tr>
<tr>
<td>Lee 2001</td>
<td>23</td>
<td>9 (39)</td>
<td>–</td>
</tr>
<tr>
<td>Lyden 2001</td>
<td>23</td>
<td>7 (30)</td>
<td>–</td>
</tr>
<tr>
<td>Karch 2000</td>
<td>22</td>
<td>7 (32)</td>
<td>–</td>
</tr>
<tr>
<td>Kritpracha 2003</td>
<td>20</td>
<td>9 (45)</td>
<td>–</td>
</tr>
<tr>
<td>Wolpert 2001</td>
<td>18</td>
<td>8 (44)</td>
<td>–</td>
</tr>
<tr>
<td>Engleke 2002</td>
<td>16</td>
<td>4 (25)</td>
<td>–</td>
</tr>
<tr>
<td>Tefera 2004</td>
<td>13</td>
<td>4 (31)</td>
<td>–</td>
</tr>
<tr>
<td>Arko 2004</td>
<td>12</td>
<td>6 (50)</td>
<td>–</td>
</tr>
<tr>
<td>Linn 2002</td>
<td>12</td>
<td>6 (50)</td>
<td>5/11 (45)</td>
</tr>
<tr>
<td>Wyers 2002</td>
<td>11</td>
<td>5 (45)</td>
<td>–</td>
</tr>
<tr>
<td>Total</td>
<td>605</td>
<td>162/605 (27)</td>
<td>21/146 (14)</td>
</tr>
</tbody>
</table>

Rayt et al., 2008
Claudication after hypogastric coverage
2008-2016

17 publications – sample size: 13-101

Early (n. = 729)

201
(28% - 95%CI = 25-31% )

Persistent (n. = 741)

126
(17% - 95%CI = 14-20% )

No difference between:
coverage vs embolisation
coils vs vascular plugs
unilateral vs bilateral coverage

No QoL data
Hypogastric coverage
To embolise or not to embolise?

No need to embolise if

Distal CIA “landing zone”

Diseased hypogastric artery

Ostial hypogastric stenosis

Sealing ring at CIA origin

Using Nellix
Hypogastric coverage

Nellix
Hypogastric preservation
External iliac to hypogastric bypass or transposition

Invasive
Universally available
Alternative to IBD/IBE
Not of historical interest only

Outcome after concomitant unilateral embolization of the internal iliac artery and contralateral external-to-internal iliac artery bypass grafting during endovascular aneurysm repair

Akihiro Hosaka, MD, Masaaki Kato, MD, Ippei Kato, MD, Shingo Isshiki, MD, and Nobukazu Okubo, MD, Osaka, Japan
JVS, 2011
Hypogastric preservation
CIA landing

Easy and quick

On IFU for up to 35 mm CIA Ø (Nellix)

Increased risk of type Ib endoleak

Secondary intervention

SGVI score: CIA diameter significant predictor of poor outcome

Karthikesalingam et al. BJS 2013
Hobo et al. JEVT, 2008
Hypogastric preservation

CIA landing

A deliberate compromise
Hypogastric preservation
Branched grafts
Hypogastric preservation
Iliac branched devices

Anatomical limitations

Narrow CIA lumen

Lack of hypogastric landing zone

Short CIA

Tortuous EIAAs

Only 20-60% of patients are suitable\textsuperscript{12}

GORE IBE may have wider applicability than Cook ZBIS\textsuperscript{2}

\textsuperscript{1}Gray et al., EJVES, 2015
\textsuperscript{2}Pearce et al., Ann Vasc Surg 2015
Hypogastric preservation
ZBIS iliac branched device (IBD)

Endovascular Aneurysm Repair with Preservation of the Internal Iliac Artery Using the Iliac Branch Graft Device

A. Karthikesalingam a, R.J. Hinchliffe a,*, P.J.E. Holt a, J.R. Boyle b, I.M. Loftus a, M.M. Thompson a

EJVES, 2010

7 studies – 196 cases

Variable clinical and anatomical criteria
Technical success: 85-100%
Buttock claudication prevented in all but 1
3 endoleaks
5 EIA occlusions
12/24 late IBD occlusion (50% claudication)
Hypogastric preservation
ZBIS iliac branched device (IBD)

Long-term Results of Iliac Aneurysm Repair with Iliac Branched Endograft: A 5-Year Experience on 100 Consecutive Cases

G. Pariani, F. Verzini, P. De Rango, D. Brambilla, C. Coscarella, C. Ferrer, P. Cao

EJVES, 2012

33 isolated iliac aneurysms
Technical success: 95%
No perioperative deaths
Follow up 1-60 months
Buttock claudicatio in 4
3 “iliac” endoleaks
  2 x Ib
  1 x III
Hypogastric preservation
Straight and helical iliac branched devices (IBD)

Endovascular repair of aortoiliac aneurysmal disease with the helical iliac bifurcation device and the bifurcated-bifurcated iliac bifurcation device

Shen Wong, MD, Roy K. Greenberg, MD, Chase R. Brown, BS, Tara M. Mastracci, MD, James Bena, MS, and Matthew J. Eagleton, MD, Cleveland, Ohio
JVS, 2013

130 patients
51% during FEVAR
Technical success: 94%
5/9 failures: IIA ostial stenosis
1 perioperative death (MI)
Follow up 1-72 months
Branch patency: 81.8% at 5 y
Claudication in 5/7 late occlusions
4 “iliac” endoleaks
Hypogastric preservation
IBE device

4 studies – 81 cases

No deaths
1 failure of deployment
2 type Ib endoleaks
2/51 early claudication
No persistent claudication
# IBD vs hypogastric coverage

## 1 year outcome

<table>
<thead>
<tr>
<th>Patients</th>
<th>23 x IBD N</th>
<th>23 x IBD %</th>
<th>37 x coverage N</th>
<th>37 x coverage %</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrelated mortality</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Reinterventions</td>
<td>0</td>
<td>–</td>
<td>2</td>
<td>5</td>
<td>.1</td>
</tr>
<tr>
<td>Iliac endoleak</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>19</td>
<td>.1</td>
</tr>
<tr>
<td>Pelvic ischemia</td>
<td>1</td>
<td>4</td>
<td>8</td>
<td>22</td>
<td>.1</td>
</tr>
<tr>
<td>Iliac diameter decrease</td>
<td>7</td>
<td>30</td>
<td>13</td>
<td>35</td>
<td>.8</td>
</tr>
<tr>
<td>Iliac limb occlusion</td>
<td>0</td>
<td>–</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

*Verzini et al., JVS, 2008*
IBD vs hypogastric coverage
3 month outcome

<table>
<thead>
<tr>
<th>Hypogastric Occlusion</th>
<th>Claudicants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral hypogastric occlusion (n. = 77)</td>
<td>27 (35%)</td>
</tr>
<tr>
<td>Unilateral IBD (n. = 4)</td>
<td>0</td>
</tr>
<tr>
<td>Bilateral hypogastric occlusion (n. = 6)</td>
<td>2 (33%)</td>
</tr>
<tr>
<td>Unilateral hypogastric occlusion + contralateral IBD (n. = 20)</td>
<td>11 (55%)*</td>
</tr>
</tbody>
</table>

*all ipsilateral to hypogastric occlusion
My take on the evidence

Hypogastric coverage results in a 15-20% risk of persistent buttock claudication

The risk of sexual dysfunction due to hypogastric coverage is unknown

Patients with suitable anatomy can be safely treated with iliac branched devices

EIA-IIA bypass/transposition is a potential alternative to iliac branched devices

Comparative data on iliac preservation vs coverage is poor

I would offer unilateral or bilateral iliac preservation, if feasible, to active patients, who want to minimise the risk of post-EVAR buttock claudication