COMPLICATIONS OF SUPRAORTIC DEBRANCHING

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Disclosure

Speaker name:

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I have the following potential conflicts of interest to report:

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

- I do not have any potential conflict of interest
Great Vessel Management for Endovascular Exclusion of Aortic Arch Aneurysms and Dissections

P. Bergeron, N. Mangialardi, P. Costa, P. Coulon, V. Douillez, E. Serreo, L. Tucimei, C. Cavazzini, F. Mariotti, Y. Sun and J. Gay

Eur J Vasc Endovasc Surg 32, 38–45 (2006)
HYBRID PROCEDURE MORTALITY

• USUALLY < 10% (0-25%)*

• IN ZONE 0 is higher

  8,46% vs 4,58% **

• IN EMERGENCY IN ZONE 0 is enormous

  50% vs 31% ***

* Antoniou – Eur J Vasc Endovasc Surg 2010
** Kotelis – J Vasc Surg 2011
Debranching
COMPLICATIONS

DIFFICULT TO EVALUATE

55-100%

Sincronous DEBRANCHING & TEVAR
Endografting of the Thoracic Aorta

314 pts (2002-2015)

Debranching 138 pts (43.9%)

- SURGICAL 122 (88.4%)
- SURGICAL + Chimney 16 (11.6%)

2 STEPS 97 (70.2%)

One step 37 (26.8%)

DELAYED LCCA-LSA bypass 4 (3.0%)

(2 total deb; 1 ca-car; 1 trauma)
SURGICAL DEBRANCHING+
CHIMNEY 16/138

Chimney Technique for Aortic Arch Pathologies:
An 11-Year Single-Center Experience

Nicola Mangialardi, MD; Eugenia Serra, MD; Holta Kasemi, MD; Vittorio Alberti, MD; Stefano Fazzini, MD; and Sonia Ronchey, MD, PhD
Department of Vascular Surgery, San Filippo Neri Hospital, Rome, Italy.

J Endovasc Ther. 2014;21:312–323
Debranching total surgery 138 (43.9%) (2002-2015)

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<table>
<thead>
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<tbody>
<tr>
<td>62</td>
<td>LCCA-LSA bypass (3 secondary)</td>
</tr>
<tr>
<td>15</td>
<td>subclavian transposition</td>
</tr>
<tr>
<td>13</td>
<td>carotid-carotid bypass*</td>
</tr>
<tr>
<td>32</td>
<td>Carotid-carotid-subclavian bypass</td>
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<tr>
<td>12</td>
<td>Total debranching of the arch**</td>
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<tr>
<td>1</td>
<td>Axillo-axillary bypass</td>
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<tr>
<td>3</td>
<td>Carotid axillary bypass</td>
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* 1 case associated with banding
** 4 cases associated with banding
DEBRANCHING ➔ MORTALITY

• CERVICAL 0-4%
• THORACIC 4-20%

BERGUER – J VASC SURG 1999
OZSAVATH – J VASC SURG 2003
GEIBUESH – J Vasc Surg 2011
OSKOWITZ – J CARDIOVASC SURG 2015
DEBRANCHING ➔ PATENCY

- CERVICAL (5 YRS) 91-98.7%
- THORACIC (10 YRS) 88%

BERGUER – J VASC SURG 1999
OZSAVATH – J VASC SURG 2003
REECE – ANN THORACIC SURG 2007
DE RANGO – J VASC SURG 2014
OSKOWITZ – J CARDIOVASC SURG 2015
Landing in zone 2

30 DAYS COMPLICATIONS 1-5%

Domening – Eur J Vasc Endovasc Surg 2008
Lee – Ann Toracic Surg 2011
Czerny – Eur J cardiothorac Surg 2011

PATENCY
TRANSPOSITION 98-100%
BYPASS 86%

1/15 (6.6%) LSA transposition → DISSECTION

→ ISCHEMIA

STENTING
OTHER COMPLICATION
TRANSPOSITION RELATED

• MAJOR LYMPHORRHOEA
  1/15 (6.6%)

• HORNER SYNDROME
Subclavian revascularization Complications: meta-analysis

- Nerve injuries 8,6%
- Lymphatic leak 2,5%
- Thrombosis 1,1%
- Haemorrhage 1,1%
- Stroke 0,7%
- Graft infection/mortality 0

Rehman – Eur J cardiothorac Surg 2011
Subclavian revascularization
Complications

Nerve injuries 8,6%

Mind the accessory phrenic nerve (present in 68%)!!!

Diaphragmatic palsies

Berguer – Veith 2011
EMERGENCY SETTING
Aortic arch ulcer: tamponade rupture
synchronous LCCA-LSA
Diseased LSA

ARM ISCHEMIA
Axillo-axillary bypass
INFECTION

GRAFT EXPLANTATION
LCSCA & LSA COVERED STENT
Landing in zone 1

Carotid-carotid bypass
Arm ischemia 3-10%

Isolated clamping of one carotid artery is safe without shunt
Secondary LSA byp
Hemi-arch transposition

Subcutaneous
Hemi-arch transposition

retropharyngeal
Retropharyngeal tunnel

- Shorter bypass
- No compression/bulging of the pharynx
  (graft = 6 mm)
- Does not interfere with tracheotomy or mid-sternotomy

Our experience 45
Subcutaneous 19
Retroph 26
Retropharyngeal route
Useful in case of complications
2 STEPS → Risk of BP occlus/: avoid competitive flow!!!!!!
2 STEPS → Avoid competitive flow!!!!!!

EARLY LSA EMBOLIZATION

FEMORAL ACCESS

BRACHIAL ACCESS
Landing in zone 0

Our experience
retrograde dissection  2/12  16,6%
1 fatal  8,3%
CLAMP RELATED

Change strategy  Bovine p. banding
30 days major complications of supraaortic debranching
10/138 pts (7,2%)

• MORTALITY (total debranch) 1/138 (0,7%)
  – Zone 0 8,3%
  – Zone 1-2 0%

• MAJOR COMPLICATIONS 9/138 (6,5%)
  – Bypass occlusion 6/138 (4,3%)
  – Stroke (CHIMNEY ASSOC) 1/138 (0,7%)
  – Infection 1/138 (0,7%)
  – Lymphorrhoea (LSA transpos) 1/138 (0,7%)
Immediate minor complications of supraaortic debranching
21/138 pts (15.2%)

- Neurologic lesions 6/138 (6.5%)
- Haematoma 2/138 (2.1%)
- Brachial lesions 3/138 (3.2%)
  (1 obstruction, 1 pseudoaneurysm, 1 av fistula)
- Lymphorrhoea 8/138 (5.7%)
- Disphagia (regressed) 2/26 (7.6%)
  (retropharingeal byp)
Supraaortic debranching
Late results  116/138 pts
follow-up 46 mths (min 2 max 168 mths)

• Mortality  14/116  12% (unrelated)
  – TEVAR related  2
  – Cardiac  2
  – Pulmonary embolism  1
  – Stroke (1 hemorr)  2

• Morbidity  5/116  4,3%
  – Stenosis/occlusions  3 (1 LCCA-LSA untreated)
  – Bypass kinking  1
  – Bypass aneurysm  1
CAR-SUBCL BYPASS
1 ANASTOMOTIC STENOSIS AT 2 MTHS

STENTING → ZILVER 7-30
CAR-SUBCL BYPASS
2 OCCLUSION (1 TREATED)

CAR-SUBCL B.  OBSTR AT 3 YRS  AXILLO-AXILL
Supraaortic debranching
Late results  116/138 pts
follow-up 46 mths (min 2 max 168 mths)

• Primary patency 97,4%
• Primary assisted patency 98,2%
• Secondary patency 99,1%
ELONGATIO CAR-CAR subcutaneous bypass (SUBCUTANEOUS) at 5yrs
EMIARCH DEBRANCHING (SUBCUTANEOUS) at 6 yrs + TYPE I B ENDOLEAK
ANEURYSM RESECTION (SHUNT) + DISTAL EXTENSION TEVAR
Conclusions

- Safe procedure
- Long patency
- Best option for pts “unfit for open surgery”

BUT

- Total debranching “major operations”

- Associated chimney useful in higher risk patients (emiarch vs total deb)