OFF THE SHELF SOLUTION: SELECTION BASED ON PLANNING

N. MANGIALARDI MD
San Filippo Neri Hospital
Roma Italy
Disclosure
Speaker name:

...........NICOLA MANGIALARDI........................

I have the following potential conflicts of interest to report:
- Consulting GORE, CORDIS, TRIVASCULAR
- Employment in industry
- Shareholder in a healthcare company
- Owner of a healthcare company
- Other(s)

☐ I do not have any potential conflict of interest
RECENTLY WE PUBLISHED OUR EXPERIENCE ON CHIMNEY TECHNIQUE THAT I CONSIDER THE QUEEN OF OTS SOLUTIONS
BECAUSE IT WAS FIRSTLY DESCRIBED AS A RESCUE FOR UNVULONTARY COVERAGE OF SUPRAORTIC VESSELS
AS WELL AS IN OUR EXPERIENCE WITH 2 RESCUE CASES

- **Born as a rescue** (our experience)
  ..unintended coverage of aortic branch

1. 06/2002 overstenting of the **LCCA**

2. 12/2002 overstenting of the **IA**
THE ONE FOR AN A LCCA OVERSTENTING,

THE STENT WAS PROBABLY TOO SHORT AND ASYMPTOMATICALLY OCCLUDED AFTER 22 MONTHS
AND WAS RESCUED WITH A CAROTID-CAROTID BYPASS
THIS IS THE SECOND CASE, HERE A BARE STENT WAS USED TO RESTORE PERFUSION AFTER AN ACCIDENTAL COVERAGE OF THE INNOMINATE ARTERY
THE PATIENT DIED FOR PULMONARY COMPLICATIONS WITH HIS CHIMNEY STILL PATENT
IN THE SUBSEQUENT YEARS WE TREATED ALWAYS FOR RESCUE SPORADICAL CASES

BETWEEN 2002 & 2008
RESCUE

LSA  1
LSA+LCCA  1
LCCA  1
WITH GOOD RESULTS CONFIRMED BY ONGOING LITERATURE
2008 PLANNED
INNOMINATE ARTERY CHIMNEY

• 81 YRS – 108 mm ATA

• COPD (02 Dep) - CAD - HTA

• UNFIT FOR TOT DEBRANCH/

TECHNIQUE

• RETROPHARINGEAL HEMIARCH DEBRANCHING > CUT-DOWN
• R/I FEMORAL
• R/I BRACHIAL

MATERIALS

• GORE TAG 40 (20+15)
• GORE HEMOBahn 11 - 50
• WALLSTENT 12 - 40

THIS IS WHY IN 2008 WE PLANNED A CHIMNEY STRATEGY IN THIS HIGH RISK PATIENT WITH A HUGE, SYMPTOMATIC ANEURYSM TURNED DOWN FROM ANY OTHER OPTION
AND YOU CAN SEE WE OBTAINED A DRAMATIC SHRINKAGE OF 5 CM DURING FOLLOW UP
IN SOME CASES TO AVOID CUTDOWN FOR LEFT C CAROTID CHIMNEY WE FOUND USEFUL THE INSERTION OF THE CHIMNEY GRAFT FROM THE RIGHT BRACHIAL ARTERY

THE CANNULATION OF THE LCCA FROM A RIGHT BRACHIAL ACCESS TO INSERT THE PARALLELL GRAFT
GLOBALLY OUR EXPERIENCE CONSIST IN 33 CASES COLLECTED OVER 13 YEARS
9 CASES WERE DONE IN EMERGENCY, THE OTHER WERE PLANNED FOR COMORBIDITIES OR PREVIOUS CARDIAC SURGERY.
ANEURYSM and dissections were the MOST FREQUENT LESION but we used the technique even in 2 cases of type one endoleak

<table>
<thead>
<tr>
<th>INDICATIONS</th>
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<tbody>
<tr>
<td>EMERGENCY</td>
<td>9 (5 salvage)</td>
<td>27.3%</td>
</tr>
<tr>
<td>PLANNED</td>
<td>24</td>
<td>72.7%</td>
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<thead>
<tr>
<th>PATHOLOGY</th>
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<tbody>
<tr>
<td>TAA</td>
<td>17</td>
<td>51.6%</td>
</tr>
<tr>
<td>TYPE B DISS</td>
<td>13</td>
<td>39.4%</td>
</tr>
<tr>
<td>EL type I (TEVAR)</td>
<td>2</td>
<td>6.0%</td>
</tr>
<tr>
<td>PAU</td>
<td>1</td>
<td>3.0%</td>
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</table>
IN THE MAJORITY OF CASES WE USED THE GORE GRAFT AND CERVICAL DEBRANCHING WAS ASSOCIATED IN MORE THAN 40%
25% OF THE CHIMNEY WERE PLACED IN THE INNOMINATE ARTERY
AND IN TWO CASES WITH UNFAVOURABLE VESSEL TAKE OFF WE PERFORMED A PERISCOPE
<table>
<thead>
<tr>
<th>Device</th>
<th>THOR/ S-G radial force</th>
</tr>
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<tbody>
<tr>
<td><strong>Proximal sealing zone</strong></td>
<td>100</td>
</tr>
<tr>
<td><strong>Distal sealing zone</strong></td>
<td>42</td>
</tr>
<tr>
<td><strong>Body spring</strong></td>
<td>41</td>
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DEVICE
Choice of parallel graft: flexibility \approx radial force

AS WELL AS THE FEATURES OF THE CHIMNEYS GRAFT MUST BE CONSIDERED WHEN PLANNING FOR THE OVERSIZING
TO REDUCE THE EL GUTTERS
WHAT WE CURRENTLY ADOPT IS A MAIN GRAFT OVERSIZING BETWEEN 20 AND 30 %, ACCORDING TO LACHAT FORMULA
Aortic graft
Oversizing options

4. \(0,72 \sqrt{a^2 + b^2}\) (Lachat)

Oversizing 25-35% for double chimney
Lower for larger diameter

OR HIGHER FOR MORE COMPONENTS
AS PARALL GRAFT WE USED SELF EXPANDABLE BARE STENT MAINLY
FOR RESCUE AND VIABAHN FOR PLANNED CASES REINFORCED WITH
BARE STENT IN PRESENCE OF SHARP ANGLE AND ALWAYS WHEN THE
CHIMNEY WAS FOR THE INNOMINATE ARTERY
LIMB GRAFTS CAN BE NECESSARY IN CASE OF LARGE ARTERY
DIAMETERS

<table>
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<tr>
<th>Stent Type</th>
<th>Count (Type)</th>
</tr>
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<tbody>
<tr>
<td>HEMO/VIABAHN</td>
<td>28 (15 REINF)</td>
</tr>
<tr>
<td>GORE LEG</td>
<td>3 (1 REINF)</td>
</tr>
<tr>
<td>ADVANTA</td>
<td>1 (REINF)</td>
</tr>
<tr>
<td>WALLSTENT</td>
<td>2</td>
</tr>
<tr>
<td>BIOTRONIK</td>
<td>2</td>
</tr>
<tr>
<td>PROTEGE’</td>
<td>4</td>
</tr>
<tr>
<td>VISI-PRO</td>
<td>1</td>
</tr>
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### 30 Days Results

- **Technical Success**: 100%
- **Mortality**: 3 (9.1%)  
  (Retr Type A-Cerebr Hemorr-Resp Failure)
- **Complications**: 7 (21.2%)
  - Minor Stroke (2 Rupt-1 Elect): 3
  - Paraparesis: 1
  - Type I EL: 0
  - Others (minor): 3

Technical success was 100% as in other experience. We had 9% of mortality. One patent died for retrograde dissection. 3 minor strokes occurred two of which in emergency. No type one endoleak was detected at completion angiography.
AT 3 AND HALF YEARS FOLLOW UP WE HAD 4 DEATH ONLY ONE PATHOLOGY RELATED DUE TO A MICOTIC ANEURYSM RUPTURE

MORTALITY (23.3%) 7/30
MEAN FOLLOW-UP 42.3 MTHS
(1-151)

- ANEUR RUPT (MYCOTIC) 1 (3 MTHS)
- CONG HEART FAIL 1 (27 MTHS)
- RESPIRATORY FAILURE 1 (6 MTHS)
- CANCER 2 (14-73 MTHS)
- IMA 2 (2-151 MTHS)
THESE ARE THE SURVIVAL AND FREEDOM FROM ANEURYSM RELATED DEATH
CHIMNEY GRAFT COMPLIC. 4 (13.3%)  
MEAN F-UP 42.3 MTHS (MIN 1-151)

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<tbody>
<tr>
<td>LSA ASYMPT OCCL</td>
<td>1 (11 MTHS)</td>
</tr>
<tr>
<td>LCCA ASYMPT OCCL</td>
<td>1 (22 MTHS)</td>
</tr>
<tr>
<td>(TREATED $\rightarrow$ BYPASS)</td>
<td></td>
</tr>
<tr>
<td>STENT FRACTURE (ASYMPT)</td>
<td>1 (2 MTHS)</td>
</tr>
<tr>
<td>VIABAHN STENOSIS</td>
<td>1 (24 MTHS)</td>
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WE OBSERVED 4 ASYMPTOMATIC CHIMNEY GRAFT COMPLICATIONS: 2 OCCLUSIONS, ONE ALREADY SHOWN, TREATED BECAUSE OF THE LEFT COMMON CAROTID ARTERY;
THE CHIMNEY WITH STENT FRACTURE IS STILL PATENT AND WAS LEFT UNTREATED
THE VIABAHN STENOSIS WAS TREATED BY ANGIOPLASTY AND STENTING VIA EXTERNAL CAROTID ARTERY
AND THIS IS THE FREEDOM FROM OCCLUSION CURVE
DURING FOLLOW UP 6 PATIENTS DEVELOPED TYPE ONE ENDOLEAK, THE ONE WITH TYPE ONE B WAS TREATED BY DISTAL EXTENSION, 3 WERE LEFT UNTREATED BECAUSE OBSERVED IN PROHIBITIVE RISK PATIENTS AND W/O SAC ENLARGEMENT, 2 WERE TREATED BY EMBOLIZATION AND ONE WAS EVEN TREATED FOR AN ASCENDING DILATATION BY THE CARDIAC SURGEON

### TYPE I ENDOLEAK (20%)
MEAN F-UP 42.3 MTHS (MIN 1-151)

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
<th>Details</th>
</tr>
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<tbody>
<tr>
<td>Ia</td>
<td>5</td>
<td>Sac enlargement 2 (IA 6 mths - LSA 10 mths) (2 embolization + 1 ascending replacement)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>w/out sac enlargement 3 (LCCA)(IA)(LCCA+LSA) (91 yrs / lung K -&gt; death / COPD &amp; tracheostomy)</td>
</tr>
<tr>
<td>Ib</td>
<td>1</td>
<td>(distal extension)</td>
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THIS IS ONE OF THE TWO: AFTER AN INEFFECTIVE REDO KISSING BALLON ANGIOPLASTY WE PERFORMED A TRANSFEMORAL COILS EMBOLIZATION
AND THIS IS THE TYPE ONE ENDOLEAK FREE SURVIVAL CURVE
RIGHT STENT GRAFT LANDING ZONE

TO PREVENT RETROGRADE TYPE A
RETROGRADE TYPE A
Day 4 sudden death
Aortic arch debranching and thoracic endovascular repair

105 pts

Paola De Rango, MD, PhD, Piergiorgio Cao, MD, FRCS, Ciro Ferrer, MD, Gioele Simone, MD, Carlo Coscarella, MD, Enrico Cieri, MD, PhD, Gabriele Pogany, MD, and Fabio Verzini, MD, PhD, Rome and Perugia, Italy

- ZONE 0 19
- ZONE I 51
- ZONE II 35

  - MORTALITY 5.8% (4/6 ZONE 0)
  - STROKE 3.8% (1/3 ZONE 0)
  - SCI 2.9%

Overall, four de novo type A retrograde dissections were recorded at 30 days: three occurred in patients with zone 0 repair (two were lethal) and one after 10 days in a patient with zone 1 partial debranching who was successfully treated with ascending aorta replacement.

(J Vasc Surg 2014;59:107-14.)
So I think I can conclude that Chimney technique is not only feasible and safe in the immediate but even durable in the long run.

Type I endoleak is still an issue.
CHIMNEY ROLE

✓ RESCUE

✓ EMERGENCY

✓ HIGH RISK PATIENTS

✓ CUSTOM SG LIMITATION
CURRENT ROLE
EMERGENCY

AND CERTAINLY CANNOT BE USE FOR URGENT CASES LIKE THIS RUPTURE