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Midterm results with MFM stenting in the treatment of complex thoracoabdominal aortic pathology

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Endovascular treatment of Aorta.
Acibadem City Clinic experience- 2008-2017:

- Total: 273
- Aortic dissection- how far are we in treatment?
  - still high mortality rate despite well-established guidelines
  - incidence may double if pre-morbid risk factors are not better controlled
  - additional tears, critical true lumen compression with end-organ ischemia can compromise acute and chronic clinical outcomes after surgical or endovascular treatment in AoD
  - false lumen growth is an independent predictor of long term mortality and aortic events in both type A and type B AoD

Aortic dissection with evidence of organ malperfusion- how far are we in treatment?

- After rupture, malperfusion is the second leading cause of dead (occurring in 10-33%) of acute aortic dissections
- Additional tears and big delay in radical treatment leading to false lumen expansion and critical true lumen compression with end-organ ischemia can compromise acute and chronic clinical outcomes after surgical or endovascular treatment in both type A an B AoD
- This is the mechanism of worse outcomes shown in the long term arms of several trials and requiring additional complex treatment procedures in the f/u period


Case. 71y male, 2 years after TAAD dissection surgical repair.
FL expansion, severe visceral ischemia and renal failure.
MFM implantation

Postdilatation needed (true lumen extreme compression)

Final angiogram. Immediate centralization of flow and visceral branches flow restoration:

CTA and Duplex after 12 months. Centralized blood flow. Complete distal healing, patent visceral vessels:

Case 2. Clinical presentation

- A 48 years old male, medical history of severe AH with poor compliance to medication
- Admitted at 9 pm with severe uncontrollable thoracic pain irradiating to his back with an onset 4 hrs before admission and deep hypoesthesia and paresis of the right leg, impaired consciousness
- Physical examination: no palpable pulse on his right leg (ABI=0.3 on the right side).
- ECG - 75 b/m, sinus rhythm, LV hypertrophy, No acute STT changes
- Echo CG and Doppler - aortic root 38mm with intimal flap in distal ascending aorta and aortic arch, compressed true lumen in LCCA false lumen present at abdominal aorta with severe compression of the true lumen, no pericardial effusion.

CTA:

- Aortic dissection Stanford type A extending from the aortic arch after the ostium of the brachiocephalic trunk to both iliac arteries.
- Two more entry sites after the left subclavian artery.
- Extreme true lumen compression (visceral and legs ischemia)
48y male with TAAD

Extreme true lumen compression

Multidisciplinary Heart team decision:
Immediate Interventional procedure

- Deep sedation + local anestesia
- Vascular access; right radial 5Fr: for angiographic control
- Right femoral totally percutaneous 20 Fr (closed with two Proglide devices
- Two overlapping MFM(Cardatis) 35/200mm implantation into the aorta from the coronary arteries to renal arteries + two nitinol Protégé stents in the compressed right iliac true lumen

Note:
proximal part of the stent starts just on the sinotubular junction above the coronary arteries

CTA, 1 month after MFM implantation.
Excellent permeability of all vessels.

CTA 6 months after:
Excellent (normal) flow in all vessels arising from the stented zone: brachiocephalic and thoracic and all vessels involved into the acute dissection: visceral, renal, lower legs)
**Case presentation**

- H.T.H.; 75 year old male; hypertensive, smoker
- Comorbidities: Coronary Artery Disease-2 vessel disease. PCI + stent x3 in the RCA. And PCI and stent in RIM. Periphery Artery Disease II st. Arterial Hypertension III gr. Operation due to Ca recti.

**Case 4: Aortic dissection and aortic aneurysm: are they different diseases?**

PV, 67 y.

Symptomatic juxtarenal AAA

Relatively healthy appearance of the ThoAo

Included in the Streamliner trial

Next day:

- Excellent almost immediate isolation of the AAA
- Uneventful early f-up
- Discharged on 3d postop day

1 week after:

- Went to hunters’ “mission”
- Acute back pain with vegetative symptomatic during chasing a pig after shooting at it

PV, 67 y.

Immediate interposition of Valiant Captiva -telescoped to the previously implanted MFM -completely isolating the entry tear
Aortic dissection and aortic aneurysm: are they different diseases?

PV, 67 y.
Immediate interposition of Valiant Captiva completely isolating the entry tear telescoped to the previously implanted MFM.

De novo atherosclerotic stenosis of SMA and occlusion of Celiac trunk. MFM implanted 2 years before. Radial approach. JR 3.5, 6Fr GC, Whisper wire crossing through the mesh.

Aortoostial flair after Hippocampus 6.0/20mm stent implantation. No residual waist.

6 months CTA f-up after intervention, SMA stented through the mesh of MFM.

The current role of multilayer flow modulator stents in complex aortic pathology

Palombo D., Petrov I., Stankov Z et al

<table>
<thead>
<tr>
<th>Procedural details</th>
<th>Number (% or mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical success</td>
<td>21 (100%)</td>
</tr>
<tr>
<td>Total MFM implanted</td>
<td>69</td>
</tr>
<tr>
<td>Mean MFM implanted</td>
<td>2 (1-6)</td>
</tr>
<tr>
<td>Cases with coverage of all visceral/renal arteries</td>
<td>20 (95.2%)</td>
</tr>
<tr>
<td>Uncovered</td>
<td>1 (4.8%)</td>
</tr>
<tr>
<td>Common iliac artery</td>
<td>1 (4.8%)</td>
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<tr>
<td>Total N of covered arteries</td>
<td>104</td>
</tr>
<tr>
<td>Arterial access</td>
<td></td>
</tr>
<tr>
<td>Radial</td>
<td>18 (85.6%)</td>
</tr>
<tr>
<td>Surgical femoral (unilateral cutdown)</td>
<td>18 (85.6%)</td>
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<tr>
<td>Additional percutaneous (femoral)</td>
<td>1 (4.8%)</td>
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<tr>
<td>Total percutaneous</td>
<td>3 (14.4%)</td>
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<tr>
<td>Anesthesia</td>
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<tr>
<td>General</td>
<td>2 (9.6%)</td>
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<tr>
<td>Local</td>
<td>19 (90.4%)</td>
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<tr>
<td>Mean procedure times (minutes)</td>
<td>(1-5)</td>
</tr>
<tr>
<td>Mean x-ray time (minutes)</td>
<td>13.7 (6-28)</td>
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<tr>
<td>Mean contrast volume (mL)</td>
<td>118.7 (80-200)</td>
</tr>
<tr>
<td>Mean intensive care stay (days)</td>
<td>0</td>
</tr>
<tr>
<td>Mean clinical and imaging follow-up (months)</td>
<td>1-59 (24)</td>
</tr>
</tbody>
</table>
Early and midterm f-up results:

Device related failure: 0%
Iliac Stent thrombosis (successful fibrinolysis): 1/39 (2.5%)
Secondary patency: 38/39 (97.4%)
Preserved side branches flow: 102/104(98%)
Normal and normalized kidney function: 21/21 (100%)
General mortality: 1/21 (4%)
Aorta related mortality: 0/21 (0%)
Death of another cause (Pancreatic Cancer): 1/21 (8.3%)
Additional late procedures: 3/21 (16.6%)

One proximal dissection treated with Stent-graft
One distal aneurysm expansion treated with bare-metal extension
One superior mesenteric artery stented through the stent mesh


Established Superiority to Open Repair in TAAA STRATO Trial
Clinical Success 6 months 12 months 24 months 36 Months
Aneurysm Exclusion: 65% (13/20) 75% (15/20) 92% (12/13) 91% (10/11)
Aorta & MFM Patency: 100% (20/20) 100% (20/20) 100% (13/13) 100% (11/11)
Branch Patency: 100% (20/20) 100% (20/20) 100% (13/13) 100% (11/11)
Celiac Trunk: 100% (19/19) 95% (11/12) 100% (11/11)
Mesenteric Trunks: 100% (20/20) 100% (13/13) 100% (11/11)
Superior Mesenteric Artery: 100% (20/20) 100% (13/13) 100% (11/11)
Neurologic Nerves: 94% (13/14) 100% (12/12) 100% (11/11)
Left Renal Artery: 100% (13/13) 100% (13/13) 91%* (10/11)
Right Renal Artery: 100% (11/11) 100% (11/11) 100% (11/11)


Conclusion:

- The implantation of Cardiatis multilayer stent in the treatment of complex aortic pathology is effective and safe.
- In cases of complicated aortic dissection, centralization of flow concept applied with totally endovascular implantation of non-covered stents in the aorta and aortic branches is feasible and safe.
- This treatment allows preservation of blood flow in the branches arising from the stented area, thus avoiding brachiocephalic, spinal cord and visceral injury.
- The early and mid-term follow-up results are promising.
- We need more systematic procedural and clinical data in order to establish the exact indications of this novel technology.