Mechanobiology of the MFM® in the treatment of complex thoracoabdominal Aneurysms and Dissections

26-01-2017
Clinical Department
MFM® - Clinical Cases

PRE

F-Up at M03
MFM® - Clinical Cases

PRE

F-Up at M05

Cardiatis
PRE

Post-Implantation
MFM® paradigm shift

FLOW LAMINATION

Endothelium Formation

Organized Thrombus

BRANCH PERFUSION

Cardiatis
The Concept - Flow Lamination

Wall Stress vs Pressure

\[ \sigma_m = \text{Main stress} \]
\[ \sigma_l = \text{Longitudinal stress} \]
\[ \sigma_r = \text{Radial stress} = \text{local vortex Pressure} (\delta P) \]

\[ \sigma_r = \delta P \approx 0 \]
\[ \sigma_m \approx \sigma_l \]

Pressure (\delta P) \approx 0

Remove the risk of Expansion and rupture

W/O MFM®

W/ O MFM

with MFM®

Cardiatis
The Concept - Flow Lamination

**Without MFM®**
- Vortex in the aneurysm sac
- High speed velocity
- High stress in the wall

**With MFM®**
- Laminated flow
- Low speed velocity
- Decreasing pressure

Flow must be laminated to reduce pressure

- Rupture
- Thrombus formation
The Concept - Endothelium Formation and Branch Patency

In Vivo Study

Clinical Cases – Endothelium Formation and Branch patency

Endothelium Formation

Cells stop at the edge of branches - Patency

Animal Study (Dr Bonneau, INRA & NAMSA, France)
Clinical Case, Endothelium (CBSET)

PRE

F-Up at M01

Branch Patency
ORGANIZED THROMBUS FORMATION

Lines of Zahn (like onion layers)
Thrombus over time (stable)

Rabbit Elastase Aneurysm Model

Animal Study (Essen, Germany & Biomatech, Lyon, France)

Clinical Case – Lines of Zahn
Flow - Type B Aortic Dissection

Systolic Phase

Proximal Entry-Tear

Distal Entry-Tear
Flow - Type B Aortic Dissection

Diastolic Phase

Proximal Entry-Tear

Distal Entry-Tear
• Patient with Type B Aortic Dissection
  • Follow-Up at 24 Months
Paradigm shift

The MFM® technology changes the conventional approach and beliefs in treating aneurysms, opening a wide range of opportunities.

The MFM® = Physiological Aneurysm Repair

MFM® platform is a unique technological breakthrough that addresses current therapeutics limitations.

Key benefits from MFM®

- Flow Lamination
  - Aneurysm Immediately Protected
- Branch Patency
  - No Need for Extra Side Branch Catheterization
- Organized Thrombus
  - Natural Physiological Repair of the Aneurysm
- Endothelium
  - No Endoleaks, device fractures, migrations, etc
Thank you very much
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