New Frontiers in Management of Chronic Aortic Dissection; “Kinetic Elephant Trunk”

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- Founder of Tulip Endovascular Innovation, Ireland
- Founder of Embricon Endovascular, Ireland
- Founder of Green Medical, Michigan, USA
- Research Education Grants:
  - Cordis, Medtronic, Endologix, Gore, Vascular Solutions
  - BMS, MSD, AstraZeneca, Cardiatis, Abbot, AOIT
  - Sanofi-Aventis, Pfizer, Ulbrich, Bolton Medical, JOTECH
  - SFI, EI, NSAI, HRB, Erasmus+
- European Commission Next-Cardio for Advanced Technology

Disclosure

Thoracic Aortic Challenges

- TA Pathology & Dissections will Rule Our Practice
- Put All Together, The Total Number Of Patients Will Surpass AAA Volumes
- Formidable & Highly Invasive Nature Of The Operation Often Leads To A Prolonged Period of suffering & Incomplete Postoperative Patient Recovery

Flow Modulation & CSAD

- 85% All Cause-survival with 100% Freedom From Neurological Events & No Incidences Of End-organ Ischaemia, Paraplegia Or Renal Insult
- Dissection Remodelling was By A Reduction In Longitudinal Length Of The Dissected Aorta, False Lumen Volume & Reduction In False Lumen Index, While False Lumen Wall Pressure Reduced Through Flow Modulation

Contemporary Aortic Dissection

- The Entire Aorta Is Unstable
- There Is Not A Single-entry Tear In The Intima Or Concomitant Finite Exit Point From Which The False Lumen Communicates To True Lumen
- There Are Multiple Entry & Exit Tears & Communications Between True & False Lumens
Study Aim

- To Expand Our Understanding Of The Dynamic Evolution Of The Aorta Throughout The Dissection Time Course
- To Investigate How Dissection Process Can Be Modulated To Equalise Lumen Pressure, Enhance Perfusion & Stabilise Aorta Along Its Entire Length Using KET

“Kinetic Elephant Trunk Technique”

Patients & Methods

<table>
<thead>
<tr>
<th>Pan Aortic Dissection</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Stents Used</td>
<td>101</td>
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<tr>
<td>Number of Branches Covered</td>
<td></td>
</tr>
<tr>
<td>Innominate Artery</td>
<td>7</td>
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<tr>
<td>Left Common Carotid</td>
<td>8</td>
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<tr>
<td>Left Subclavian</td>
<td>9</td>
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<tr>
<td>Visceral Arteries</td>
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</tbody>
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Endovascular Scissoring

- Create Uni-luminal Aorta By Balloon Rupture of Intimal Membrane
- Approximation of Intimal Layer to Outer Aortic Wall by Streamliner
- Done Only in Juxta-Renal Aorta to Distal Aorta

Endovascular Scissoring

- Balloon- Provoked Intimal Disruption
- Streamliner Restores Uni-luminal Spiral Flow Dynamics
- Averts Visceral or Spinal Cord Malperfusion

Total-Endovascular Elephant Kinetic Trunk

Endovascular Kinetic Elephant Trunk
Chronic Symptomatic Aortic Dissection

CS-Type A & B Dissection

Pericardial Window for Peri-Cardiac Effusion

Total-Endovascular Kinetic Elephant Trunk

Results

- Technical Success Was 90.9%
- A Mean Of 4.0±/1.0 Devices Were Deployed Per Patient With A Mean 7.7+/-.69 Branches Covered Per Patient
- Proximal Landing Zones Ranged From Zone 0 To Zone 2 With Distal Landing Zone Varying From Zone 9 To Zone 11
- On Average Treatment Spanned 10.2±0.8 Zones
Results

- Length Of Hospital Stay Was 15.8±10.2 Days
- Thirty-days All-cause Survival & Aortic-related Survival Were 100%
- All Great Vessels & Visceral Branches Were Patent With Freedom Of Stroke, End-organ Ischaemia, Paraplegia & Renal Failure
- There Were No Cases Of Reintervention In The Thirty Days Post KET

What We Learned So far

- Regardless Of Number Of Stents Used, There Was No Linear Association Between Morbidity Or Mortality & Stent Number
- Endovascular Scissoring Allowed All Visceral Branches To Arise From A Single Lumen Post Streamliner Deployment & Facilitates Rapid Endothelialisation & Aortic Branch Perfusion With Extensive Coverage Lengths With Aortic Stabilization

Conclusion

- Its Radial Force Allows To Overcome Septal Rigidly Of CSAD & Gradual True Lumen Gain
- It’s Simplicity, Consistency & Reproducibility In Managing Very High Risk Patients With Negligible Morbidity & Mortality Will Add To Armamentarium Of Cardiovascular Specialist
- We Are Beyond The Learning Curve That Allowed Establishing The Indications & Contraindications of Streamliner Technology in CSAD

Endo-Bentall & Kinetic Elephant Trunk