Performance of Helix transendocardial biotherapeutic delivery system after 300 cases

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Background

Comprehensive approaches to local cardiovascular biologic therapy require a dedicated delivery system and may be regulated as combination products. FDA recent guidance has been towards performing sham-controlled trials, suggesting that there may be concern with delivery system safety. One leading trial using a placebo controlled trial design excluded events related to catheterization or injection procedure in the primary analysis. There is a need for understanding the overall MACE rate associated with different delivery platforms currently in use. Here we report on the safety experience of the Helix transendocardial delivery system after 300 clinical cases and compare results to those reported in the literature with other leading platforms.

Clinical Experience

The Helix Catheter System is comprised of the Helix Transendocardial Delivery Catheter used in combination with the Morph ® Universal Deflectable Guide Catheter. The Morph ® Universal Deflectable Guide is advanced through the aortic valve over a guide wire and provides the ability to guide the Helix Catheter. This catheter has been used in more than 5000 clinical procedures. The Helix Catheter for transendocardial delivery is advanced through the Morph guide via a hemostasis valve. The therapeutic lumen discharges at the distal tip of the helical needle. A second lumen discharges from the base of the helix for delivering contrast to confirm engagement and positioning. The helical needle allows for active fixation.

Clinical Trial Results

Comparative analyses of cell and gene delivery clinical trials over the past ten years utilizing different catheter based delivery systems have been reviewed for details on safety reporting and frequency of major adverse cardiac events including stroke/ ischemic events, myocardial infarction/vascular obstruction, cardiac perforation, vascular dissection, and death. Papers included delivery via intracoronary artery infusion using the STOP FLOW technique (N=907), and transendocardial intramyocardial delivery using the JNU Myno straight needle catheter (N=632), the BioCardia Helix catheter (N=300), and the Celayd C-Cath curved needle catheter (N=120). Primary articles on trials were supplemented by reports from the FDA Manufacturer and User Facility Device Experience of reported events, although for investigational trials there is no requirement to report anticipated adverse events. VT have been excluded in MACE due to the variability of reporting.

Conclusion

The Helix Transendocardial Delivery System is currently the safest biotherapeutic intramyocardial delivery system based on currently available data among the leading delivery systems in clinical trial use today. Procedural safety in a real world multicenter experience remains to be established with all biotherapeutic delivery systems.

References

3. The Helical Infusion Catheter System has been used in ten clinical trials for adult stem cells, and gene delivery in patients with ischemic heart failure or acute myocardial infarction, including TAMBIM (NCT00507468), POISEIDON (NCT01787996), TAC-HFT (NCT00788006), ACER1-100 Phase (NCT01082094), STOP-HF (NCT01643580), TRIDENT (NCT02216784), REGACARDIO (NCT02056681), EXCELLENT (NCT020669810), ALSTER-Helix (NCT020939042) and the CardiAMP HF Trials (NCT02428309).

Safety Profile of various intramyocardial injection catheters

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Emergent MACE Rate</th>
</tr>
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<tbody>
<tr>
<td>Transendocardial + Celyad C-Cath</td>
<td>5.2%</td>
</tr>
<tr>
<td>Transendocardial + JNJ Myostar</td>
<td>2.5%</td>
</tr>
<tr>
<td>STOP Flow Intramyocardary Artery</td>
<td>1.2%</td>
</tr>
<tr>
<td>Transendocardial + BioCardia Helix</td>
<td>0.3%</td>
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<table>
<thead>
<tr>
<th>Procedure Related Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transendocardial + Celyad C-Cath</td>
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<td>Transendocardial + JNJ Myostar</td>
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</tr>
</tbody>
</table>

Safety Profile is comparable to PCI procedure

Comparison of perforation rates for various percutaneous procedures showed transendocardial delivery using the Helix Infusion Catheter System approaching the safety profile of conventional percutaneous coronary intervention (PCI).

Figure: Comparison of perforation rates for various percutaneous procedures showed transendocardial delivery using the Helix Infusion Catheter System approaching the safety profile of conventional percutaneous coronary intervention (PCI).