

Press Release

First MRI-guided coronary intervention with stent placement successfully performed in animal trial using MaRVis MR micro-guidewires

July 12, 2019 – A group of interventional cardiologists and medical physicists of the Heart Center Freiburg University and Faculty of Medicine Freiburg, Germany, have performed the first successful animal trial wherein they repeatedly deployed a non-metallic vascular scaffold into coronary arteries in a fully MRI-guided intervention with the help of a MaRVis MR micro-guidewire. The authors concluded "that real-time MRI-guided coronary catheterization and intervention via femoral access is possible without the use of any contrast agents or radiation." This animal trial paves the way to exploit the expected benefits of MRI-guided coronary interventions, e.g. no radiation burden and continuous visualization throughout the entire procedure, leading to a new level of precision medicine. The MaRVis MR safe guidewire portfolio is the first and only one worldwide comprising a 0.014" MR micro-guidewire. Besides the good handling properties, the MaRVis MR guidewires are unique with their patent-protected iron particle-based MR marker system.

Magnetic Resonance Imaging (MRI) – guided cardiac interventions offer a huge number of benefits for patients, physicians and the healthcare system. They lead to a new level of precision medicine without radiation burden. The benefit to precisely see in the MR image the heart and coronary artery walls predicts for the future a higher efficiency in coronary interventions. Further, additional functional information like perfusion studies and blood flow quantification to examine revascularization can directly be retrieved from the MR image with modern MR imaging technologies.

A group of interventional cardiologists (led by Prof. Constantin von zur Mühlen and Dr. Timo Heidt) and medical physicists (led by Prof. Michael Bock) of the Heart Center Freiburg University and Faculty of Medicine Freiburg, Germany, have performed the first successful animal trial wherein they repeatedly deployed a non-metallic vascular scaffold into pig coronary arteries in a fully MRI-guided intervention with the help of a MaRVis MR micro-guidewire. (Heidt et al., Real-time magnetic resonance imaging – guided coronary intervention in a porcine model; Scientific Reports, Volume 9, Article number: 8663 (2019) <https://doi.org/10.1038/s41598-019-45154-7>)

The MR safe MaRVis 0.014" MR micro-guidewire has set the basis to explore percutaneous coronary intervention (PCI) under MRI-guidance. So far the lack of such MR micro-guidewires prevented preclinical development as these are a key requirement for any PCI. The MaRVis MR markers in the guidewire enabled "reliable localization of the guidewire position including the guidewire's distal end in the image." The authors stated: "Therefore, a major drawback of using guidewires in MRI has been settled."

Continuous visualization by MRI over the entire duration of the intervention is another huge benefit as it allows the physician to permanently see what he is doing. This is not possible with X-ray guidance due to the radiation burden.

The authors concluded "that real-time MRI-guided coronary catheterization and intervention via femoral access is possible without the use of any contrast agents or radiation." However, the authors also underlined the urgent need for further development of MR catheters with good mechanical properties and good MR visibility "as an important step towards MRI as a routine alternative to X-ray fluoroscopy".

Dr. Klaus Düring, CEO of MaRVIS Interventional GmbH, comments: "We are strongly delighted to have enabled this big step forward in development of MRI-guided coronary interventions with our unique MR safe micro-guidewires. We have learned a lot from this animal trial and will translate this into optimized coronary MR guidewire development. Further, we recognize the need of development of MR safe and visible catheters as another precondition to successful establishment of MRI-guided PCI and other interventions in the clinical routine. Our patent-protected platform technology for interventional MR devices enables such MR catheter development. Availability of such MR catheters will be a next major landmark in this field of clinical development."

MaRVIS Interventional GmbH is a German medical device company dedicated to development, regulatory approval and marketing of MR safe and MR visible interventional devices. It has developed a patent-protected comprehensive platform technology integrating optimal mechanical properties with sharp and precise visualization of the devices in magnetic resonance imaging (MRI). The first focus of MaRVIS is on MR safe and visible guidewires, which has been realized in the world's first full portfolio of CE marked 0.035" standard and stiff guidewires and 0.014" micro guidewires. The MaRVIS guidewires offer superior mechanical handling and MR visibility and have been successfully tested in numerous model and animal trials in 23 European and U.S. centers in various medical fields of application. This first-in-class platform technology provides high flexibility and is a powerful basis for the design of a broad spectrum of diverse interventional MR safe and visible devices.

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