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New's We're Watching: J&J's Varipulse PFA Earns CE Mark; Labs Create Intravascular Robots; And More

by Reed Miller

Medtech Insight's News We're Watching highlights some recent business and R&D developments you may have missed. This week, Biosense Webster's Varipulse PFA platform earned a CE mark; Biosense Webster also announced the start the pivotal IDE study of its Laminar left atrial appendage elimination system; the FDA approved Boston Scientific's Agent paclitaxel-coated balloon and cleared Medtronic's OsteoCool 2.0 bone ablation system; three papers in *Science Robotics* describe magnetically controlled vascular robots that could go places wires and catheters cannot.

Biosense Webster's Varipulse PFA Earns A CE Mark

Johnson & Johnson/*Biosense Webster*'s Varipulse pulsed field ablation (PFA) platform earned a CE mark for the treatment of symptomatic, drug-refractory, recurrent paroxysmal atrial fibrillation, the company announced on 29 February.

Varipulse includes the Varipulse variable-loop multielectrode catheter, the Trupulse multichannel PFA generator, and the Carto 3 three-dimensional, real-time cardiac mapping system. (Also see "*Updated: J&J Moves Closer To PFA Approval; New Data Presented At Boston AF*" - Medtech Insight, 7 Feb, 2024.)

The CE mark is supported by *one-year outcomes from 226 patients in the inspIRE trial* confirming the safety and effectiveness of pulmonary vein isolation ablation with the Varipulse system in patients with drug-refractory paroxysmal atrial fibrillation.

The company previously reported that it expected the CE mark for Varipulse in the first quarter

of 2024 and hopes to complete an application to the US Food and Drug Administration very soon. Once it is approved in the US, it will compete with *Boston Scientific*'s Farapulse PFA and *Medtronic*'s PulseSelect PFA, both of which also have CE marks.

Japan's Ministry of Health, Labour and Welfare (MHLW) approved Varipulse in January.

IDE Trial Of Biosense Webster's Left Atrial Appendage Eliminator Begins

Biosense Webster announced the start of the pivotal investigational device exemption (IDE) study of its Laminar left atrial appendage elimination (LAAX) system with cases completed at the Los Robles Health System in California and at Bernard's Heart & Vascular Center, in Jonesboro, AR.

The prospective, randomized, open-label study will enroll about 1,500 patients with non-valvular atrial fibrillation at up to 100 sites in the US.

The study will compare the safety and efficacy of the Laminar LAAX system to commercially available left atrial appendage closure (LAAC) devices.

Boston Scientific's Watchman and *Abbott*'s Amplatzer Amulet LAAC devices create a barrier between the left-atrial appendage and the left atrium to prevent emboli that form in the appendage from reaching the brain. However, Laminar does more than block the appendage; it has a ball and lock that twists the tissue around the opening to exclude and "eliminate" the appendage. (Also see "*Updated: J&J Will Pay At Least $400m For Laminar To Add Stroke-Stopping Technology*" - Medtech Insight, 30 Nov, 2023.)

J&J acquired the LAAX technology by acquiring Laminar for $400m in late 2023.

Biosense Webster also owns the WaveCrest LAA occlusion technology originally developed by Coherex.

Boston Scientific's Agent DCB Earns FDA Approval

The US Food and Drug Administration *approved* Boston Scientific's Agent paclitaxel-coated balloon catheter for percutaneous coronary interventions on 29 February.

Specifically, Agent is *indicated* for adult patients undergoing PCI to treat in-stent restenosis in

coronary arteries 2-4 mm in diameter and lesions up to 26 mm long to improve myocardial perfusion.

"The Agent DCB addresses a critical unmet need by providing a dedicated treatment option for the challenging condition of in-stent restenosis and we look forward to offering US physicians the opportunity to treat their patients with this novel device," said Lance Bates, the president of Boston Scientific's interventional cardiology therapies business.

The US FDA granted Agent DCB its *breakthrough device designation* in 2021.

The approval is based on results from the 600-patient *AGENT IDE* trial. In the prespecified interim analysis of the first 480 patients, the study met the primary endpoint of target lesion failure at one year – 17.9% in the Agent DCB group versus 28.7% in the control group treated with an uncoated balloon catheter. (Also see "*News We're Watching: TCT Yields More Encouraging Results For TAVR; HeartPoint Resets Trial Plans, Butterfly Tries Brain-Interface Tech*" - Medtech Insight, 30 Oct, 2023.)

Wells Fargo analyst Larry Biegelsen expects US interventionalists to rapidly adopt Agent DCB. "Our checks indicate that the average selling price in the US will be $5,500-6,000 – materially above our prior estimate of $2,500 – and ahead of drug-eluting stents today, which are priced at $500-750," he wrote in a 1 March note.

"This would imply a $550m US opportunity for in-stent restenosis alone (~10% of PCI patients), and we expect rapid adoption given the unmet need in the in-stent restenosis population."

FDA Clears Medtronic's OsteoCool 2.0 Radiofrequency Bone Ablation System

The US Food and Drug Administration *cleared* Medtronic's OsteoCool 2.0 radiofrequency ablation system for the treatment of painful bone metastases and benign bone tumors, including osteoid osteoma.

This upgraded version of the OsteoCool can simultaneously deploy four internally cooled probes to ablate two vertebral bodies at once or create a larger ablation zone for extra-spinal applications. It offers four probe sizes, more than any other comparable system available in the US, according to Medtronic.

According to Medtronic, OsteoCool is the most powerful bone tumor ablation system on the market and the only bone tumor ablation platform with internally cooled probes to ensure predictable ablations and reduce the risk of excess heating.

The clearance is supported by *OPuS One*, the largest study of radiofrequency ablation in bone metastases. *One-year results* from 206 patients in OPuS One showed radiofrequency ablation of lytic metastases provides significant pain relief within three days, translating to improvements in quality of life.

iRhythm Proposes $450m Offering

Cardiac rhythm diagnostics company *iRhythm Technologies* plans to offer $450m (aggregate principal amount) in convertible senior notes, due in 2029, in a private placement to qualified institutional buyers.

iRhythm will use a portion of the net proceeds from this offering to pay the cost of new "*capped call transactions*." The capped call transactions are expected to reduce the potential dilution to iRhythm's common stock.

Approximately $80.1m of the net proceeds will go to repayment of existing debt and another $25m of the net proceeds will repurchase shares of iRhythm's common stock. The rest of the funds will go to general corporate purposes, including sales and marketing activities, medical affairs and educational efforts, research and evidence development, working capital, capital expenditures, and other investments.

The company will also grant the initial purchasers of those notes an option to purchase, within 13 days day, more notes worth up to $67.5m.

"Given the capped call transactions, there will be no share dilution until the stock appreciates significantly," Wells Fargo Larry Biegelsen pointed out in a 4 March note.

iRhythm's share price dropped from just over $120 to below $113 following the announcement.

The company's revenue grew nearly 20% in 2023 to $492.7m. Gross margins were up 67.3%, but the net loss was $123.4m, up $7.3m compared to 2022.

iRhythm controls about 70% of the US long-term cardiac monitoring market and 25-30% of the overall US ambulatory cardiac monitoring market, covering about 6.4 million cardiac monitoring procedures annually. (Also see "*Cardio Conversations: 'Much More Than Just A Patch,' iRhythm CEO Blackford Talks AI Arrhythmia Diagnostics*" - Medtech Insight, 3 Mar, 2024.)

Science Robotics Highlights Endovascular Robots

Researchers at *ETH Zurich* have developed a magnetically steered continuum robot that could access brain vessels without a wire or catheter.

In a paper in *Science Robotics*, Roland Dreyfus and colleagues describe a highly dexterous, articulated robot that can be steered through tortuous blood vessels from the aorta to tiny cranial arteries.

So far, the group has demonstrated the feasibility of the robot in a pig. This experience shows it has potential for atraumatic access to occluded vessels in the brain, they conclude.

Currently, minimally invasive access to the brain requires the skillful manipulation of wires or tubes. “The outcome of the procedure heavily relies on the clinician’s skill and the device’s ability to navigate to the affected target region in the bloodstream, which is often inhibited by tortuous blood vessels,” the researchers explain. “Sharp turns require high flexibility, but this flexibility inhibits translation of proximal insertion to distal tip advancement.”

The robot created by the Zurich group has a helical protrusion that translates rotation to forward motion at every point of contact with the vessel wall and the articulating magnetic tip allows for active steerability.

“Given the distinctive characteristics of the helical device, obtaining US Food and Drug Administration (FDA) registration will require clinical data from extensive in vivo studies involving multiple animals, including postmortem assessments, followed by subsequent human studies."

Also in *Science Robotics*, researchers led by Xurui Liu of Huazhong University of Science and Technology in Wuhan, China, describe a novel magnetic soft microfiberbot that could eventually be deployed to embolize brain aneurysms or brain tumors.

The soft microfiberbots were fabricated by thermal drawing of a magnetic soft composite into microfibers that were molded into polarized helix. By controlling the magnetic fields, the operator could propel and navigate the robot through complex vasculature and robotic embolization in submillimeter regions.

Liu’s group completed an in vitro embolization of aneurysm and tumor in neurovascular “phantoms” and an embolization of a rabbit femoral artery under real-time fluoroscopy.

“These studies demonstrate the potential clinical value of our work, paving the way for a robotic embolization scheme in robotic settings,” the authors conclude.

A research group led by Qinglong Wang from the Chinese University of Hong Kong have

developed a technique for using laser-speckle contrast imaging to track and navigate an endovascular "microswarm" of magnetic nanorobots in real time. So far, the group tested the microswarm in the femoral veins of anesthetized rats.

This approach could eventually improve targeted endovascular delivery of drugs, according to a paper in *Science Robotics*.

"The proposed strategy … offers great potential in biomedical applications as a radiation-free, real-time, and prolonged in vivo tracking method of a microrobotic swarm with high delivery efficiency," the researchers conclude.