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Taking heart: innovation trends at Cardiostim 2014



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TAKING HEART: INNOVATION TRENDS AT CARDIOSTIM 2014

Fiona Dunlevy
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In June, over 5000 of the best and brightest cardiologists will unite in Nice, France at the biennial Cardiostim conference to present and debate the latest in cardiac electrophysiology and device therapies. Cardiovascular disease is already Europe's deadliest disease with 4.3 million deaths per year, and experts warn that this figure is set to rocket given Europe's rapidly aging population and the rise in obesity and diabetes.¹ This month we predict the trends that will be making waves at Cardiostim 2014, including the innovative disruptive technologies that are toppling gold standards off their perches.

Several companies believe that going large is not going to heal our hearts; instead they are going small - very small. Miniaturisation is the name of the game these days, with advances in electronics and nanotechnology fuelling the race to shrink devices. Miniaturized leadless pacemakers, such as the Micra from Medtronic, will



debate during the conference, with the motion "Leadless Pacing Is the Solution to Most Current Weaknesses of Pacing."

Traditionally, pacemakers are surgically implanted in the chest with leads snaking into the heart via blood vessels. At just one tenth the size of traditional pacemakers, the Micra device is small enough to be slipped into the heart itself via long flexible tubes called catheters. This avoids both surgery and the need for electrical leads, which connect traditional pacemakers to the heart, and can displace or become infected. The catheter delivery system also makes device replacement easier once the battery gives up, although big extensions in battery life mean that the devices should last several years longer than traditional pacemakers. Another miniature game changer is the tiny Reveal LINQ from Medtronic, which is injected under the skin and continuously monitors the heart for long stretches of time to catch transient problems with heart rhythm, transmitting data wirelessly to an external recorder when the patient is asleep.

Catheters will be a hot topic in their own right during Cardioslim 2014, and they have come a long way since the ancient Greeks fashioned bronze catheters to unblock the urinary tract. Today's catheters are used to locate and image blockages in blood vessels, to deliver and anchor miniaturized devices in place, to deliver stents to prop open obstructed blood vessels as well as new valves to replace faulty originals. In the field of cardiac arrhythmias, catheters are increasingly being used for ablation, or destruction, of patches of heart tissue sending out erroneous electrical signals causing the heart to beat too fast, too slow or erratically. Several Cardioslim sessions will discuss catheter ablation and all eyes will be on new trends in catheter navigation and force sensing.

Ablation efficacy has already improved in recent years with the adoption of irrigated catheter tips, which produce deeper lesions in the tissue. Effective tissue destruction also depends on good contact of the catheter tip with the malfunctioning heart tissue to be destroyed. Until recently, physicians had no way of knowing how hard the tip was pressing into the heart wall and if they were damaging the tissue enough to permanently switch off the electrical signals causing arrhythmia. In a way, they had lost their sense of touch. Technology is catching up though, and new generation "force sensing" catheters provide real time measurements of contact force during ablation, allowing doctors to apply just the right amount of force.

At the same time, advances in robotic navigation capabilities, are keeping pace with catheter developments, with an entire Cardioslim session devoted to catheter navigation and mapping. Technologies on the table for discussion include body surface mapping, magnetic resonance imaging and endocardial rotor mapping. Advances in body surface mapping will be presented by a representative of the French team that authored a recent paper showing how a vest studded with electrodes can non-invasively pinpoint areas of arrhythmia.² Rotor mapping hunts down the exact area of the errant electrical whirlwind (or rotor) that sustains arrhythmia once triggered, using multi-electrode "basket" catheters. It's hoped that this will improve ablation therapy by flagging tissue destruction targets based on functional rather than physical landmarks. Finally, navigation is going 3D and even 4D by adapting catheters to be compatible and visible by magnetic resonance imaging (MRI). As well as improving the overall efficacy and speed of ablation procedures, these advances, together with magnetic and robotic manipulation of catheter placement, will help reduce exposure of both patients and medical staff to the radiation associated with traditional techniques.

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The exchange of advances and ideas is key to the success of any conference, and with the lineup of innovative devices to be presented in Nice next month, we expect Cardioslim 2014 to be no different. With innovations from miniature devices to intelligent catheters shaking up the field to calm the heart, we think that Cardioslim 2014 can best be summed up as "be regular, my beating heart."

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