**OPTIONS FOR REMOTE PATIENT MONITORING IN THE LVAD POPULATION**

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*Purpose*: Multiple technologies are emerging that may have roles in remote patient monitoring in the LVAD population. These include smartphone applications and wearables, nanosensors, lab-on-a-chip platforms, and miniaturized systems. We investigated the feasibility and safety of a novel ingestible nanosensor Proteus Medical to monitor medication compliance among patients with left ventricular assist devices (LVAD).

*Methods*: The sensor is a miniaturized circuit composed of Mg and Cu and is embedded within a medication or placebo pill. Upon ingestion, gastric acids activate the circuit producing a biogalvanic battery and a 1-2V signal. A receiver patch on the abdominal wall captures and transmits this signal to a cloud-based platform and to an iPad application. To assess the efficacy of this system, LVAD recipients meeting inclusion criteria were considered for enrollment. Study subjects ingested 4-6 sensors over a 3-day period and were continuously monitored with telemetry, defibrillator, and LVAD interrogation, and were monitored to 30 minutes post-ingestion.

*Results*: To date, 4 subjects have been enrolled with a combined ingestion of sensors. Successful signal transmission was observed in 86 % (18 / 21) ingestions with possible crosstalk between the LVAD and patch suspected in 3/21 ingestions. 100% positive signal detection was demonstrated after placement of the receiver patch in positions lateral or beneath the LVAD pocket. Signals were detected within 15 minutes after ingestion and no false signals were observed. No changes were evident on defibrillator or LVAD function after any ingestion.

*Conclusion*: This study represents an early application of emerging mobile health options that are available to the LVAD population. Clinical application for this sensor includes monitoring patients to reduce the risk of device-related complications including bleeding and thrombosis, and as a digital health strategy to improve patient safety and outcomes.