Managing Congestive Heart Failure with Wireless Implantable Hemodynamic Monitors: Patient Emotional and Behavioral Effects

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Introduction
Congestive Heart Failure (CHF) is a chronic, costly, and crippling disease state and Wireless Implantable Hemodynamic Monitors (W-IHMs) are a novel CHF monitoring technology providing remotely-transmitted daily pulmonary artery pressure data to care providers. The patient experience involves both managing self-care behaviors and cardiac anxiety.

Congestive Heart Failure
• CHF affects more than 5.5 million US adults, with an estimated 8 million cases by 2030.
• Nearly half of CHF patients die within 5 years of diagnosis.
• Costs associated with CHF were recently estimated at $30 billion each year, and to surpass $1 trillion by 2035.
• The American Heart Association describes the progression of heart failure in Four Stages. Stages C & D are characterized by many severe symptoms including difficulty breathing while performing routine tasks, swelling in bodily extremities, and difficulty sleeping.

Pulmonary Artery Pressures (PAP)
• Worsening in pulmonary artery pressures have been associated with a worsening in heart failure conditions.
• These changes may occur up to two weeks in advance of patient observable symptomology changes.

PAP Monitoring
Wireless Implantable Hemodynamic Monitors (W-IHMs) are a novel CHF monitoring technology providing remotely-transmitted daily pulmonary artery pressure data to care providers.

Study Purpose
The study purpose was to determine the prospective effects of W-IHMs on maintenance-related self-care practice (mSCP) and Heart Focused Anxiety (HFA) in this CHF population.

Wireless Implantable Hemodynamic Monitor
Pictured above is the only currently commercially available version of W-IHMs technology, CardioMEMSTM by St Jude Medical.

Design
CHF patients receiving W-IHMs were recruited at their CHF clinics to complete a Cardiac Anxiety Questionnaire (CAQ) and the Self Care of Heart Failure Index (SCHFI v6.2) Section A pre-implantation baseline measurement and at a 1 month follow up.

The CAQ is an 18-item self-report measure designed to assess HFA with a 5-point Likert scale. The SCHFI v6.2, Section A, is a 10-item self-report measure of heart failure maintenance-related self-care practices utilizing a 4-point Likert scale and standardized mean scoring on a 100 point scale.

Methods
Preliminary analysis of initial mean scores of total HFA and mSCP pre-implantation and at one month follow up. Correlated T-tests examined mean differences between baseline and follow up reports.

Results
Participant HFA was significantly lower ($t(8) = 4.69, p = .002$) at 1 month follow up ($M = 74.15, SD = 11.45$) than at baseline ($M = 81.08, SD = 5.28$) with participant mSCP significantly higher ($t(8) = 2.50, p = .04$) at 1 month follow up ($M = 81.08, SD = 5.28$) than at baseline ($M = 74.15, SD = 11.45$).

Conclusions
Preliminary results of this ongoing study indicated that W-IHMs are associated with reduced cardiac anxiety and improved self-care in CHF patients. These results suggest that the increased oversight of their condition by care providers provide benefits in terms of the emotional and behavioral demands of CHF.

Demographics Ranges Marital Status % (N)
Age 39-81 (M = 60, SD = 12.27) Single 11% (N = 1)
Education HS-Grad School (Mo: HS) Married 56% (N = 5)
Annual House Income <$10k-$75k (M = $20k-$40k) Divorced 11% (N = 1)
Widow 22% (N = 2)
Gender % (N)
Female 55% (N = 5) African American 55% (N = 5)
Male 45% (N = 4) White 45% (N = 4)

1Dr. Samuel F. Sears has research grants from Medtronic and Zoll Medical. He currently serves as a consultant to Medtronic and St. Jude Medical. He has received speaker honorarium from Medtronic, Boston Scientific, Zoll Medical, Spectranetics, and St. Jude Medical.
2Dr. Ashley Burch has a research grant and serves as a Consultant for Zoll Medical.