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Wireless Fitness Monitor Helps Tailor Recovery Strategy After Heart Surgery

Technology creates opportunity to improve post-discharge outcomes

Chicago – Using wireless technology may speed patients' postoperative recovery following heart surgery and improve post-discharge outcomes, according to a study in the September 2013 issue of *The Annals of Thoracic Surgery*.

"This type of technology will transform the assessment of surgical and medical recovery," said lead study author David J. Cook, MD, from the Mayo Clinic in Rochester, MN. "When an older patient is hospitalized—whether it's for surgery or another medical condition—that patient's ability to regain strength and mobility is a primary determinant of whether the patient can go home and be independent."

Using an off-the-shelf fitness monitor, Dr. Cook and colleagues monitored the total number of steps taken each day by patients following elective heart surgery (coronary artery bypass grafting, valve repair or replacement, or both). Study patients were older than age 50, lived at home, were ambulatory prior to surgery, and were expected to be hospitalized for 5-7 days following surgery.

Key Points

- Wireless monitoring of patient mobility following heart surgery may help transform post-operative care.
- Significant relationships were found between the number of steps taken in the early recovery period and length of hospital stay/discharge location.
- Technology has the potential to change how health care is delivered and managed in the next 3 years.

Fitness monitors were placed on ankles of each patient following discharge from the intensive care unit. Day of placement was identified as recovery day 1.

For analysis, patients were grouped by length of hospital stay (LOS) (short, intermediate, or long) and discharge location [home, home with health care (HHC) support, or skilled nursing facility (SNF)].

On recovery day 2, the researchers found significant differences in mobility among patients who were later discharged home independently compared with those discharged home with HHC support or to a

SNF. The median number of steps measured on recovery day 2 for the home group was 675 vs. 108 steps for the HHC and SNF groups. This gap was also evident on recovery days 3 and 4.

The researchers also found that patients with short and intermediate lengths of stay walked more on recovery days 1 and 2 compared with patients with a long LOS. By the end of recovery day 2, patients with a short LOS reached a median of 818 steps vs. 514 and 223 steps in the intermediate and long LOS groups, respectively.

Dr. Cook noted that while the results were not unexpected, they are unique because they represent the first demonstration that remote monitoring of mobility is effective in assessing hospital surgical recovery, and such data have implications for resource utilization and outcomes.

"The integration of these types of technologies with the ability to acquire, aggregate, and report data in ways that make it readily actionable will change how health care is delivered and managed," said Dr. Deschamps, the study's senior author and department chair of surgery at Mayo Clinic. "The benefits this technology brings to most elderly hospitalized patients will be tremendous. The technology is already robust and reliable, and the next 3 years will bring the software integration to allow the data to easily populate electronic medical records or patient dashboards."

Potential to Advance Care of Hospitalized Patients

In an accompanying commentary in the same issue of *The Annals*, Clare H. Ridley, MD, Joseph V. Adler, PT, DPT, CCS, and Albert T. Cheung, MD, from the University of Pennsylvania Perelman School of Medicine in Philadelphia, discussed the benefits of wireless monitoring and its impact on resource utilization and heath care costs.

"The application of wireless accelerometry to quantify physical activity has the potential to extend the capabilities of the physical therapy team, measure the effectiveness of rehabilitation regimens, quantify progress and improve the ability to predict operative risk," said Dr. Cheung. "The investigators have shown that creative application of sophisticated but affordable miniature electronic devices has the potential to advance the care of hospitalized patients."

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For a copy of the study or commentary, contact Cassie Brasseur at 312-202-5865 or cbrasseur@sts.org.