

Non-invasive Evaluation of Cardiac Time Intervals by the HEMOTAG Recording Device to Tailor Treatment of Acutely Decompensated Heart Failure

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Introduction

Evaluation of cardiac time intervals (CTIs) by the HEMOTAG recording device has been associated with early and accurate identification of acutely decompensated heart failure (ADHF). It is unclear if the daily evaluation of CTIs can guide treatment for patients with ADHF and improve short-term outcomes.

Methods

HATS OFF (Hemotag Assessment for Short-term Outcomes of Heart Failure) is a prospective, unblinded, single-center, non-randomized study that enrolled hospitalized patients with ADHF and other acute medical conditions (control group) to assess the relationship between daily isovolumetric contraction time (IVCTs) by HEMOTAG and the clinical progression of ADHF.

Results

A subset analysis of 30 patients admitted between 08/2019 and 12/2019 to our cardiovascular center was performed. Out of these, 12 patients have ADHF, and 18 patients were in the control group. IVCTs were recorded on admission and on a daily basis (during hospitalization) while NT-pro-BNP was collected on admission and on the 3rd day of hospitalization. For patients with ADHF, the initial NT-pro-BNP went from a mean of $5,515 \pm 2,766$ pg/ml to a mean $3,801 \pm 3,066$ pg/ml vs. in the control arm, went from a mean of 130 ± 72 pg/ml to a mean of 149 ± 71 pg/ml. The HEMOTAG was used to track daily IVCTs (normal <40 ms) in all patients. For ADHF patients, the mean IVCT went from 59 ± 9 ms (day 1 of hospitalization) to 48 ± 7 ms (Last day). Conversely, the control arm did not have any significant changes in their daily IVCTs, demonstrated by a mean of 32 ± 9 ms (day 1) to a mean of 35 ± 9 ms (final day). Figure 1 depicts the progression of IVCTs and NT-pro-BNP in a subject with ADHF, and Figure 2 shows the IVCTs progression for a control arm subject.



The image showcases the application of HEMOTAG Vitals. Once the device is positioned on the patient's chest, a 30-second recording begins through the HEMOTAG App. The patient receives an alert upon completion of the reading, and the data is automatically uploaded to our HIPAA-compliant, secure cloud system for processing. A comprehensive structural heart health report is then generated and accessible to the provider through the Clinician Dashboard. This enables the provider to assess the patient and optimize their care.

Conclusion

This study suggests that daily IVCTs by HEMOTAG can predict the progression and volume status of patients with ADHF. The applicability of this study to our daily practice and its role that guide treatment will be tested on phase 3 clinical trial (HATS OFF study group). NHLBI grant# R44HL145941

Figure 1.

A progressive decrease in IVCT in a patient with ADHF as volume overload (congestion) decreases with daily diuretics.

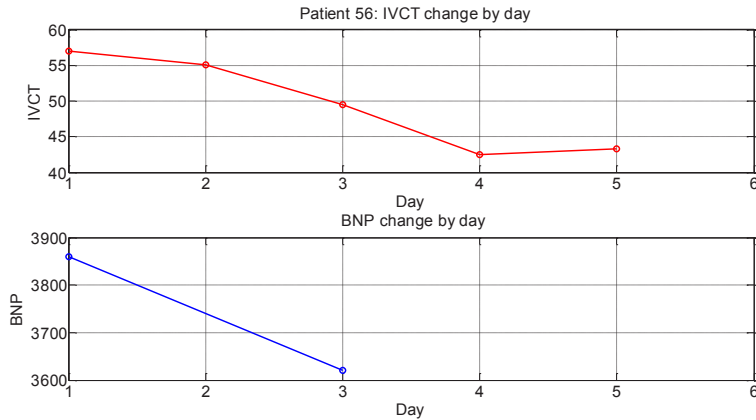
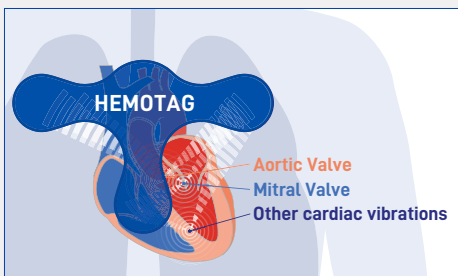
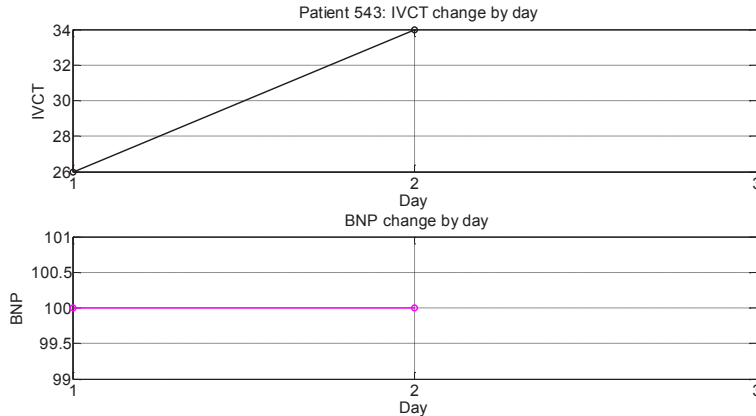


Figure 2.

Example of a control arm patient showing no significant change in IVCT (<40ms) and NT-pro-BNP during the index hospitalization.



About HEMOTAG Vitals

HEMOTAG Vitals is the future of non-invasive cardiac hemodynamic monitoring. Providing vitals using our proprietary non-invasive quad sensing vibration technology, which previously were available only through surgical procedures or blood draws. Aventusoft/HEMOTAG sees beyond the gold-standard invasive procedures and implantable devices, with our mission to revolutionize the way we can respond to structural heart disease and heart failure (HF) in the coming decade.