Use of HEMOTAG Cardiopulmonary Assessment System for Predicting Clinical Decompensation in Heart Failure in the Inpatient Setting

Submission Category: Heart Failure and Cardiomyopathies

Background

Heart failure carries high morbidity and in patients with acutely decompensated heart failure decongestion remains a mainstay in treatment. The assessment of euvolemia among patients with heart failure can be challenging, particularly among higher risk patients and those patients in which body habitus may obscure the physical examination.

Case

A 66 year old male with history significant for an ischemic cardiomyopathy with an ejection fraction of 25%, atrial fibrillation, chronic kidney disease, and morbid obesity (BMI of 55) presented to the hospital in acutely decompensated heart failure following three other similar admissions over the preceding month. He had evidence of adequate end-organ perfusion, yet was significantly volume overloaded. Ischemia was ruled out. The patient was ultimately initiated on appropriate diuretic therapy with an excellent response to diuretics with over 24 liter net negative output. Following a 5 day period of aggressive diuresis, he was thought to be euvolemic and subjectively reported no further symptoms of congestion.

Decision-making

As part of the on-going HATS-OFF clinical trial in which the HEMOTAG device is used to assess the isovolumetric contraction time (IVCT) of the heart, a validated marker of congestion, the patient had daily IVCT recordings. Despite clinical evidence of euvolemia, as supported by a lack of edema, no jugular venous distension, and subjective resolution of symptoms with a decrease in urine output and mild increase in BUN and creatinine above his baseline, he was noted to have persistent elevation in his IVCT. Considering the discordant clinical picture, decision was made to obtain a right heart catheterization which demonstrated marked volume overload with a right atrial pressure of 20 mm Hg and a pulmonary capillary wedge pressure of 36 mm Hg. Decision was made to continue aggressive intravenous diuretics, of which the patient responded to favorably and ultimately discharged 10 days later with stability in the outpatient setting at clinic follow-up.

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

Among hospitalized patients with decompensated heart failure, daily IVCT readings from the novel HEMOTAG device can supplement physical exam findings in understanding the true volume status of a patient. The HEMOTAG device may be particularly beneficial in higher risk patients, including those with morbid obesity in which the physical exam may be misleading and those with frequent readmissions to better understand volume status.

Figure 1A: Urine Output

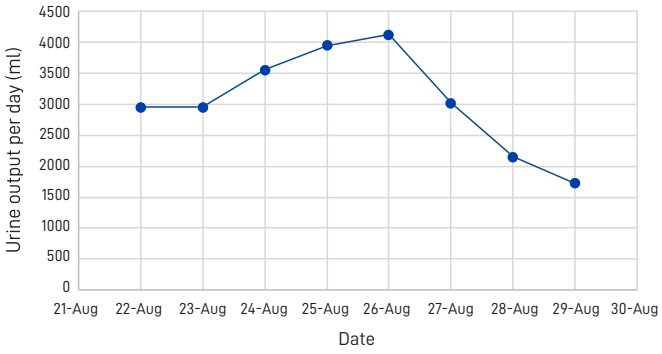


Figure 1B: Measured Isovolumetric Contraction time (IVCT)

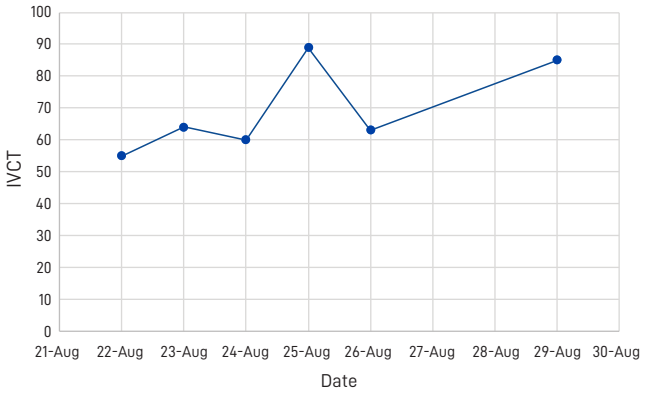
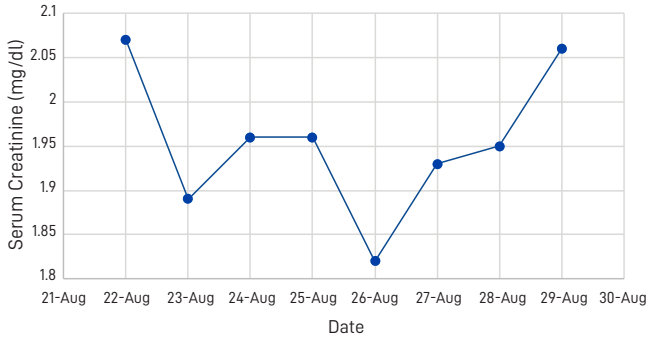
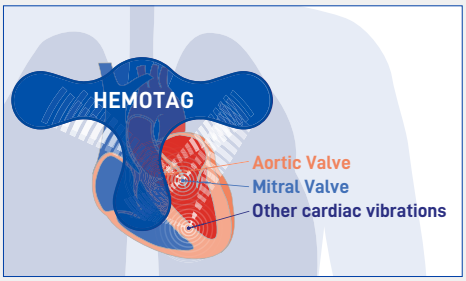


Figure 1C: Serum Creatine





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.

HEMOTAG® by Aventusoft

info@hemotag.com | www.hemotag.com | 561.234.4040