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# Exploration of a rapid transdermal wearable in assessment of cardiac injury

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## INTRODUCTION

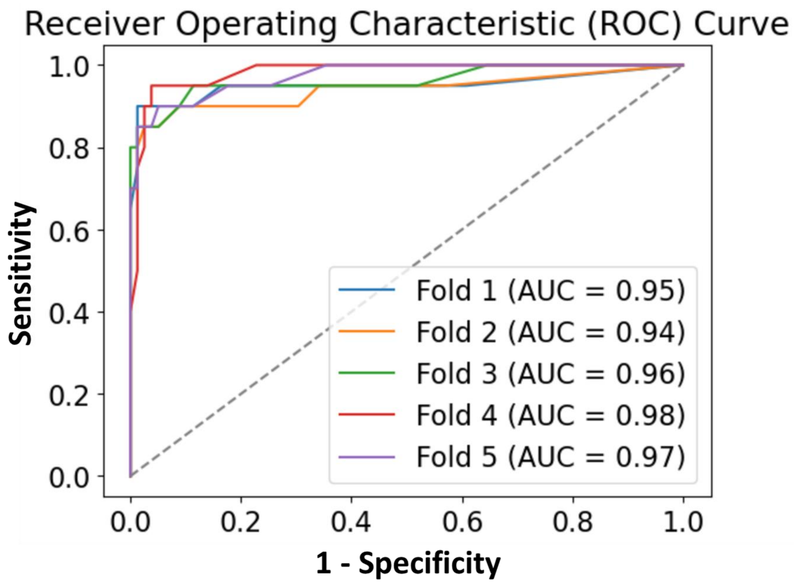
Suspected acute coronary syndrome is a common Emergency Department presentation. A rapid transcutaneous troponin measurement would provide improved efficiency in acuity assessment and prevent ED overcrowding. Our purpose was to evaluate a non-invasive wireless wrist-worn optical wearable device for the rapid determination of cardiac injury. This technology is based on molecular spectroscopy that uses innocuous infrared light to detect changes in molecular absorption signals correlating with cardiac injury, even in a complex matrix such as skin and tissue.

**Figure 1. Tropsensor**


## OBJECTIVE

Our purpose was to evaluate a non-invasive wireless wrist-worn optical wearable device for the rapid determination of cardiac injury (Figure 1). This technology is based on molecular spectroscopy that uses innocuous infrared light to detect changes in molecular absorption signals correlating with cardiac injury, even in a complex matrix such as skin and tissue (Figure 2).

**Plot 1. Performance metrics**




## METHODS

This multisite study enrolled healthy normal subjects after screening for known cardiovascular risk factors, and hospitalized patients with a troponin measurement exceeding the local lab assay's 99th percentile.

A random cohort of 20% of our dataset was excluded and a neural network model (2 layer TanH activation function) trained on the remainder. The trained model was tested on the excluded cohort data. Data is presented as 95% confidence intervals (CI) and C statistics (Plot 1).

## RESULTS

Overall, 79 healthy controls and 20 elevated troponin patients were enrolled.

The optical device delineated the patients with elevated cardiac injury biomarker from the normal subjects with an accuracy of 0.955 (CI: 0.949 - 0.96) and C-statistic of 0.96 (CI: 0.9461 - 0.9897).

**Figure 2. Tropsensor on a patient**

## CONCLUSION

This pilot study supports the potential to differentiate patients with cardiac injury from normal subjects using a transcutaneous device.

**Disclosures:** S.B. holds option equity with RCE Technologies. J.T., J.K. and A.B. are employees of RCE Technologies. A.H.B.W, A.S.J. and W.F.P. are advisors to RCE Technologies and hold option equity shares.