Diagnosis of cardiogenic shock (CS) is traditionally based on clinical exam, laboratory data, and invasive hemodynamic assessment. There are limited data deeply phenotyping the profile of circulating biomarkers in patients with CS.

METHODS

- Admissions to the cardiac intensive care unit (CICU) at Brigham & Women’s Hospital (Boston, MA) were enrolled in a biorepository with admission blood sampling between 2017 and 2020.
- CS was assessed using clinical data and invasive hemodynamic assessment (when available).
- Proteomic profiling performed with Olink multiplex platform, which uses pairs of oligonucleotide-labeled antibodies to bind, identify, and quantify circulating proteins with high specificity on a qPCR readout.
- Using a case-control approach, we analyzed 449 biomarkers (hsTnT, Olink CVD II, CVD III, cardiometabolic, inflammation, neuro) in patients with CS (n=69) vs CICU controls without shock (n=175).
- Biomarkers for CS were also analyzed against the subgroups of CICU controls without shock (n=69) and with heart failure but no shock (n=69).
- Multivariable models included age, sex, eGFR, ASCVD, history of HF, and presentation with acute MI.
- Bonferroni correction was used to control type 1 error.

RESULTS

- Sixty-seven (Fig 1), 20, and 15 biomarkers were significantly associated with the diagnosis of CS as compared with (1) all CICU controls without shock, (2) non-shock controls with hypotension, and (3) non-shock controls with HF, respectively.

RESULTS (Continued)

- Of these, the strongest associations per 1 SD were:
  - 8 biomarkers (CTSD, FGF-23, GDF-15, IGFBP-1, NT-proBNP, OPN, OSMR, ST2) were positively associated with CS across all control groups (Fig 2).

RESULTS (Continued)

- Compared with patients in the lowest quartile, patients in the highest quartile of each of these protein biomarkers had >40-fold higher odds of having CS vs CICU controls (Fig 3).

CONCLUSIONS

- In a well-phenotyped cohort of CICU patients, a targeted proteomic approach identified 8 biomarkers among 449 candidates as the most upregulated in CS as compared to CICU controls without shock as well as compared to the subgroups of CICU controls with hypotension and HF without shock.
- Among those 8 biomarkers, FGF-23, GDF-15, ST2, and CTSD were more upregulated and more closely associated with CS than either NT-proBNP or hsTnT.
- This pilot study illustrates the potential for proteomic profiling in CS.

DISCLOSURE OF FACULTY RELATIONSHIPS:
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Fig 1. Volcano plot summarizing adjusted associations between biomarkers and cardiogenic shock (as compared with CICU controls without shock).

Fig 2. Summary heat map of biomarkers with higher adjusted* odds for CS across different control populations.

Fig 3. Adjusted* odds of CS by quartile