Intensive blood pressure lowering in individuals with low diastolic blood pressure and elevated troponin levels in SPRINT

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BACKGROUND

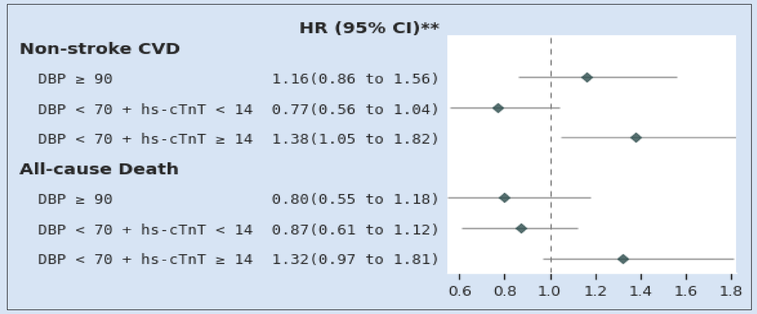
- Hypertension (HTN) affects ~1.4 billion people worldwide and is a leading cause of cardiovascular disease (CVD) and early death.
- Recent guidelines recommend lower blood pressure (BP) targets, but the optimal BP target for individuals with low diastolic BP (DBP) remains controversial because of the J curve phenomenon:
  - Low DBP is associated with increased CVD risk and death, thought to be due to reduced coronary perfusion in diastole.
- High sensitivity cardiac troponin T (hs-cTnT), a biomarker of subclinical myocardial injury, may be able to identify individuals with low DBP at-risk of harm from additional BP lowering.
- However, there are no data from randomized trials on whether lower BP targets have similar CVD and mortality benefits in individuals with low DBP and elevated hs-cTnT.

METHODS

- Participants:
  - SPRINT (Systolic Blood Pressure Intervention Trial)
    - 9,361 non-DM adults with HTN and at high CVD risk; 102 sites.
    - Randomized intensive vs. standard SBP (<120 vs. <140 mm Hg).
    - Trial stopped early (2010-2015) due to ↓CVD in intensive arm.
  - Ancillary analysis of 8,828 (94%) participants with baseline hs-cTnT
- Combined baseline DBP and hs-cTnT groups:
  - Low DBP = <70 mm Hg. Elevated hs-cTnT = ≥14 ng/L.
    - Low DBP + elevated hs-cTnT = 784 (8.9%)
    - Low DBP + non-elevated hs-cTnT = 1287 (14.6%)
    - Normal or high DBP = 6657 (76.5%)
- Outcomes:
  - **Non-stroke CVD composite** (MI, ACS not resulting in MI, acute decompensated HF, or death from CVD)
  - **All-cause mortality**
- Analysis: Cox proportional hazards models.

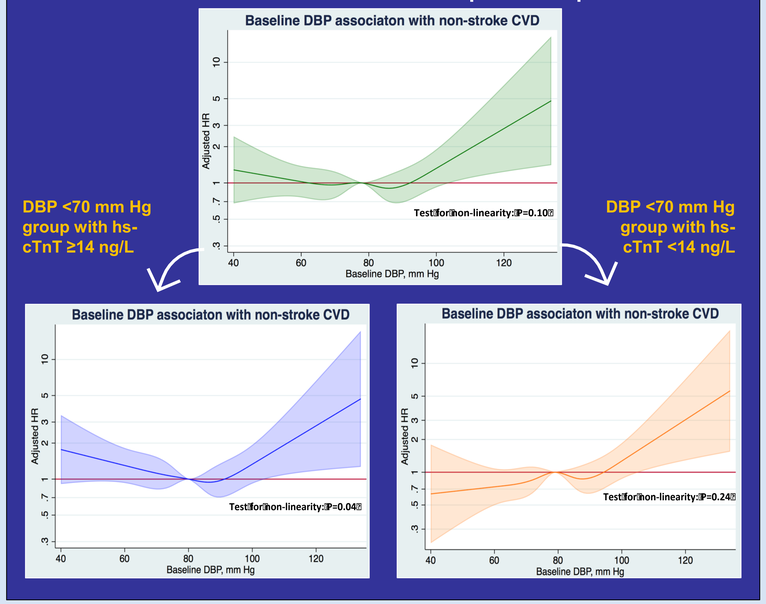
RESULTS

- Low DBP and elevated hs-cTnT group: mean baseline DBP = 62 (±6) mm Hg; median baseline hs-cTnT = 20 ng/L. Older, more often male, less often African American, less often current smokers, more likely to be on a statin, and had a higher pulse pressure and lower eGFR.
- **Low DBP and elevated hs-cTnT was associated with higher non stroke CVD risk compared with those with normal DBP*.**



*Reference group is those with baseline DBP of ≥70 mm Hg to <90 mm Hg.
**Adjusted for baseline age, sex, race, treatment assignment, current smoking, prior CVD, body mass index, low density lipoprotein cholesterol, statin use, systolic blood pressure, total number of antihypertensive medications, and eGFR.

Spline plots of multivariable-adjusted associations between baseline DBP and the non-stroke CVD composite endpoint



- **Randomization to intensive versus standard SBP lowering led to similar reductions in non-stroke CVD risk and death across DBP/hs-cTnT groups**

Outcome	Standard Tx Events/N (%)	Intensive Tx Events/N (%)	HR (95% CI)	P for Interaction
Non-Stroke CVD Composite				
DBP ≥70	189/3380 (5.6%)	138/3377 (4.1%)	0.72 (0.58, 0.90)	0.10
DBP <70 + hs-cTnT <14	41/652 (6.3%)	16/635 (2.5%)	0.39 (0.22, 0.69)	
DBP <70 + hs-cTnT ≥14	52/379 (13.7%)	45/405 (11.1%)	0.78 (0.52, 1.16)	
All-Cause Mortality				
DBP ≥70	140/3380 (4.1%)	91/3377 (2.7%)	0.65 (0.50, 0.84)	0.60
DBP <70 + hs-cTnT <14	25/652 (3.8%)	19/635 (3.0%)	0.76 (0.42, 1.39)	
DBP <70 + hs-cTnT ≥14	40/379 (10.6%)	36/405 (8.9%)	0.83 (0.53, 1.31)	

CONCLUSIONS

- The combination of low DBP and elevated hs-cTnT is associated with increased CVD risk compared to normal DBP.
- The J-curve association between DBP and non-stroke CVD risk may be largely explained by elevations in hs-cTnT among those with low DBP.
- However, SPRINT participants with low DBP and elevated hs-cTnT levels appear to derive similar CVD and mortality benefits from intensive SBP lowering as those without low DBP.
  - Thus, the J curve likely represents confounding / reverse causation.
- These findings support the use of lower BP targets in clinical practice, even among individuals with low DBP and subclinical myocardial injury.

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