NATRIURETIC PEPTIDE AND CARDIOVASCULAR RISK ACROSS ANTHROPOMETRIC MEASURES IN PATIENTS WITH HFmrEF or HFpEF

Josephine Harrington,[1,2*] John Ostromonski,[3*] Brian Claggett,[3] Akshay Desai,[3] Kieran Docherty,[4] Pardeep Jhund,[4] Carolyn Lam,[5] John McMurray,[5] Marc Pfeffer,[3] Bertram Pitt,[6] Faiez Zannad,[7] Scott Solomon,[3] Muthiah Vaduganathan [3]

[1]University of Colorado, Aurora, United States [2]Colorado Prevention Center, Aurora United States [3]Brigham and Women's Hospital, Boston United States, [4]University of Glasgow Glasgow United Kingdom, [5]National Heart Centre Singapore, Singapore, Singapore, [6]University of Michigan Medical Center, Ann Arbor, Michigan, United States, [7]Université of Lorraine, Lorraine, France *Co-First

BACKGROUND

- Elevated levels of NT-proBNP are strongly associated with increased risk for cardiovascular (CV) death and heart failure (HF) hospitalization
- Natriuretic peptide levels are known to vary inversely with body mass index
- The relationship between NT-proBNP and alternative markers of adiposity, including waist-to-height ratio (WHtR), has not been well-characterized.

OBJECTIVES

- To assess the relationship between multiple anthropometric measures with NT-proBNP in patients with HFmrEF and HFpEF
- To assess risk of HF events across the spectrum of BMI and WHtR
- To evaluate the interaction of BMI and WHtR on the relationship between NT-proBNP and risk of HF events

METHODS

- **Study Population**: Patients with HFmrEF or HFpEF enrolled in TOPCAT Americas, PARAGON-HF, or FINEARTS-HF
- **Statistical Analysis**:
- Participant-level pooled analysis across 3 HFmrEF/HFpEF trials
- The associations between WHtR and BMI with NT-proBNP were examined using linear regression with multivariable adjustment.
- The association between baseline NT-proBNP (per doubling) and risk of CV death and HF hospitalization was then evaluated across both BMI and WHtR through Cox proportional hazards regression with multivariable adjustment.
- Predicted incidence rates at a fixed NT-proBNP concentration and predicted NT-proBNP concentration at a fixed incidence rates were estimated across BMI and WHtR categories using Poisson regression

RESULTS

Baseline Demographics Across Waist to Height Ratio

WHtR	<0.5 N=551	0.5 to <0.6 N=3474	0.6 to <0.7 N=4256	≥0.7 N=2299	P value
Age (years)	72	72	73	71	<0.001
Male	49.2%	49.8%	51.2%	41.3%	<0.001
BMI (kg/m^2)	23.4	26.2	30.9	36.7	<0.001
Hypertension	82.8%	88.9%	92.9%	96.4%	<0.001
Diabetes	28.1%	33.0%	44.0%	54.4%	<0.001
EF (%)	54	54	55	55	<0.001
NYHA					<0.001
Class I	1.1%	1.7%	1.3%	0.8%	
Class II	76.6%	77.1%	73.1%	63.1%	
Class III	22.0%	20.8%	25.1%	35.2%	
Class IV	0.4%	0.4%	0.5%	0.9%	
eGFR (mL/min/1.73 m^2)	64	64	62	61	<0.001
NT-proBNP pg/mL	1293	1049	941	841	<0.001

Association between baseline NT-proBNP (per doubling) and CV death or HF hospitalization by baseline anthropometric category (BMI or WHtR). Models adjusted for age, sex, LVEF, eGFR, systolic blood pressure, history of atrial fibrillation, any diuretic use, trial, randomized treatment, and alternate anthropometric term (BMI if WHtR, WHtR if BMI).

Predicted Incidence Rates of CV Death or HF Hospitalization at NT-proBNP = 300 pg/mL Among Participants without Atrial Fibrillation, by Joint Categories of BMI and WHtR

	BMI Category (kg/m^2)		
WHtR Category	18.5 to <30	30 to <35	≥35
	IR per 100 py	IR per 100 py	IR per 100 py
<0.5	2.6	--	--
0.5 to <0.6	3.4	4.1	--
0.6 to <0.7	4.1	5.0	5.9
≥0.7	5.1	6.2	8.9

Predicted NT-proBNP at IR (CV Death or HF Hospitalization) = 5 per 100 Person-Years Among Participants without Atrial Fibrillation, by Joint Categories of BMI and WHtR

	BMI Category (kg/m^2)		
WHtR Category	18.5 to <30	30 to <35	≥35
	NT-proBNP (pg/mL)	NT-proBNP (pg/mL)	NT-proBNP (pg/mL)
<0.5	542	--	--
0.5 to <0.6	578	576	--
0.6 to <0.7	381	346	197
≥0.7	203	208	77

CONCLUSIONS

- WHtR more closely predicts risk of CV death and HF hospitalization than BMI in patients with HFmrEF and HFpEF
- Distinct relationships exist between BMI and WHtR with NT-proBNP
- When assessing risk for CV death and HF hospitalization, WHtR and NT-proBNP may provide complimentary information

Limitations: Post hoc analysis; possible inconsistencies across acquisition of WHtR; NT-proBNP and BMI inclusion/exclusion criteria limit range of data; no adjustment for multiplicity