Autonomic Balance and Migraine:
The Atherosclerosis Risk in Communities Study

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Presenter Disclosure Information

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DISCLOSURE INFORMATION:
No relationships to disclose.

Introduction

The role of autonomic nervous system dysfunction in migraine continues to be debated

Case-control studies have used various measures:

- Cardiovascular tests, vasomotor reactions to temperature changes, responses to pharmacological tests, changes in biochemical parameters

Findings have been contradictory and inconclusive

Study Question

Do individuals with migraine have impaired autonomic function, as measured by heart rate variability indices?

Study Population

Atherosclerosis Risk in Communities Study (ARIC)

- Longitudinal, population-based cohort of 15,792 individuals aged 45-64 from four geographically defined centers
- Four visits, at three year intervals, with HRV measured at Visit 1 (1987-1989) and history of migraine at Visit 3 (1993-1995)

Study Population

- Exclusions
  - Did not attend Visit 3 (n=2905)
  - Missing information on migraine status (n=37)
  - Ethnicity (n=80)
  - Age less than 45 at baseline (n=34)
  - Missing or invalid HRV data (n=2511)
- Final sample size: N=10,225

Migraine Definition

IHS criteria

(1) A lifetime history of headaches lasting 4-72 hours

(2) At least two of:
- Unilateral location
- Pulsating quality
- Moderate or severe intensity
- Aggravation by physical activity

(3) At least one of:
- Nausea and/or vomiting
- Photo- & phonophobia

(4) At least five such attacks

(5) Normal neurological exam

ARIC criteria

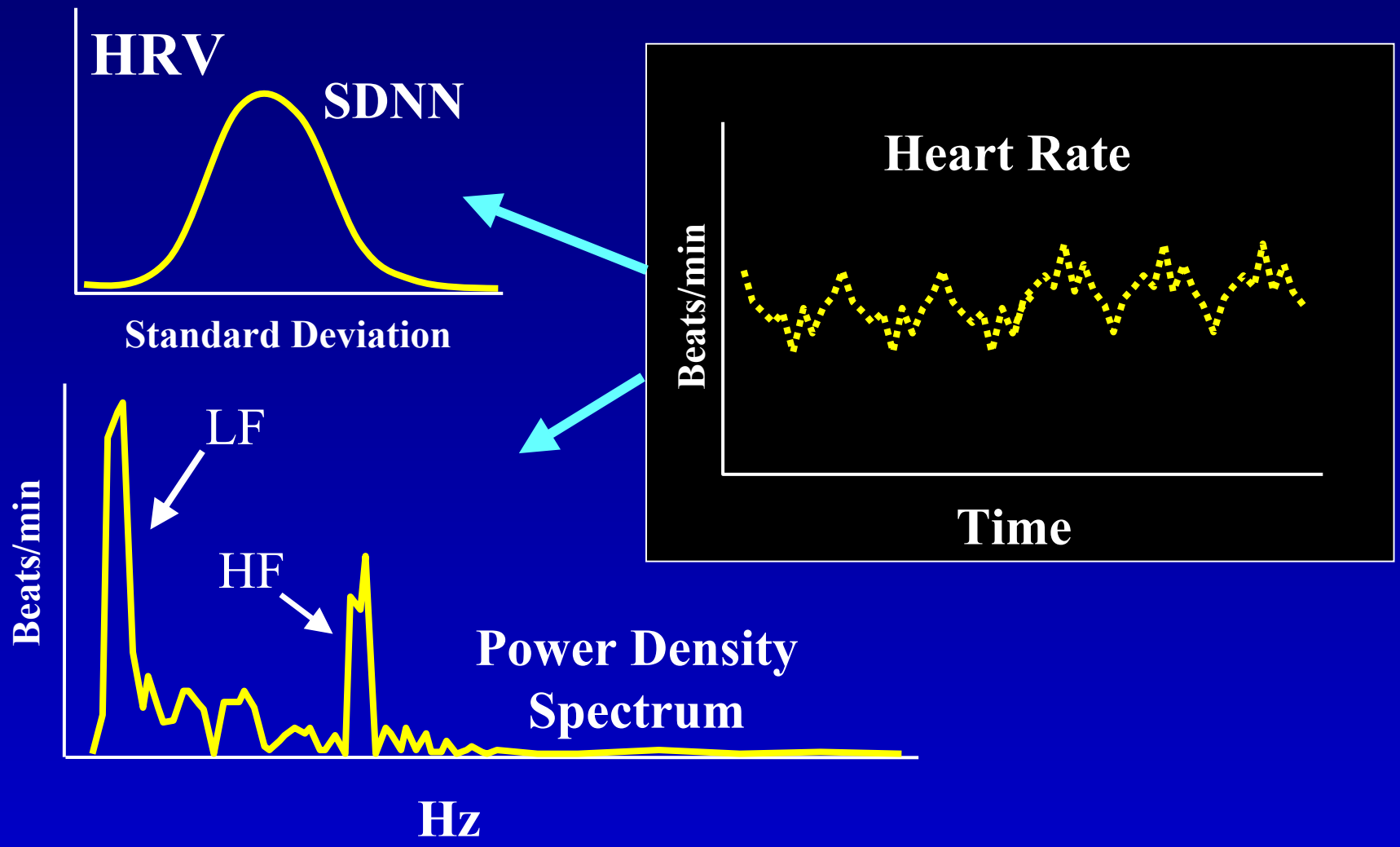
(1) A lifetime history of headaches lasting ≥4 hours

(2) At least one of:
- Mostly unilateral
- Throbbing, pulsating, or pounding

(3) At least one of:
- Nausea and/or vomiting
- Photo- & phonophobia

(4) A lifetime history of such headaches over a period of one or more years

Heart Rate Variability Measurements



Analysis

Logistic regression

- Modeling the odds of being a migraineur
- HRV measures (SDNN, HF, LF) in sex- and race-specific quartiles
- Adjusted for sex-race group, age, study center, and resting mean heart rate

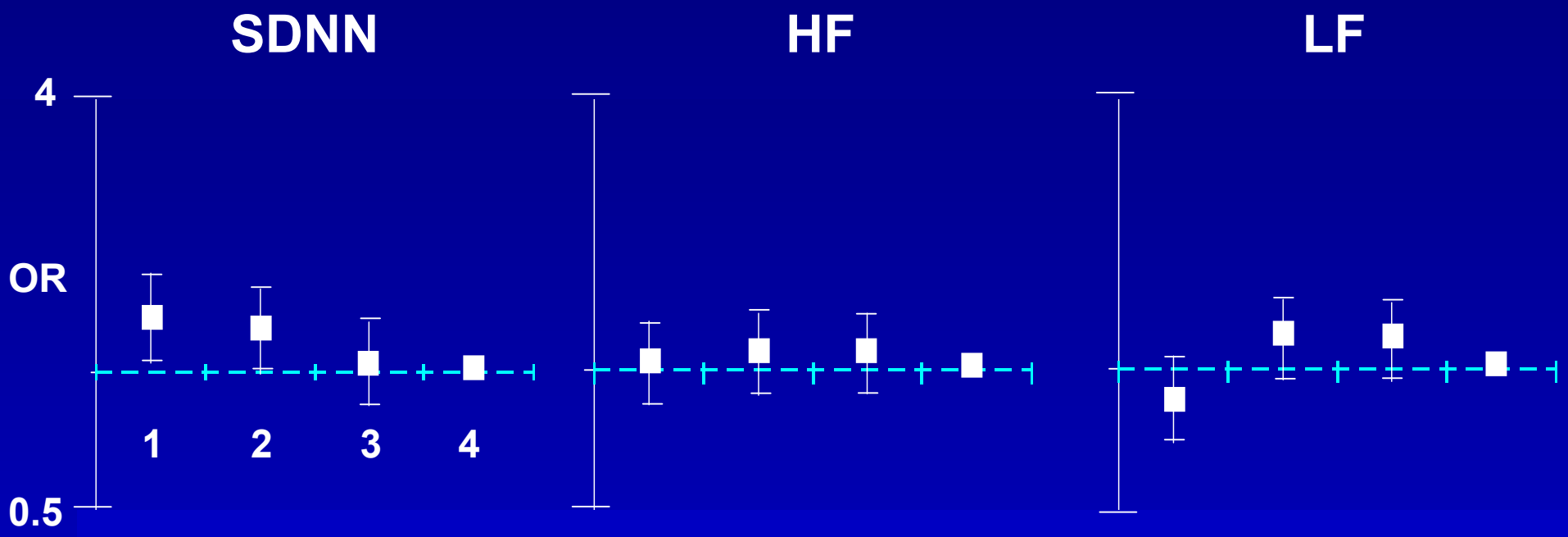
Results

- Migraine status is strongly associated with sex and race.

	#	# of migraineurs	%
Black men	780	8	1%
Black women	1453	75	5%
White men	3591	136	4%
White women	4401	618	14%

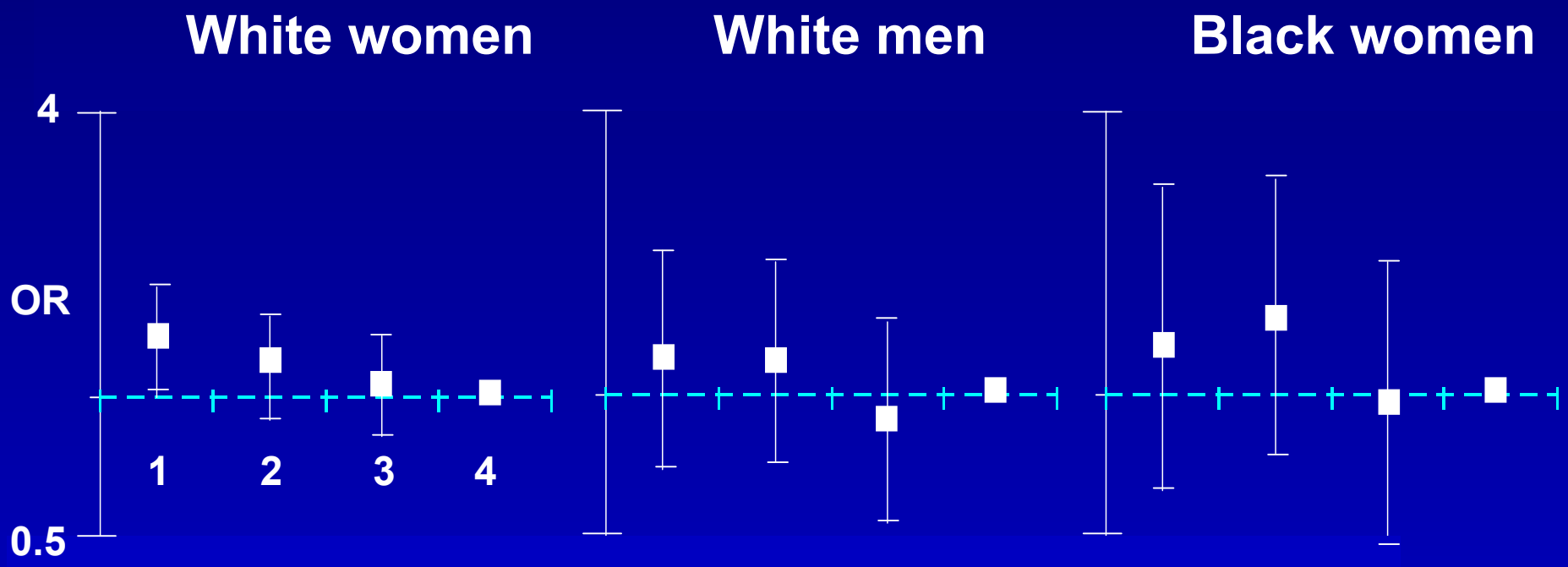
- Migraine status was not associated with blood pressure, hypertension, diabetes, or educational level.

Results - Pooled



- adjusted for sex-gender group, age, study center, and mean resting heart rate

Results - SDNN in Stratified Analyses



- adjusted for age, study center, and mean resting heart rate

Strengths and Weaknesses

- Large, population based sample
- Uniform assessment of migraine and heart rate variability
- Short 2-minute HRV records do not completely capture LF function
- Migraine criteria do not exactly meet IHS criteria
- Migraine and heart rate variability were not assessed at the same examination

Conclusion

- There is the suggestion of an inverse relationship between SDNN and migraine status, especially among white women. However, the association is not strong and is not seen in the frequency domain measures.
- Consequently, the results are inconclusive, and do not provide strong support either for or against an association between migraine and autonomic nervous system dysfunction.