

TRIATHLON DEATHS: SWIMMING-INDUCED PULMONARY EDEMA?

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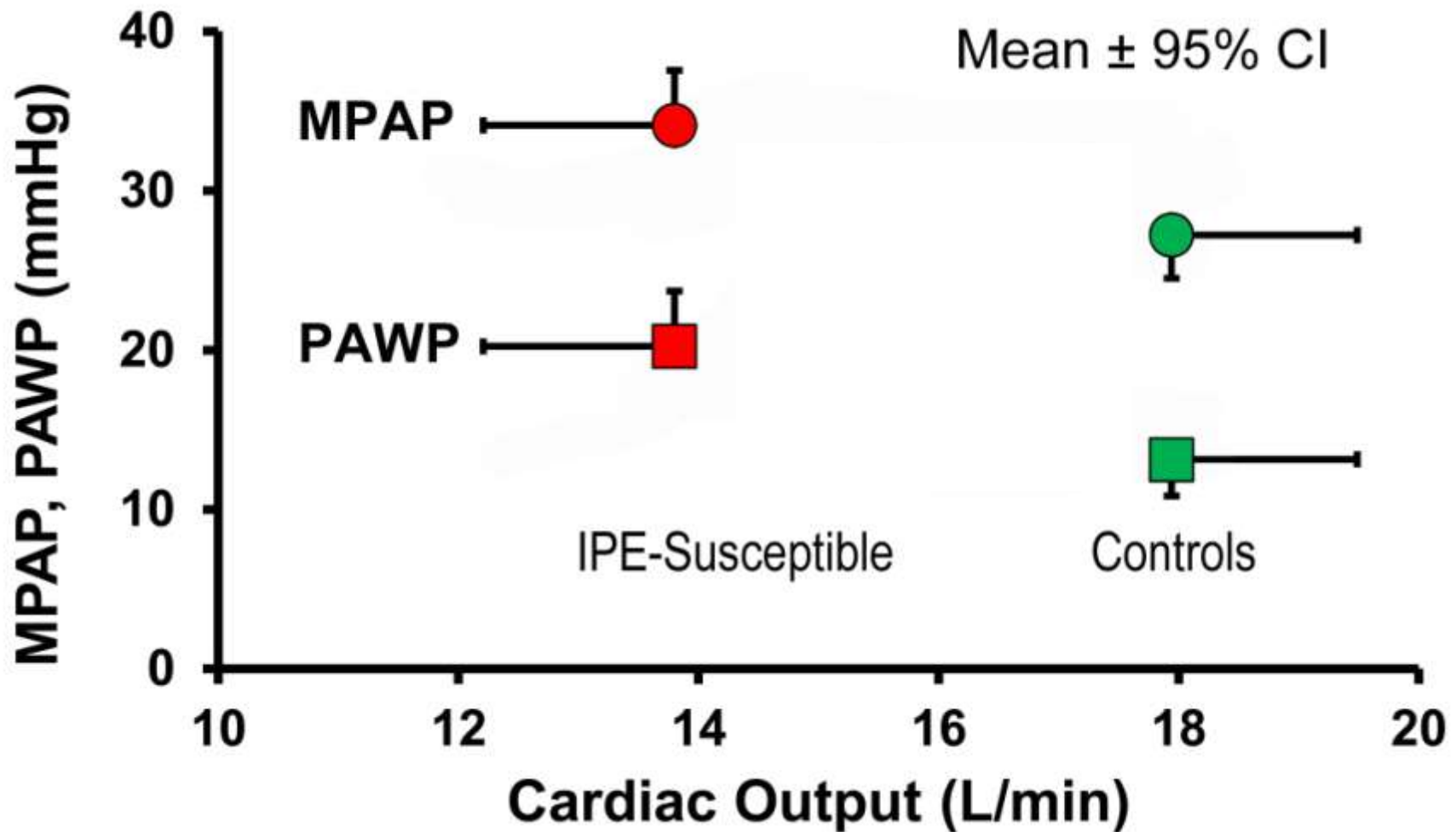
Introduction

- Deaths during triathlon
 - Majority occur during the swim
 - No known explanation, mostly healthy participants
- Could swimming-induced pulmonary edema (SIPE) be contributing?
 - 1.5% of triathletes reported symptoms consistent with SIPE*
 - Reported in some NAVY BUD/S recruits, scuba divers, and snorkelers

Background

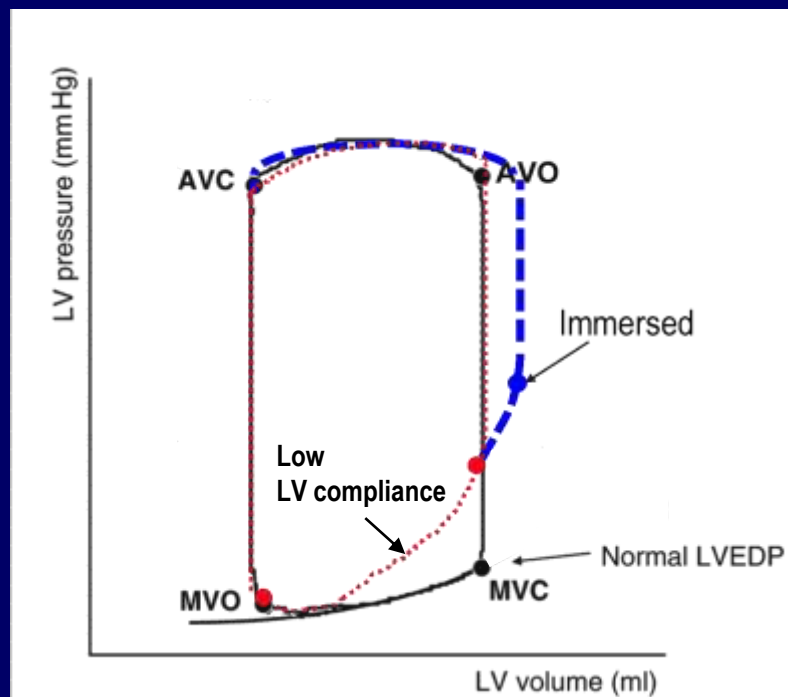
- Characteristics of SIPE
 - Dyspnea, hemoptysis, cough during swimming
 - Risk factors: cold water, hypertension, overhydration, heavy exertion
- Higher pulmonary artery (PAP) and pulmonary artery wedge pressures (PAWP) in SIPE-susceptible than controls during immersed exercise*

PAP and PAWP During Cold (20°C) Immersed Exercise*



Possible Mechanism

SIPE susceptible individuals have excessive elevation of PA and PAWP pressures due to low LV compliance



In a series of triathlon deaths 2006-8, 6/9 (67%) had LVH*

*Harris KM, et al. JAMA 303:1255-7, 2010

Hypothesis

- SIPE may be the cause of some deaths during the swim portion of triathlons
- Prevalence of LVH (as a marker of SIPE risk) will be higher in those who die during a triathlon vs. the general triathlete population

Methods

- Searched for triathlon deaths from October 2008-March 2014
 - 41 deaths found, 36 during swim
 - After IRB approval, 18 autopsy reports obtained



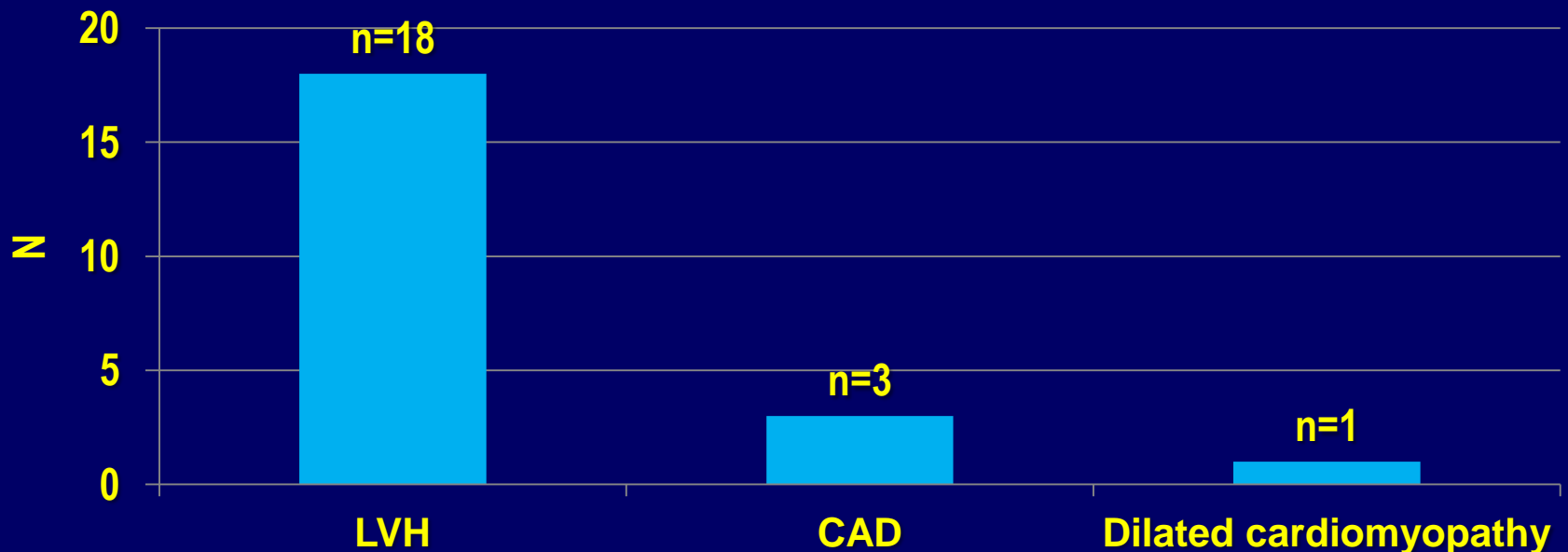
Photo courtesy of Ms. Katherine Calder-Becker

Results

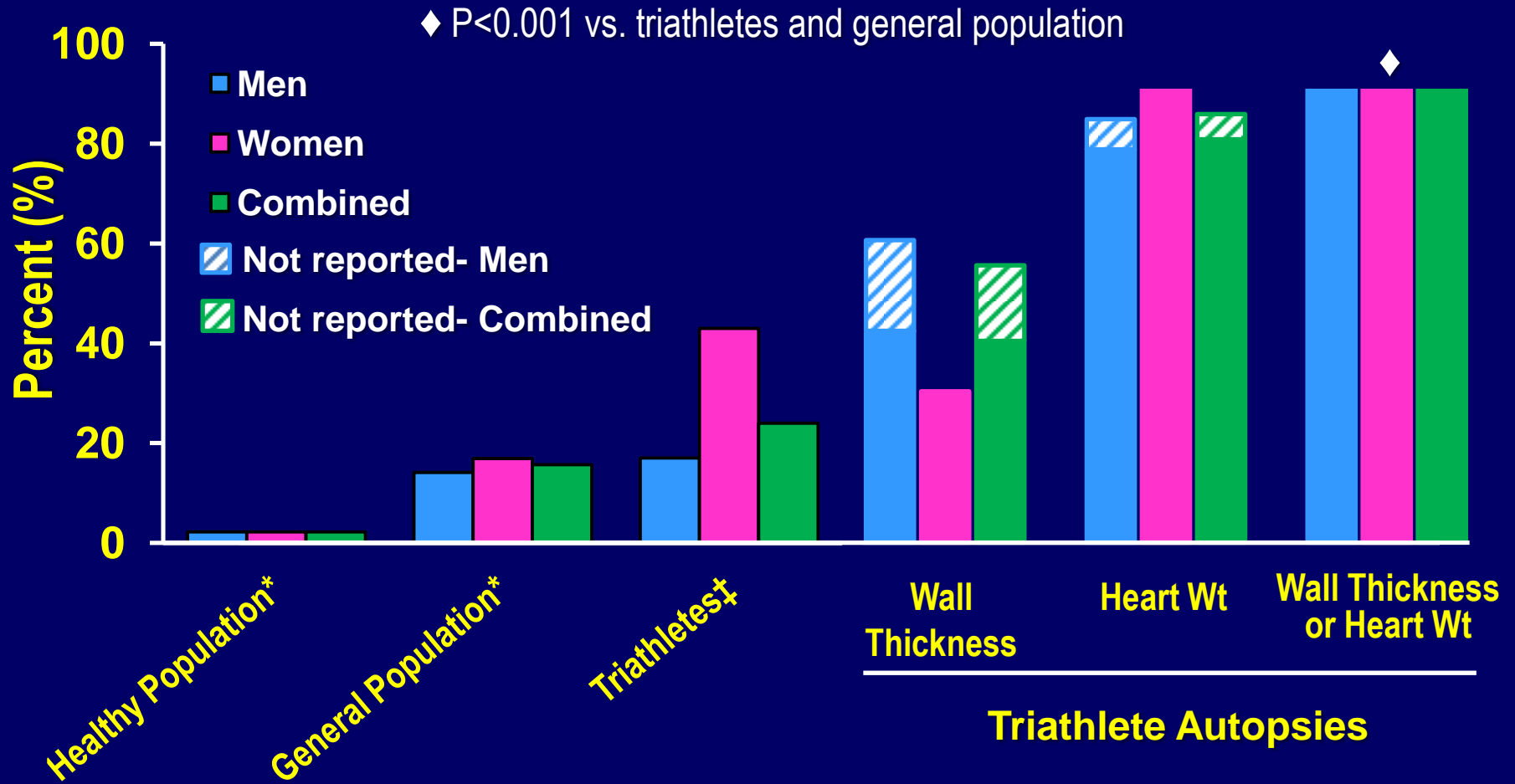
■ Demographics

- 15 male, 3 female
- Age: 46.6 ± 7.6 (mean \pm SD), range 33-64 years
- BMI: 28.5 ± 5.4 , range 17.9-38.3 kg/m²

Cardiovascular conditions found on autopsy of decedents



Results: LVH Prevalence



*Levy D, et al. Am J Cardiol 59:956, 1987

‡Douglas PS, et al. Am J Cardiol 80:1384, 1997

Conclusions

- Hypothesis supported that LVH is more prevalent amongst autopsies of those who die during triathlon than the reported triathlete population
- Thus, LVH may be a risk factor for SIPE which may be contributing to triathlon deaths