Frailty Status Modifies the Association Between Air Pollution Exposure and Post-MI Mortality: A 20-Year Follow-Up Study

Yariv Gerber, Vicki Myers, David Broday, Yuval, David Steinberg, Yaacov Drory

Tel Aviv University and the Technion

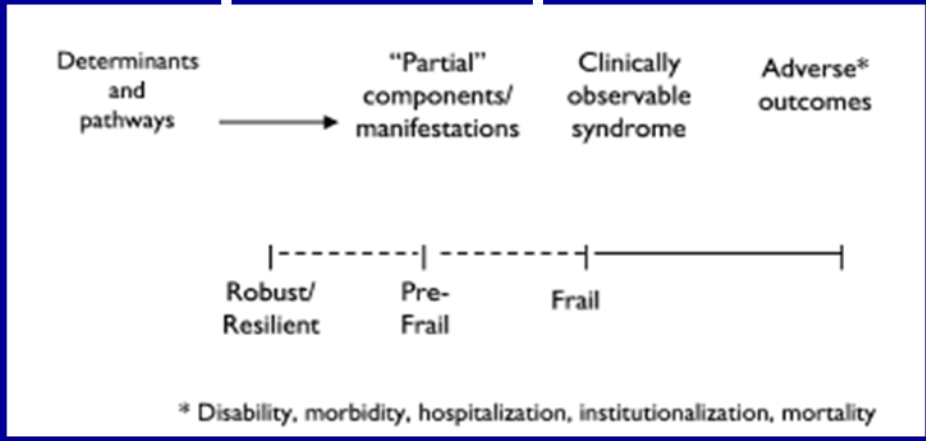
This work was supported by the Environment and Health Fund, Israel

Disclosure

The Authors Have No Conflicts of Interest

Introduction

- Chronic exposure to particulate matter (PM) has been associated with increased post-MI mortality, readmissions and adverse events
- Who are the 'susceptible subgroups'?
- Frailty is a non-specific, age-related syndrome of increasing vulnerability and decreasing resistance to stressors, which predicts post-MI outcome



Sternberg 2011 JAGS

Methods

- 1,120 post-MI patients followed up for all cause (1992-2011) and cardiac mortality (1992-2005)
- Individual exposure to PM2.5 was assessed at residential addresses using a geo-coding process
- Frailty was assessed at baseline, via an accumulation of deficits index (perceived health, functional limitations, comorbidity, weight loss, physical inactivity)
- Clinical and socioeconomic data collected

Results

- A modest, non-significant increase in mortality was associated with increasing PM2.5 exposure
- The association differed markedly by baseline frailty status

Included in Analysis	n (# of Deaths)	HR (95% CI)*	HR (95% CI)†
No exclusion	1,120 (469)	1.05 (0.93-1.18)	1.10 (0.97-1.25)
Frailty score ≥ 0.05	815 (396)	1.06 (0.93-1.21)	1.10 (0.95-1.27)
Frailty score ≥ 0.10	462 (270)	1.10 (0.94-1.29)	1.18 (0.99-1.40)
Frailty score ≥ 0.15	260 (180)	1.16 (0.96-1.41)	1.30 (1.05-1.62)
Frailty score ≥ 0.20	137 (104)	1.41 (1.09-1.82)	1.48 (1.09-2.02)
Frailty score ≥ 0.25	58 (44)	1.42 (0.97-2.10)	1.76 (1.02-3.05)

* Basic adjustment (age, sex, and baseline frailty score)

† Extensive adjustment (SES measures and patient and MI characteristics)

Results (cont.)

- The interaction between frailty and PM2.5-associated mortality risk was stronger for CVD than for non-CVD causes

Included in Analysis	Hazard Ratio (95% CI)	
	CVD (n=226)	Non-CVD (n=91)
No exclusion	1.07 (0.90-1.27)	1.20 (0.91-1.59)
Frailty score ≥ 0.05	1.05 (0.87-1.27)	1.28 (0.94-1.74)
Frailty score ≥ 0.10	1.23 (0.99-1.52)	1.11 (0.77-1.61)
Frailty score ≥ 0.15	1.36 (1.01-1.84)	1.26 (0.74-2.13)
Frailty score ≥ 0.20	1.57 (1.06-2.32)	1.23 (0.61-2.49)
Frailty score ≥ 0.25	2.61 (1.17-5.83)	0.78 (0.09-6.86)
P for interaction	0.03	0.70

Conclusions

- Among survivors of first MI in central Israel, frailer patients were more sensitive to the effects of chronic PM exposure
- Ability to identify air pollution susceptibility at the time of MI would facilitate preventive intervention