Heartbeat: Highlights from this issue

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In countries, such as the UK and USA, with increasing populations of elderly patients, the presence of frailty is associated with increased health and social needs as well as an increased risk of cardiovascular disease (CVD). The association of frailty with CVD risk factors was addressed in a cross-sectional study of 1622 men aged 71 to 92 years who had been prospectively enrolled in the British Regional Heart Study in 1978–1980. (*See page 616*) Overall, 19% of these men were frail and an additional 54% were pre-frail, with frailty defined as a clinical syndrome consisting of 3 or more of the following features: unintentional weight loss, symptoms of exhaustion, low grip strength, slow walking speed and low physical activity. Compared to non-frail men, frailty was associated with obesity, high waist circumference, low high-density lipoprotein (HDL) levels, hypertension, poor lung and renal function and a higher heart rate.

In an accompanying editorial, Prof Ralph Stewart (*See page 582*) comments that "although causal pathways are uncertain, it is possible that common lifestyle and socioeconomic factors increase the risk of both frailty and cardiovascular disease in later life (see figure 1)." In addition to ensuring that frail patients are appropriately screened and treated for CVD, Prof Steward recommends: 'Prevention of frailty is also important, and a healthy lifestyle may significantly decrease the risk of frailty and disability at older ages."

Mitral valve prolapse (MVP) affects 2 to 3% of the population with a characteristic mitral valve anatomy related to abnormal connective tissue in the spongiosa layer of the valve leaflets. At the tissue level, MVP shares several characteristics with changes in the eye in patients with open angle glaucoma (OAG), an important cause of blindness. Thus, Dr Chiang and colleagues (*See page 609*) hypothesized that these two seemingly disparate conditions might, in fact, be associated with each other. (See video abstract http://heart.bmj.com/content/early/2015/01/16/heartjnl-2014-306198.full) Their novel findings are based on a cohort study of over 20 thousand patients with MVP, compared to over 86 thousand propensity matched patients without MVP. The incidence rate of OAG was higher in those with MVP at 16.07 versus 10.17 per 10,000 person years, with an adjusted hazard ratio of 1.88 (95% CI 1.58 to 2.23). This association between MVP and OAG was confirmed in four stratified age groups and by examining the cumulative incidence of OAG over a 13-year followup period. (figure 2)

Is an association between MVP and glaucoma biologically plausible? Dr Delling and Vasan provide a editorial (*See page 584*) that guides the reader through the possible genetic and histologic similarities of these two conditions. They also point out that although this is a very large study with rigorous statistical analysis that attempted to adjust for relevant covariates, it still is possible that a common genetic pathway accounts for this observed association, rather than MVP being a risk factor for development of glaucoma. They conclude: "Multiple common pathways involving extracellular matrix dysregulation in both conditions may explain their co-occurrence. Nevertheless, these pathways are likely to account for only a modest proportion of

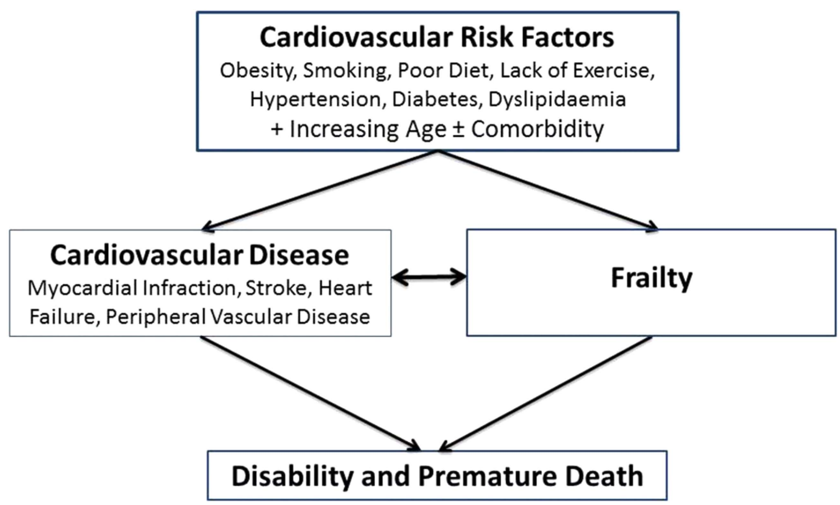

Figure 1 Proposed links between cardiovascular risk factors and frailty, cardiovascular disease, disability and premature death.

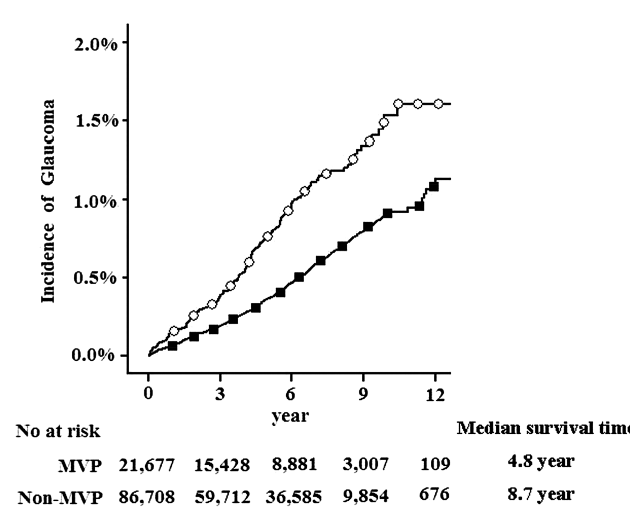

Figure 2 Cumulative incidence of glaucoma in patients with and without mitral valve prolapse (MVP). MVP group, ---○---; comparison group, ---■---.; p<0.001 by log-rank test.

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Table 1 Risk of coronary heart disease (all CHD) associated with stress resilience, physical fitness and body mass

	Event rates/1000 person-years (95% CI)	Unadjusted Model 1 HR (95% CI)	Adjusted Model 2 HR (95% CI)	Model 3 HR (95% CI)	Model 4 HR (95% CI)
Main exposure					
Stress resilience					
1. High (7–9)	1.59 (1.52 to 1.67)	Reference	Reference	Reference	Reference
2. Moderate (4–6)	1.97 (1.92 to 2.03)	1.24 (1.18 to 1.30)	1.18 (1.12 to 1.25)	1.09 (1.02 to 1.15)	1.04 (0.98 to 1.09)
3. Low (1–3)	2.61 (2.52 to 2.70)	1.65 (1.56 to 1.75)	1.54 (1.45 to 1.63)	1.28 (1.21 to 1.36)	1.17 (1.10 to 1.25)
Mediators					
Physical fitness (per unit change, 0–9)		0.93 (0.92 to 0.94)			0.93 (0.92 to 0.94)
Body mass index (kg/m^2)					
Underweight (<18.49)	1.70 (1.60 to 1.80)	0.88 (0.83 to 0.94)			0.78 (0.73 to 0.83)
Normal weight (18.5–24.99)	1.92 (1.80 to 1.96)	Reference			Reference
Overweight (25.0–29.99)	3.36 (3.17 to 3.36)	1.76 (1.66 to 1.88)			1.63 (1.53 to 1.74)
Obese (≥30.0)	5.22 (4.63 to 5.89)	2.79 (2.47 to 3.15)			2.23 (1.97 to 2.52)

Model 1. Unadjusted.
Model 2. Adjusted for childhood factors (birth year, region, parental SEI and household crowding).
Model 3. Adjusted for 2+ characteristics in adolescence (cognitive function, diastolic and systolic blood pressure and CVD diagnosis at conscription).
Model 4. Adjusted for 2+3+ physical fitness and body mass index in adolescence.
CVD, cardiovascular disease; SEI, socioeconomic index.

either MVP or OAG. Additional studies are warranted to confirm the observation reported by Chiang et al and to elucidate the biological basis underlying the association."

In older adults, life-style and other risk factors for coronary heart disease (CHD) often can be traced back to events early in life, leading to increased efforts to reduce lifetime risk in by preventing obesity, discouraging smoking, and increasing physical activity in children and adolescences. A new study in *Heart* suggests that low stress resilience in adolescence also is associated with an increased risk of CHD later in life (***See page 623***). A cohort of 237, 980 Swedish men who underwent a semistructured interview at age 18–19 years were later assessed for CHD at ages 35 to 58 years. In this study, stress resilience measured as a young adult, defined as the ability to cope with stressful exposures, was associated with CHD in middle age with incidence rates per 1000 patient-years ranging from 2.61 for those with low stress resilience to 1.59 for those with high stress resilience. (Table 1) Although higher levels of physical activity as a young adult were associated with a lower CHD risk later in life, this benefit was less evident in those with low stress resilience. The authors suggest the possible mechanism for these observations is that "stress resilience can influence cardiovascular outcomes through different non-mutually exclusive pathways: men with low-stress resilience will be more affected by stressful events in their everyday life and more likely to suffer chronic stress with potential physiological consequences; and stress resilience can also influence behavioural factors such as exercise, smoking and diet." (See video abstract http://heart.bmj.com/content/early/2015/02/10/heartjnl-2014-306703.full) If this data is replicated in other studies, attention to stress resilience, as well as encouraging a heart healthy lifestyle, may be needed in children and adolescences.

The Education in article in this issue on "How to select a guidewire: technical features and key characteristics" by Drs Toth, Yamane and Heyndrickx (***See page 645***) provides practical advice to trainees and interventional cardiologists on this procedural issue.

The Image Challenge (***See page 636***) case asks you to decide on the next step in clinical management of a 66 year old woman presenting with chest pain and an abnormal ECG who has undergone coronary angiography.

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