

Editor's presentation: 'Les liaisons dangereuses. The heart in the time of COVID-19'

Massimo F Piepoli^{1,2}

The heart in the time of COVID-19

Coronavirus disease 2019 (COVID-19) has been completely upsetting our society so that every kind of daily behaviour had to be adapted and modified; this is evident for scientific and medical communication too. Here, authors from Italy and Spain, the two countries in Europe that have been most hit by COVID-19, have promoted some reflections for every physician professionally involved both in the war against COVID-19 and in treating 'traditional' patients without this new disease. We should rethink our clinical management and routine controls of different cardiovascular diseases (e.g. heart failure, chronic coronary syndromes) in favour of out-of-hospital diffused and programmed assistance (including e-health)¹ to reduce the risk of infection and guarantee the same level of care to all our patients.

Efficacy of extended, comprehensive outpatient cardiac rehabilitation

The importance and the challenge of long-term maintenance of risk factor control after acute events are well evident.² In this regard, the benefit of an intensive long-term (12 months) prevention programme after acute myocardial infarction using personal teachings and telemetric strategies has recently been published.³ Here a new Austrian model of long-term, phase III secondary prevention lasting 6–12 months is presented, in which endurance and strength training sessions were carried out regularly and lasted up to 50 minutes each. A large cohort of consecutive patients from a national registry significantly improved their metabolic risk factor profile and increased exercise capacity. Adequate and accredited programmes need to be established nationwide to help patients comply with medical recommendations of lifelong lifestyle changes.⁴

Walking pace improves the prediction of mortality

Current established risk scores for cardiovascular or all-cause mortality largely rely on non-modifiable (age, sex)

or biological (e.g. blood pressure, cholesterol) risk factors. The discordance between health promotion campaigns, which are mainly based on modifiable lifestyle behaviours (i.e. encouragement of physical activity) and risk prediction is therefore evident. Consequently, behaviour change does not necessarily affect current risk prediction, while risk prediction does not reinforce the importance of healthy lifestyle behaviours. A UK Biobank prognostic study aimed to quantify and rank systematically the potential usefulness of simple, easily collected dietary, physical activity and physical function variables as prognostic markers for mortality in comparison with, and when added to, the SCORE risk factors. Importantly, walking pace was found to improve risk prediction but no other indicators. This is in contrast with other studies demonstrating the benefit of healthy diet on lowering cardiovascular risk.⁵ A study limitation was that risk factor control was assessed by self-reported questionnaires.

Cost-effectiveness of exercise therapy

There is strong evidence for the effectiveness of prescribed supervised exercise therapy, exercise training and exercise-based cardiac rehabilitation in patients with cardiovascular diseases,^{6,7} but economic evaluations are limited. A systematic search of seven electronic databases identified 15 economic evaluations conducted alongside prescribed supervised exercise therapy, showing that intervention was highly cost-effective in coronary heart disease, chronic heart failure, intermittent claudication, body mass index greater than 25 kg/m², but with less evidence in hypertension or type 2 diabetes mellitus.

¹Heart Failure Unit, G da Saliceto Hospital, Italy

²Institute of Life Sciences, Sant'Anna School of Advanced Studies, Italy

Corresponding author:

Massimo F Piepoli, Heart Failure Unit, G da Saliceto Hospital, AUSL Piacenza and University of Parma, Parma, Italy.

Email: m.piepoli@gmail.com

Non-alcoholic fatty liver disease and cardiovascular disease

Non-alcoholic fatty liver disease (NAFLD) is the leading cause of chronic liver disease worldwide, and it encompasses a wide spectrum of conditions, ranging from simple steatosis to non-alcoholic steatohepatitis, fibrosis and hepatocellular carcinoma. Although NAFLD is associated with an increased risk of liver-related morbidity or mortality, it is now considered a multisystem disorder, which affects a variety of extra-hepatic organs, including the cardiovascular system. In this context, here an 'In the news.' article claimed that NAFLD patients should be screened for cardiovascular diseases on a regular basis. It is not surprising that NAFLD associates with an increased risk, because they share common risk factors such as abdominal obesity, hypertension, atherogenic dyslipidemia and insulin resistance/dysglycemia. In addition, multiple common pathophysiological mechanisms may play a role, such as systemic inflammation, endothelial dysfunction, oxidative stress and the role of pro-protein convertase subtilisin/kexin type 9 (PCSK9).⁸

Septal myectomy in hypertrophic cardiomyopathy: predictors of improved exercise capacity

Hypertrophic cardiomyopathy (HCM) is a prevalent inherited heart disease that affects one in 500 individuals and, importantly, 70% of these patients exhibit the hypertrophic obstructive phenotype, with greater risk of mortality, and more progressive heart failure severity.⁹ Septal myectomy surgery is the gold standard treatment for patients who do not respond to medical therapy, intervention that leads to increased long-term survival, and exercise capacity (VO_{2peak}). Here a large cohort of patients with HCM demonstrated that demographic (i.e. female sex, age), lack of cardiac rehabilitation enrolment and cardiovascular risk factors (i.e. history of dyslipidemia) were predictive of those HCM patients who did not exhibit improvements in exercise capacity following septal myectomy surgery. These findings demonstrate the importance of individual clinical characteristics influencing peak exercise capacity following septal myectomy surgery in patients with HCM.

Suboptimal health behaviours in grown-up congenital heart disease

Optimal health behaviours are essential in the maintenance of good health and reduction of risk for cardiovascular complications, particularly in adults with grown-up congenital heart disease, because they are

at higher risk than the general population for cardiovascular events. A large international registry has shown that a substantial percentage did not follow optimal health behaviours (i.e. 10% binge drinking, 12% cigarette smoking and 6% at least monthly use of recreational drugs). Moreover, despite the emphasis placed during clinic appointments on dental hygiene, aimed at minimising the risk of infective endocarditis, over a quarter of patients fail to see their dentist annually and almost one-third brush their teeth less than twice daily. Finally, despite moving away from exercise restriction for most patients, fewer than half participate in sports. The findings are somewhat disconcerting considering that these are mostly patients under regular follow-up in specialised centres, who meet health professionals regularly throughout their lives. The results of this study can be interpreted as our failure as health-care providers to educate patients and encourage behaviour associated with a healthy lifestyle.¹⁰ Moreover, a system is required that targets patients who are more likely to exhibit at-risk behaviours, providing them with sufficient information and stimuli to maximise engagement.^{1,11}

Remnant cholesterol and residual cardiovascular risk

Despite achieving optimal low-density lipoprotein cholesterol levels, the residual cardiovascular risk has been attributed to triglyceride-rich lipoproteins and their cholesterol content, known as remnant cholesterol (RC). RC has gained increasing recognition as a biomarker driving residual risk in this contemporary era of greater obesity, diabetes and metabolic syndrome rates. Here in a large database involving 5754 patients, RC was significantly associated with coronary atheroma progression, regardless of biochemical and clinical risk factors. This suggests that accelerated progression of atherosclerosis is an important factor underlying the observation of a greater incidence of clinical cardiovascular events. Measuring RC is likely to play an important role in identifying patients requiring more intense or personalised medical therapy for secondary prevention. These data also highlight RC and triglyceride targeted therapies as areas of interest for the clinical development of novel anti-atherosclerotic agents.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Frederix I, Caiani EG, Dendale P, et al. ESC e-Cardiology Working Group Position Paper: Overcoming challenges in digital health implementation in cardiovascular medicine. *Eur J Prev Cardiol* 2019; 26: 1166–1177.
2. Kotseva K, De Backer G, De Bacquer D, et al. Lifestyle and impact on cardiovascular risk factor control in coronary patients across 27 countries: results from the European Society of Cardiology ESC-EORP EUROASPIRE V registry. *Eur J Prev Cardiol* 2019; 26: 824–835.
3. Wienbergen H, Fach A, Meyer S, et al. Effects of an intensive long-term prevention programme after myocardial infarction – a randomized trial. *Eur J Prev Cardiol* 2019; 26: 522–530.
4. Janssen A, Wagenaar KP, Dendale P, et al. Accreditation of clinical centres providing primary prevention, secondary prevention and rehabilitation, and sports cardiology: a step towards optimizing quality. *Eur J Prev Cardiol* 2019; 26: 1775–1777.
5. Kwok CS, Gulati M, Michos ED, et al. Dietary components and risk of cardiovascular disease and all-cause mortality: a review of evidence from meta-analyses. *Eur J Prev Cardiol* 2019; 26: 1415–1429.
6. Doyle MP, Indraratna P, Tardo DT, et al. Safety and efficacy of aerobic exercise commenced early after cardiac surgery: a systematic review and meta-analysis. *Eur J Prev Cardiol* 2019; 26: 36–45.
7. Saeidifard F, Medina-Inojosa JR, West CP, et al. The association of resistance training with mortality: a systematic review and meta-analysis. *Eur J Prev Cardiol* 2019; 26: 1647–1665.
8. Macchi C, Banach M, Corsini A, et al. Changes in circulating pro-protein convertase subtilisin/kexin type 9 levels – experimental and clinical approaches with lipid-lowering agents. *Eur J Prev Cardiol* 2019; 26: 930–949.
9. Finocchiaro G, Papadakis M, Dhutia H, et al. Obesity and sudden cardiac death in the young: clinical and pathological insights from a large national registry. *Eur J Prev Cardiol* 2018; 25: 395–401.
10. Villani GQ, Villani A, Zanni A, et al. Mobile health and implantable cardiac devices: patients' expectations. *Eur J Prev Cardiol* 2019; 26: 920–927.
11. Ariansen I, Strand BH, Kjøllestad MKR, et al. The educational gradient in premature cardiovascular mortality: examining mediation by risk factors in cohorts born in the 1930s, 1940s and 1950s. *Eur J Prev Cardiol* 2019; 26: 1096–1103.