Cardiovascular journals

Air pollution study throws a spanner in the works

Mark Kearney, Cardiologist, King's College Hospital, London

We often tell our patients to go for a walk to improve their cardiovascular health. New data emerging tell us that we should be considering where that walk should be. Air pollution is well recognised as being associated with death and hospital admission from cardiovascular disease – the mechanisms underlying this association are currently the topic of intense research. O'Neill et al (see right) have added to our understanding of this link with particular reference to diabetes.

These investigators explored the link between 24-hour average ambient levels of air pollution and endothelial function (assessed using the brachial artery vasodilator response to increased flow [FMD]) in people with diabetes or those at high risk of developing diabetes, such as people with impaired glucose tolerance or a first-degree relative with a history of diabetes. People were living in Boston, Massachusetts, which interestingly has relatively low air pollution levels for the US.

Associations between endothelial function and four measures of particulate air pollution were made: particle number (reflecting locally generated traffic particles), black carbon (principally traffic related), SO_4^{2-} (primarily from coal-burning power plants; often transported over long distances) and fine particles (aerodynamic diameter < 2.5 µm).

The strongest and most important association was that between FMD and SO_4^{2-} particles. This association was not found in the group without diabetes. Endothelial dysfunction is thought to be a key early event in the initiation and progression of atherosclerosis. Given that people with diabetes already have impaired endothelial function, discovering an added effect of air pollution on this represents an important advance in our understanding of the pathophysiology of vascular disease in our patients.

While there is no doubt that exercise is of benefit to our patients, the emergence of air pollution as a potential risk factor for vascular disease 'throws a spanner in the works'. Healthcare professionals dealing with patients in inner-cities, in particular, should now bear in mind the location of exercise when advising their patients.

AMERICAN HEART JOURNAL

Common ACS symptoms seen in few patients

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 A major factor in acute coronary syndrome (ACS) prehospital delay is the decision time for patients to seek medical care.

2 To reduce decision time, the authors assert, knowledge is needed of the symptoms and patients' experiences of ACS.

3 With this in mind, the symptoms of ACS – with or without ST elevation – were investigated in 1939 individuals in Sweden with ACS, with particular regard to sex, age and diabetes.

4 Women reported slightly higher pain or discomfort levels than men; age-based differences were minor, and diabetes did not appear to have an effect on reported symptoms.

5 Individuals with ST elevation had a higher frequency of associated symptoms.

6 More noteworthy was that only a small proportion of individuals reported the symptoms commonly associated with ACS (severe chest pain with a quick onset and a peak within minutes).

Thuresson M, Jarlov MB, Lindahl B, Svensson L, Zedigh C, Herlitz J (2005) Symptoms and type of symptom onset in acute coronary syndrome in relation to ST elevation, sex, age, and a history of diabetes. *American Heart Journal* **150**(2): 234–42

CIRCULATION

Diabetes increases vulnerability to air pollution

Readability	✓✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓✓

1 It has been suggested by epidemiological studies that diabetes confers an increased risk to the cardiovascular effects of particle air pollution.

2 Research into the possible mechanisms that led to these epidemiological observations could be of major importance for public health, given the current burden of diabetes.

3 Exploring possible mechanisms was one aim of this study; another was to clariy the relationship with diabetes.

4 Of 269 participants, 227 had diabetes and 42 were considered at risk of the condition.

5 Four particle metrics were used for air pollution: particle number, fine particle concentration, black carbon concentration and sulphate concentration.

6 Changes in vascular reactivity per interquartile range increase for each air pollutant were calculated.

7 In people with diabetes, significant decreases in flow-mediated vascular reactivity were found for sulphate and black carbon concentrations, and significant decreases in nitroglycerin-mediated vascular reactivity were found for sulphate and fine particle concentrations.

8 No significant decreases were observed in those only at risk of diabetes.

9 Diabetes may thus increase vulnerability to air pollution.

O'Neill MS, Veves A, Zanobetti A et al (2005) Diabetes enhances vulnerability to particulate air pollution-associated impairment in vascular reactivity and endothelial function. *Circulation* **111**(22): 2913–20

CIRCULATION

Benefits of ramipril seen in longer term

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 This follow-up to the Heart Outcomes Prevention Evaluation (HOPE) study aimed to see if the 4.5-year benefits of ramipril 10 mg daily (reductions in vascular events and new diabetes diagnoses) were maintained for a further 2.6 years post-trial and whether patient risk or other treatments affected the benefits.

2 Of the 9297 HOPE participants, 4528 took part in the follow-up; during this, angiotensin-converting enzyme inhibitor use was similar for the trial's ramipril and placebo groups.

3 Relative to those who took placebo during the trial, those on ramipril had a signifcantly lower risk for revascularisation (relative risk [RR] 0.84; 95 % confidence interval [CI], 0.70–0.99) and new diabetes diagnosis (RR, 0.66; 95 % CI, 0.46–0.95) during follow-up.

4 The benefits were deemed to be similar across subgroups based on patient risk and other treatments.

Bosch J, Lonn E, Pogue J et al (2005) Long-term effects of ramipril on cardiovascular events and on diabetes: results of the HOPE study extension. *Circulation* **112**(9): 1339–46

AMERICAN HEART JOURNAL

CAD present in around one in four adults in Pakistan

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 It is has been convincingly shown that South Asian people who have migrated to the Western world have one of the highest rates of coronary artery disease (CAD).

2 However, findings in non-migrant populations are inconsistent.

3 This cross-sectional survey of 320 people living in Pakistan aged 40 or older was used to determine CAD prevalence and examine risk factors.

4 CAD prevalence was found to be 26.9 % (23.7 % in men; 30.0 % in women; P=0.12 for difference).

5 Smoking status, systolic blood pressure and proteinuria were all independently related to the risk of CAD.

Jafar TH, Jafary FH, Jessani S, Chaturvedi N (2005) Heart disease epidemic in Pakistan: women and men at equal risk. *American Heart Journal* **150**(2): 221–6

'CAD prevalence was found to be 26.9 % in people living in Pakistan aged 40 or older.'

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

Metabolic syndrome linked to increased mortality post-MI

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓✓

1 The metabolic syndrome is thought to be an early marker for impaired glucose metabolism, but few data are available in post-myocardial infarction (MI) patients on its prognostic value.

2 The prognostic roles of the metabolic syndrome and diabetes in such people were examined using data from the GISSI-Prevenzione trial.

3 Relative to controls, the metabolic syndrome was linked to significantly higher probabilities of death (+29 %; P=0.002) and major cardiovascular (CV) endpoints (+23 %; P=0.005), while diabetes was linked to significantly higher probabilities of death (+68 %; P<0.0001), major CV endpoints (+47 %; P<0.0001) and hospitalisation for coronary heart disease (+89 %; P<0.0003).

4 The findings led the authors to suggest that there is room for more aggressive treatment.

Levantesi G, Macchia A, Marfisi RM et al (2005) Metabolic syndrome and risk of cardiovascular events after myocardial infarction. *Journal of the American College of Cardiology* **46**(2): 277–83

'The metabolic syndrome was linked to significantly higher probabilities of death and major cardiovascular CV endpoints post-myocardial infarction.'

CIRCULATION

CABG may reduce mortality in high-risk SPECT patients with asymptomatic diabetes

Readability	✓✓✓✓
Applicability to practice	✓✓
WOW! factor	✓✓✓✓✓

1 Coronary artery bypass grafting (CABG) has been shown to improve survival relative to percutaneous coronary intervention (PCI) in people with symptomatic diabetes who have coronary artery disease (CAD); nothing similar, though, has been published for people with asymptomatic diabetes.

2 In this study, 826 people with asymptomatic diabetes without known CAD had single photon emission computerised tomography (SPECT) images classified as low, intermediate or high risk.

3 Seventy-six patients underwent early revascularisation (CABG or PCI).

4 Without regard for SPECT-assessed risk, there was no significant difference in 5-year survival between patients treated with early revascularisation and those on medical therapy alone.

5 In the group with high-risk scans (n=261), though, 5-year survival was significantly different for patients who underwent CABG (85 %), patients who underwent PCI (72 %) and those on medical therapy alone (67 %; P=0.02 for 3-way comparison).

Sorajja P, Chareonthaitawee P, Rajagopalan N et al (2005) Improved survival in asymptomatic diabetic patients with high-risk spect imaging treated with coronary artery bypass grafting. *Circulation* **112**(9 Suppl): I311–6

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

Metabolic syndrome linked with increased subclinical atherosclerosis

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓✓✓

'The identification of metabolic syndrome in young, otherwise healthy, people is an important indicator of subclinical atherosclerosis and therefore future cardiovascular risk, and should be screened for.'

1 Evidence already exists demonstrating an association between the metabolic syndrome (MetS) and increased subclinical atherosclerosis, and also with increased cardiovascular risk in middle-aged and older adults. No such association has been shown in young people.

2 The authors studied 507 young people (mean age 32 years) without diabetes, from the Bogalusa Heart Study (a long-term study to determine the natural history of atherosclerosis, now completed), in order to see if a similar association exists in young people.

3 MetS was defined using the World Health Organization and the National Cholesterol Education Program Adult Treatment Panel III definitions.

4 Subclinical atherosclerosis was determined by ultrasound measuring carotid intima–media thickness (CIMT).

5 Using both MetS definitions, the CIMT of 132 people were significantly greater in those with MetS than in those without MetS.

6 Therefore, the authors conclude that the identification of MetS in young, otherwise healthy, people is an important indicator of subclinical atherosclerosis and therefore future cardiovascular risk, and should be screened for.

Tzou WS, Douglas PS, Srinivasan SR (2005) Increased subclinical atherosclerosis in young adults with metabolic syndrome. *Journal of the American College of Cardiology* **46**(3): 457–63

CIRCULATION

Candesartan appears to reduce risk of diabetes

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 Type 2 diabetes is a common and important risk factor for the development of heart failure and future prognosis.

2 CHARM (Candesartan in Heart failure – Assessment of Reduction in Mortality and morbidity program) investigators analysed the development of type 2 diabetes and type 2 diabetes plus all-cause mortality in a population of 5431 people with heart failure but no diabetes.

3 The study population was randomised to receive either 32 mg candesartan (intervention group; an angiotensin receptor blocker) or matching placebo once daily for 2–4 years.

4 Significantly more of the placebo group developed type 2 diabetes compared with the intervention group (7.4% versus 6.0%, respectively; P=0.020).

5 Type 2 diabetes plus all-cause mortality occurred in 25.2% and 28.6% in the intervention and placebo groups, respectively (P=0.004).

6 These results demonstrate, the authors conclude, that candesartan significantly reduces the risk of developing type 2 diabetes in people with heart failure as well as type 2 diabetes plus all-cause mortality.

7 Thus, evidence is also provided for the involvement of the renin–angiotensin system in the development of type 2 diabetes.

Yusuf S, Ostergren JB, Gerstein HC et al (2005) Effects of candesartan on the development of a new diagnosis of diabetes mellitus in patients with heart failure. *Circulation* **112**(1): 48–53

CIRCULATION

Metabolic syndrome appears to be associated with CVD

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 The World Health Organization (WHO), National Cholesterol Education Program Adult Treatment Panel III (NCEP), European Group for the Study of Insulin Resistance (EGIR) and the American College of Endocrinology (ACE) have all published definitions of the metabolic syndrome. The value of all definitions have yet to be assessed with respect to cardiovascular disease (CVD).

2 This paper used all four definitions to calculate the respective predictive values for fatal and non-fatal CVD in 1364 participants (615 males) of the population-based Hoorn Study, with no history of diabetes or CVD at baseline (1989–1990).

3 At baseline, prevalence of the metabolic syndrome ranged from 17–32%, dependent on which definition was used.

4 At 10 years, the population with the metabolic syndrome showed an approximate 2-fold increase in fatal and non-fatal CVD; the risk of these increased as the number of risk factors increased.

5 The authors conclude that individual constituent risk factors for CVD will provide a more informative graded assessment of fatal or non-fatal CVD for an individual without diabetes or the metabolic syndrome.

Dekker JM, Girman C, Rhodes T et al (2005) Metabolic syndrome and 10-year cardiovascular disease risk in the Hoorn Study. *Circulation* **112**(5): 666–73