

The incidence of AF in Olmsted County per 1,000 person-years, adjusted for age and sex, increased from 3.04 in 1980 to 3.68 in 2000. Poisson regression, adjusted for age and sex, indicated a significant increase in the incidence of AF over the 21-year study period ( $P=0.014$ ), with a relative increase of 0.6% per year. On the basis of the trends determined in Olmsted County and using US Census Bureau population projections, a model was constructed to estimate AF prevalence in the US. If a similar continued increase in age-adjusted AF is presumed beyond 2000, and assuming that these incidence rates can be applied to the entire US, the prevalence model projects that 15.9 million adults will have AF in 2050.

The researchers suggest that an urgent primary prevention strategy for AF is required to avert the potentially huge public health burden indicated by these projections.

**Original article** Miyasaka Y *et al.* (2006) Secular trends in incidence of atrial fibrillation in Olmsted County, Minnesota, 1980 to 2000, and implications on the projections for future prevalence. *Circulation* 114: 119–125

## Characterization of coronary plaque rupture using IVUS-VH

Coronary plaque rupture is known to be a major cause of sudden coronary death, but it is also commonly seen in non-coronary sudden death, and can be a clinically silent cause of plaque progression.

Rodriguez-Granillo and colleagues compared the characteristics of patients with and without plaque rupture in the coronary tree, and evaluated the plaque rupture phenotype using intravascular ultrasonography–virtual histology (IVUS-VH). Among a group of 40 patients referred for percutaneous coronary intervention, 28 plaque ruptures were diagnosed in 26 vessels of 20 patients. Sixteen (59.3%) patients with acute coronary syndrome had at least one plaque rupture (22% had multiple plaque ruptures), whereas only four (30.8%) stable patients had one or more plaque rupture. Ruptures of the left anterior descending artery, seen in 34.2% of patients, were clustered in the proximal part of the vessel, whereas those located in the right coronary artery, seen in 24.2% of patients, were more distal. The presence of plaque rupture

was significantly associated with greater BMI and higher plaque burden ( $P=0.01$  for both). Around two-thirds of current smokers presented with plaque rupture. Compared with minimum lumen area sites, ruptured plaques showed a significantly higher content of necrotic core ( $P=0.03$ ) and a trend towards higher calcification.

In this study, therefore, patients with at least one plaque rupture in their coronary tree had higher BMI and worse IVUS-derived characteristics than patients without plaque rupture. Furthermore, the sites of plaque rupture had a worse phenotype than the sites of minimum lumen area in the same vessels.

**Original article** Rodriguez-Granillo GA *et al.* (2006) Global characterization of coronary plaque rupture phenotype using three-vessel intravascular ultrasound radiofrequency data analysis. *Eur Heart J* 27: 1921–1927

## Endothelial progenitor cell count is an atherosclerotic marker in diabetes

The number and function of endothelial progenitor cells (EPCs) is highly correlated with the severity of peripheral arterial disease (PAD) in patients with type 2 diabetes, reports an Italian study. Targeting EPC alterations could, therefore, help to slow PAD progression. EPCs are involved in neovasculogenesis and maintenance of vascular homeostasis, and circulating EPCs have already been shown to be decreased in subjects with PAD, especially those with diabetes.

Two sets of diabetic patients were recruited: 72 with PAD, and 55 without. Surface expression of CD34, VEGFR2 (KDR) and, in a subset of 55 patients, CD133, was used to define progenitor cells, and was quantified using flow cytometry. Patients with PAD had highly decreased levels of circulating EPCs compared with those without PAD; CD34<sup>+</sup>KDR<sup>+</sup> cell count showed higher accuracy and sensitivity at discriminating patients with PAD than CD34<sup>+</sup>-only cell count. Levels of CD34<sup>+</sup>KDR<sup>+</sup> EPCs also showed a strong, independent inverse correlation with degree of carotid stenosis and lower extremity atherosclerosis, markers of PAD severity. Furthermore, cultured EPCs from patients with PAD had reduced clonogenic and adhesion capacity, indicating reduced ability to maintain endothelial homeostasis and angiogenesis.