

## IMAGING

FRACTAL ANALYSIS  
FOR CHD MORTALITY

Suboptimal architecture of the vascular network is associated with an increased risk of coronary heart disease (CHD) mortality, according to a study published in the *European Heart Journal*. Analysis of the coronary microcirculation, and particularly the retinal vascular network, has previously been used to predict the risk of CHD in women. Gerald Liew and colleagues, however, have now taken this predictive approach one step further by utilizing fractal analysis of the retina to obtain a global assessment of the vascular network architecture.

The researchers recruited 3,303 individuals from New South Wales, Australia (all of whom were  $\geq 49$  years of age), and took 30° retinal photographs of the optical disc, macula, and other retinal fields. These photographs were analyzed using International Retinal Imaging Software (IRIS)—Fractal in combination with a box-counting method to measure the retinal fractal dimension (Df) of each participant. Other factors, such as resting systolic and diastolic blood pressure, HDL-cholesterol and LDL-cholesterol levels, and history of angina, acute myocardial infarction, hypertension, and diabetes were also determined for each individual.

Overall, 468 of the participants died from CHD-related causes over the follow-up period of 14 years, as determined by the cause of death reported in the Australian National Death Index. The investigators found that individuals with a suboptimally low or high Df (representing sparser or denser branching patterns than normal, respectively) had a 50% increased risk of CHD mortality; indeed, a subgroup of these participants aged  $\leq 70$  years had an almost twofold higher risk of CHD mortality. Further research into the role of microvascular branching patterns in cardiovascular disease development might uncover novel therapeutic and preventative strategies for CHD.

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