and safety of DES (with sirolimus or paclitaxel) and BMS. All trials provided 6–12 months' clinical follow-up after index PCI. Using a hierarchical Bayesian random-effects model, the team pooled the results, stratifying by the type of drug and presence of carrier polymer.

The pooled results indicated that mortality and MI occurred at similar rates for DES and BMS. Major cardiac adverse events, however, occurred at a lower rate in the DES group than in the BMS patients (7.8% vs 16.4%; odds ratio (OR) 0.42; 95% credible interval (CI) 0.32 to 0.53), as did angiographic restenosis (8.9% vs 29.3%; OR 0.18; 95% CI 0.06 to 0.40).

The authors conclude that sirolimus-eluting and polymeric-paclitaxel-eluting stents are superior to BMS in reducing the rates of angiographic restenosis and major cardiac adverse events, although no clear benefit has been shown in terms of a reduction in mortality or MI rates.

Original article Babapulle MN *et al.* (2004) A hierarchical Bayesian meta-analysis of randomised clinical trials of drug-eluting stents. *Lancet* **364:** 583–591

Spironolactone and hyperkalemia

The landmark Randomized Aldactone Evaluation Study (RALES), published in 1999, showed that spironolactone, a potassium-sparing diuretic, improves outcomes in patients with severe heart failure. The drug can sometimes cause life-threatening hyperkalemia, however, when used in combination with angiotensin-converting enzyme (ACE) inhibitors (which are also indicated for heart failure). Although this complication was rare in RALES, it is possible that physicians prescribe spironolactone more freely in practice. Juurlink *et al.* have carried out a time-series analysis to examine the effects of RALES at the population level in Ontario, Canada.

For the period 1994–2001, the investigators linked the records of all prescription drugs dispensed and all hospitalizations for over 1.3 million patients aged 66 years or older. They examined trends in spironolactone-prescribing rates, hospitalization for hyperkalemia and associated mortality.

From 1994 to 2001, there was a statistically significant increase ($P < 0.001$) in rates of spironolactone prescription, hospitalization for hyperkalemia and associated mortality. Among patients with heart failure who were treated with ACE inhibitors, there were 560 additional hospitalizations for hyperkalemia (95% CI 285 to 754) and 73 additional inpatient deaths (95% CI 27 to 120) in 2001, compared with the expected numbers.

In conclusion, publication of RALES was associated with a sharp increase in the spironolactone prescription rate, in the rate of hospitalization for hyperkalemia and in associated mortality. The authors suggest that clinicians should take into account other risk factors for hyperkalemia when prescribing spironolactone, and that renal function and potassium levels should be closely monitored.

Original article Juurlink DN *et al.* (2004) Rates of hyperkalemia after publication of the randomized aldactone evaluation study. *N Engl J Med* **351:** 543–551

GLOSSARY
ECG
Electrocardiogram

Prediction of outcome in myocardial ischemia

A report by Mueller and colleagues has provided new information about the prognostic value of the admission ECG in cases of myocardial ischemia. The study included a cohort of 1,450 consecutive patients with unstable angina/non-ST-segment elevation myocardial infarction (nonSTEMI), who were assessed by coronary angiography within 24 h of admission. Patients were divided into three groups according to the presence of new ST-segment depression ($n = 136$), T-wave inversion ($n = 419$) or no changes on the admission ECG ($n = 895$). Revascularization was carried out in the majority of patients ($n = 1,066$), most often by percutaneous coronary intervention (PCI) with stent placement. Coronary artery bypass grafting was carried out in selected patients. The primary endpoint was all-cause mortality.

Adjusting for potential confounders, the cumulative death rate at 36 months was significantly higher for patients with ST-segment depression (hazard ratio [HR] 2.2, 95% CI 1.1 to 4.6) than for patients with no ECG changes; by contrast, T-wave inversion was associated with a more favorable outcome (HR 0.44, 95% CI 0.20 to 0.96). Surprisingly, the prognostic value of these ECG changes was similar in men and women.

Mueller *et al.* conclude that ST-segment depression and T-wave inversion were important prognostic factors in patients undergoing very early revascularization for unstable angina/

GLOSSARY

NASCET
North American Symptomatic Trial Collaborators

ESCT
European Carotid Surgery Trial

CC
Common carotid

AMI
Acute myocardial infarction

TOPCARE-AMI
Transplantation of Progenitor Cells And Regeneration Enhancement in Acute Myocardial Infarction

BMC
Bone-marrow-derived progenitor cells

CPC
Circulating progenitor cells

LVEF
Left-ventricular ejection function

MRI
Magnetic resonance imaging

nonSTEMI. It is unclear whether these findings will apply outside the study, where early and aggressive use of PCI may be less common.

Original article Mueller C *et al.* (2004) Prognostic value of the admission electrocardiogram in patients with unstable angina/non-ST-segment elevation myocardial infarction treated with very early revascularization. *Am J Med* **117:** 145–150

Measurement of carotid stenosis

Established techniques for measuring the severity of internal carotid artery (ICA) stenosis include the NASCET, ESCT and CC methods. Of these, only NASCET has been validated for use with contrast-enhanced magnetic resonance angiography (CEMRA), which is fast replacing intra-arterial digital subtraction angiography (DSA) as the modality of choice. U-King-Im *et al*. have compared the diagnostic performance and reproducibility of the NASCET, ESCT and CC methods on CEMRA, using DSA as the reference standard.

Symptomatic patients with suspected ICA stenosis ($n = 142$) underwent DSA and CEMRA, providing 284 arteries for analysis. All angiograms were reviewed independently by three experienced neuroradiologists and the maximum stenosis was calculated using the NASCET, ECST and CC methods. Stenosis was then classified as mild, moderate, severe or complete occlusion.

Intermodality correlation and agreement were similar for the three methods. For the identification of DSA-defined severe stenosis on CEMRA, there were no significant differences between the three measurement methods for specificity, positive predictive values or negative predictive values. Sensitivity, however, was significantly lower using ESCT (78.9%) than with NASCET (93.0%) or CC (87.7%).

The authors conclude that all three methods are adequate for use with DSA but that NASCET is the most appropriate measurement method when using CEMRA. They recommend that other non-invasive methods should also be validated according to the measurement method.

Original article U-King-Im JMKS *et al.* (2004) Measuring carotid stenosis on contrast-enhanced magnetic resonance angiography. *Stroke* **35:** 2083–2088

Cell transplantation therapy in acute MI

Therapy with adult progenitor cells has resulted in improved cardiac function after AMI in animal models. The TOPCARE-AMI trial was a pilot study investigating the safety and feasibility of this approach in humans, and providing information for the design of double-blind controlled trials. The final results of the study have recently been published.

Patients with acute ST-segment elevation MI (STEMI) undergoing acute reperfusion treatment were randomized to intracoronary infusion of either BMC ($n = 29$) or CPC ($n = 30$) within 7 days of AMI. BMC were isolated from bone-marrow aspirates from each patient on the day of cell transplantation, whereas CPC were cultured from venous blood samples collected immediately after randomization (24 h after AMI). In each case, cell suspensions were infused into the infarct artery via an over-the-wire balloon catheter and blood flow was blocked at intervals to allow adhesion and transmigration of the cells.

LVEF increased significantly from $50 \pm 10\%$ at baseline to $58.3 \pm 10\%$ at 4 months, and LV end-systolic volume was significantly reduced. At 1 year, MRI investigation revealed a sustained improvement in global EF, reduced infarct size and lack of reactive hypertrophy, indicating a favorable LV remodeling process. There were no differences between the groups of patients. The incidence of death or re-infarction was 3.4% and there was no evidence of myocardial ischemic damage or enhanced restenosis.

The authors conclude that transplantation of BMC or CPC is safe, feasible and deserves investigation in randomized trials.

Original article Schächinger V *et al.* (2004) Transplantation of progenitor cells and regeneration enhancement in acute myocardial infarction. *JACC* **44:** [http://www.cardiosource.com/library/journals/journal/article/fulltext?acronym=JAC&uid=PIIS0735109704016298&kwhighligh=] (accessed 24 September 2004)

Neurocognitive risks of CABG

Long-term neurocognitive deficit, defined as a combined loss of memory, learning, concentration and visual motor response, has been recognized as an adverse effect of surgery. Zimpfer *et al*. have prospectively measured the extent of