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ISCHAEMIC HEART DISEASE

Drug eluting stents are useful in vessels < 2.75 mm diameter ▶ Initial trials of drug eluting stents were in medium size vessels (average 3 mm), but restenosis rates are highest in small vessels. They are also technically difficult to graft. Ardissino and colleagues randomised 257 patients to treatment with either a sirolimus eluting stent (129) or uncoated stent (128). Eligible patients included those with stable angina or acute coronary syndromes found to have a single, uncomplicated, 50–99% stenosis of a vessel < 2.75 cm in diameter. After eight months of follow up, 9.8% of those receiving a sirolimus eluting stent, compared to 53.1% of those receiving a uncoated stent, showed evidence of restenosis (> 50%) (relative risk (RR) 0.18, 95% confidence interval (CI) 0.10 to 0.32; $p < 0.001$). Furthermore, fewer patients randomised to sirolimus stents experienced major cardiac events. The authors conclude that the use of sirolimus eluting stents in these small arteries likely represents a significant advance, and suggest that extended follow up is carried out.

▲ Ardissino D, Cavallini C, Bramucci E, *et al.* Sirolimus-eluting vs uncoated stents for prevention of restenosis in small coronary arteries. *JAMA* 2004;292:2727–34.

Even a minor troponin rise is bad for your health ▶ In 1024 patients with acute coronary syndrome, treated with revascularisation within 24 hours (mean six hours), troponin T remained of prognostic significance. In-hospital mortality was 0.7% (3/449) in patients with troponin T concentrations < 0.010 µg/l, 2.0% (4/197) in those with concentrations from 0.010–0.035 µg/l, 3.2% (6/186) in those with concentrations from 0.035–0.229 µg/l, and 4.7% (9/192) in patients with concentrations > 0.229 µg/l. Cumulative two year mortality rates were 2.8%, 8.0%, 10.5%, and 14.8% from the lowest to highest troponin T groups ($p < 0.001$). In contrast, the risk of non-fatal myocardial infarction assumed an inverted U shaped curve and was lower in the lowest and highest troponin T groups. Previous studies have shown that troponin T concentrations predict which groups benefit from intervention and use of glycoprotein IIb/IIIa receptor blockers, but this study suggests that the adverse risk is not completely removed by such treatment.

▲ Mueller C, Neumann F-J, Perruchoud AP, *et al.* Prognostic value of quantitative troponin T measurements in unstable angina/non-ST-segment elevation acute myocardial infarction treated early and predominantly with percutaneous coronary intervention. *Am J Med* 2004;117:897–902.

Aspirin sensitivity is more common than you think

▶ Although acetylsalicylic acid (aspirin) is commonly used for patients with chronic cardiovascular disease, a minority of patients have a sensitivity to acetylsalicylic acid and other non-steroidal anti-inflammatory drugs. The prevalence of aspirin exacerbated respiratory tract disease is approximately 10% and for aspirin induced urticaria the prevalence varies from 0.07–0.2% of the general population. Aspirin sensitivity is most often manifested as rhinitis and asthma or urticaria/angioedema induced by cross-reacting non-steroidal anti-inflammatory drugs that inhibit cyclooxygenase 1. The primary mechanism of sensitivity is less often related to drug specific IgE antibody production leading to urticaria/angioedema and rarely to anaphylaxis. Most patients with acetylsalicylic acid sensitivity are able to undergo desensitisation therapy safely and successfully except in cases of chronic idiopathic urticaria. However, there have not been any randomised trials that specifically focus on the efficacy of aspirin desensitisation. Furthermore, experience with acetylsalicylic acid desensitisation in patients with coronary artery disease (CAD) is very limited. After successful desensitisation, acetylsalicylic acid treatment must be

indefinitely continued to prevent re-sensitisation. For patients with CAD, clopidogrel is an alternative to desensitisation.

▲ Gollapudi RR, Teirstein PS, Stevenson DD, *et al.* Aspirin sensitivity: implications for patients with coronary artery disease. *JAMA* 2004;292:3017–23.

Contrast nephropathy and N-acetyl cysteine ▶ Using a before and after analysis, Shah and Hsu show that, in hospitalised patients, the use of N-acetyl cysteine was found to be different from that in the trial by Tepel *et al.* (600 mg twice daily from the day before to 48 hours after the contrast administration) in 57% of patients, and did not appear to reduce the incidence of contrast induced nephropathy (CIN) whether or not it was used correctly (incidence 16%). However, no patient needed dialysis. CIN is, however, associated with increased mortality and longer hospital stay. However, a review of eight trials suggested a possible benefit (Birck *et al.*). A more updated review of 20 trials by Nallamothu *et al.* suggests only a modest possible benefit: the summary risk ratio for contrast related nephropathy was 0.73 (95% CI 0.52 to 1.0; $p = 0.08$), a non-significant trend towards benefit in patients treated with acetylcysteine. Perhaps the only way to answer the question once and for all is a mega-trial. To detect a 27% reduction in contrast related nephropathy if a baseline incidence of contrast related nephropathy of 13.4% was assumed, a study would need to enrol 1283 patients in both the treatment and control arms to have a power of 80%.

▲ Tepel M, van der Giet M, Schwarzfeld C, *et al.* Prevention of radiographic-contrast-agent-induced reductions in renal function by acetylcysteine. *N Engl J Med* 2000;343:180–4.

▲ Shah SJ, Hsu C-Y. Has acetylcysteine use changed the incidence of contrast nephropathy in hospitalized patients? A before-after study. *Am J Med* 2004;117:948–52.

▲ Nallamothu BK, Shojania KG, Saint S, *et al.* Is acetylcysteine effective in preventing contrast-related nephropathy? A meta-analysis. *Am J Med* 2004;117:938–47.

▲ Birck R, Krzossok S, Markowitz F, *et al.* Acetylcysteine for prevention of contrast nephropathy a meta-analysis. *Lancet* 2003;362:598–603.

How to manage coronary disease before major non-cardiac surgery: routine revascularisation is not warranted

▶ β Blockade is accepted as reducing perioperative ischaemia in patients at risk of coronary disease. This reduction was associated with a lower mortality in the atenolol group six months after hospital discharge (0% v 8% in the placebo group, $p < 0.001$), after one year of follow up (3% v 14%, $p = 0.005$), and after two years of follow up (10% v 21%, $p = 0.02$). Poldermans *et al.*, in the DECREASE (Dutch echocardiographic cardiac risk evaluation applying stress echocardiography) trial, investigated the use of the β blocker bisoprolol in high risk patients referred for vascular surgery. In that study, the group treated with bisoprolol had a significant reduction in the incidence of death from cardiac causes as compared with patients receiving standard care (3.4% v 17%, $p = 0.02$) and a significant reduction in the incidence of non-fatal myocardial infarction (0% v 17%, $p < 0.001$). Now a randomised trial of coronary revascularisation has been published. Patients who were scheduled for elective vascular operations at 18 Veterans Affairs medical centres were randomly assigned to undergo coronary revascularisation (percutaneous coronary intervention or coronary artery bypass grafting, 258 patients) or medical treatment alone (252 patients). Medical treatment was optimised in both groups, with > 80% in both arms taking β blockers, 54% receiving statins, and > 70% receiving aspirin. Patients with a stenosis of the left main coronary artery of at least 50%, a left ventricular ejection fraction of less than 20%, and severe aortic stenosis were excluded from randomisation. The majority of patients enrolled had single vessel or two vessel disease. After vascular surgery, there were no differences between the two groups in the incidence of myocardial infarction or in-hospital mortality. At a median follow up of 2.7 years, the mortality was 22% in the revascularisation group and 23% in the non-revascularisation group. This does not answer the question of how to screen

patients facing vascular surgery, as all these patients had had angiography. In fact only 8% of the patients having surgery were entered into the trial.

▲ Mangano DT, Layug EL, Wallace A, *et al.* Effect of atenolol on mortality and cardiovascular morbidity after noncardiac surgery. *N Engl J Med* 1996;**335**:1713–20. [Erratum, *N Engl J Med* 1997;**336**:1039.]

▲ Poldermans D, Boersma E, Bax JJ, *et al.* The effect of bisoprolol on perioperative mortality and myocardial infarction in high-risk patients undergoing vascular surgery. *N Engl J Med* 1999;**341**:1789–94.

▲ Poldermans D, Bax JJ, Kertai MD, *et al.* Statins are associated with a reduced incidence of perioperative mortality in patients undergoing major noncardiac vascular surgery. *Circulation* 2003;**107**:1848–51.

▲ McFalls EO, Ward HB, Moritz TE, *et al.* Coronary-artery revascularization before elective major vascular surgery. *N Engl J Med* 2004;**351**:2795–804.

HYPERTENSION

β Blockers are good for patients with hypertension and COPD ►

The cohort comprised 1966 patients (mean (SD) age, 65.8 (10.7) years) enrolled in general internal medicine clinics at seven Veterans Affairs medical centres between December 1996 and October 1999. Patients had a diagnosis of both chronic obstructive pulmonary disease (COPD) and hypertension and were receiving single agent antihypertensive treatment. Compared with calcium channel blockers, β blockers were associated with a decrease in mortality from any cause after adjusting for propensity for having been prescribed a β blocker (hazard ratio 0.57, 95% CI 0.33 to 0.89). The association was similar when β blockers were compared with all other antihypertensive medications, and the decreased risk of mortality was apparent among patients with pre-existing cardiac disease. Restriction of analyses to long acting calcium channel blockers or to patients who used β agonists did not affect the point estimates. Thus β blockers are safe to use, and may have some mortality advantage. The patients receiving β blockers appeared to be no different to the others in the study apart from the treatment of hypertension.

▲ Au DH, Bryson CL, Fan VS, *et al.* Beta-blockers as single-agent therapy for hypertension and the risk of mortality among patients with chronic obstructive pulmonary. *Am J Med* 2004;**117**:925–31.

Diuretics are good in hypertension ►

Diuretics are a well established treatment for hypertension. They have made a comeback after ALLHAT (antihypertensive and lipid-lowering treatment to prevent heart attack trial) showed that as a monotherapy, they were equal to or superior to other antihypertensive agents as first line treatment. But most patients with hypertension will require more than one agent, and which to use next? Of the 93 676 women aged 50–79 years enrolled in the women's health initiative observational study (WHI-IS) between 1994 and 1998, 57% of the 30 219 patients with hypertension were receiving monotherapy at baseline (enrolment) while 23% were treated with a combination of agents. A retrospective analysis showed that over a mean of 5.9 years, monotherapy with calcium channel blockers versus diuretics was associated with a greater risk of cardiovascular death (hazard ratio 1.55). Furthermore, women treated with a diuretic plus a calcium channel blocker had an 85% greater risk of cardiovascular disease death versus those treated with diuretic plus a β blocker. The combination of diuretic plus β blocker was no different from diuretic plus angiotensin converting enzyme inhibitor. What is odd is that heart attacks and stroke rates were no different between any of these three combinations.

▲ Wassertheil-Smoller S, Psaty B, Greenland P, *et al.* Association between cardiovascular outcomes and antihypertensive drug treatment in older women. *JAMA* 2004;**292**:2849–59.

GENERAL CARDIOLOGY

No one diet is better than the rest ► Which is best: low carbohydrate (Atkins), macronutrient restriction (Zone), calorie restriction (Weight Watchers), or fat restriction (Ornish)? A single centre randomised trial of overweight or obese (mean body mass index 35, range 27–42) adults aged 22–72 years with known hypertension, dyslipidaemia, or fasting hyperglycaemia was performed over two years. A total of 40 patients were assigned to each diet. After two months of maximum effort, participants selected their own levels of dietary adherence. Assuming no change from baseline for participants who discontinued the study, mean weight

loss at one year was 2.1 kg for Atkins (53% completed, $p = 0.009$), 3.2 kg for Zone (65% completed, $p = 0.002$), 3.0 kg for Weight Watchers (65% completed, $p = 0.001$), and 3.3 kg for Ornish (50% completed, $p = 0.007$). Greater effects were observed in study completers. Each diet significantly reduced the low density lipoprotein/high density lipoprotein (LDL/HDL) cholesterol ratio by approximately 10% (all $p = 0.05$), with no significant effects on blood pressure or glucose at one year. Amount of weight loss was associated with self reported dietary adherence level ($r = 0.60$; $p = 0.001$) but not with diet type ($r = 0.07$; $p = 0.40$). For each diet, decreasing values of total/HDL cholesterol, C reactive protein, and insulin were significantly associated with weight loss (mean $r = 0.36$, 0.37, and 0.39, respectively) with no significant difference between diets ($p = 0.48$, $p = 0.57$, $p = 0.31$, respectively).

▲ Dansinger ML, Gleason JA, Griffith JL, *et al.* Comparison of the Atkins, Ornish, Weight Watchers, and Zone diets for weight loss and heart disease risk reduction: a randomized trial. *JAMA* 2005;**293**:43–53.

ICD therapy: who is it for? ►

Ten to 15% of instances of sudden cardiac death occur in patients with left ventricular dysfunction but no evidence of prior myocardial infarction. No single prospective randomised controlled trial of implantable cardioverter-defibrillator (ICD) therapy in non-ischaemic cardiomyopathy (NICM) has demonstrated convincing evidence of mortality reduction. A meta-analysis of eight randomised controlled ICD trials enrolling a total of 2146 patients with NICM found that ICD therapy demonstrated a 31% relative reduction in all cause mortality compared to medical treatment. This means that 25 NICM patients would need to be treated with an ICD device to prevent one death at two years, compared to only 18 with ischaemic cardiomyopathy. Although data from primary prevention trials were convincing, results from secondary prevention trials was less robust (primarily because of the small number of enrolled patients with NICM). The authors conclude by reminding us that mortality reduction does not necessarily imply greater clinical benefit among those with heart failure.

▲ Desai AS, Fang JC, Maisel WH, *et al.* Implantable defibrillators for the prevention of mortality in patients with nonischaemic cardiomyopathy. *JAMA* 2004;**292**:2874–9.

ICDs: not soon after acute MI ►

The DINAMIT investigators randomly assigned 674 patients with left ventricular dysfunction and impaired cardiac autonomic function to receive ICD therapy or optimal medical treatment 6–40 days after a myocardial infarction (MI). Over a follow up period of approximately 30 months, no significant difference in overall mortality was observed between the two treatment groups. Although the rate of death from arrhythmia was substantially lower in the ICD group (1.5% per year) than in the control group (3.5% per year), more deaths from non-arrhythmic causes occurred in the ICD group (6.1% per year v 3.5% per year in the control group). Moreover, the majority of the deaths from non-arrhythmic causes in the ICD group were cardiac in nature. The authors conclude that their study defines a limitation of prophylactic ICD therapy. Previous studies have suggested benefit from ICD implantation for secondary prevention, and in patients with impaired left ventricular function and previous acute MI, but remote from previous infarction.

▲ Hohnloser SH, Kuck KH, Dorian P, *et al.* Prophylactic use of an implantable cardioverter-defibrillator after acute myocardial infarction. *N Engl J Med* 2004;**351**:2481–8.

Vasopressin in cardiac arrest: another one bites the dust?

► In a review of five studies of > 1000 patients, there were no significant differences between the vasopressin and epinephrine (adrenaline) groups in failure of return of spontaneous circulation (RR 0.81, 95% CI 0.58 to 1.12), death before hospital admission (RR 0.72, 95% CI 0.38 to 1.39), death within 24 hours (RR 0.74, 95% CI 0.38 to 1.43), death before hospital discharge (RR 0.96, 95% CI 0.87 to 1.05), or combination of number of deaths and neurologically impaired survivors (RR 1.00, 95% CI 0.94 to 1.07). Subgroup analysis based on initial cardiac rhythm showed no significant difference in the rate of death before hospital discharge between the vasopressin and epinephrine groups in any of the three subgroups: ventricular fibrillation or ventricular tachycardia (RR 0.97, 95% CI 0.79 to 1.19), pulseless electrical activity (RR 1.02, 95% CI 0.95 to 1.10), or asystole (RR 0.97, 95% CI 0.94 to 1.00).

▲ Aung KK, Htay T. Vasopressin for cardiac arrest: a systematic review and meta-analysis. *Arch Intern Med* 2005;165:17–24.

Journals scanned

American Journal of Medicine; American Journal of Physiology: Heart and Circulatory Physiology; Annals of Emergency Medicine; Annals of Thoracic Surgery; Archives of Internal Medicine; BMJ; Chest; European Journal of Cardiothoracic Surgery; Lancet; JAMA; Journal of Clinical

Investigation; Journal of Diabetes and its Complications; Journal of Immunology; Journal of Thoracic and Cardiovascular Surgery; Nature Medicine; New England Journal of Medicine; Pharmacoeconomics; Thorax

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IMAGES IN CARDIOLOGY

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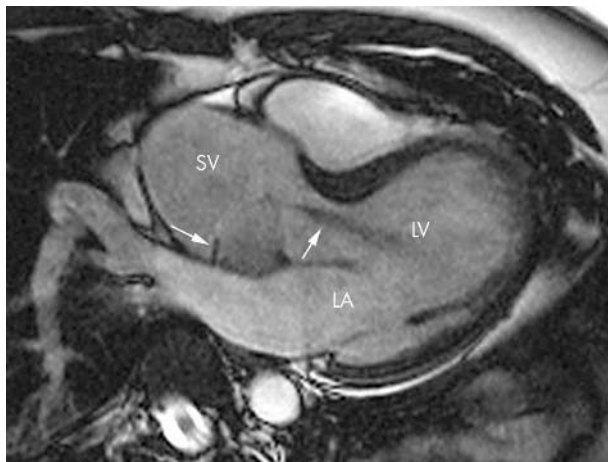
Early aortic intimal tear without haematoma or dissection: early diagnosis by cardiac magnetic resonance imaging

A 22 year old man was found to have a 5.4 cm aortic root aneurysm upon screening echocardiogram. He had no Marfanoid features. His 19 year old brother had died suddenly of an acute ascending aortic dissection six weeks previously. A cardiology appointment was scheduled, but in the interim he developed transient chest, neck, and jaw burning. He was transferred pain-free from his local emergency room for further evaluation.

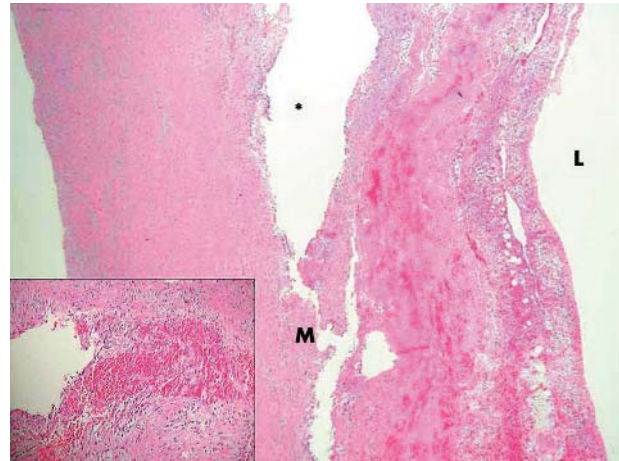
A computed tomographic (CT) scan with contrast showed an enlarged ascending aorta. A second CT and a two dimensional echocardiogram were performed within seven hours and was unchanged. Though no dissection was seen, he was recommended to have surgery. Cardiac magnetic resonance imaging (MRI) was performed before the surgery. At surgery, a subacute, nearly circumferential intimal and medial tear of the ascending aorta was found above the aortic valve. There was no dissection in either the antegrade or retrograde direction. The pericardial space contained no free blood. The patient received a 25 mm St Jude composite graft with coronary artery reimplantation, and he recovered uneventfully.

In this case cardiac MRI enabled an early intimal tear to be visualised before the better known features of dissection became present.

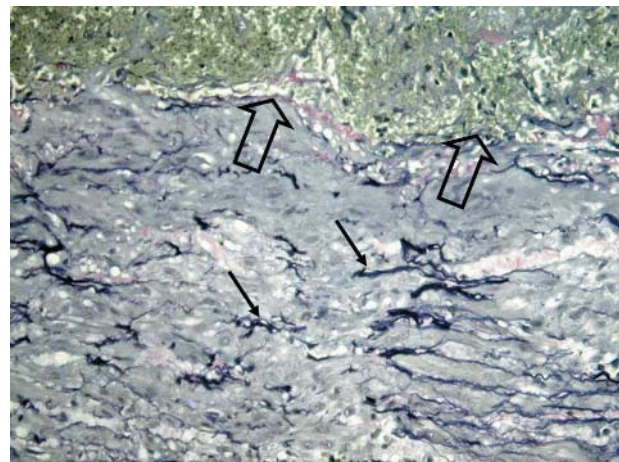
T F Longe, J R Lesser, R S Schwartz
rss@rsschwartz.com



Cardiovascular magnetic resonance (CMR) left ventricular outflow tract (LVOT) view. Dilated sinuses of Valsalva (5.4 cm) with effaced sinotubular junction. A persistent 1 cm non-mobile linear protrusion into the sinuses was seen without independent motion (longer arrow), aortic wall thickening, contrast staining, or significant pericardial effusion. There was mild aortic insufficiency across a trileaflet valve (thick arrow). LA, left atrium; LV, left ventricle; SV, sinuses of Valsalva.



Pathology showing cystic medial necrosis. Ascending aorta with cystic medial necrosis and dissection, low magnification to show entire wall. The lumen (L) is on the right of the field. An aortic dissection (*) is present within the aortic media, associated with haemorrhage involving the media (M) as well. Inset: wall of the cystic degeneration with dissection shows fibroblasts and organising blood clot (haematoxylin and eosin).



Cystic medial necrosis. Elastin fibres at high magnification. The elastin fibres (dark strands, highlighted with dark arrows) are notably irregular and discontinuous, typical of degenerative changes seen in cystic medial necrosis. The dissection is present at the top of the field (open arrows) (elastin stain).