The Medicine, Angioplasty, or Surgery Study (MASS-II): A Randomized, Controlled Clinical Trial of Three Therapeutic Strategies for Multivessel Coronary Artery Disease: One-Year Results

Hueb W, Soares PR, Gersh BJ, et al. J Am Coll Cardiol 2004;43:1743–51.

Study Question: What are the relative efficacies of three possible therapeutic strategies (coronary artery bypass graft [CABG] surgery, percutaneous coronary intervention [PCI] and medical therapy [MT]) alone for patients with multivessel coronary artery disease (CAD), stable angina and preserved ventricular function?
Methods: A total of 611 patients with multivessel CAD, stable angina and preserved ventricular function were randomized to CABG (n=203), PCI (n=205) or MT (n=203). The primary end point was cardiac mortality, Q-wave myocardial infarction (MI) or refractory angina requiring revascularization. All data were analyzed according to the intention-to-treat principle.
Results: The 1-year survival rates were 96.0% for CABG, 95.6% for PCI and 98.5% for MT. The rates for 1-year survival free of Q-wave MI were 98% for CABG, 92% for PCI and 97% for MT. After 1-year follow-up, 8.3% of MT patients and 13.3% of PCI patients underwent additional interventions, compared with only 0.5% of CABG patients. At 1-year follow-up, 88% of the patients in the CABG group, 79% in the PCI group and 46% in the MT group were free of angina ($p<0.0001$).
Conclusions: Medical therapy for multivessel CAD was associated with a lower incidence of short-term events and a reduced need for additional revascularization, compared with PCI. In addition, CABG was superior to MT for eliminating anginal symptoms. All three therapeutic regimens yielded relatively low rates of cardiac-related deaths.
Perspective: CABG is associated with an upfront risk, i.e. operative mortality. Thus, while it appears that survival is similar with the three treatment strategies at 1 year, longer-term data from this trial may help to understand if surgical revascularization improves survival compared with the other two strategies. Clearly symptom relief and need for coronary revascularization is lower with CABG. RM

Terminal Complement Blockade With Pexelizumab During Coronary Artery Bypass Graft Surgery Requiring Cardiopulmonary Bypass: A Randomized Trial

Verrier ED, Sherman SK, Taylor KM, et al, for the PRIMO-CABG Investigators. JAMA 2004;291:2319–27.

Study Question: What is the efficacy and safety of pexelizumab, a C5 complement inhibitor, in reducing perioperative myocardial infarction (MI) and mortality in coronary artery bypass graft (CABG) surgery?
Methods: Patients (≥18 years) undergoing CABG surgery with or without valve surgery at 205 hospitals in North America and Western Europe from January 2002 to February 2003 (n=3099) were randomly assigned to receive intravenous pexelizumab (2.0 mg/kg bolus plus 0.05 mg/kg per hour for 24 hours; n=1553) or placebo (n=1546) 10 minutes before undergoing the procedure in a double-blinded fashion. The primary composite end point was the incidence of death or MI within 30 days of randomization in those undergoing just CABG surgery (n=2746). Secondary analyses included the intent-to-treat analyses of death or MI composite at days 4 and 30 in all 3099 study patients.
Results: After 30 days, 134 (9.8%) of 1373 patients receiving pexelizumab vs. 161 (11.8%) of 1359 of patients receiving placebo (relative risk, 0.82; 95% confidence interval, 0.66–1.02; $p=0.07$) died or experienced MI in the CABG surgery population. In the intent-to-treat analyses, 178 (11.5%) of 1547 patients receiving pexelizumab vs. 215 (14.0%) of 1535 receiving placebo died or experienced MI (relative risk, 0.82; 95% confidence interval, 0.68–0.99; $p=0.03$).
Conclusions: Compared with placebo, pexelizumab was associated with a trend for a reduction in the risk of the composite end point of death or MI in patients who had undergone CABG surgery only, and statistically significant risk reduction 30 days after the procedure among all patients undergoing CABG with or without valve surgery.
Perspective: Pexelizumab appears to reduce the harmful effects of the inflammatory response initiated by complement activation. This mechanism presumably underlies the clinical benefits seen in CABG (current study) and in patients receiving reperfusion for acute myocardial infarction (COMMA and COMPLY studies that evaluated this drug as adjunct to primary angioplasty and thrombolysis, respectively). Larger studies are needed to confirm these initial findings. RM/KE

Utility of B-Type Natriuretic Peptide in Predicting Postoperative Complications and Outcomes in Patients Undergoing Heart Surgery

Hutfless R, Kazanegra R, Madani M, et al. J Am Coll Cardiol 2004;43:1873–9.

Study Question: Could preoperative and postoperative B-type natriuretic peptide (BNP) levels be used as predictors of postoperative complications and outcomes in patients after open-heart surgery?
Methods: Ninety-eight male patients (63±9.1 years) undergoing open-heart surgery at a single institution during a 19-month period had their BNP levels analyzed and postoperative data recorded.

Results: There was a higher preoperative BNP level in patients requiring intra-aortic balloon pumps (IABPs) (mean BNP=387±112 vs. 181±25 pg/mL), in patients who died within 1 year (357±93 vs. 184±26 pg/mL) and in patients with postoperative hospital stays of 10 days or more (307±68 vs. 179±27 pg/mL). Receiver operating characteristic curves demonstrated preoperative BNP levels as predictors of postoperative IABP use, hospital stay ≤10 days and mortality <1 year with areas under the curve of 0.70, 0.64 and 0.70, respectively. A BNP cut-off value above 385 pg/mL demonstrated high specificity (=90% in each) and accuracy (=86%, 79% and 85%, respectively) for predicting each of these end points.
Conclusions: Preoperative BNP levels >385 pg/mL predict postoperative complications and 1 year mortality after heart surgery. Postoperatively, elevated peak BNP levels and elevated change to peak BNP levels were associated with prolonged hospital stay and mortality within 1 year.
Perspective: The elevated preoperative BNP levels preoperatively in patients undergoing open-heart surgery may be a reflection of clinical or subclinical heart failure. It is unclear whether therapeutic interventions in such patients prior to coronary revascularization will reduce risk or not. RM

Predictors of New Malignant Ventricular Arrhythmias After Coronary Surgery

Ascione R, Reeves BC, Santo K, Khan N, Angelini GD. J Am Coll Cardiol 2004;43:1630–8.

Study Question: What are the predictors and prognostic implications of sustained ventricular tachycardia/ventricular fibrillation (VT/VF) after coronary artery bypass graft (CABG) surgery?
Methods: Data collected prospectively at the time of CABG in 4411 patients were analyzed. CABG was performed conventionally using warm-blood cardioplegia in 74% of patients and off-pump in 26% of patients. Patients who had an isolated episode of post-CABG VT/VF were treated with an antiarrhythmic drug for 6 months.
Results: An isolated episode of post-CABG VT/VF occurred in 1.6% of patients. Post-CABG 30-day mortality was higher in patients who had VT/VF (22% vs. 1.4%). Independent predictors of post-CABG VT/VF included age >65 years, female gender, unstable angina, low ejection fraction and need for inotropic agents and an intra-aortic balloon pump. Among patients who survived for 1 month post-CABG, 2-year survival was 98% and 97% among patients with and without post-CABG VT/VF, respectively.
Conclusions: Post-CABG sustained VT/VF is unusual and is associated with a high in-hospital mortality rate but not with lower long-term survival.
Perspective: Although not addressed in this study, post-CABG VT/VF may be precipitated by early graft closure, perhaps explaining the high in-hospital mortality rate in patients who had post-CABG VT/VF. For the patients with VT/VF who survive the hospitalization, the study provides convincing evidence that post-CABG VT/VF does not have long-term prognostic implications and is not an indication for implantation of an automatic defibrillator. FM

Radial Artery Bypass Grafts Have an Increased Occurrence of Angiographically Severe Stenosis and Occlusion Compared With Left Internal Mammary Arteries and Saphenous Vein Grafts

Khot UN, Friedman DT, Pettersson G, Smedira NG, Li J, Ellis SG. Circulation 2004;109:2086–91.

Study Question: What are the angiographic outcomes of radial arterial grafts vs. internal mammary and saphenous vein grafts?
Methods: The investigators reviewed all coronary angiography procedures from February 1996 to October 2001, and selected patients with a radial artery bypass graft. Angiographic outcomes were divided into groups as (1) occluded, (2) severe disease (≥70% stenosis, or string sign) or (3) patent (<70% stenosis). Multivariable analyses determined predictors of severe disease or occlusion.
Results: A total of 310 patients had a radial artery graft (mean follow-up after coronary artery bypass grafting =565±511 days). Radial artery grafts had a patency rate of 51.3%, which was significantly lower than that for left internal mammary arteries (90.3%, $p<0.0001$) or saphenous vein grafts (64.0%, $p=0.0016$). Radial artery grafts had an occlusion rate of 33.7%, compared with 4.8% for left internal mammary arteries ($p=0.0001$), and had a severe stenosis rate of 15.1%, compared with 5.9% for saphenous vein grafts ($p=0.0003$) and 4.8% for left internal mammary arteries ($p<0.0001$). Women had a worse overall radial artery patency rate than men (38.9% vs. 56.1%, $p=0.025$). A radial artery graft was the most powerful multivariable predictor of severe stenosis or occlusion ($\chi^2=28.87$, $p<0.0001$). Because of diseased radial artery grafts, 58 patients required subsequent percutaneous intervention, and 26 patients required repeat CABG.
Conclusions: In patients predominantly presenting with signs and symptoms of myocardial ischemia after CABG, radial artery grafts have lower patency rates than left internal mammary artery and saphenous vein grafts. Selective use of the radial artery is warranted, particularly in women.
Perspective: Because only patients with recurrent ischemia were studied, the findings in this report are confounded by selection bias. This likely explains why this publication is contradictory to many other reports that have shown radial artery patency rates to be in between internal mammary and saphenous vein graft patency rates. RM