Am J Cardiol (2004);94:627-31
Comparison of three-year outcomes after coronary stenting versus coronary artery bypass grafting in patients with multivessel coronary disease, including involvement of the left anterior descending coronary artery proximally (a subanalysis of the arterial revascularization therapies study trial)
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The long-term effect of stents in patients with multivessel disease involving the proximal left anterior descending artery was investigated. At 3 years, there was no difference in the combined incidence of death, stroke, and myocardial infarction in either group, but the need for repeat revascularization was more frequent in the group with stenting than in the group with coronary artery bypass grafting.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15342295

Catheter Cardiovasc Interv (2004);63:57-60
Elective sirolimus-eluting stent implantation for multivessel disease involving significant LAD stenosis: one-year clinical outcomes of 99 consecutive patients--the Rotterdam experience
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The aim of this study was to evaluate the effectiveness of sirolimus-eluting stent (SES) implantation for patients with multivessel disease, which included left anterior descending artery (LAD) treatment. Since April 2002, SES has been utilized as the device of choice for all interventions in our institution as part of the Rapamycin-Eluting Stent Evaluated at Rotterdam Hospital (RESEARCH) registry. In the first 6 months of enrollment, 99 consecutive patients (17.6% of the total population) were treated for multivessel disease involving the LAD. The impact of SES implantation on major adverse cardiac events (MACE) was evaluated. All the patients received SES in the LAD. Additional stent implantation in the right coronary artery, the left circumflex, or in all three major vessels was attempted successfully in 32 (32%), 51 (52%), and 16 (16%) of the treated patients respectively. During a mean follow-up of 360 +/- 59 days (range, 297-472 days), we had one death, one non-Q-wave myocardial infarction, and eight patients required subsequent intervention. The event-free survival of MACE at 1 year was 85.6%. SES implantation for multivessel disease in a consecutive series of patients is associated with low incidence of adverse events. The reported results are related predominantly to the reduction in repeat revascularization.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15343568

Catheter Cardiovasc Interv (2004);63:184-91
Percutaneous coronary intervention or bypass surgery in multivessel disease? A tailored approach based on coronary pressure measurement
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The optimal revascularization strategy, percutaneous coronary intervention (PCI) or

coronary artery bypass graft surgery (CABG), for patients with multivessel coronary artery disease (MVD) remains controversial. The aim of the present study was to compare the long-term outcomes after selective PCI of only hemodynamically significant lesions (fractional flow reserve, or FFR < 0.75) to CABG of all stenoses in patients with MVD. In 150 patients with MVD referred for CABG, FFR was determined in 381 coronary arteries considered for bypass grafting. If the FFR was less than 0.75 in three vessels or in two vessels including the proximal left anterior descending (LAD) artery, CABG was performed (CABG group). If only one or two vessels were physiologically significant (not including the proximal LAD), PCI of those lesions was performed (PCI group). Of the 150 patients, 87 fulfilled the criteria for CABG and 63 for PCI. There were no significant differences in the angiographic or other baseline characteristics between the two groups. At 2-year follow-up, no differences were seen in adverse events, including repeat revascularization (event-free survival 74% in the CABG group and 72% in the PCI group). A similar number of patients were free from angina (84% in the CABG group and 82% in the PCI group). Importantly, the results in both groups were as good as the surgical groups in previous studies comparing PCI and CABG in MVD. In patients with multivessel disease, PCI in those with one or two hemodynamically significant lesions as identified by an FFR < 0.75 yields a similar favorable outcome as CABG in those with three or more culprit lesions despite a similar angiographic extent of disease.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15390344

Circulation (2004);109:2290-5
Propensity analysis of long-term survival after surgical or percutaneous revascularization in patients with multivessel coronary artery disease and high-risk features
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BACKGROUND: Although most randomized clinical trials have suggested that long-term survival rates after percutaneous coronary intervention (PCI) or surgical multivessel coronary revascularization (CABG) are equivalent, some post hoc analyses in high-risk groups and adjustment for severity of coronary disease have suggested higher mortality after PCI. METHODS AND RESULTS: We studied 6033 consecutive patients who underwent revascularization in the late 1990s. PCI was performed in 872 patients; 5161 underwent CABG. Half the patients had significant left ventricular dysfunction or diabetes. Propensity analysis to predict the probability of undergoing PCI according to 22 variables and their interactions was used. The C-statistic for this model was 0.90, indicating excellent discrimination between treatments. There were 931 deaths during 5 years of follow-up. The 1- and 5-year unadjusted mortality rates were 5% and 16% for PCI and 4% and 14% for CABG (unadjusted hazard ratio, 1.13; 95% CI, 1.0 to 1.4; P=0.07). PCI was associated with an increased risk of death (propensity-adjusted hazard ratio, 2.3; 95% CI, 1.9 to 2.9; P<0.0001). This difference was observed across all categories of propensity for PCI and in patients with diabetes or left ventricular dysfunction. Other independent predictors of mortality (P< or =0.01 for all) were renal dysfunction, age, diabetes mellitus, chronic lung disease, peripheral

vascular disease, left main trunk stenosis, and extent of coronary disease (Duke angiographic score). CONCLUSIONS: In patients with multivessel coronary artery disease and many high-risk characteristics, CABG was associated with better survival than PCI after adjustment for risk profile.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15117846

Am J Cardiol (2005);95:349-54
In-hospital and long-term outcomes of multivessel percutaneous coronary revascularization after acute myocardial infarction
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Multivessel percutaneous coronary intervention (PCI) early after acute myocardial infarction (AMI) is discouraged because of the potential for increased complications. However, with recent advances in PCI, the safety and long-term outcomes of multivessel PCI are unknown. We evaluated the outcomes of multivessel PCI early after AMI (ST-elevation and non-ST-elevation AMI). We identified all patients who had multivessel disease and underwent PCI within 7 days after an AMI from 1997 to 2002. Clinical outcomes were compared between patients who underwent multivessel PCI (n = 239) and patients who underwent treatment of the infarct-related artery alone (n = 1,145). The primary end point was cumulative survival at 6, 12, and 36 months. Secondary end points included a composite of mortality, recurrent infarction, coronary artery bypass graft, or target vessel revascularization at the same time points. There were 138 deaths and 351 occurrences of the composite end point during follow-up. The multivessel PCI group had a significantly higher prevalence of adverse prognostic indicators. Despite this, observed event rates were similar between the multivessel PCI and 1-vessel PCI groups. The Kaplan-Meier estimated 1-year survival was 0.91 (95%

820 patients treated with primary angioplasty for AMI between 1998 and 2002 were classified in groups of patients with single vessel disease (SVD) or MVD (> or =70% stenosis of > or =2 coronary arteries). Patients with MVD were subdivided in 3 groups on the basis of the revascularization strategy: 1) patients undergoing percutaneous coronary intervention (PCI) of the infarct-related artery (IRA) only; 2) patients undergoing PCI of both the IRA and non-IRA(s) during the initial procedure; and 3) patients undergoing PCI of the IRA followed by staged, in-hospital PCI of the non-IRA(s). Procedural, 30-day, and 1-year outcomes are reported. RESULTS: At 1 year, compared with patients with SVD, patients with MVD had a higher incidence of re-infarction (5.9% vs 1.6%, P =.003), revascularization (18% vs 9.6%, P <.001), mortality (12% vs 3.2%, P <.001), and major adverse cardiac events (MACEs; 31% vs 13%, P <.001). In patients with MVD, compared with PCI restricted to the IRA only, multivessel PCI was associated with higher rates of re-infarction (13.0% vs 2.8%, P <.001), revascularization (25% vs 15%, P =.007), and MACEs (40% vs 28%, P =.006). Multivessel PCI was an independent predictor of MACEs at 1 year (odds ratio = 1.67, P =.01). CONCLUSIONS: These data suggest that in patients with MVD, PCI should be directed at the IRA only, with decisions about PCI of non-culprit lesions guided by objective evidence of residual ischemia at late follow-up. Further studies are needed to confirm these findings.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15389238

J Am Coll Cardiol (2004);43:1743-51
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
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OBJECTIVES: We sought to evaluate the relative efficacies of three possible therapeutic strategies for patients with multivessel coronary artery disease (CAD), stable angina, and preserved ventricular function. BACKGROUND: Despite routine use of coronary artery bypass graft surgery (CABG) and percutaneous coronary intervention (PCI), there is no conclusive evidence that either one is superior to medical therapy (MT) alone for the treatment of multivessel CAD. METHODS: The primary end point was defined as cardiac mortality, Q-wave myocardial infarction (MI), or refractory angina requiring revascularization. All data were analyzed according to the intention-to-treat principle. RESULTS: A total of 611 patients were randomly assigned to either a CABG (n = 203), PCI (n = 205), or MT (n = 203) group. The one-year survival rates were 96.0% for CABG, 95.6% for PCI, and 98.5% for MT. The rates for one-year survl12( t)-5.5w[(96.0(soe)

rates of cardiac-related deaths.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15145093

Am Heart J (2004);148:467-74
Complete versus culprit vessel percutaneous coronary intervention in multivessel disease: a randomized comparison
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BACKGROUND: The purpose of this study was to compare the safety, efficacy, and costs of complete versus "culprit" vessel revascularization in multivessel coronary artery disease treated with percutaneous coronary interventions (PCI). METHODS: Patients with multivessel disease and an identified culprit vessel were randomly assigned to complete revascularization of vessels > or =50% stenoses (n = 108) versus revascularization limited to the culprit vessel (n = 111). The primary end point, major adverse cardiac events (MACE), were defined as cardiac or noncardiac death, myocardial infarction, need for coronary artery bypass graft surgery, and repeat PCI up to 1 year. RESULTS: Despite equal MACE at 24 hours (6.3% vs 7.4%), strategy success was higher in the culprit vessel than in the complete revascularization group (93.7% vs 81.5%, P =.007). MACE rates at 1 month (14.4% vs 9.3%), 1 year (32.4% vs 26.9%), and 4.6 +/- 1.2 years (40.4% vs 34.6%) were similar in both groups. Repeat PCI was performed more often in the culprit vessel group (31.2% vs 21.2%, P =.06). A lower consumption of medical material was associated with lower procedural costs in the culprit vessel group (5784 vs 7315 Euros; P <.001). However, between 1 year and the end of follow-up, costs had equalized in both groups. CONCLUSIONS: Complete versus culprit vessel revascularization in multivessel coronary disease treated with PCI was associated with a lower strategy success rate, similar MACE rates, and initially higher costs. However, over the long term, more repeat PCIs were conducted in patients treated by culprit revascularization only, mostly because of the need to treat lesions initially left untreated. As a consequence, incremental costs had equalized within 1 year. The decision of whether to perform culprit vessel or complete revascularization

up to 3 years. Survival rates without stroke or myocardial infarction were similar in each group at 1 year and 3 years (90.5% versus 91.4% for PCI versus CABG at 1 year and 87.2% versus 88.4% for PCI versus CABG at 3 years). However, the respective repeat revascularization rates were 21.2% and 26.7% at 1 and 3 years in patients allocated to PCI, compared with 3.8% and 6.6% in patients allocated to CABG (P<0.0001). Diabetes (P<0.0009) and maximal pressure for stent deployment (P<0.002) are the strongest independent predictors of events at 3 years after PCI, whereas left anterior descending coronary artery grafting (P<0.006) is the best predictor of event-free survival at 3 years after CABG. The incremental cost of surgery compared with PCI for an event-free patient was 19 257 at 1 year but decreased to 10 492 at 3 years. It remained at 142 391 at 3 years when revascularization procedures were excluded in the efficacy end point, however. CONCLUSIONS: Three-year survival rates without stroke and myocardial infarction are identical in both groups, and the cost/benefit ratio of stenting is determined primarily by the increasing need for revascularization in the PCI group.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=14993134

J Am Coll Cardiol (2004);43:1154-60
Treatment of multivessel coronary artery disease with sirolimus-eluting stent implantation: immediate and mid-term results
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OBJECTIVES: This study evaluated clinical outcome after multivessel stenting with sirolimus-eluting stents (SES) in unselected lesions. BACKGROUND: Safety and effectiveness of multivessel SES implantation is currently unknown. METHODS: Major adverse cardiac events (MACE) (death, myocardial infarction [MI], and repeat revascularization) were analyzed at 30 days and at 6 months after multivessel SES implantation. RESULTS: In 155 consecutive patients, 573 SES were implanted in 3.3 +/- 1.3 lesions per patient. At 30 days, the cumulative MACE rate was 10.3%: 7.1% patients developed a non-Q-wave MI, 1.9% developed a Q-wave MI, 0.6% died for non-cardiac reasons, and 0.6% had a repeat revascularization. Clinical follow-up was obtained in all 112 eligible patients treated for 359 lesions at a mean time of 6.5 +/- 2.2 months. The cumulative MACE rate was 22.3%: 3 (2.7%) deaths (1 for cardiac reasons), 4 (3.6%) MIs, target lesion revascular*iz5(i)1.5(s.4(plsC1517 T.6%) )-5sion ry/d RE)-6ere*

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Circulation (2004);109:e9043-4
Surgery may be better than PCI in patients with multivessel disease at high risk
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http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=15148285

Am J Cardiol (2004);93:404-9
Relative benefit of coronary artery bypass grafting versus stent-assisted percutaneous coronary intervention for angina pectoris and multivessel coronary disease in women versus men (one-year results from the Stent or Surgery trial)
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Information on the relative benefit of coronary artery bypass grafting (CABG) versus stent-assisted percutaneous coronary intervention (PCI) for improvement of cardiac-related health status in women and how it compares with men is limited. The Stent or Surgery trial compared randomly assigned CABG and stent-assisted PCI in 206 women and 782 men with multivessel disease. We examined longitudinal changes at 6 and 12 months from baseline by gender and treatment in 3 subscales of the Seattle Angina Questionnaire (SAQ): physical limitation, angina frequency, and quality of life. At the time of revascularization, women were older, more severely ill, and tended to have lower SAQ scores than men. At 6 months, SAQ scores after both procedures improved significantly in both genders, with greater improvement achieved with CABG. After adjustment for other factors, in men, CABG was associated with a 54.7% greater improvement in physical limitation compared with PCI, 31.3% greater improvement in angina frequency, and 18.3% greater improvement in quality of life. In women, these relative differences were 11.6%, 43.2%, and 39.3%, respectively. At 1 year, men continued to show greater improvement with CABG in all 3 dimensions (50.6%, 19.7%, and 15.3%, respectively), but inbnaire a7(y)5.7[(c.7(y)55.1(quali)5.5465 TDf-0.04.).4(s)ell.4( m0.2( )5.1