Comparing the Effectiveness of Coronary Artery Bypass Graft Surgery and Nonsurgical Catheter-Based Interventions for Coronary Artery Disease

What is the problem and what is known about it so far?
Coronary artery disease causes blockages of the blood vessels that supply the heart muscle and can lead to heart attacks, heart failure, and death. These blockages can be managed with heart surgery called coronary artery bypass grafting (CABG). They may also be managed with procedures performed with catheters inserted through the skin called percutaneous coronary interventions (PCIs). These include angioplasty or stenting in which a balloon or inserted coils dilate blocked areas. In clinical trials of highly selected patients randomly assigned to CABG or PCI, a small survival advantage has been seen with CABG. Whether this difference is also true among patients who might not have precisely the same characteristics of individuals who were enrolled in such trials (for example, because of other illnesses they might have) is not known.

Why did the researchers do this particular study?
To assess whether there is a difference between CABG and PCI when performed in real-world practice among patients not enrolled in clinical trials.

Who was studied?
105,156 patients who were enrolled in Medicare between 1992 and 2008 and had CABG or PCI.

How was the study done?
Researchers used electronic billing records to identify clinical characteristics of the patients, including diseases, such as diabetes, peripheral vascular disease (a narrowing of vessels other than those of the heart [such as in the leg]), or a history of heart failure or smoking. After “matching” patients to make groups that had similar proportions of patients with each of these and many other characteristics, they then compared the survival of those who had CABG with those who had PCI.

What did the researchers find?
Overall, survival was longer after CABG than after PCI. Although this difference was small (weeks to months), the difference in survival that might be predicted for any individual after CABG or PCI varied widely and was influenced by the presence or absence of certain medical factors. Patients with diabetes were predicted to have a particular survival advantage with CABG compared with PCI. Other factors that were associated with an advantage to CABG were a history of smoking, heart failure, or peripheral arterial disease. Conversely, patients lacking any of these factors would be predicted to have a slightly better chance of survival after PCI.

What were the limitations of the study?
This type of study cannot confidently determine whether CABG or PCI is the cause of improved or worsened outcomes when compared in the patients studied. The choice of CABG or PCI in the study patients was made considering many factors that the researchers could not assess. These factors might have important effects on how well a patient does after CABG or PCI. Such factors include problems with other kinds of surgery in the past, frailty, limited ability to walk or care for oneself, personal preferences, and many others.

What are the implications of the study?
The individual characteristics identified in this study are associated with whether a patient will have a greater survival benefit from CABG or PCI. Patients and physicians should discuss these and other factors when deciding the best plan of care.