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Long-Term Survival Following Coronary Revascularizations

This application addresses broad **Challenge Area:** (04) Clinical Research and specific **Challenge Topic:** 04-HL-104: Perform Secondary Analyses of Existing Data to Answer Important Clinical and Preventive Medicine Research Questions. Coronary revascularization procedures (i.e., coronary artery bypass graft (CABG) surgery and percutaneous coronary interventions (PCI)) are among the most frequently performed procedures in the United States, with an estimated 1.3 million PCIs and 0.5 million CABG surgery procedures performed annually. In recent years, the vast majority of PCIs are performed with coronary stents.

Since stenting and CABG surgery are each a possible intervention for patients with coronary artery disease, particularly for patients with two or three diseased coronary arteries, there is an important need to assess which procedure is appropriate for which patients. There have been recent randomized controlled trials (RCTs) that have compared medium-term survival for CABG surgery and stenting for all patients, and a pooled analysis that has merged the data of several trials to obtain comparative outcomes for subgroups of patients undergoing revascularization. Also, some observational studies, including two by these authors, have examined medium-term outcomes for all patients and for subsets of patients.

However, these studies have a few limitations. First, the RCTs are not large enough to examine subgroups of patients to determine which patients are served best by which procedure. Second, the meta-analyses of RCTs consists of RCTs that pre-date the use of drug-eluting stents, which have been shown by some studies to have lower mortality and by nearly all studies to have lower subsequent revascularization rates than bare metal stents. Third, most studies have not examined outcomes over relatively short periods of time, and these comparative outcomes may differ from longer-term outcomes. Furthermore, recent studies have demonstrated that complete revascularization with PCI is associated with better outcomes for a relatively short period of time (2-3 years), but no studies have looked at comparative outcomes for longer periods.

The objectives of our studies are to test the hypotheses that 1) CABG surgery is associated with superior long-term survival compared to stenting with drug-eluting stents (DES) or bare-metal stents (BMS); 2) that the relative benefit in long-term survival between CABG surgery and stenting is modified by patient characteristics; 3) that incomplete revascularization is associated with inferior long-term survival for patients receiving DES or BMS. We will also create bedside friendly risk scores to predict long-term mortality for CABG surgery and PCI, which has not been done before.

The results of the proposed studies will have direct impact on a broad range of medical professionals who manage coronary artery disease and patients who need coronary revascularization procedures. The new information on long-term survival following coronary revascularizations generated from the proposed studies can be combined with current knowledge, and can be used by physicians and patients when considering coronary revascularization procedures in the management of coronary heart disease.