Preoperative Anemia Increases Surgery Risks

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ORLANDO—Anemia is a potent risk factor for patients undergoing surgery. Patients who were anemic just prior to coronary artery surgery, elective vascular surgery, or endovascular aortic aneurysm repair had a significantly increased risk of death or major adverse events at 30 days. Patients with severe anemia had hemoglobin levels of less than 9.0 g/dL.

The incidence of an adverse outcome during both the first 30 days after surgery and throughout an average follow-up of 3.8 years was significantly worse in the patients with anemia with normal hemoglobin levels. The rate of death or MI also increased as the severity of anemia worsened.

In multivariate analyses that controlled for patients’ age, gender, and clinical parameters at baseline, patients with anemia had a significantly increased risk for adverse outcomes, both perioperatively and long-term. The relative risk for patients with severe anemia was comparable to the increased risk for death or MI faced by patients with heart failure or chronic kidney disease (see box).

The study presented by Dr. Diehm on patients undergoing endovascular repair of abdominal aortic aneurysms used data collected on 711 consecutive patients who underwent endovascular aneurysm repair (EVAR) during March 1994–November 2006 at the Baptist Cardiac and Vascular Institute in Miami. Anemia was defined by the same criteria used in Dr. Dunkelgrun’s study, and was present in 218 patients. The average age of all patients in the study was about 76 years. The patients in the anemia group were significantly older and were more likely to have concurrent cardiac, renal, and pulmonary disease.

The rates of death, aneurysm rupture, or need for follow-up open surgery during the first 30 days after EVAR were not significantly different between the anemic and normal patients. But during an average long-term follow-up of 48 months, patients with anemia were significantly more likely to die. In a multivariable analysis that controlled for baseline demographic and clinical differences, patients had about a 1.3% increased risk of long-term mortality for each 1 g/dL reduction in their serum hemoglobin level.

The third reported study on anemia and surgical risk reviewed data collected on 14,574 patients who were entered in the Coronary Artery Surgery Study (CASS) registry during 1974–1979. These patients, a subgroup of the more than 25,000 patients in the registry, all had data available on their hematocrit and serum creatinine levels at baseline. The average age of all patients was about 53 years, and about three-quarters were men.

The study group included 2,318 patients (19%) with anemia, as defined as a serum hematocrit of less than 39% in men and less than 36% in women. The patients with anemia had a significantly lower level of creatinine clearance, compared with the nonanemic patients. During the first 5 years following surgery, the incidence of death was 16% in patients with anemia and 12% in nonanemic patients, a statistically significant difference, reported Dr. Malini Madhavan, a physician at the Mayo Clinic in Rochester, Minn. A significant 4% difference in mortality between the anemic and nonanemic patients also was seen after 10 and 15 years of follow-up, indicating that even after an early increase in risk linked to anemia mortality rates were then similar in both subgroups.

‘Anemia caused most of the risk [for increased death] early, and then the relative risk remained stable. We don’t know why,’ said Dr. Patricia J. Best, senior investigator for the study and a cardiologist at the Mayo Clinic.

The study’s size was smaller than the investigators would have liked because at the time of approval, stenting for left main disease was not an accepted treatment. Dr. Martin explained in an interview, noting that American Heart Association and American College of Cardiology guidelines state that left main stenting should only be done when the patient is not a good candidate for bypass surgery.

LE MANS was sponsored by the Polish Ministry of Science and Informatics. Dr. Martin reported no conflicts of interest.

The trial enrolled 105 patients with greater than 50% left main stenosis, with or without multivessel disease. Those with total occlusions were excluded. Patients were evenly randomized to PCI or to CABG, and there were no crossovers. The mean age of both arms was 61 years. Men comprised 60% of the PCI arm and 73% of the CABG arm (J. Am. Coll. Cardiol. 2008;51:538-45).

The average number of diseased vessels was two in both arms. In the CABG group, an average of three vessels were grafted, compared with an average of two arteries dilated in the PCI group, a significant difference. In addition to the bypass, all patients were deemed by both the principal interventional and surgical investigators to be technically eligible for the PCI procedure, they said.

At 30 days, there were no deaths in the PCI group and two deaths in the CABG group. Over the same period, both major adverse events and MACCEs were significantly more common in the CABG arm (28% versus 8%, and 13% versus 2% respectively). Hospital length-of-stays were 7 days and 12 days, respectively.

However, the number of repeat revascularizations at 1 year was significantly higher in the PCI arm, at 15, compared with 5 in the CABG group. At 1 year, left ventricular ejection fraction improved only in the PCI group, the investigators said. “Both groups demonstrate similar improvement in angina and good long-term functional capacity on exercise stress testing,” they explained.

The actual 1-year survival was lower in surgical patients, but the difference did not reach statistical significance: 92.5% for CABG and 98% for PCI.

The importance of our study is that it provides the first randomized, prospective data comparing percutaneous stenting with surgery in unprotected left main artery disease,” said Dr. Jack L. Martin, the U.S.-based coauthor of the article. “Importantly, major adverse events—including respiratory infection, the need for respiratory support, renal failure, and the need for blood transfusion—were much lower in the percutaneously treated patients,” he said.

Dr. Martin, chief of interventional cardiology in the Main Line Heart System, Philadelphia.

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