Study Identifies Patients With Higher Risk After Bilateral Knee Replacement

A new study by researchers at Hospital for Special Surgery has identified patients who are at a higher risk of morbidity and mortality when undergoing knee replacement surgery in both legs at the same time. The study found that patients who have a history of significant medical problems, especially congestive heart failure or pulmonary hypertension, are at increased risk for major complications.

"What we sought to do for the first time with this study, was to provide evidence-based risk stratification for who should be considered at high risk for morbidity and mortality when undergoing bilateral knee replacement surgery," said Stavros Memtsoudis, M.D., Ph.D., an anesthesiologist at Hospital for Special Surgery, who led the study. "This is an elective procedure, so in the end, the primary concern should be for patient safety." The study appears online ahead of print in the journal Anesthesia & Analgesia.

Bilateral knee replacement surgery or total knee arthroplasty (TKA) has advantages over staged unilateral knee replacement surgery (which is considered the alternative to bilateral knee arthroplasty) in terms of decreasing the time that patients spend in a hospital, decreasing hospital costs, and allowing patients to return to work and an active life more quickly. Studies have shown that bilateral knee replacements, however, are associated with greater morbidity and mortality than unilateral knee replacements.

To find out which patients are more at risk, researchers at Hospital for Special Surgery turned to the Nationwide Inpatient Survey, sponsored by the Agency for Healthcare Research and Quality (AHRQ). This is the largest inpatient database available in the United States that includes information on patients of all ages. It collects data from about 20% of all hospitalizations in the U.S. This large cohort of patient information is unparalleled and allows for the appropriate study of relatively rare events such as morbidity and mortality surrounding surgery. The study investigators analyzed data between 1998 and 2007 and found that more than 200,000 bilateral TKAs were performed during this time frame. The incidence of major in-hospital complications and mortality was 9.5 percent. The researchers analyzed outcomes with respect to patient demographics including comorbidities such as heart problems, diabetes, liver dysfunction, cancer, and alcohol abuse. They used a multivariate analysis to determine independent risk factors for major morbidity and mortality.

Patients undergoing bilateral TKA were 5.5 times more likely to have adverse outcomes if they had congestive heart failure and four times more likely to have worse outcomes if they had pulmonary hypertension. Patients were almost twice as likely to have complications if they were older than 75 years of age compared to

individuals below the age of 65 years. Men had a 50 percent greater risk of complications than women.

"Age by itself will be a risk factor in any kind of surgery, so I am a little hesitant to say that patients who are over the age of 65 shouldn't have bilateral knee replacement surgery, especially since a large number of knee replacement patients falls into that category. However, patients with extremes in age should be carefully evaluated before consideration for bilateral procedures." said Dr. Memtsoudis. He added that the role of male gender is unclear, but could involve factors not accounted for in the analysis, such as hormonal differences.

What should be clear from the study, however, is that patients with congestive heart failure and pulmonary hypertension as well as significant other comorbidities are not good candidates for this bilateral surgery. "During orthopedic surgery, bone particles and marrow enter the bloodstream and embolizes (lodges) in the pulmonary vasculature and other organs thus impacting on blood flow through the lung and other systems. While these events stress the heart, they rarely cause any clinically noticeable effects in otherwise healthy patients. However, people who have a history of heart failure are already at a disadvantage," explained Dr. Memtsoudis. "When a patient has pre-existing pulmonary hypertension, this may also make it more difficult for their heart to pump blood against even more increased pulmonary pressures brought upon by the occlusion of small vessels in the lungs."

The HSS researchers say national guidelines need to be developed regarding bilateral knee replacement surgery and are organizing a meeting for 2012 to discuss the development of such guidelines. "Clinicians need to adopt an approach when doing this surgery that reconciles the benefits of bilateral knee replacement surgery and concerns for safety," said Dr. Memtsoudis. "In order to do that, they will need to use evidence-based criteria of who should and who shouldn't be considered an appropriate candidate for bilateral knee replacement. What we are providing with this study is the first step towards an evidence-based approach to risk stratifying patients."

Almost 600,000 knee replacements are performed each year in the United States. These numbers are expected to rise as baby boomers, who are often reluctant to give up their active lifestyle, age.

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