Optimal acetabular cup positioning is attained in less than 50% of cases, study reports

March 9, 2010

NEW ORLEANS — High-volume surgeons are more likely than low-volume surgeons to attain optimal cup positioning for total hip arthroplasty, but both groups still attain optimal cup positioning less than half of the time, according to a study presented here.

The findings were presented by Bryan Jarrett, BS, at the 56th Annual Meeting of the Orthopaedic Research Society. Jarrett said the purpose of the study was to attempt to correlate the influence of various patient factors — body mass index (BMI), age, gender and primary diagnosis for the total hip arthroplasty (THA) — with the positioning of the acetabular cup.

“Cup positioning and implant positioning are extremely important to attain long-term success,” he noted.

Methods and measurements

The researchers compiled data from 2,063 patients who underwent a primary THA, revision THA or Birmingham hip resurfacing from 2004 through 2008. Postoperative anteroposterior (AP) pelvis and cross table lateral digital radiographs were obtained for each patient, and the AP radiographs were measured to calculate cup inclination and version angles. Version direction was determined through the lateral radiographs.

Acceptable angle ranges were defined as 30° to 45° for abduction and 5° to 25° for version.

Study results

There were 1,954 qualifying patients, with 1,218 (62%) acetabular cups falling within the optimal abduction range and 1,576 (87%) in the optimal version range. There were 921 (47%) patients with both inclination and version angles within the optimal ranges.

In the combined analysis, low-volume surgeons showed a 2-fold increase in risk for cup malpositioning compared with high-volume surgeons. Minimally-invasive surgery, as an approach, showed a 6-fold increase in risk for cup malpositioning when compared to the posterolateral approach. Obesity, defined as a BMI greater than 30, showed a 1.3-fold increase in risk.

Less than half

With patient influences taken into account, the high-volume surgeons outperformed their low-volume counterparts, but both still attained optimal ranges in less than 50% of patients.
"When we just looked at high-volume surgeons, 38% of the patients fell within the optimal ranges," Jarrett said. "When we just looked at low-volume surgeons, we saw that 26% of the patients were within the optimal ranges.

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