Hip Resurfacing in Amputees

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Patients with lower extremity amputations develop hip arthritis earlier and more often than the general population. This is true for both their intact and residual limbs. These patients represent a unique population when they need hip arthroplasty, as they require a high degree of hip strength and mobility and have complex movement patterns. Their expectations for postoperative function may be higher than for patients with intact limbs. Hip resurfacing arthroplasty (HRA) is an attractive option for amputees, as it provides a stable hip that is less intrusive to the femur. Since amputees typically are younger at presentation and have altered gait mechanics, HRA could provide a benefit compared to total hip replacement (THR). There is very limited information on hip arthroplasty procedures in amputees, even though the first procedure was reported in 1953.

METHODS:

Hip resurfacing arthroplasty using a polyethylene acetabular component was performed in 39 amputee patients (45 hips). Both above and below knee amputations were included. Trauma, tumor, vascular disease, infection, and congenital conditions were the reasons for amputation. Implant survivorship and complications were recorded, and radiographs were evaluated for implant osseointegration, wear, position, and leg length. A comparison group of 30 amputee patients (36 hips) with THR was also evaluated. Patients were evaluated using the Hip Disability Osteoarthritis Outcome Score (HOOS), Harris Hip Score (HHS), Minimum Clinical Improvement Difference (MCID), and Patient Acceptable Symptom State (PASS). The PASS question was: Taking into account your hip pain and function and how it affects your daily life including your ability to participate in sport and social activities, do you consider your state acceptable? RESULTS:

The results are shown in the Table. No patient was lost to follow-up at a mean of 12 years (maximum follow-up 40 years). A polyethylene acetabular component was used in every procedure and all prostheses both for HRA and THR were placed without cement. The posterior approach was used for all HRA cases and the anterior approach for 18 (50%) of the THR cases. There was one revision for femoral head avascular necrosis and one polyethylene exchange for wear in the HRA group; the polyethylene in this case was before highly cross-linked polyethylene was available.

There was one HRA patient with an infection treated successfully with a Debridement Antibiotics and Implant Retention procedure. One HRA and one THR patient had residual limb breakdown that healed in 6 weeks. At final follow-up, 33 (85%) of HRA patients had a leg length difference of more than 1 cm (range; 1 - 4.7 cm). Among HRA patients with a difference, the prosthetic limb was shorter in 24 (75%) and longer in 8 (25%). For THR patients, 30 (85%) had a leg length difference, shorter on the amputated limb in 22 (75%) patients and longer in 8 (25%) patients. No patient was concerned about their leg length difference. The postoperative leg length differences did not change from preoperative differences noted. There were no differences in hip scores or implant survivorship based on limb length.

In the THR comparison group, there were 3 revisions: 1 infection, 1 femoral loosening, and 1 instability. The HRA procedures took an average of 29 additional operative minutes to complete compared to THR. Every patient achieved MCID, which required an improvement of 28 points in the HOOS and 27 points in the HHS, and 85% of HRA and 70% of THR patients achieved PASS. There was no difference in outcome based on whether the HRA or THR was in the amputated limb or whether it was a unilateral or bilateral HRA or THR. DISCUSSION AND CONCLUSION:

This is one of the larger series reporting hip arthroplasty procedures in amputees. The HRA outcomes in this series are as favorable or more favorable compared to THR results in this patient population. An unexpected finding in amputee hip arthroplasty patients was that leg length differences are common both before and after arthroplasty. This was not anticipated, as these patients can choose their leg lengths. It would have been assumed they would choose equal leg lengths. Unequal leg lengths did not adversely affect the survivorship, patient-reported outcomes, or complications of the HRA or THR. There may be a patient acceptance advantage when patients rather than surgeons choose the limb length. Hip resurfacing arthroplasty is a demanding procedure that can be used successfully in patients with lower limb amputations.

