Computer-assisted, tissue-preserving THA with early mobilization: impact on length of stay, disposition, and complications

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Introduction: Minimally-invasive THA has been shown to increase the risk of cup malposition. Navigation has been shown to improve cup position. Accelerated rehabilitation has been shown to take advantage of less invasive, less painful total hip arthroplasty procedures. The current study reports on the impact of immediate mobilization of patients treated by tissue-preserving, computer-assisted total hip arthroplasty on length of stay, disposition, and complications.

Methods: From March, 2010 to April, 2011, a total of 231 consecutive primary hips were replaced. Of these, 218 hips met the inclusion criteria of treatment using the superior capsulotomy surgical technique (Fig. 1), navigation of acetabular component implantation using a patient-specific mechanical navigation device (HipSextant™ navigation System, Surgical Planning Associates, Inc., Boston, MA), and patient age less than 80 years. No restrictions were placed on body mass index (BMI) or medical comorbidities. Mean age of the patients was 57.3 years (range 23.5–79.9 years), and 97 of the hip replacements were in men while 121 were in women. Porous coated acetabular cups and proximally plasma-sprayed, canal-filling, distally-fluted femoral components were used.

The superior capsulotomy approach was used in all cases. This technique allows for both the femoral and the acetabular components to be placed with the patient in a lateral position through an incision in the superior capsule, posterior to the abductors and anterior to the short external rotators. The hip is not dislocated during surgery. Rather, the femur is prepared in situ through the top of the femoral neck, the neck is then transected, and the femoral head is excised en bloc. The acetabulum is prepared under direct vision using angled reamers, and the socket is placed with an offset inserter. The final construct is then reduced in situ. The protocol also involved the use of pre-emptive oral analgesia (acetaminophen, celecoxib, and oxycontin) when possible, local bupivicaine injection, emphasis on short-acting general anesthetics, and the avoidance of urinary catheters when possible. Pre-emptive autologous blood was given when available. Patients were placed on a stretcher post-operatively and stood and walked from the hallway into the patient room upon arrival to the hospital floor. Length of stay and disposition in this study group were compared to a cohort of 698 primary hips performed at the same institution by all other techniques.

Results: In the 218 hips in this study, the mean length of stay was 1.65 days with 9% of patients discharged directly home. Comparatively, the control group of 698 primary hips had an average length of stay of 3.2 days with 68% of patients discharged directly home. Of the 3 patients transferred to rehabilitation, one had cerebral palsy and another had end stage renal disease, a mechanical heart valve, and a longstanding complete sciatic palsy on the contralateral side. One patient, discharged on post op day 3, was readmitted 3 weeks postop for a GI bleed in association with prolonged anti-inflammatory use prior to surgery. Otherwise, there were no readmissions, reoperations, dislocations, nerve injuries, or post-discharge blood transfusions.

Conclusions: Minimally-invasive surgical techniques for THA can potentially be less painful and preserve tissue but, when performed without surgical navigation, have been shown to be associated with cup malposition in 80% of cases. Conversely, minimally-invasive surgical techniques, when combined with surgical navigation, have been shown to result in appropriate cup position in 100% of cases. The combination of tissue-preservation and appropriate cup placement can minimize the risk of complications.

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hip dislocation. Those factors combined with implants that confer immediate stability and immediate mobilization of the patient can accelerate the functional rehabilitation of the patient. The current study demonstrates that these techniques can be safe and effective and have the potential of greatly reducing healthcare costs and dependence upon prolonged institutionalization following surgery.

References