

A New Risk-Assessment Score and Treatment Algorithm for Patients at High-Risk of Dislocation following Total Hip Arthroplasty

Jonathan M Vigdorich, Ameer M Elbuluk, Kaitlin M Carroll, David Jacob Mayman, Richard Iorio, Aaron Buckland, Seth A Jerabek

INTRODUCTION:

Dislocation remains a common cause of failure after total hip arthroplasty (THA). Several factors have been shown to increase the risk of instability, the biggest of which is spinal fusion or deformity. Implant options have been developed to help address this problem such as large-diameter femoral heads, dual mobility constructs (DM), and constrained liners. Although DM cups have been shown to decrease the rate of dislocation in primary THA, there are no current guidelines to support clinical decision making regarding these interventions. The purpose of this study was to develop and validate a risk prediction score and treatment algorithm for patients at an increased risk for dislocation.

METHODS:

Three adult reconstruction fellowship-trained surgeons performed 1,082 consecutive primary unilateral THAs using computer-navigation between January 2014 and December 2015. During this period, no DM implants were used in patients undergoing primary THA. Overall dislocation rate in this period was 1.8%. In this cohort, 320 patients had radiographic spine pathology, and 10 of these patients had dislocations postoperatively, for a high-risk dislocation rate of 3.1%. Beginning in 2016, all surgeons used a standardized scoring system to assess risk of dislocation in patients undergoing primary THA. Risk assessment began with standardized preoperative imaging, including sitting (anterior pelvic tilt) and standing (posterior pelvic tilt) AP and lateral stereoradiographs. Subsequently, risk analysis was then performed based on the predetermined scoring system, and patients with a risk score greater than 4 underwent THA with a high-risk treatment algorithm. The high-risk algorithm included the use of high-offset or variable anteversion stems, patient-specific increases, or decreases in acetabular anteversion based on pelvic tilt using computer-navigation, measurement of combined anteversion, careful attention to anterosuperior osteophytes, careful attention to restoring/increasing leg-length and offset, and the use of large-diameter femoral heads or dual mobility constructs.

RESULTS:

Using our novel risk assessment tool, 192 of 1,009 patients were identified as high-risk of postoperative dislocation. All 192 patients underwent primary THA with the high-risk algorithm. Dual mobility prostheses were used in 143 cases. In patients evaluated with our risk algorithm, there was 1 dislocation (0.5%) compared to 3.1% in the previous group not assessed with our risk system and treatment algorithm. This represented a 6-fold decrease in the rate of dislocation for this high-risk cohort.

DISCUSSION AND CONCLUSION:

Our study suggests that a new risk prediction model and treatment algorithm can help identify patients at high-risk of postoperative dislocation who may benefit from the use of DM articulations. At short-term follow up, patients who underwent THA using this risk score and algorithm demonstrated a 6-fold decreased rate of dislocation compared to conventional THA. Future studies using this risk algorithm are warranted to establish the long-term clinical benefits and survivorship in patients at high risk for dislocation.