Spine evaluation is critical to reduce dislocations in revision total hip arthroplasty

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Hip replacement surgery is highly successful in restoring mobility, relieving pain and improving quality of life. Each year in the United States, more than 330,000 hip replacement surgeries are performed, and that number is expected to almost double by the year 2030.

Even though hip replacement is widely considered one of the most successful surgeries performed today, as with all surgical procedures, complications may occur. Some patients may require revision surgery many years later after the original implant wears out or if they experience hip dislocation.

Previously, surgeons were unaware why certain hip replacement patients experience dislocations. However, recently a new assessment tool before revision hip replacement surgery has significantly reduced the rate of recurrent dislocations compared to a standard evaluation. The new tool was created by Jonathan M. Vigdorchik, MD and colleagues at Hospital for Special Surgery (HSS) and NYU Langone Orthopedic Hospital. Their study is accepted for publication in a 2019 issue of *The Bone & Joint Journal*.

"We were very surprised that the dislocation rate was only 3% for patients who received the new presurgical assessment compared to 16% for those who did not," says Dr. Vigdorchik, a hip and knee surgeon at HSS. "We knew that spine function affects hip replacement outcomes, but not to this magnitude." Dr. Vigdorchik and colleagues also found that without this new evaluation method, 77% of inappropriately

positioned hip implants would not have been identified.

The new classification tool, called the Hip-Spine Classification in Revision Total Hip Arthroplasty (THA), allows surgeons to evaluate spinal function and mobility when planning revision surgery by analyzing a series of X-ray images of the spine and hip, taken from lying down, standing and sitting positions.

The study evaluated outcomes for 222 patients who underwent revision hip replacement for recurrent instability from January 2014 to January 2017 at HSS and NYU. The researchers compared results for 111 patients who received the new spine function assessment to a matched group of 111 patients who did not.

Analyzing the images, which included calculating the changes in pelvic tilt between standing and sitting positions, provided more robust information about how patients' spine function affected hip alignment than a standard assessment that only examined images taken in the lying down position. The images were taken with advanced imaging equipment (EOS), but Dr. Vigdorchik says that the new assessment protocol can also be used with standard X-rays.

The tool assigns a simple score to each patient's results: "1" for normal spine alignment or "2" for a loss of the normal curvature at the base of the spine called a flatback deformity; and "A" for normal spine mobility or "B" for a stiff spine. The score informs the approach for revision surgery.

"We also discovered a group of patients with spine stiffness that often go unrecognized," says Dr. Vigdorchik. "In a group of 61 patients who had not had previous spine surgery, our tool revealed that 74% had stiff spines, allowing us to take this into account when planning their revision surgeries." While spinal stiffness is a risk factor for future dislocations it

is usually anticipated only in patients who have had prior spinal fusion procedures. However, our findings showed that this is not always the case.

Surgeons at HSS and NYU started adopting the new assessment approach in 2014. "We hope our study draws awareness to the need for spinal evaluation and that more centers conducting hip replacement surgery will implement our protocol to help their patients," says Dr. Vigdorchik. "Few centers in the world are looking at this. Based on our work to date, we are collaborating with colleagues at Stanford University and the Mayo Clinic to conduct a multi-center study to collect more evidence. We hope that one day, this approach becomes the standard of care."

Dr. Vigdorchik and colleagues received an award for the best poster at the AAOS 2018 Annual Meeting for a previous study that reported the impact of using the new tool for patients having a first hip replacement surgery. "Our most recent results for patients undergoing revision surgeries add to our previous work in the frontline setting and underscore the importance of conducting a robust evaluation of spine function before hip replacement surgery. We have reached an era where we can prevent many errors in hip replacement before even doing the surgery with a proper and complete pre-surgical evaluation," said Dr. Vigdorchik.

Provided by Hospital for Special Surgery

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