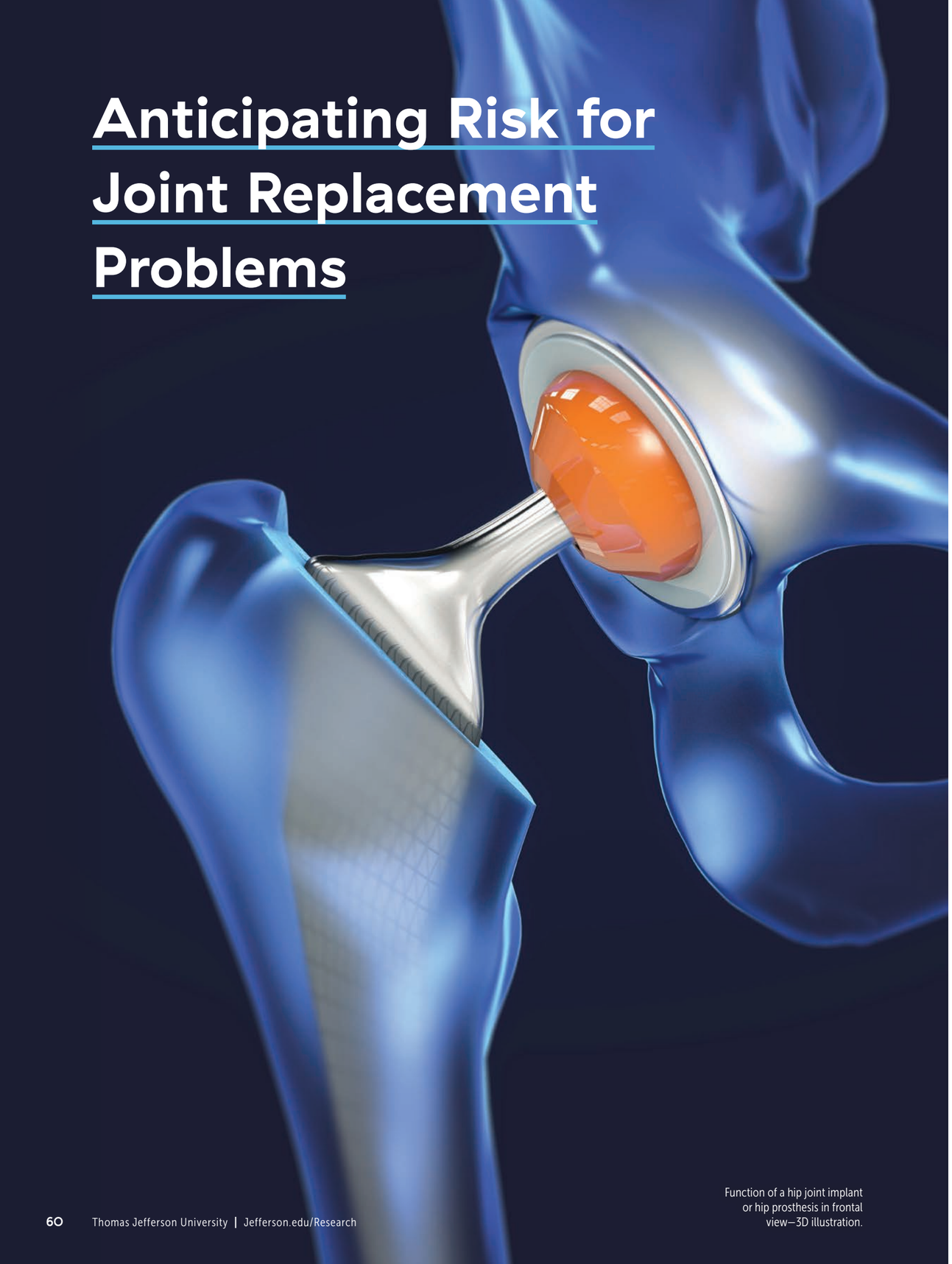
Anticipating Risk for Joint Replacement Problems



Function of a hip joint implant or hip prosthesis in frontal view—3D illustration.

Research teams led by **Javad Parvizi, MD**, clinical research professor and vice chair of orthopedic surgery, have identified risk factors associated with two major postoperative issues for patients undergoing total hip or knee replacements.

Despite ongoing improvements in technology and perioperative protocols, some patients undergoing total joint arthroplasty (TJA) experience serious medical complications requiring postoperative intensive care. With TJA increasingly being performed in ambulatory surgical settings, it is important to understand which patients are most at risk for such complications. Dr. Parvizi and his colleagues conducted a study to identify patient risk factors for admission to an intensive care unit (ICU) following elective total hip (THA) and total knee (TKA) arthroplasty. The researchers used data on 12,342 THA patients and 10,976 TKA patients—132 and 114 of whom, respectively, had an unplanned postoperative ICU admission.

For both sets of patients, the study found multiple independently associated factors for increased risk of ICU admission. Those factors included (but were not limited to) older age, bilateral procedure, revision surgery, increased Charlson comorbidity index, increased estimated blood loss, increased preoperative glucose and decreased preoperative hemoglobin. Increased body mass index was an additional factor for knee procedure patients. All the procedures included in the analysis were done at a high-volume center with surgeons specializing in joint reconstruction. "Thus the findings may not be generalizable to all facilities and practices," Dr. Parvizi explains. "However, we do believe that, in general, identifying risk factors for admission to the ICU following elective TJA may help surgeons risk stratify patients and allow for higher-risk surgeries to be performed in facilities where an ICU is available."

Periprosthetic joint infection (PJI) is one of the most pressing clinical issues in orthopedic surgery, resulting in additional surgeries, longer hospital stays and poor outcomes for patients. Dr. Parvizi led a group of researchers in examining the use of irrigation and debridement (I&D) surgery, which is usually reserved for patients presenting with acute PJI. While the procedure is helpful for some patients, data suggests that failure rates for the intervention range between 30 and 80 percent. "Having an objective assessment tool to predict if a PJI patient is likely to benefit from I&D surgery would help in treatment decision-making," says Dr. Parvizi.

His group conducted the study using data previously collected for an international, multicenter study of 1,174 revision THA and TKA arthroplasty patients—34.4 percent of whom had failed treatment with I&D. The study found 10 variables that were most associated with I&D failure, and the predictive algorithm was built around those variables. In tests of its use, the predictor tool effectively anticipated actual results. For instance, for patients predicted to have a 10 percent probability for failure, the actual failure rate was 11.1 percent; and for patients with a predicted failure rate of between 20 and 30 percent, the actual rate was 25 percent. The app has been incorporated into PJI-related calculator apps (ICMPHILLY) and websites used by physicians across the globe, such as **icmphilly.com**. ■

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> Javad Parvizi, MD