The James A. Rand Young Investigator's Award

Traditional Intravenous Fluid vs. Oral Fluid Administration in Primary Total Knee Arthroplasty: A Randomized Trial

Jason M. Jennings, MD, Mauricio Mejia, MD, Michael A. Williams, MD, Roseann M. Johnson, BS, Charlie C. Yang, MD, Douglas A. Dennis, MD

Introduction: Optimal perioperative fluid management has not been established in patients undergoing orthopaedic surgical procedures. Our purpose was to investigate the effects of perioperative fluid management on patients experiencing total knee arthroplasty (TKA).

Methods: 130 patients who met inclusion criteria undergoing primary unilateral TKA were prospectively randomized into traditional (TFG) vs. oral (OFG) perioperative fluid management groups. The TFG had a predetermined (4L) amount of intravenous fluids (IVF) administered in the perioperative period. The OFG began drinking a minimum of three, 20-ounces servings of clear fluids daily for three days prior to surgery. This cohort also drank 10-ounces of clear fluids 4 hours prior to surgery. Perioperative IVF were discontinued when the patient began oral intake or when the total amount of IVF reached 500mL. Outcome measures included: bodyweight (BW) fluctuations, knee motion, leg girth, bioelectrical impendence, quadriceps activation, functional outcomes testing, KOOS JR, VR-12, laboratory values, vital signs, patient satisfaction, pain scores, and adverse events.

Results: The TFG had increased BW the evening of surgery (7.0±4.3 vs. 3.0±3.9, p=0.000), postoperative day (POD) #1 (9.1±4.3 vs. 4.7±3.9, p=0.000), and POD#2 (6.2±5.0 vs. 4.4±4.0, p=0.032). Bioelectrical impedance showed less limb edema in the OFG (4.2±29.7 vs. 17.8±30.3, p=0.000) on POD#1. Urine specific gravity differences were seen preoperatively between groups (OFG: more hydrated, p=0.002). Systolic blood pressure decrease from baseline was greater in the OFG upon arrival to the floor (19.4±13.5 vs. 10.6±12.8, p=0.000), and 8 (23.4±13.3 vs. 17.0±12.9, p=0.006) and 16 (25.8±13.8 vs. 25.8±13.8, p=0.046) hours after floor arrival. The TFG had more UOP on POD#1 (3369mL±1343mL vs. 2435mL±1151mL).

Conclusions: Oral fluid intake with IVF restriction in the perioperative period after TKA may offer short-term benefits with swelling and BW fluctuations. The authors continue to limit perioperative IVFs and encourage patient initiated fluid intake.