

## Percent Body Fat More Associated with Perioperative Outcomes after Total Joint Arthroplasty than BMI

Ramon A. Ruberte, MS, Robert J. Butler, DPT, PhD, J. Stephen Appleton Jr., MD,  
Robin M. Queen, PhD, Samuel S. Wellman, MD, David Attarian, MD,  
Michael P. Bolognesi, MD, **Cameron K. Ledford, MD**

**Introduction:** Obesity is classically defined by body mass index (BMI); however, BMI fails to distinguish fat mass from lean mass which can be distinguished by measuring percent body fat (PBF) using clinically efficacious methods. Since PBF provides a more patient-specific measure, it may be more helpful than BMI in identifying total hip (THA) and total knee arthroplasty (TKA) perioperative risks.

**Methods:** Prospectively collected perioperative outcomes were reviewed on 316 adult patients undergoing primary THA (168) and TKA (148). Height and weight were measured to calculate BMI while PBF was determined by bioelectrical impedance. Patients with BMI >30 kg/m<sup>2</sup> and PBF >25% in men or PBF >31% in women were classified as obese. Statistical analysis was conducted utilizing independent samples t-test or one way ANOVA and all statistical significance was established at p <0.05.

**Results:** 284 (89.9%) patients were obese by PBF while 182 (57.6%) were obese by BMI. PBF was significantly higher in those who underwent blood transfusion (mean  $\pm$  sd,; 41.9  $\pm$  12.0 vs. 37.7  $\pm$  9.1), had longer length of stay (LOS) > 3 days (41.5  $\pm$  9.5 vs. 34.2  $\pm$  8.7), and were discharged to an extended care facility rather than home (41.8  $\pm$  10.1 vs. 36.4  $\pm$  8.6). No significant differences existed for BMI on these outcomes. Additionally, both BMI (34.6  $\pm$  6.2 vs. 31.6  $\pm$  6.0) and PBF (41.5  $\pm$  9.5 vs. 37.7  $\pm$  9.3) were significantly higher in the patients with postoperative hospital adverse events.

**Conclusion:** Higher PBF was associated with postoperative blood transfusion, longer hospital LOS, and discharge to an extended care facility while no such association was observed with BMI. These results suggest that PBF may be a more effective measure to use in screening for perioperative risks and determining outcomes associated with total joint arthroplasty, especially those performed in obese patients.