**RESULTS**

Average age, height, weight, BMD, and total body %fat for males and females are shown in Table 1. Results show that all subjects were obese according to WHO criteria (BMI ≥ 30 kg/m²) [3]. BMI values ranged from 36.2 to 45.5 in women and 41.4 to 54.4 in men. Total body %fat ranged from 42.9% to 52.6% in women and 37.7% to 49.5% for men. As expected, average bone mineral density (BMD) for these heavy subjects (female, 1,310 g/cm²; male 1,419 g/cm²) was higher than BMD expected for similar-aged adults of average body weight (female, 1,125 g/cm²; male 1,220 g/cm²), confirming the known positive association of BMD with body weight [4,5].

Precision errors (%CV) were surprisingly small, given the size and thickness of these very obese subjects. Precision errors with the iDXA were about 1% for total body BMD and bone mineral content (BMC), 2% for total body fat mass, 0.95% for total body lean mass, and 0.8% for total body fat mass (Table 2).

**DISCUSSION**

Previously, improved total body precision with the iDXA compared to the Lunar Prodigy (GE Healthcare) has been demonstrated in average weight [3,7]. This is one of the first studies to evaluate iDXA total body precision in highly obese subjects (mean BMI 44). We found precision errors with the iDXA were small, despite several challenges that occur when scanning very obese subjects. One challenge occurs when the subject’s supine body width is too large to fit within the scan window of the densitometer. Previous studies have shown there is nearly perfect symmetry in total body values between the right and left halves of the body [1,2]. Therefore, all subjects were positioned so that at least half of the body lies within the scan window, the iDXA MicroView software finds the body’s central axis and accurately calculates results for the total body.

Another potential challenge in measuring obese subjects involves patient thickness. Precision error typically increases with subject thickness due to decreased x-ray penetration and image quality, a challenge that is addressed by increased resolution of the detector and higher x-ray flux with the iDXA [7]. Within this obese group, there were no significant correlations between subject weight and precision for BMD, BMC, fat mass, lean mass or %fat. Finally, there were some inconsistencies in scanning procedure regarding patient positioning that may have led to a small degradation of precision results. Despite these challenges, precision was remarkably good, about 1% for total body BMD, BMC, and lean mass, 0.8% for total body fat mass, and 1.2% for total body fat mass.

**CONCLUSION**

Lower precision error improves confidence in clinical decision-making and minimizes the time necessary to detect a significant change in an individual. We conclude that iDXA precision was excellent, despite the known challenges of scanning very obese subjects. With the increasing incidence of obesity in society, the higher table weight limit and wider patient portal on the iDXA system combined with excellent precision make this a valuable tool in the measurement of body composition in large bodies. The following references are cited in the text: