

IAN COOK & KRISTY HENSON, Dept of Biomedical Sciences, West Virginia School of Osteopathic Medicine, Lewisburg, WV, 24901. Variation in renal cortical thickness and its association with chronic disease in anatomical donors

West Virginia has one of the highest rates of kidney disease in the United States, highlighting the need to better understand renal morphology and its relationship to disease. The purpose of this study was to quantify renal cortical thickness and examine its associations with demographic factors and pathological findings. Kidneys from fourteen donors in an anatomical laboratory were analyzed bilaterally. Morphology was documented and external measurements were collected. Additionally, internal, cortical thickness was measured. A principal component analysis (PCA) was used to evaluate variation in external and internal measurements. One-way ANOVA tested differences in mean cortical thickness among donors, and paired T-tests compared left and right kidneys within individuals. A binary logistic regression assessed whether cortical thinning predicted medical comorbidities. PCA demonstrated that the first three components accounted for 71.52%, 13.42%, and 10.40% of total variance, respectively, with one outlier outside the 95% confidence interval. Donors differed significantly in cortical thickness ( $p = 0.012$ ), with donor identity explaining 55% of inter-individual variability ( $\omega^2 = 0.546$ ). No significant left–right differences were observed ( $p = 0.37$ ). Kidneys were categorized as “thin” ( $<4.5$  mm) or “not thin,” and associations with diabetes and hypertension were evaluated using odds ratios. Neither diabetes (OR 5.33, 95% CI 0.34–82.8,  $p = 0.88$ ) nor hypertension (OR 2.0, 95% CI 0.098–41.0,  $p = 0.67$ ) showed significant associations with cortical thinning. These findings demonstrate substantial inter-individual variation in cortical thickness without evidence of laterality effects or significant associations with chronic disease in this sample.