K-01

Renal mass anatomical characteristics and perioperative outcomes of laparoscopic partial nephrectomy: A critical analysis

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Introduction and Objective: Anatomical parameters determining renal mass complexity have been used in a number of proposed scoring systems despite lack of a critical analysis of their independent contributions. We sought to assess independent contribution of anatomical parameters on perioperative outcomes of laparoscopic partial nephrectomy (LPN).

Methods: Preoperative imaging studies were reviewed for 147 consecutive patients undergoing LPN for a single renal mass. Renal mass anatomy was recorded: size, growth pattern (endo-/meso-/exophytic), centrality (central/hilar/peripheral), anterior/posterior, lateral/medial, polar location. Multivariable models were used to determine associations of anatomical parameters with warm ischemia time (WIT), operative time (OT), estimated blood loss (EBL), intra- and postoperative complications as well as renal function. All models were adjusted for the learning curve and relevant confounders.

Results: Tumor size (p=0.068), endophytic growth (p=0.017), central (p=0.016) and hilar locations (p=0.073) were associated with WIT. Only tumor size was independently associated with OT (p<0.001), and none of the anatomical parameters was related to EBL. The odds of intraoperative and overall complications appeared increased in central and hilar tumors without approaching statistical significance. Postoperative renal function was not associated with any of the anatomical parameters considered after adjustment for baseline function and WIT.

Conclusion: This study provides a detailed analysis of the independent impact of renal mass anatomical parameters on perioperative outcomes. The findings suggest diverse contributions of tumor location to perioperative outcomes with different magnitudes of effect. While providing constructive critique of the existent nephrometric scores, we suggest our data may help refine these systems and drive towards a reliable quantifiable measure of objective renal mass complexity.