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Comparing the outcomes of open, laparoscopic & robotic partial nephrectomy: a network meta-analysis

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Background: Renal cell carcinoma (RCC) incidence and mortality are continuing to rise worldwide. We aimed to perform a systematic review and network meta-analysis (NMA) to determine the advantages and disadvantages of open (OPN), laparoscopic (LPN), and robotic-assisted partial nephrectomy (RAPN) with particular attention to intra-operative, immediate post-operative, as well as longer term functional and oncologic outcomes.

Methods: A systematic review was performed as per PRISMA-NMA guidelines. Binary data was compared using odds ratios (ORs). Mean differences (MDs) were used for continuous variables. ORs and MDs were extracted from the articles to compare the efficacy of the various surgical approaches. Statistical validity is guaranteed when the 95% credible interval (CrI) does not include 1.

Results: In total, there were 31 studies included in the NMA with a combined 7,869 patients. Of these, 33.7% (2,651/7,869) underwent OPN, 20.8% (1,636/7,869) underwent LPN while 45.5% (3,582/7,869) had RAPN. There was no difference for either LPN or RAPN as compared to OPN in ischaemia time, intra-operative complications, positive surgical margins (PSMs), operative time or trifecta rate. Estimated blood loss (EBL), post-operative complications and length of stay (LOS) were all

significantly reduced in RAPN when compared with OPN. The outcomes of RAPN and LPN were largely similar except the significantly reduced EBL in RAPN.

Conclusions: This systematic review and network meta-analysis suggests that RAPN is the preferable operative approach for patients undergoing surgery for lower-staged RCC.

Keywords: Open nephrectomy; laparoscopic nephrectomy; robotic-assisted nephrectomy; partial nephrectomy; network meta-analysis (NMA)

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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