



Off-clamp robotic-assisted partial nephrectomy

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INTRODUCTION

Robotic-assisted partial nephrectomy (RAPN) is an effective option for the management of small renal masses. Off-clamp RAPN has emerged as a method to minimize renal ischemic injury and improve renal functional outcomes. In this video we demonstrate our technique for off-clamp RAPN in a patient with a complex 3.6cm hilar tumor.

MATERIALS AND METHODS

We performed a retrospective review of 187 patients who received off-clamp RAPN between August 2007 and March 2015. Patient demographic information, operative information, perioperative outcomes, and renal functional outcomes were evaluated. The Chronic Kidney Disease Epidemiology Collaboration formula was used to calculate eGFR.

RESULTS

The 187 patient cohort had a mean (\pm standard deviation) age of 58.8 ± 11.8 years and a mean

BMI of $32.2 \pm 8.3 \text{ kg/m}^2$. The mean clinical tumor size was $2.9 \pm 1.6 \text{ cm}$ with a mean nephrometry score of 6.9 ± 2.1 . There was a mean operative time of 169 ± 61 minutes and a mean estimated blood loss of $242 \pm 299 \text{ mL}$. Positive surgical margins occurred in 2 cases (1.1%). Average hospital length of stay was 2 ± 1.3 days, and there were 14 (7.5%) postoperative complications. Mean percent decline of eGFR was $6.8 \pm 21.4\%$. The average follow-up was 454 days (15-2195 days) with 1 recurrence (0.53%) occurring at day 596.

CONCLUSION

Off-clamp RAPN, which eliminates warm ischemic time, is both safe and effective in the treatment of small renal masses when performed by an experienced surgeon. We have found this technique is appropriate for most tumors amenable to minimally invasive partial nephrectomy.

CONFLICT OF INTEREST

None declared.

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EDITORIAL COMMENT: OFF-CLAMP ROBOTIC-ASSISTED PARTIAL NEPHRECTOMYMike Bozin ¹, Homayoun Zargar ^{2,3}

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In this video the Wright et al. (1) demonstrate their off-clamp technique of robotic-assisted partial nephrectomy (RAPN) and subsequently report the outcomes of a cohort of patients previously treated utilizing this technique. The method of choice for haemostasis in this video is electrocautery with the compression of larger vessels with robotic fourth arms if troublesome bleeding is encountered. One assumes if further bleeding is encountered, haemostasis can also be obtained using suture ligation. Off-clamp RAPN has gained popularity in recent years with the view to eliminate warm ischemia in order to maximize preservation of renal function. Various techniques for achieving this goal have been described ranging from tertiary and quaternary branch dissection to utilization of preplaced sutures in selected cases at the time of RAPN (2, 3). Zero ischemia comes at the potential price of increase in blood loss, higher complication rates and inferior visualization of tumor bed compromising resection with negative surgical margin. However with technical refinements and an increase in cumulative experience such drawbacks can be eliminated as demonstrated in this series (4).

On the flipside evidence from studying changes in the operated kidney using MAG3 renal scan also supports the notion that not every minute of ischemia counts and renal parenchyma preservation plays a more important role in renal function preservation if the warm ischemia time can be limited to less than 25-30 minutes (5, 6). Furthermore where prolonged ischemia time anticipated intracorporeal cooling could mitigate the deleterious effects of warm ischemia without compromising renal functional outcomes (7). Future studies need to explore the role of renal ischemia preconditioning, use of novel renoprotective agents, as well as quantifying the influence of unmeasured factors on renal function such as the impact of local ischemia caused by renorrhaphy.

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