

# Tumor Enucleation with Zero Ischemia for Renal Cell Carcinoma by Robotic Retroperitoneal Approach

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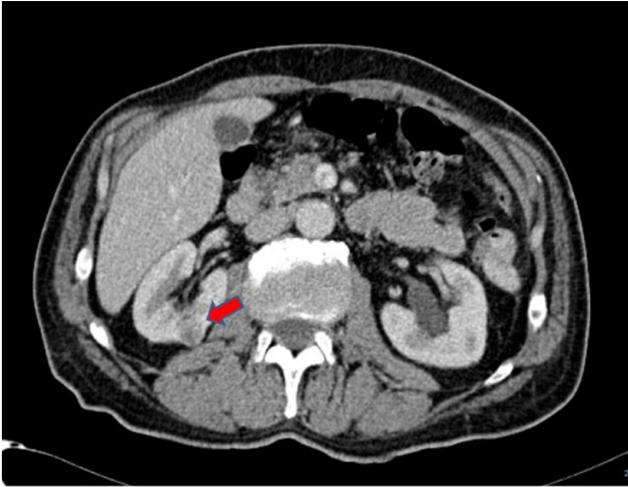
**Keywords:** kidney neoplasms; surgery; laparoscopy; robotics; methods.

## INTRODUCTION

**W**e present a surgical technique with zero ischemia enucleation of a right renal tumor using the robotic retroperitoneal approach (RA).

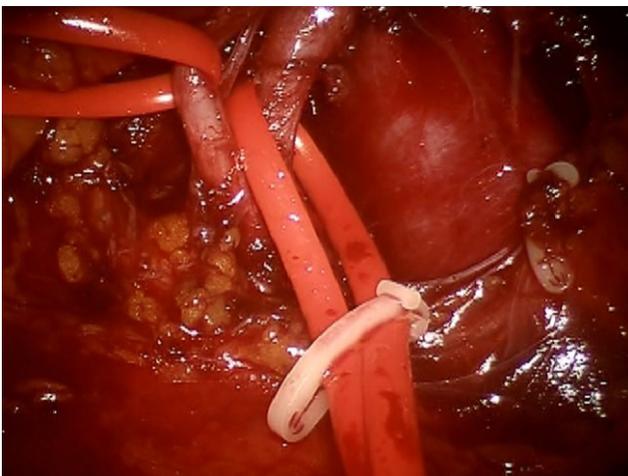
## CASE REPORT

A 67 year-old male, with a 14 mm right upper pole renal tumor, located on the posterior kidney surface, discovered accidentally after a computer tomography (Figure 1). The Preoperative Aspects and Dimensions Used for an Anatomical (PADUA) score was 7. After general endotracheal anesthesia was administered, the patient was placed in the full flank position. The body was flexed to expand the distance between iliac crest and the tip of the 12th rib. The retroperitoneum was entered through a 12 mm incision (for 12 mm trocar) in the angle between the 12th rib and paravertebral muscles in Gaur manner.<sup>(1)</sup> At 9 cm of this trocar, above the iliac crest another 12 mm trocar was introduced under camera vision (optic trocar for robotic camera). At 9 cm distance from the second trocar, on the line obtained through extending the line from the 12th rib, an 8 mm robotic trocar was placed. This way a favorable triangular position for the robotic trocars resulted, avoiding the conflict between robotic arms and between robot and assistant surgeon. Two 10 mm trocars were placed for the assistant surgeon, laterally and medially from the optic trocar (Figure 2). Finally, the first 12 mm trocar

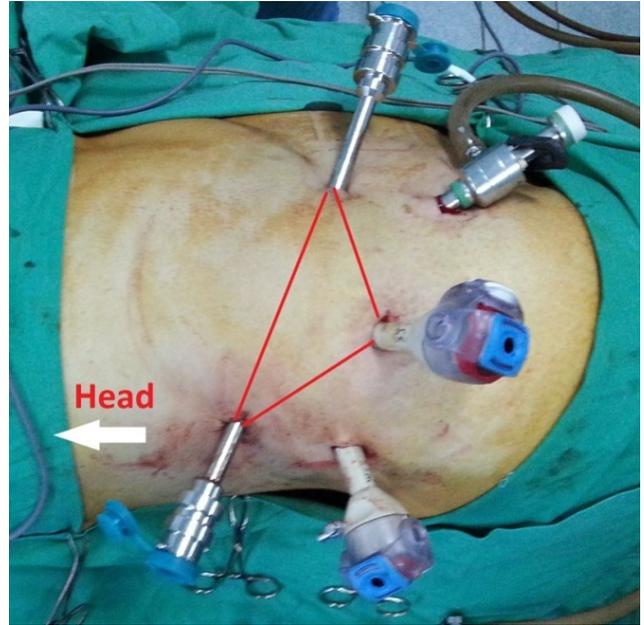


**Figure 1.** Renal tumor on the posterior side of the right kidney (CT aspect).

was replaced with an 8 mm robotic trocar. The da Vinci robot was then docked over the patient's head and shoulders. The RA allows us a direct access to the ureter and renal hilum. We found three distinct renal arteries that were skeletonized on the vessel loop, without using vascular clamps for the ischemia (Figures 3 and 4). After localization and preparation of the posterior aspect of the kidney, we performed a zero-ischemia enucleation of the tumor (Figure 5). Renography was performed using 2.0 Vicryl. The specimen was then bagged and recovered at the end of the case



**Figure 3.** Renal pedicle with two renal arteries.

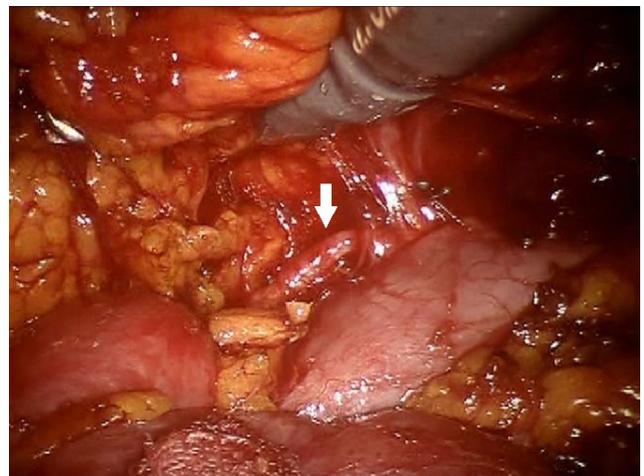


**Figure 2.** Trocar placement for robotic retroperitoneal approach.

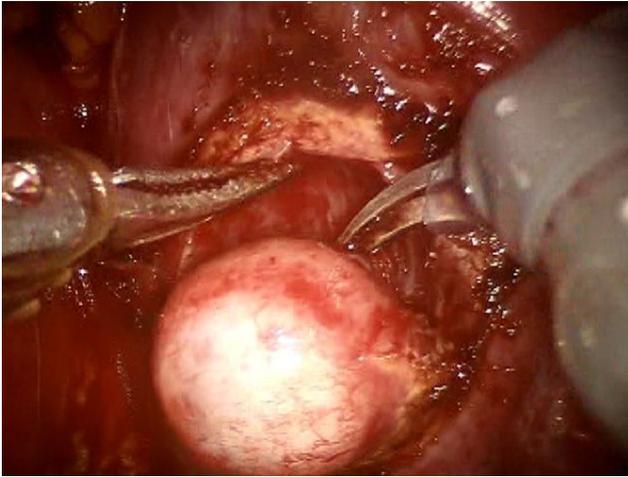
through the camera-port incision. The retroperitoneal space was prepared in 10 minutes and the insertion of the five trocars took 15 minutes, with 5 minutes docking. The operative time was 90 minutes, with 250 mL blood-loss. No postoperative complication was noted. Surgical margins were negative, and a pT1a Fuhrman 1 grade was found. He was discharged on the 6th day after the procedure.

## DISCUSSION

There are two issues regarding the presented case that need



**Figure 4.** Renal vein and the third renal artery.



**Figure 5.** Robotic enucleation of renal tumor.

further discussion. The first concerns the robotic partial nephrectomy with RA and the second concerns the zero ischemia time with robotic approach. The favorable perioperative results for RA (operative time, ischemia time) are explained through the rapid and direct access on the renal artery<sup>(2,3,4)</sup> and to the posterior side of the kidney, with a facile management of postoperative blood or urine loss.<sup>(5)</sup> The disadvantages for RA are related to the conflict among the robotic arms or between the robot and the assistant surgeon and the difficulty of the surgeon in recognizing the anatomy while using RA.<sup>(6,7)</sup>

The enucleation consists of blunt dissection in the avascular cleavage between the tumor pseudocapsule and the renal parenchyma without clamping the renal artery (zero ischemia). This technique is considered to follow the oncological principles imposed by the EAU guidelines.<sup>(8,9)</sup>

In the literature there are few data about robotic renal enucleation with RA. Recently, the results of a multicenter study were published, which included 886 cases of robotic partial nephrectomies, but none with zero ischemia time.<sup>(10)</sup>

## CONCLUSION

We concluded that this case is important by presenting two new aspects of surgical technique: robotic RA for performing a renal tumor enucleation without ischemia time.

## CONFLICT OF INTEREST

None declared.

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