

## Nephron-Sparing Robot-Assisted Partial Nephrectomy (RAPN) After Super selective Embolization with Onyx of the Renal Tumor: Description of the Clamp less Technique in our Initial Experience

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### ABSTRACT

RAPN is considered the gold standard to treat the localized renal tumors, through the PADUA and RENAL score to evaluate and compare the correlations between preoperative and the anatomical aspects. In our team we have performed the RAPN after super selective embolization with Onyx of the renal tumors with clamp less technique, obtaining a shorter intraoperative resection time of tumor, no time of ischemia, and reduction of bleeding and intraoperative complications. This study describes this new approach on 3 patients. The first patient is a 46 years old woman, with a tumor of 6.2 cm, entirely exophytic, localized on the lower pole of the left kidney with a RENAL SCORE of 5a. The second patient is a 64 years old woman, with a tumor of 4.1 cm, partially exophytic, localized on the superior pole of the right kidney and a RENAL SCORE of 6a. The third patient is a 55 years old man, with a tumor of 4.8 cm, almost entirely exophytic and near to collecting system (5 mm), of the superior pole of the right kidney and a RENAL SCORE of 6a. In all three patients the time of hospitalization is reduced, with regular post-operative course and preserved renal functional at 6 months after surgery.

**Keywords:** Super selective embolization, intraoperative complications, RENAL SCORE, localized renal tumors, PADUA

### INTRODUCTION

#### Background

Renal localized cancers are evaluated with R.E.N.A.L. [Radius (tumor size as maximal diameter), Exophytic/endophytic properties of the tumor, Nearness of tumor deepest portion to be collecting system or sinus, Anterior (a)/posterior (p) descriptor and the Location relative to the polar line nephrometry scores] [1,2]. EAU guidelines recommend offering partial nephrectomy to patients with T1 tumors. Lots of centers perform RAPN to improve the post-operative course and to reduce the post and intraoperative complications [3] The technique nephron-sparing RAPN after super selective embolization describes in literature with results that show resections of moderate complexity performed clamp less, without intraoperative bleeding [4].

#### MATERIALS & METHODS

In this study we have chosen 3 patients and through the RENAL SCORE we have planned the procedure in a multidisciplinary team. The first patient is a 46 years old woman, with a tumor of 6.2 cm, entirely exophytic, localized on the lower pole of the left kidney. She has no significant comorbidity. She has been staged with TC chest-abdomen,

without evidence of venous thrombus or metastasis (cT1b; N0; V0; M0). The second patient is a 64 years old woman, with a tumor of 4.1 cm, partially exophytic, localized on the superior pole of the right kidney. In anamnesis she has hypertension, obesity and hepatopathy HCV+. She has been staged with TC chest-abdomen, without evidence of venous thrombus or metastasis (cT1b; N0; V0; M0). The third patient is a 55 years old man, with a tumor of 4.8 cm, almost entirely exophytic and near to collecting system (5 mm), of the superior pole of the right kidney. In anamnesis he has only GERD. He has been staged with TC chest-abdomen, without evidence of venous thrombus or metastasis (cT1b; N0; V0; M0). At first renal arteriography is made to

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visualize the arterial vascularization, focused on the tumoral artery that is catheterized super selectively. The tumor and its artery is embolized with Onyx. The second time of the procedure performed is the RAPN.

**RESULTS**

In all patients the total operative time and the resection time of the tumor time are reduced compared to median of our center. Intraoperative bleeding is minimal and it isn't necessary to isolate the vascular pedicle. In all procedures

the time of ischemia is 0. The post-operative course has been regular (Clavien 0 in every patient). The tumor of patient 1 is a chromophobe cell renal carcinoma, the tumor of patient 2 is a papillary renal cell carcinoma type 1, the tumor of patient 3 is a clear cell renal carcinoma. In all patients' surgical margins are negative. The complete description of the pre-operative, intraoperative and post-operative features is showed in **Tables 1-3 and Figures 1 and 2.**

**Table 1.** The main features of patients, side of tumors, the dimensions, the pre-operative stad.

	Sex	Age	Side	Dimensions (mm)	cTNM	Venous Thrombus
<b>Patient 1</b>	F	46	Left	62x58x35	T1bNOMO	VO
<b>Patient 2</b>	F	64	Right	41x38x25	T1bNOMO	VO
<b>Patient 3</b>	M	55	Right	48x39x27	T1bNOMO	VO

**Table 2.** Performance status, preoperative renal function, evaluation of tumors with R.E.N.A.L score and anesthesiological risk with ASA score.

	Charlson comorbidity index	Renal Function (Level of creatinine pre-operative)	R.E.N.A.L. score	ASA
<b>Patient 1</b>	2	0.81	5a	2
<b>Patient 2</b>	7	0.72	6a	2
<b>Patient 3</b>	5	1.08	6a	2

**Table 3.** Perioperative and post-operative evaluation. The resection tumor time (with clamp less technique), intraoperative bleeding, histological features of tumor and the renal function at 6 months.

	Total surgical time (minuts)	Resection tumor time (minuts)	Intraoperative bleeding (cc)	Surgical margins	Histology	Renal function (level of creatinine at 6 months)
<b>Patient 1</b>	110	25	180	RO	Cromophobe cell carcinoma	0.88
<b>Patient 2</b>	125	33	110	RO	Papillary cell carcinoma type 1	0.69
<b>Patient 3</b>	118	28	128	RO	Clear cell carcinoma	1.12

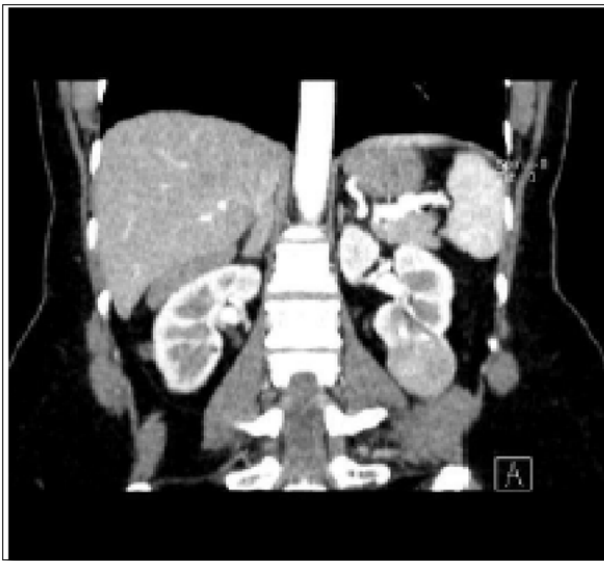
**DISCUSSION**

RAPN is considered the gold standard to treat the localized renal tumor and surgery can be planned through nephrometry score, like R.E.N.A.L. score, with less post-operative complications and shorter hospital stay than open

technique. Sometimes the localization and the clamping of vascular pedicle can be hard, with increased risk of intraoperative bleeding and increasing the time of resectione of tumor. The RAPN after superselective embolization with Onyx of the renal tumor can reduce the risk of intraoperative bleeding and the time of the resection of tumors.



**Figure 1.** Case pre-Embolization.



**Figure 2.** TC 1° case.

## CONCLUSIONS

Identifying the vascular pedicle in the RAPN can be hard, increasing the risks of intraoperative bleeding and sincreased surgical resection times. The super selective embolization with Onyx can help the urologist to perform the resection of tumor, with less intraoperative bleeding, shorter resection tumor time. The follow-up at the 6<sup>th</sup> months showed no evidence of residual tumor and a renal function (level of creatinine) equal to the preoperative evaluation.

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