

# THE IMPACT OF 3D RECONSTRUCTION DURING PARTIAL NEPHRECTOMY IN HIGHLY COMPLEX RENAL TUMORS

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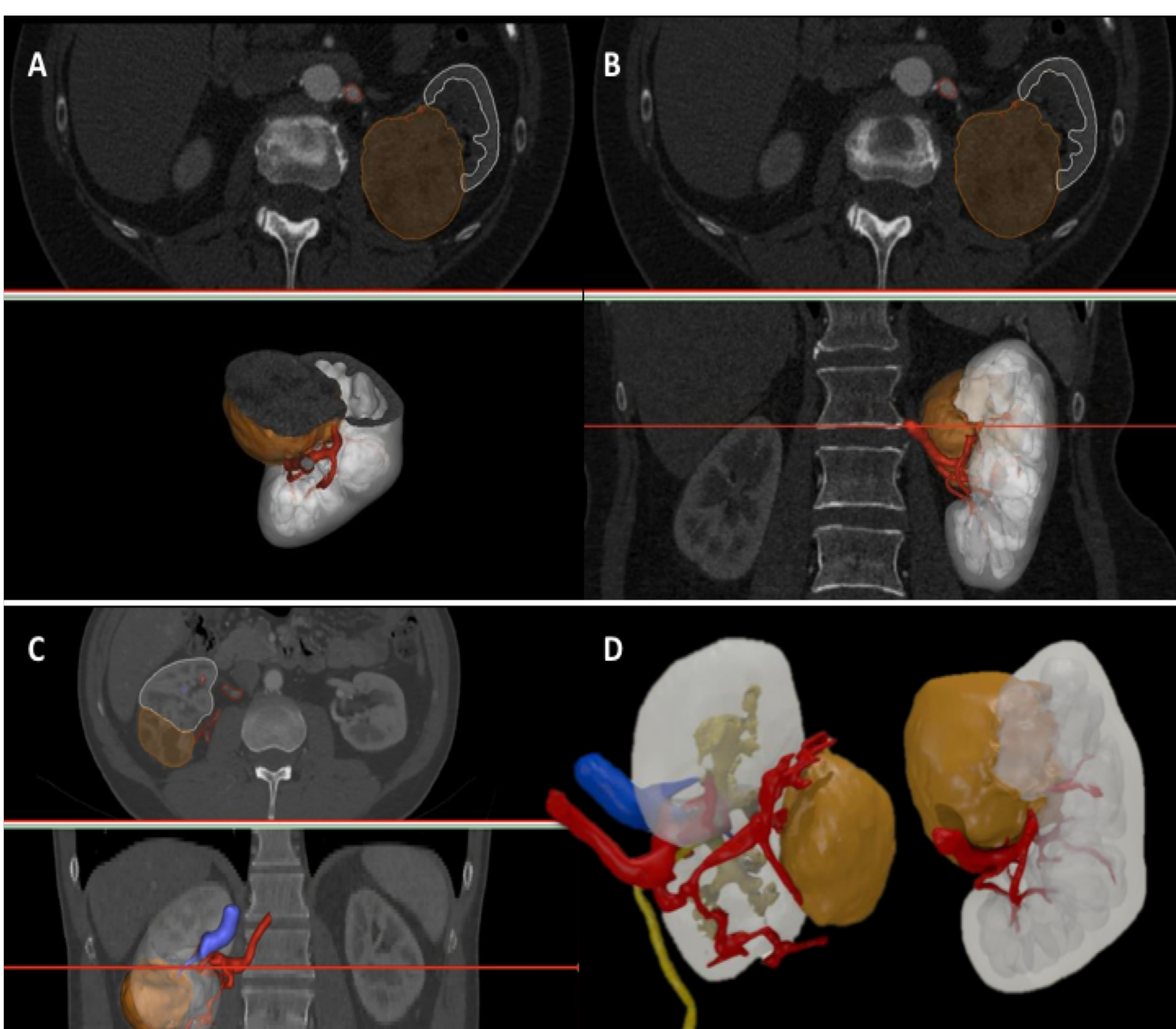
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## INTRODUCTION AND OBJECTIVE:

- The introduction of robotic technology has expanded the indications to partial nephrectomy for both novice and expert surgeons also for the treatment of **highly complex renal tumors**.
- 3D reconstruction** could be a tool for the surgeon to enlarge even more the indications to PN in these cases.
- The aim of this study is to assess the role of 3D reconstruction in aiding **preoperative planning** for highly complex renal tumors amenable to **robotic partial nephrectomy (RPN)**.

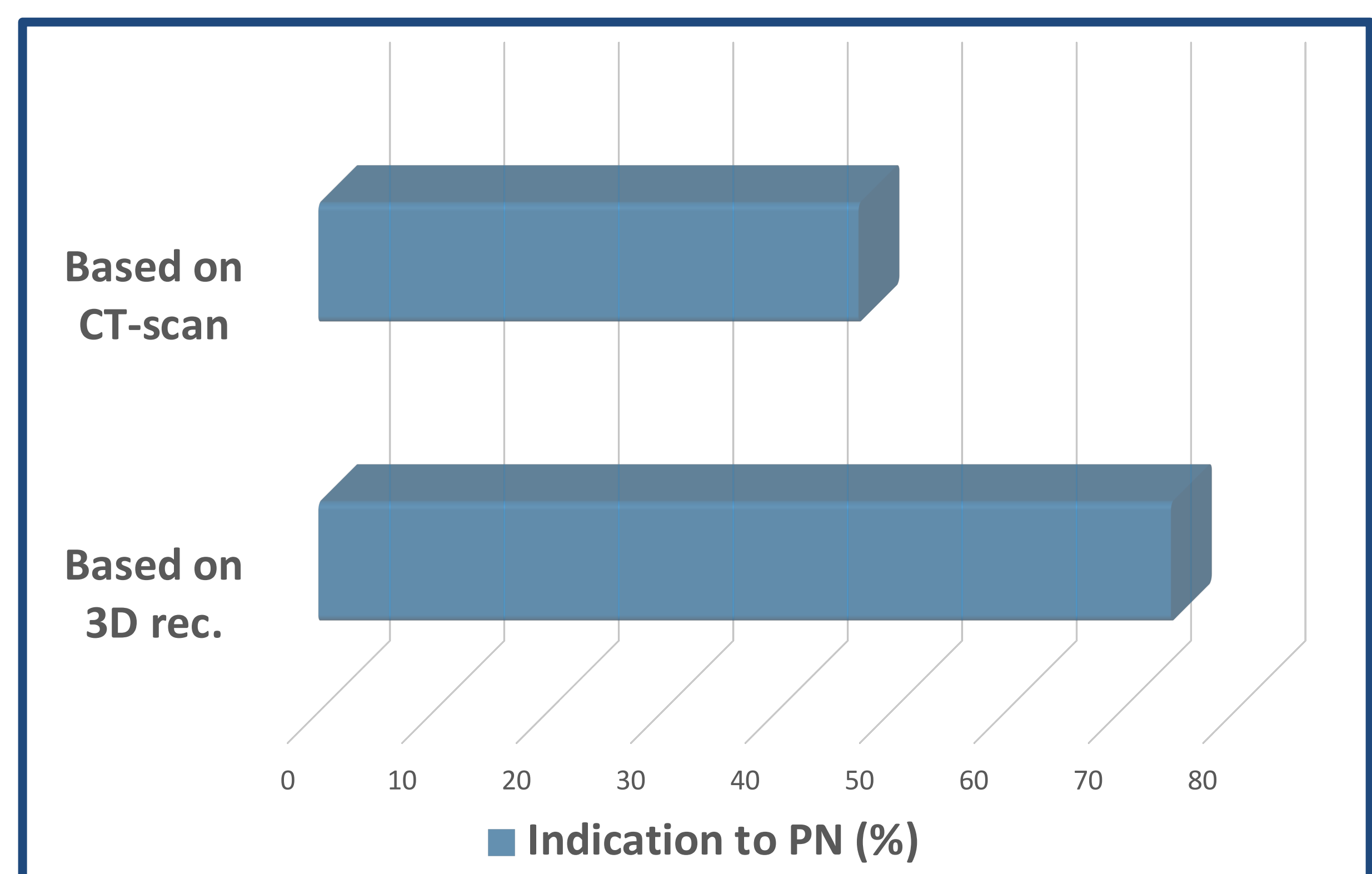
## METHODS :

- The 3D reconstruction was performed by professional bioengineers on the basis of high-resolution CT scans using a dedicated software by M3DICS. The obtained virtual models were reviewed by a bioengineer and two urologists (D.A and E.C), in order to evaluate the accuracy and the reliability of the reconstruction.
- Computed tomography scans and respective 3D reconstructions of 20 highly complex renal tumors** were made available for display to the attendees/urologists of the 6<sup>th</sup> Techno-Urology Meeting.
- These 20 cases had already undergone robotic partial nephrectomy performed by a single experienced surgeon.
- The attendees asked to watch the videos of the CT scans first, and then the respective 3D reconstruction of 5 out of the 20 cases, randomly selected.
- A purpose-built **questionnaire** collected responders' surgical experience and surgical indication (**RPN vs nephrectomy**) after viewing the CT scan and the respective 3D reconstruction.



## RESULTS:

- 20 expert urologists, 27 young urologists, and 61 residents (total=108) participated in the study. **542 views** of the cases were obtained.
- Based on CT scans, RPN was indicated in 256 cases (47.2%).
- After viewing the respective 3D reconstruction, in **148 cases the responders changed their idea**: indication to RPN raised to 404 cases (74.5%) (p<0.001). (Graph 1)
- Table 1 shows the stratified data by expertise of the urologist.



	Indicazione to PN n (%)	P Value
<b>EXPERT UROLOGIST</b>		
Based on CT-scan	52 (53,1)	0,009
Based on 3D rec.	74 (75,5)	
<b>UROLOGIST</b>		
Based on CT-scan	78 (40,9)	0,0001
Based on 3D rec.	106 (19,7)	
<b>RESIDENTS</b>		
Based on CT-scan	126 (40,4)	<0,0001
Based on 3D rec.	224 (71,8)	

## CONCLUSIONS:

- The present study is encouraging and it surely represent a significant step towards the validation of the use of **3D reconstruction for surgical planning** in patients undergoing robotic kidney surgery.
- The use of this technology might translate into a larger adoption of **nephron sparing approach**.
- Further studies in this area are mandatory to corroborate these results.