JACKSON HOLE SEMINARS

Robotic partial nephrectomy for complex cases: planning the surgical strategy

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GVM CARE & RESEARCH

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Open questions…….

To treat or no to treat……..

Open ……..Laparoscopicaly……Robotically……..Ablative techniques

To clamp or not to clamp

Main artery……..selective clamping……..superselective clamping…….early declamping

Renorraphy technique (1 or 2 layers Vs sutureless)

European Association of Urology

EAU Guidelines on Renal Cell Carcinoma

Recommendations	Strength rating
Offer surgery to achieve cure in localised renal cell cancer.	Strong
Offer partial nephrectomy (PN) to patients with T1 tumours.	Strong
Offer PN to patients with T2 tumours and a solitary kidney or chronic kidney disease, if technically feasible.	Weak
Do not perform ipsilateral adrenalectomy if there is no clinical evidence of invasion of the adrenal gland.	Strong
Do not offer an extended lymph node dissection to patients with organ-confined disease.	Weak
Offer embolisation to patients unfit for surgery presenting with massive haematuria or flank pain.	Weak

PN is the standard of care for T1 RCC

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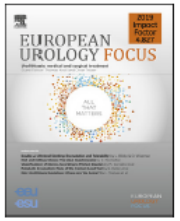

Kidney Cancer

Perioperative Outcomes of Open, Laparoscopic, and Robotic Partial Nephrectomy: A Prospective Multicenter Observational Study (The RECORd 2 Project)

Carlo Andrea Bravi[a], *Alessandro Larcher*[a], *Umberto Capitanio*[a], *Andrea Mari*[b], *Alessandro Antonelli*[c], *Walter Artibani*[d], *Maurizio Barale*[e], *Roberto Bertini*[a], *Pierluigi Bove*[f], *Eugenio Brunocilla*[g,h], *Luigi Da Pozzo*[i], *Fabrizio Di Maida*[b], *Cristian Fiori*[j], *Paolo Gontero*[e], *Vincenzo Li Marzi*[k], *Nicola Longo*[l], *Vincenzo Mirone*[l], *Emanuele Montanari*[m], *Francesco Porpiglia*[j], *Riccardo Schiavina*[g,h], *Luigi Schips*[n], *Claudio Simeone*[c], *Salvatore Siracusano*[d], *Carlo Terrone*[o], *Carlo Trombetta*[p], *Alessandro Volpe*[q], *Francesco Montorsi*[a], *Vincenzo Ficarra*[r], *Marco Carini*[b], *Andrea Minervini*[b,*]

Prospective, multicenter, observational study

N = 2331 (cT1)

- ✓ Minimally invasive techniques had lower rate of Clavien-Dindo ≥ 2 complications
- ✓ Laparoscopy had longer ischemia time than open and robotic
- ✓ Risk of AKI halved by robotic and laparoscopy
- ✓ Similar positive margins rate

Table 2 – Multivariable logistic and linear regressions to assess the relationship between surgical approach and each endpoint of interest.

Outcomes	Laparoscopic vs Open OR – estimate (95% CI)	*p* Value	Robotic vs Open OR – estimate (95% CI)	*p* Value	Robotic vs Laparoscopic OR – estimate (95% CI)	*p* Value
Clavien–Dindo ≥ 2 complications	0.52 (0.34–0.78)	0.002	0.27 (0.15–0.47)	<0.0001	0.54 (0.33–0.91)	0.020
Warm ischemia time	1.57 (0.45–2.69)	0.006	4.92 (3.56–6.28)	<0.0001	3.31 (2.16–4.45)	<0.0001
Acute kidney injury	0.50 (0.37–0.68)	<0.0001	0.49 (0.34–0.69)	<0.0001	0.99 (0.72–1.35)	0.9
Positive margins	1.26 (0.79–2.01)	0.3	0.89 (0.51–1.55)	0.7	0.68 (0.43–1.08)	0.10
Modified trifecta achievement	1.28 (0.94–1.74)	0.12	1.39 (0.97–1.99)	0.075	1.15 (0.84–1.57)	0.4

CI = confidence interval; eGFR = estimated glomerular filtration rate; OR = odd ratio; PADUA = Preoperative Aspects and Dimensions Used for an Anatomical (score).
Models adjusted for age, gender, Charlson comorbidity index, body mass index, single kidney status, preoperative eGFR, total PADUA score, peritoneal access, type of resection, and median annual caseload per center.

Nephron-sparing surgery (NSS) in cT2 RCC…

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Kidney Cancer

Outcomes of Robot-assisted Partial Nephrectomy for Clinical T2 Renal Tumors: A Multicenter Analysis (ROSULA Collaborative Group)†

Riccardo Bertolo [a,b,‡], Riccardo Autorino [c,‡,], Giuseppe Simone [d], Ithaar Derweesh [e], Juan D. Garisto [b], Andrea Minervini [f], Daniel Eun [g], Sisto Perdona [h], James Porter [i], Koon Ho Rha [j], Alexander Mottrie [k], Wesley M. White [l], Luigi Schips [m], Bo Yang [n], Kenneth Jacobsohn [o], Robert G. Uzzo [p], Ben Challacombe [q], Matteo Ferro [r], Jay Sulek [s], Umberto Capitanio [t], Uzoma A. Anele [c], Gabriele Tuderti [d], Manuela Costantini [d], Stephen Ryan [e], Ahmet Bindayi [e], Andrea Mari [f], Marco Carini [f], Aryeh Keehn [g], Giuseppe Quarto [h], Michael Liao [i], Kidon Chang [u], Alessandro Larcher [k,t], Geert De Naeyer [k], Ottavio De Cobelli [r], Francesco Berardinelli [m], Chao Zhang [n], Peter Langenstroer [o], Alexander Kutikov [p], David Chen [p], Nicolo De Luyk [q], Chandru P. Sundaram [s], Francesco Montorsi [t], Robert J. Stein [b], Georges Pascal Haber [b], Lance J. Hampton [c], Prokar Dasgupta [q], Michele Gallucci [d], Jihad Kaouk [b], Francesco Porpiglia [a]*

Retrospective, multicenter study

N = 298

- ✓ Median tumor size = 7.6 cm
- ✓ Median RENAL score = 9
- ✓ Median estimated blood loss = 150 ml
- ✓ Intraoperative complications = 5.4%
- ✓ Postoperative compications = 22% (Clavien-Dindo ≥ 3 = 5%)
- ✓ Positive surgical margins = 8%

… WHY NOT???

In elective indications, NSS in cT2 renal masses may represent a treatment option in case it does not compromise oncological radicality and when the related benefits clearly exceed the potential harm

Long term renal function preservation
Reduced risk of CKD
Reduced risk of CV morbidity
Reduced risk of all-causes mortality

Postoperative surgical morbidity
Risk of reinterventions
Prolonged hospitalization
Risk of AKI

In any case, adequate surgical training is of paramount importance!!!

Robot-Assisted Partial Nephrectomy: core preoperative and surgical steps

- ✓ Preoperative evaluation of tumor location and renal anatomical complexity
- ✓ Intraoperative delination of tumor’s contours
- ✓ Renal pedicle management
- ✓ Tumor excision
- ✓ Renorraphy

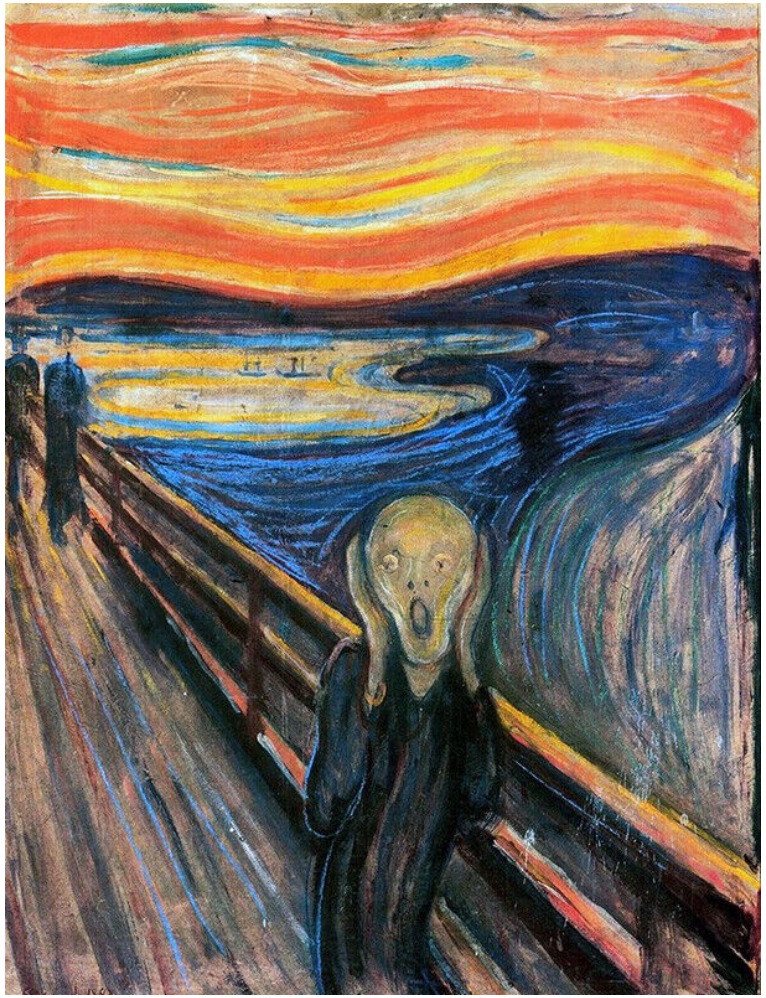
WHAT COMPLEXITY MEANS…???

(…not only nephrometric scores…)

Surgeon Expertise

450 major proc / y

50-70 PN / y



Anytime I ask to myself: TO CLAMP or NOT TO CLAMP???

- Volume
- Site (anterior or hilar)
- Capsule thickness
- Spheric or irregular

- Perirenal fat highly represented and/or obese patient and/or toxic fat
- Anatomical abnormalities
- Multiple lesions
- Multiple pathologies

Perinephric Fat Thickness Is an Independent Predictor of Operative Complexity During Robot-Assisted Partial Nephrectomy

Liam C. Macleod, MD, MPH, Ryan S. Hsi, MD, John L. Gore, MD, MS,
Jonathan L. Wright, MD, MS, and Jonathan D. Harper, MD

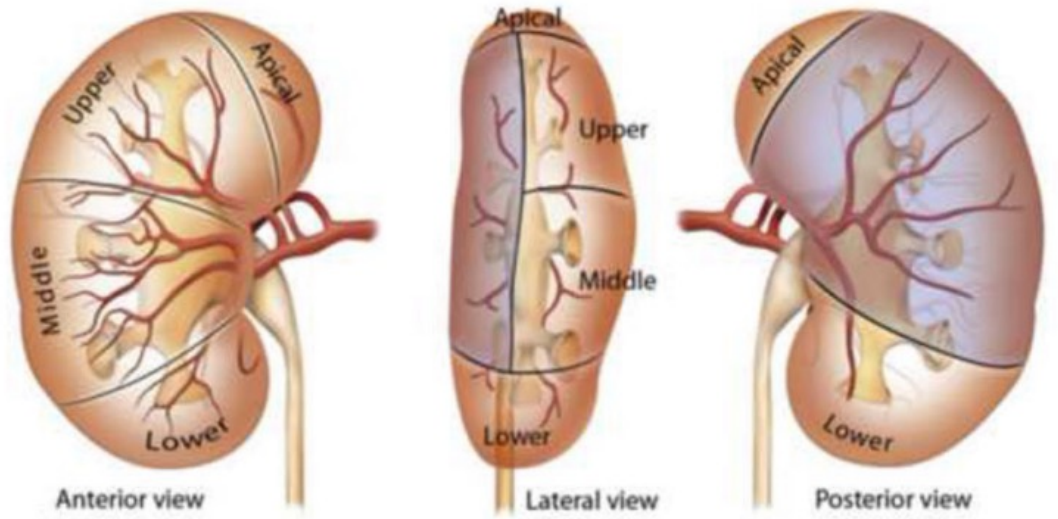
Results: Among 53 patients undergoing RAPN, perinephric fat measurements were independently associated with increased EBL and operative time. For each 1-mm increase in medial perinephric fat, EBL increased 24 mL (95% confidence interval [CI] 13–34 mL) and operative time increased 3.3 minutes (95% CI 1.0–5.7 min). For each 1-mm increase in posterior perinephric fat, the EBL and operative time increases were 19 mL (95% CI 8.1–30 mL) and 3.3 minutes (95% CI 1.0–5.6 min). Abdominal wall fat was not associated with operative time or EBL.
Conclusion: Perinephric fat thickness, particularly medial and posterior fat, is associated with increased EBL and operative time during RAPN, independent of BMI and nephrometry score. These data may be helpful for preoperative risk assessment and counseling and could be incorporated in future complexity scores.

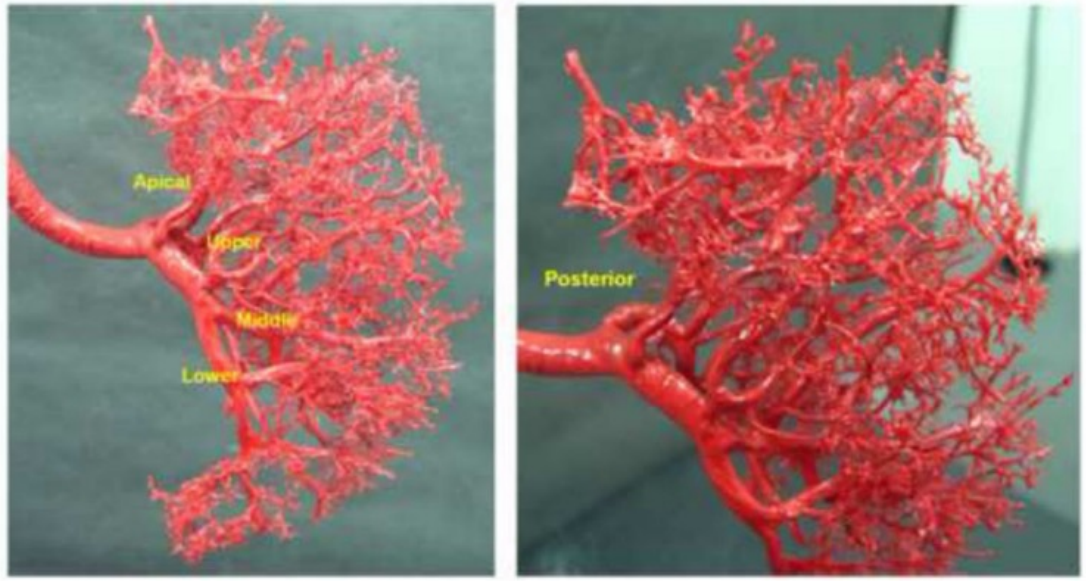
Macleod et al, J Endourol 2014

Renal pedicle management and renal ischemia: how to deal with it?

- ✓ Standard clamping (artery-only, en-bloc)
- ✓ Selective and super-selective clamping
- ✓ Cold ischemia
- ✓ Early unclamping technique
- ✓ Off-clamp technique

Whenever possible!!!





Adult Urology

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Oncology: Adrenal/Renal/Upper Tract/Bladder

Deviation from the Protocol of a Randomized Clinical Trial Comparing On-Clamp versus Off-Clamp Laparoscopic Partial Nephrectomy (CLOCK II Laparoscopic Study): A Real-Life Analysis

Pierluigi Bove,* Riccardo Bertolo, Marco Sandri, Chiara Cipriani, Costantino Leonardo, Paolo Parma, Mario Falsaperla, Domenico Veneziano, Antonio Celia, Andrea Mari, Andrea Minervini and Alessandro Antonelli, on Behalf of the AGILE Group (Italian Group for Advanced Laparo-Endoscopic Surgery)

Conclusions:

An advantage in terms of early functional outcomes does exist when avoiding artery clamping

The likelihood of shifting from pure off-clamp to on-clamp LPN relies on tumor size and complexity.

The intraoperative need to convert the planned strategy seemed harmless on postoperative course.

Why an off-clamp RAPN should be adopted?

While the benefit from this approach can be debated in the setting of bilateral kidney, normal renal function, and single localized tumor, we believe that off-clamp approach is a good indication for several reasons:

1. **Ensures accurate hemostasis of "actual" foci of active bleeding**
2. **Vascular clamping represents a further "complication" of PN**, can be time-consuming and can be associated with higher risk of intraoperative complications in some conditions (e.g. obesity, malformations)
3. **Can be useful in the management of multiple ipsilateral tumors** (→ "off-renal-hilum-dissection" approach, particularly important given the non-negligible risk of re-do PN)

Clinical case #1 – multiple RAPN

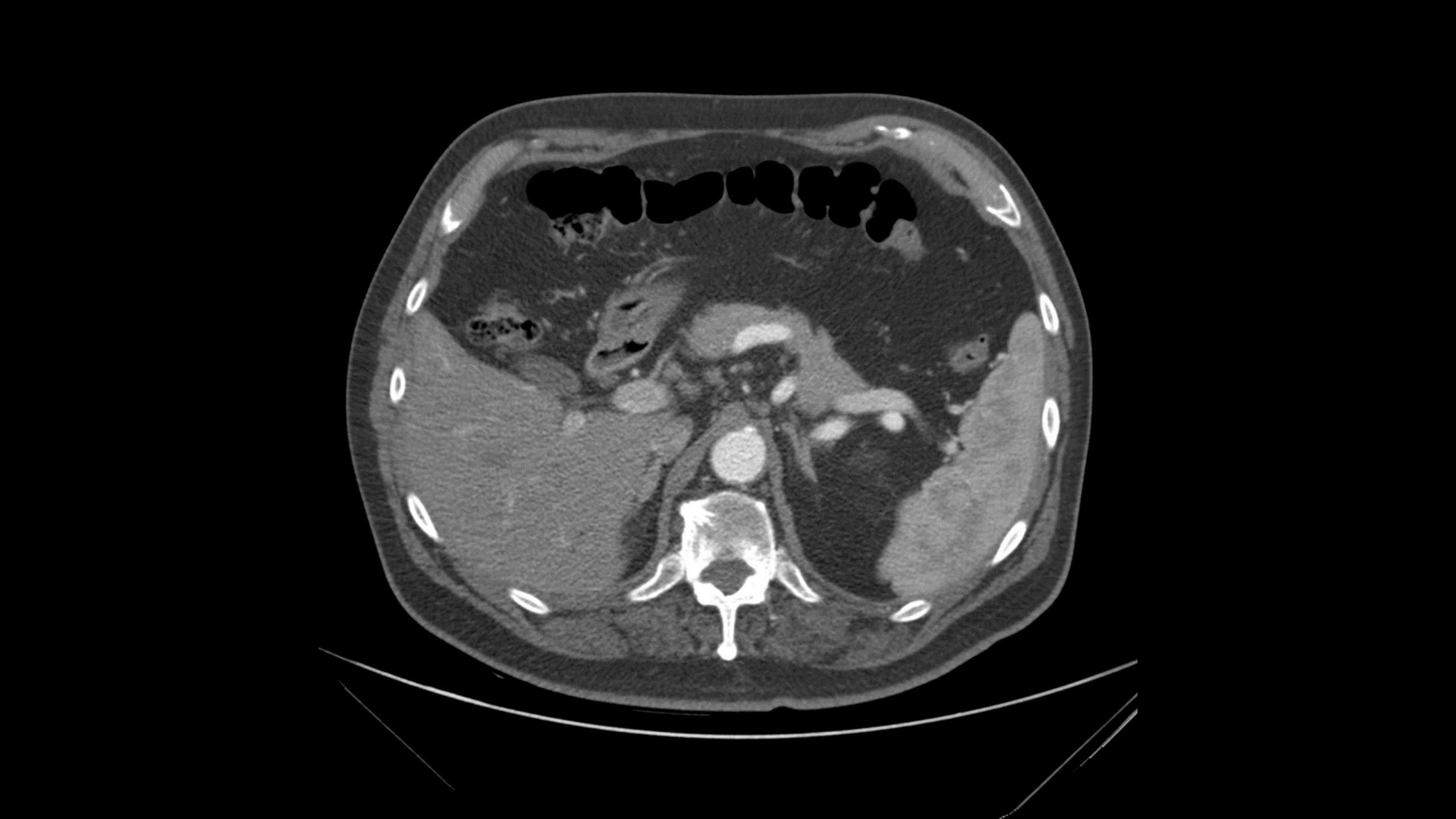
Male, 65 yr

Mild smoker

Medical history: Birt-Hogg-Dubé syndrome (multiple pulmonary cysts, recurrent spontaneous pneumothoraces, cutaneous fibrofolliculomas, renal tumours of various histological types)

Surgical history: right open partial nephrectomy (2016, chromophobe RCC pT1a)

CT scan: 4 left kidney tumors (between 2 and 4 cm) – capsula poorly represented – different density



Clinical case #2 – hilar tumor with concomitant UPJO and renal cyst

Male, 70 yr

Non-smoker

Medical history: NIDDM, hypertension, hyperuricemia

DTPA renal scan: split renal function 65% right / 35% left, T1/2 = 22 min

CT scan: left upper pole renal cyst (10 cm) + kidney tumor (2 cm, hilar, posterior, R.E.N.A.L. score 9) + hydronephrosis by UPJO

Clinical case #3 – on-clamp RAPN

Female, 67 yr

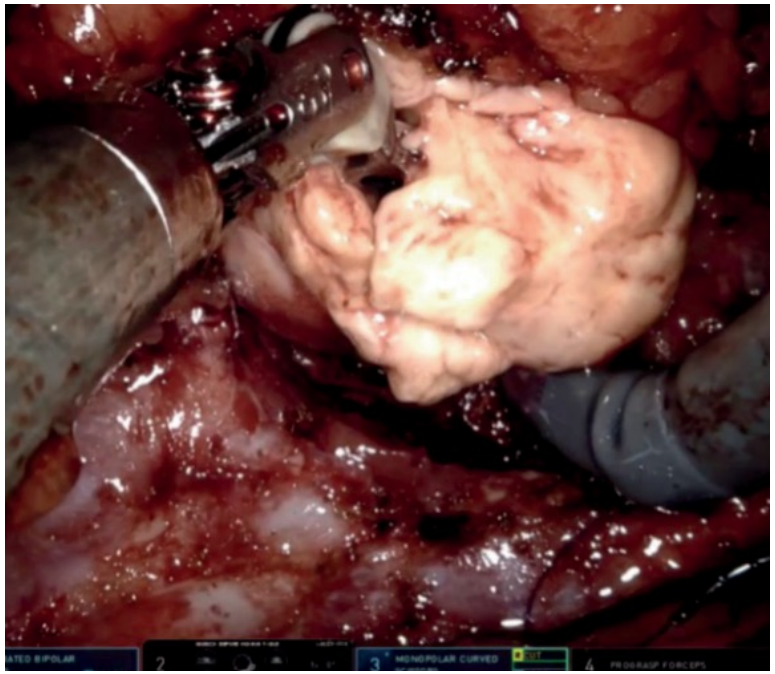
Non-smoker

Medical history: hypertension

CT scan: left kidney tumor (6 cm, mid-upper pole, anterior, partially endophitic, R.E.N.A.L. score 10)

Does tumor rupture during robot-assisted partial nephrectomy have an impact on mid-term tumor recurrences?

Simon Hawlina[1,2], Kosta Cerovic[1], Andraz Kondza[1], Peter Popovic[3,4], Jure Bizjak[1], Tomaz Smrkolj[1,2]



TR is a possible complication during RAPN, especially if tumor enucleation is performed on pRCCs with a higher RENAL nephrometry score, leading to prolonged WIT. We suggest proceeding with the resection of the tumor with a deeper resection plane and only eventually converting to radical nephrectomy or open PN, because it seems that TR has no mid-term risk of tumor recurrence or higher complication rate. The rate of long term effects of TR on tumor recurrences are still unknown.

Hawlina et al, Radiol Oncol 2023

Conclusions:

- Perform PN whenever is technically feseable according to surgeon expertise
- Preop. surgical plan is crucial for pts safety and oncological oucomes
- Be flexible (adapt the technique to the case and not *viceversa*)

Thank you

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