Tumori del rene: Trattamento Chirurgico

Moderatore: Prof. Massimo Schiavone

Relatore:

Dott. Stefano Signore

Direttore UOC Urologia

Polo Ospedaliero S. Eugenio - CTO

ASL Roma 2

Carcinoma renale: epidemiologia

- 2-3% di tutti i cancri
- Più frequente nei Paesi occidentali
- Negli ultimi 20 anni è aumentato di circa il 2% sia in Europa che nel resto del mondo… ma con un trend in discesa in Svezia e Danimarca
- Nel 2012, circa 84400 nuovi casi e 34700 morti correlate al carcinoma renale nei Paesi dell'Unione europea
- Picco di incidenza: 60-70 anni
- Rapporto maschio:femmina = 1.5:1

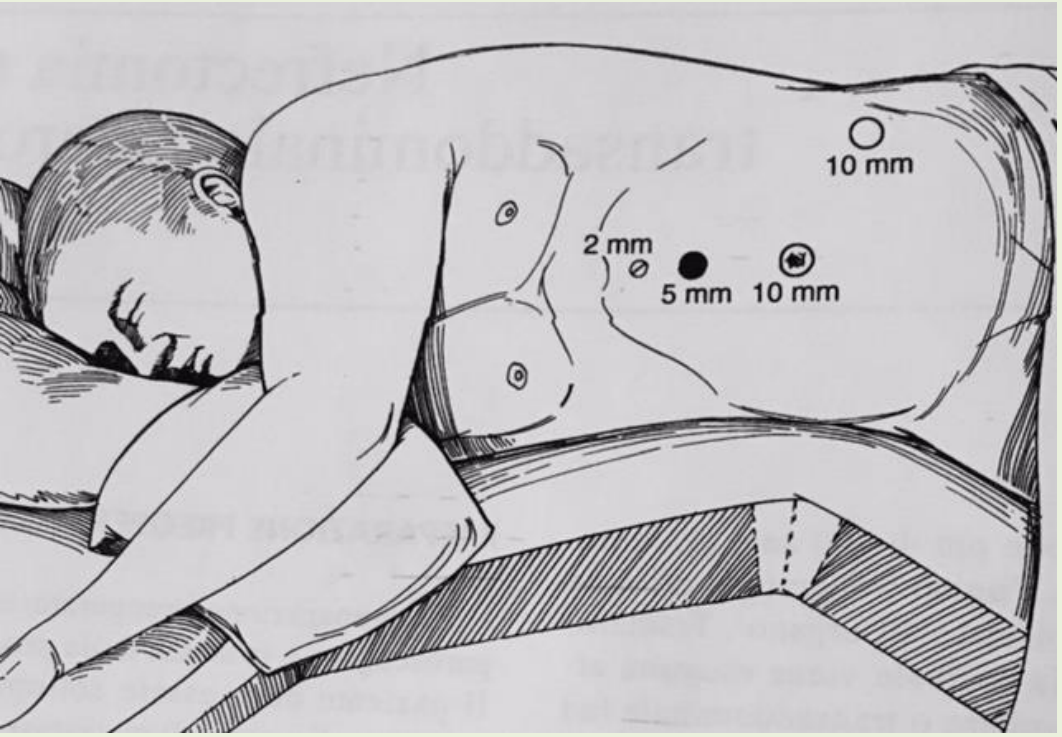
Nefrectomia: accessi più comuni

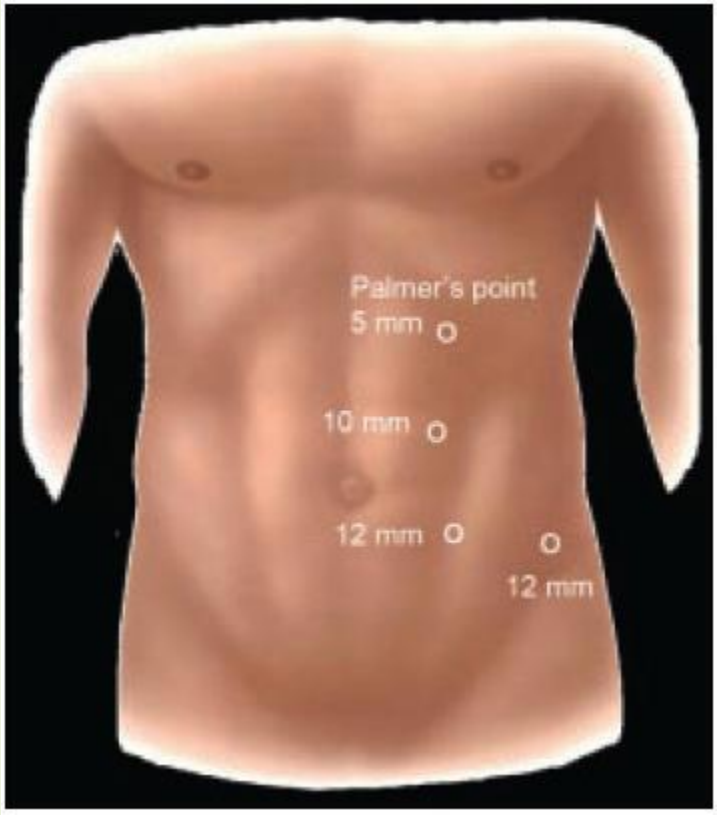
POSIZIONE LOMBOTOMICA

Accesso transperitoneale

Accesso retroperitoneale

Posizione lombotomica: accesso transperitoneale





Dispositivi a radiofrequenza

Più efficacia nell'emostasi

Migliore isolamento termico delle branche dello strumento

Eccessiva sintesi dei tessuti

Dispositivi ad ultrasuoni

Più veloce

Minore efficacia nell'emostasi

Integrità dei tessuti

Nefrectomia radicale

Tecnica standard nella nefrectomia radicale transperitoneale

1. *Medializzazione del colon e isolamento dell'uretere; in questa fase il riferimento principale è il muscolo psoas, nostro "orizzonte"*
2. *Isolamento del polo inferiore del rene seguendo l'uretere, fino ad evidenziare la vena renale*
3. *Isolamento del polo superiore (attenta dissezione delle flessure epatica/splenica)*
4. *Isolamento dell'ilo vascolare del rene ovvero dissezione e legatura dell'arteria e della vena renale*
5. *Definitiva liberazione posteriore e asportazione del rene*

Isolamento e legatura separate prima dell'arteria e poi della vena renale o legatura "en-bloc"?

Isolamento e sezione en-bloc del peduncolo vascolare in corso di nefrectomia radicale laparoscopica

- ✓ *Tentativo iniziale di semplificare la tecnica chirurgica*
- ✓ *Successiva standardizzazione della tecnica*
- ✓ *Conferma di un razionale in numerosi centri urologici internazionali*

EFFICACIA e SICUREZZA

Safety and Efficacy of En Bloc Renal Hilar Vascular Staple Ligation: A Meta-Analysis

Win Shun Lai and Soroush Rais-Bahrami*

From the Departments of Urology (WSL, SR-B) and Radiology (SR-B), University of Alabama at Birmingham, Birmingham, Alabama

Purpose: We reviewed the literature on the safety of en bloc ligation. We also performed a meta-analysis of the effect of using this technique with vascular staplers on perioperative factors compared to conventional renal pedicle dissection and isolated staple ligation of the renal artery and vein.

Materials and Methods: A literature search was performed to include all primary studies related to the safety of en bloc ligation of the renal hilum. After exclusion criteria were applied 9 studies were identified for review, of which 4 included a control group and were used in the meta-analysis. The primary end point was the incidence of arteriovenous fistula. Secondary end points were procedure duration, blood loss and the number of perioperative complications.

Results: None of the total population of 595 patients in whom en bloc ligation was performed for nephrectomy were diagnosed with arteriovenous fistula formation at an average postoperative followup of 26.5 months. When comparing en bloc and isolated ligation of the renal artery and vein, the meta-analysis showed a significant improvement in procedure duration for en bloc nephrectomy. There was no difference in estimated blood loss or the number of complications.

Conclusion: En bloc ligation appears to be as safe as and potentially more beneficial in terms of perioperative factors than conventional renal pedicle dissection and isolated vascular ligation.

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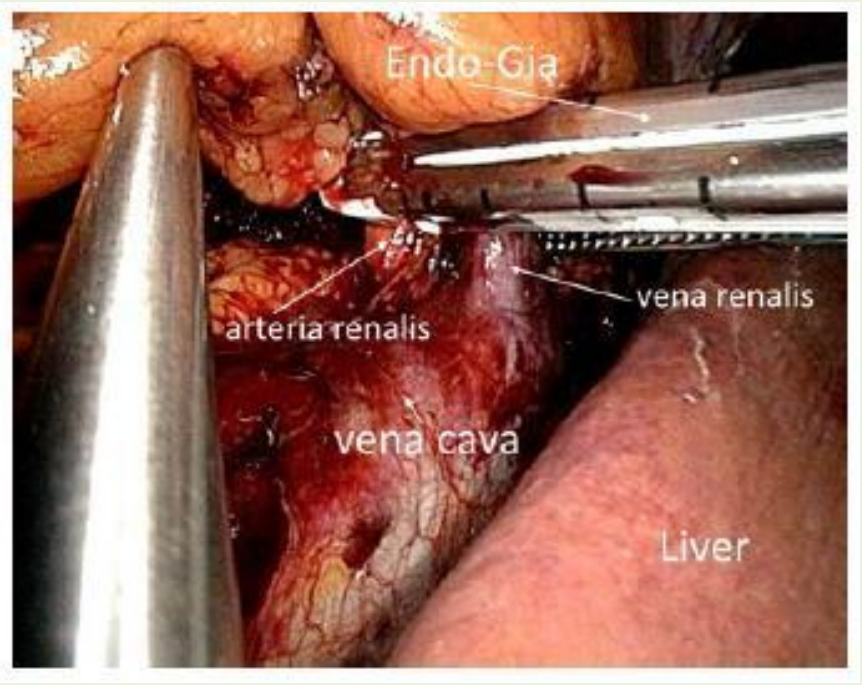
Legatura en-bloc dell'ilo renale presupposti

- ✓ ***Possibilità di sanguinamenti significativi durante la dissezione separata dei vasi renali***
- ✓ ***Le emorragie in questa fase della dissezione rappresentano la causa maggiore di conversione a chirurgia open***
- ✓ ***Nella legatura en-bloc l'utilizzo delle stappler meccaniche, in particolare l'EndoGia 45mm, non prevede una dissezione minuziosa e potenzialmente rischiosa***

I vasi vengono assicurati con un solo passaggio, lasciando il campo operatorio pulito nel rispetto della radicalità oncologica e della sicurezza vascolare, con tempi chirurgici ridotti



Dan Med J 63/2 | February 2016 | DANISH MEDICAL JOURNAL

En bloc ligation of renal vessels is safe and reduces duration of surgery

Nessn Htum Azawi, Mariam Annalisa Skibsted Hult, Claus Dahl & Mikkel Fode

Conventionally, individual ligation of the renal artery and vein with clips is performed during laparoscopic nephrectomy (LN). Concomitant ligation of the vessels (en bloc ligation) is not a standard procedure due to an expected risk of stapler dysfunction [1, 2] and the development of arteriovenous fistulas (AVF) [3]. However, recent studies suggest that en bloc ligation may be a safe procedure that offers a reduction in surgical time as well as a lower blood loss without evidence of an increased risk of the development of AVF [4] compared with the conventional technique.

Nostra esperienza:

modifica parziale dei passaggi storici della nefrectomia radicale laparoscopica

Isolamento precoce del polo superiore del rene

Miglior controllo e più attenta protezione degli organi viciniori

Migliore visualizzazione della stappler nel suo intero percorso

- ***La legatura en-bloc in corso di nefrectomia radicale laparoscopica appare una procedura sicura ed efficace che garantisce una riduzione di tempi operatori e, nella nostra esperienza, non incide in alcun modo sul rischio emorragico.***
- ***Inoltre, come descritto dalla letteratura degli ultimi venti anni, la fistola arterovenosa non rappresenta al giorno d'oggi una reale complicanza della legatura en-bloc***

Nefrectomia parziale:
Linee-guida European Association of Urology
e revisione della letteratura

T - Primary Tumour		
TX	Primary tumour cannot be assessed	
T0	No evidence of primary tumour	
T1	Tumour ≤ 7 cm or less in greatest dimension, limited to the kidney	
	T1a	Tumour ≤ 4 cm or less
	T1b	Tumour > 4 cm but ≤ 7 cm
T2	Tumour > 7 cm in greatest dimension, limited to the kidney	
	T2a	Tumour > 7 cm but ≤ 10 cm
	T2b	Tumours > 10 cm, limited to the kidney
T3	Tumour extends into major veins or perinephric tissues but not into the ipsilateral adrenal gland and not beyond Gerota fascia	
	T3a	Tumour grossly extends into the renal vein or its segmental (muscle-containing) branches, or tumour invades perirenal and/or renal sinus fat (peripelvic fat), but not beyond Gerota fascia
	T3b	Tumour grossly extends into the vena cava below diaphragm
	T3c	Tumour grossly extends into vena cava above the diaphragm or invades the wall of the vena cava
T4	Tumour invades beyond Gerota fascia (including contiguous extension into the ipsilateral adrenal gland)	

N - Regional Lymph Nodes	
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in regional lymph node(s)*
M - Distant Metastasis	
M0	No distant metastasis
M1	Distant metastasis

TNM stage grouping			
Stage I	T1	N0	M0
Stage II	T2	N0	M0
Stage III	T3	N0	M0
	T1, T2, T3	N1	M0
Stage IV*	T4	Any N	M0
	Any T	Any N	M1

Linee guida EAU: cambiamenti 2016 -> 2017

5.4 Summary of evidence and recommendations for the diagnostic assessment of renal cell cancer

Summary of evidence	LE
Contrast enhanced multi-phasic CT has a high sensitivity and specificity for characterisation and detection of RCC, invasion, tumour thrombus and metastatic RCC.	2
MRI has a slightly higher sensitivity and specificity for small renal masses and tumour thrombus as compared to CT.	2
CEUS has a high sensitivity and specificity for characterisation of renal masses.	2
US, Power-Doppler US and PET-CT have a low sensitivity and specificity for detection and characterisation of RCC.	2

Linee guida EAU: cambiamenti 2016 -> 2017

Recommendations	grade	
Use multi-phasic contrast-enhanced computed tomography (CT) for general staging and detection of renal cell cancer (RCC).	strong	↑↑
Use axial abdominal imaging and CT of the chest for staging of RCC.	strong	↑↑
Use non-ionising modalities, mainly contrast enhanced ultrasound (CEUS), for further characterisation of small renal masses, tumour thrombus and differentiation of unclear renal masses.	weak	↑
Do not use bone scan and/or positron-emission tomography (PET)-CT for staging of RCC.	weak	↓
Perform a renal tumour biopsy before ablative therapy and systemic therapy without previous pathology.	strong	↑↑
Perform a percutaneous biopsy in select patients who are considered for active surveillance.	weak	↑
When performing a renal tumour biopsy technique, use a coaxial technique.	strong	↑↑
Do not perform a renal tumour biopsy of cystic renal masses.	weak	↓

Nefrectomia parziale: evidenze e raccomandazioni

Summary of evidence	LE
PN achieves similar oncological outcomes to RN for clinically localised tumours (cT1).	1b
Ipsilateral adrenalectomy during RN or PN has no survival advantage.	3
In patients with localised disease without evidence of LN metastases, there is no survival advantage of LND in conjunction with RN.	1b
In patients unfit for surgery with massive haematuria or flank pain, embolisation can be a beneficial palliative approach.	3

Recommendations	GR
Surgery is recommended to achieve cure in localised RCC.	B
PN is recommended in patients with T1a tumours.	A
Favour PN over RN in patients with T1b tumour, whenever feasible.	B
Ipsilateral adrenalectomy is not recommended when there is no clinical evidence of invasion of the adrenal gland.	B
LND is not recommended in localised tumour without clinical evidence of lymph node invasion.	A

Nefrectomia parziale vs. radicale

Summary of evidence	LE
Laparoscopic RN has lower morbidity than open surgery.	1b
Oncological outcomes for T1-T2a tumours are equivalent between laparoscopic and open RN.	2a
PN can be performed, either with an open, pure laparoscopic- or robot-assisted approach, based on surgeon's expertise and skills.	2b

Recommendations	GR
Laparoscopic RN is recommended for patients with T2 tumours and localised masses not treatable by PN.	B
RN should not be performed in patients with T1 tumours for whom PN is indicated.	B

PN=partial nephrectomy; RN=radical nephrectomy.

Int J Surg. 2016 Apr 21 pii: S1743-9191(16)30058-9. doi: 10.1016/j.ijsu.2016.04.028. [Epub ahead of print]

Laparoscopic partial nephrectomy.

Zhao PT[1], Richstone L[2], Kavoussi LR[2].

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Abstract

Laparoscopic partial nephrectomy (LPN) compares favorably to traditional open nephron-sparing surgery (NSS) in terms of oncologic and surgical principles for kidney tumors. Studies have shown the modality to be feasible with similar oncologic efficacy and superior renal functional outcomes compared with laparoscopic radical nephrectomy (LRN) for tumors. The main advantages of LPN include marked improvements in estimated blood loss, decreased surgical site pain, shorter postoperative convalescence, better cosmesis, and nephron preservation. This review article evaluates the literature regarding LPN and discusses the main steps of the operation, the perioperative workup and management, surgical complications, and its role in the surgical management of kidney masses.

Nefrectomia parziale open: ancora un ruolo…

Int J Surg. 2016 May 10. pii: S1743-9191(16)30113-3. doi: 10.1016/j.ijsu.2016.05.031. [Epub ahead of print]

Open partial nephrectomy in renal cell cancer - Essential or obsolete?

Anastasiadis E[1], O'Brien T[2], Fernando A[2].

Author information

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[2]Department of Urology, Guy's and St Thomas NHS Foundation Trust, London, UK.

Abstract

Since the first partial nephrectomy was first conducted 131 years ago, the procedure has evolved into the gold standard treatment for small renal masses. Over the past decade, with the introduction of minimally invasive surgery, open partial nephrectomy still retains a valuable role in the treatment of complex tumours in challenging clinical situations (e.g. hereditary renal cancer or single kidneys), and enables surgeons to push the boundaries of nephron-sparing surgery. In this article, we consider the origin of the procedure and how it has evolved over the past century, the surgical techniques involved, and the oncological and functional outcomes.

Nefrectomia parziale:

Dettagli chirurgici

Tempo di ischemia: parametro cruciale?

J Urol. 2016 Jun;195(6):1655-63. doi: 10.1016/j.juro.2015.09.099. Epub 2016 Jan 22.

Current Paradigm for Ischemia in Kidney Surgery.

Mir MC[1], Pavan N[1], Parekh DJ[2].

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RESULTS: Our traditional knowledge of renal ischemia is derived from animal studies, ie kidney transplant and retrospective partial nephrectomy series that indicate the risk of renal function impairment for every minute of ischemia. Careful evaluation of historical studies highlights flaws of the use of ischemia duration as a dichotomous marker (25 or 30 minutes) while predicting renal function outcomes. Recent studies have revealed no effect of duration of ischemia on ultimate kidney function in the short or long term. Quality and quantity of parenchyma preserved postoperatively are key predictors of ultimate renal function after partial nephrectomy. Traditionally partial nephrectomy has been performed with hilar occlusion to provide a relatively bloodless surgical field allowing effective oncologic control during tumor excision with secure management of blood vessels, collecting system and renal reconstruction. Selective clamping and nonclamping techniques have been proposed to avoid the perceived harmful effects of ischemia, although they convert a complex surgery into a more challenging procedure, potentially limiting the widespread use of partial nephrectomy for management of renal cancers. Promising urine and blood-based biomarkers (NGAL, KIM-1) in the context of critical care settings and global stress have been observed to predict acute kidney injury. Within the partial nephrectomy environment the usefulness of those markers needs to be further investigated. To date, no study has proved their usefulness in the setting of partial nephrectomy.

CONCLUSIONS: Based on the available evidence, use of a single cutoff for duration of ischemia time as a dichotomous value for renal function outcomes in the setting of partial nephrectomy is flawed. Renal ischemia is a controversial topic with a shifted paradigm within the last decade. Current evidence has shown that patients with 2 kidneys undergoing nephron sparing surgery can tolerate ischemia times of more than 30 minutes without a clinically significant decline in renal function. Biomarkers predictive of renal tubular injury fail to predict acute kidney injury in the context of partial nephrectomy. Indications for partial nephrectomy could be significantly expanded as the safety of limited renal ischemia is now better understood.

Tempo di ischemia: parametro cruciale?

Eur Urol. 2015 Jul;68(1):61-74. doi: 10.1016/j.eururo.2015.01.025. Epub 2015 Feb 20.

Renal Ischemia and Function After Partial Nephrectomy: A Collaborative Review of the Literature.

Volpe A[1], Blute ML[2], Ficarra V[3], Gill IS[4], Kutikov A[5], Porpiglia F[6], Rogers C[7], Touijer KA[8], Van Poppel H[9], Thompson RH[10].

EUROPEAN UROLOGY

EVIDENCE SYNTHESIS: The vast majority of reviewed studies were retrospective, nonrandomized observations. Based on the current literature, RF recovery after PN is strongly associated with preoperative RF and the amount of healthy kidney parenchyma preserved. Warm ischemia time (WIT) is modifiable and prolonged warm ischemia is significantly associated with adverse postoperative RF. Available data suggest a benefit of keeping WIT <25min, although the level of evidence to support this threshold is limited. Cold ischemia safely facilitates longer durations of ischemia. Surgical techniques that minimize or avoid global ischemia may be associated with improved RF outcomes.

CONCLUSIONS: Although RF recovery after PN is strongly associated with quality and quantity of preserved kidney, efforts should be made to limit prolonged WIT. Cold ischemia should be preferred when longer ischemia is expected, especially in presence of imperative indications for PN. Additional research with higher levels of evidence is needed to clarify the optimal use of renal ischemia during PN.

Tempo di ischemia: parametro cruciale?

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Review

Impact of ischaemia time on renal function after partial nephrectomy: a systematic review

Xavier Rod, Benoit Peyronnet, Thomas Seisen, Benjamin Pradere, Florie D. Gomez, Grégory Verhoest, Christophe Vaessen, Alexandre De La Taille, Karim Bensalah, Morgan Roupret

View issue TOC
Volume 118, Issue 5
November 2016
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First published: 9 August 2016 Full publication histo
DOI: 10.1111/bju.13580 View/save citation

Results

Of the 1119 studies identified, 969 abstracts were screened after duplicates were removed: 29 articles were finally included in this review, including nine studies that focused on patients with a solitary kidney. None of the nine studies adjusting for the amount of preserved parenchyma found a negative impact of warm ischaemia time on postoperative renal function, unless this was extended beyond a 25-min threshold. The quality and the quantity of preserved parenchyma appeared to be the main contributors to postoperative renal function.

Conclusion

Currently, no evidence supports that limited ischaemia time (i.e. ≤25 min) has a higher risk of reducing renal function after PN compared to a 'zero ischaemia' technique. Several recent studies have suggested that prolonged warm ischaemia (>25–30 min) could cause an irreversible ischaemic insult to the surgically treated kidney.

Partial Nephrectomy in Clinical T1b Renal Tumors: Multicenter Comparative Study of Open, Laparoscopic and Robot-assisted Approach (the RECORd Project)

Francesco Porpiglia, Andrea Mari, Riccardo Bertolo, Alessandro Antonelli, Giampaolo Bianchi, Francesco Fidanza, Cristian Fiori, Maria Furlan, Giuseppe Morgia, Giacomo Novara, Bernardo Rocco, Bruno Rovereto, Sergio Serni, Claudio Simeone, Marco Carini, and Andrea Minervini

http://dx.doi.org/10.1016/j.urology.2015.08.049
0090-4295

Table 3. Comparison of intraoperative and postoperative data between OPN, LPN, and RAPN

Intra- and postoperative data	OPN (n = 133)		LPN (n = 57)		RAPN (n = 95)		P*	P†	P†
High volume center, n (%)	95	71.4%	53	93.0%	95	100.0%	.01	.01	<.0001
Clampless procedures, n (%)	26	19.5%	19	33.3%	13	13.7%	.04	.004	.25
Ischemia time (min), median IQR	16.0	14.0-20.0	24.0	20.0-29.0	18.0	15.0-24.0	<.0001	<.0001	.004
EBL (cc), median IQR	200	100-300	200	100-200	150	100-200	.46	.04	.01
Operative time (min), median IQR	135	110-170	129	110-150	155	120-196	.33	.001	.002
Intraoperative complications, n (%)	8	6.0%	2	3.5%	1	1.1%	.48	.29	.05
Medical postoperative complications, n (%)	17	12.8%	1	1.8%	2	2.1%	.02	.88	.04
Surgical postoperative complications, n (%)	23	17.3%	8	14.0%	8	8.4%	.58	.27	.04
Surgical Clavien 2, n (%)	13	9.8%	4	7.0%	4	4.2%	.54	.45	.11
Surgical Clavien 3, n (%)	7	5.3%	1	1.8%	1	1.1%	.27	.71	.09
Positive surgical margins, n (%)	9	6.8%	1	1.9%	2	2.5%	.18	.82	.16
Trifecta outcome, n (%)	83	62.4%	36	63.2%	66	69.5%	.92	.42	.27
3rd day delta Hb, median IQR	2.0	1.7-3.0	1.0	0.2-3.0	2.4	1.4-3.0	.003	.01	.69
1st day delta eGFR, median IQR	15.2	0.0-28.5	5.2	0.0-16.7	1.2	0.0-12.6	.02	.22	<.0001
3rd day delta eGFR, median IQR	9.2	0.0-27.6	7.2	0.0-14.0	1.9	0.0-14.6	.45	.66	.12
1st month delta eGFR, median IQR	8.7	0.0-19.5	7.3	0.0-14.0	1.6	0.0-13.0	.59	.21	.12

EBL, estimated blood loss; other abbreviations as in Tables 1 and 2.
* OPN vs LPN.
† LPN vs RAPN.
† RAPN vs OPN.

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European Association of Urology

Platinum Priority – Kidney Cancer

Editorial by R. Houston Thompson on pp. 641–642 of this issue

Indications, Techniques, Outcomes, and Limitations for Minimally Ischemic and Off-clamp Partial Nephrectomy: A Systematic Review of the Literature

Giuseppe Simone[a,b,*], *Inderbir S. Gill*[c], *Alexandre Mottrie*[d], *Alexander Kutikov*[e], *Jean-Jacques Patard*[f], *Antonio Alcaraz*[g], *Craig G. Rogers*[h]

[a] *Department of Urology, "Regina Elena" National Cancer Institute, Rome, Italy;* [b] *Department of Urology, San Giovanni Bosco Hospital, Turin, Italy;* [c] *USC Institute of Urology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA;* [d] *OLV Vattikuti Robotic Surgery Institute, Aalst, Belgium;* [e] *Division of Urologic Oncology, Fox Chase Cancer Center, Temple University Health System, Philadelphia, PA, USA;* [f] *Department of Urology, Bicêtre Hospital, Paris XI University, Le Kremlin-Bicêtre, France;* [g] *Department of Urology, Hospital Clínic i Provincial de Barcelona, Barcelona, Spain;* [h] *Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI, USA*

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European Association of Urology

Platinum Priority – Kidney Cancer

Editorial by R. Houston Thompson on pp. 641–642 of this issue

Indications, Techniques, Outcomes, and Limitations for Minimally Ischemic and Off-clamp Partial Nephrectomy: A Systematic Review of the Literature

Giuseppe Simone[a,b,*], *Inderbir S. Gill*[c], *Alexandre Mottrie*[d], *Alexander Kutikov*[e], *Jean-Jacques Patard*[f], *Antonio Alcaraz*[g], *Craig G. Rogers*[h]

[a] Department of Urology, "Regina Elena" National Cancer Institute, Rome, Italy; [b] Department of Urology, San Giovanni Bosco Hospital, Turin, Italy; [c] USC Institute of Urology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA; [d] OLV Vattikuti Robotic Surgery Institute, Aalst, Belgium; [e] Division of Urologic Oncology, Fox Chase Cancer Center, Temple University Health System, Philadelphia, PA, USA; [f] Department of Urology, Bicêtre Hospital, Paris XI University, Le Kremlin-Bicêtre, France; [g] Department of Urology, Hospital Clínic i Provincial de Barcelona, Barcelona, Spain; [h] Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI, USA

Enucleation and enucleoresection are recognized by current guidelines as oncologically effective techniques when a minimal tumor-free margin is achieved [2,3] and have the benefit of preserving healthy parenchyma, a major determinant of maintaining RF after PN [10,12].

The effect of resection techniques on RF has not been sufficiently addressed, although wider resection margins do not lead to improved cancer control [39] but probably affect the quantity of parenchyma preserved and consequently RF. Simmons et al [40] found that late eGFR was directly associated with percentage functional volume preservation ($p < 0.001$) and highlighted the importance of technical modifications, including minimization of resection margins and of tissue incorporated into renorrhaphy, to optimize functional outcomes after PN.

In a retrospective comparison of Off-C and On-C MIPN in 121 patients, Desai et al observed a trend towards better parenchymal preservation with an Off-C approach (95% vs 90%, $p = 0.07$) despite greater tumor volume (19 vs 8 ml, $p = 0.002$) and complexity (PADUA score 10 vs 8, $p = 0.009$) [41]. Whether this finding may be explained by the Off-C approach itself, the resection technique, point-specific hemostasis of the parenchymal defect instead of conventional renorrhaphy, or a combination of these variables should be the focus of further research.

Surg Innov. 2009 Dec;16(4):306-12. doi: 10.1177/1553350609354605. Epub 2009 Dec 22.

Laparoscopic partial nephrectomy using FloSeal for hemostasis: technique and experiences in 102 patients.

Wille AH[1], Johannsen M, Miller K, Deger S.

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Abstract

OBJECTIVES: The authors report their techniques, perioperative data, and oncological outcome for laparoscopic partial nephrectomy in a single-center experience with 3 different surgeons.

PATIENTS AND METHODS: A total of 102 consecutive patients underwent laparoscopic transperitoneal partial nephrectomy for exophytic tumors using FloSeal for hemostasis. Mean age was 58 years (range = 26-79 years), and median tumor size was 2.6 cm (range = 0.5-8.5 cm). In 84 cases, the renal artery was clamped using endoscopic bulldog clamps, and tumor resection was performed using scissors or the harmonic scalpel. Hemostasis was achieved by application of FloSeal; lesions of the collecting system were closed with Lahodny sutures in 33 cases (31%). Frozen sections were obtained for margin status.

RESULTS: All 102 procedures were successful with no intraoperative complications. Mean surgical time was 201 minutes (range = 60-355 minutes); clamping time was 25.8 minutes (range = 6-75 minutes) in 64 cases. Margins were negative in 92 cases; in 8 cases secondary resection was necessary to achieve negative margin status, and in 2 cases radical nephrectomy was performed. Histological findings were clear-cell carcinoma in 51 (50.0%), papillary carcinoma in 26 (25.5%), and others in 25 (24.5%) cases. At a mean follow-up of 32 months (12-62 months), no recurrence was observed.

CONCLUSIONS: Laparoscopic partial nephrectomy with the use of FloSeal is a feasible and safe method for treatment of small renal masses. The technique is reproducible by surgeons who are used to complex laparoscopic procedures. Patient outcome during follow-up was comparable with data published for open standard procedures.

PMID: 20031942 DOI: 10.1177/1553350609354605

OPEN

Using a Harmonic Scalpel "Drilling and Clamping" Method to Implement Zero Ischemic Robotic-assisted Partial Nephrectomy

An Observation Case Report Study

Chen-Pang Hou, MD, Yu-Hsiang Lin, MD, Yu-Chao Hsu, MD, Chien-Lun Chen, MD, Phei-Lang Chang, MD, and Ke-Hung Tsui, MD

ment zero-ischemic RAPN. The authors prospectively collected baseline and perioperative data of patients who underwent zero ischemic RAPN performed by our harmonic scalpel "drilling and clamping" method. From April 2012 to December 2014, a total of 19 consecutive zero ischemic RAPN procedures were performed by a single surgeon. For 18 of the 19 patients, RAPN using our harmonic scalpel "Drilling and Clamping" method was successfully completed without the need for hilar clamping. The median tumor size was 3.4 cm (range: 1.8–6.2); operative time was 3.2 hours (range: 1.9–4.5); blood loss was 100 mL (range: 30–950); and postoperative hospital stay was 4 days (3–26). One patient required intraoperative blood transfusion. Two patients had intra or postoperative complications: 1 was converted to traditional laparotomy because of massive bleeding, whereas another had postoperative stress ulcer. Pathology confirmed renal cell carcinoma in 13 patients (63.2%), angiomyolipoma in 6 patients: (31.5%), and oncocytoma in 1 patient (5.3%). Mean pre- and postoperative serum creatinine (0.82 mg/dL and 0.85 mg/dL, respectively), estimated glomerular filtration rate (84.12 and 82.18, respectively), and hemoglobin (13.27 g/dL and 12.71 g/dL, respectively) were comparable. The authors present a novel zero-ischemic technique for

TABLE 2. The Operative and Perioperative Data of the Patients

Patient Number = 19	Number	Median (Range) or Percentage
Operative time (hours)		3.2 (1.9–4.5)
Estimated blood loss (mL)		100 (30–950)
Intraoperative complications	1	5.3%
Postoperative complications	1	5.3%
Conversion	1	5.3%
Blood transfusion	1	5.3%
Time to oral intake (d)		2 (1–21)
Postoperative hospital stay (d)		4 (3–26)
Pathology findings		
RCC	12	63.2%
Clear cell	11	
Papillary	1	
Amgiomyolipoma	6	31.5%
Oncocytoma	1	5.3%
Pathological stage of RCC		
Ia	11	
Ib	1	
Margin positive	1	5.3%
Follow up duration (mo)		24 (41–6)

RCC = renal cell carcinoma.

OPEN

Using a Harmonic Scalpel "Drilling and Clamping" Method to Implement Zero Ischemic Robotic-assisted Partial Nephrectomy

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Surgical Procedures:

(1) Zero-degree camera lens was used during the whole procedure.

(2) Once the colon was taken down, the Gerota fascia was opened, and the ureter as well as the kidney low pole was lifted off the psoas muscle. The kidney was mobilized for identifying the tumor. For upper pole or posterior aspect tumors, the entire kidney should be mobilized from the abdominal side wall and diaphragm as much as possible. Intraoperative ultrasonography was used to identify the tumor location. Identification of the hilum and vessels that might require clamping was not necessary in our surgical technique.

(3) We used the blunt blade of robotic Harmonic scalpel (Intuitive Surgical, Sunnyvale, CA) (Figure 4) to drill holes around the tumor, with a 5 mm distance from the tumor margin. The distance between each hole was approximately 3 mm (Figure 5A). The drilling angle should be beveled tangent to the surface arc of the tumor (Figure 5E). We inserted the scalpel into the created holes and clamped. The kidney tissue was cut at power level 5 and 55,500 Hz vibrating frequency (Figure 5B). The "drilling and clamping" method was repeated around the tumor outline to excise the mass (Figure 5C). As for larger tumors, the technique could be performed again on the second layer until the whole mass was completely resected (Figure 5F).

(4) A 3–0 self-locking, absorbable polyglyconate suture (V-lock 90TM; Covidien Inc) was used to close the large sinuses, end arteries, and collecting system at the resection base. After the bleeding was controlled, 3–0 Vicryl sutures were placed across the defect to close the parenchyma using a sliding renorraphy technique with large Hem-o-lock clips (Teleflex Medical) (Figure 5E).[16]

(5) FLOSEAL Hemostatic Matrix (Baxter Inc, CA) and Surgicel (Ethicon Inc, Somerville, NJ) were applied to the resection bed before the whole procedure terminated.

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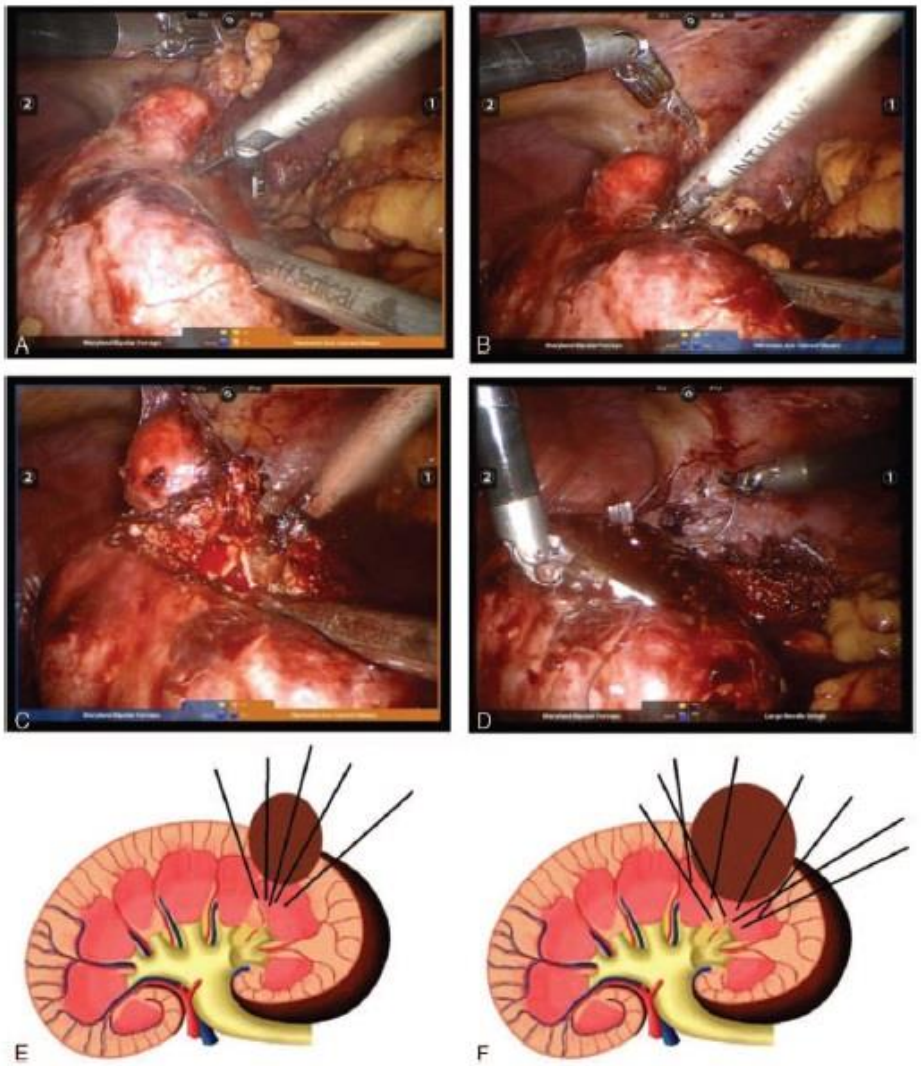

FIGURE 5. A, Drill holes by robotic harmonic scalpel around the tumor, with a 5 mm distance from the tumor margin. The distance between each hole was approximately 3 mm. B, Insert the scalpel blades into the created holes, clamp, and cut. C, Repeat the drilling and clamping method around the tumor outline to excise the mass. E, The drilling angle should be beveled tangent to the surface arc of the tumor. F, For a larger tumor, the technique can be performed again on the second layer until the whole mass is completely resected.

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Surgery in Motion

Robotic Unclamped "Minimal-margin" Partial Nephrectomy: Ongoing Refinement of the Anatomic Zero-ischemia Concept

Raj Satkunasivam[a,†], *Sheaumei Tsai*[a,†], *Sumeet Syan*[a], *Jean-Christophe Bernhard*[a], *Andre Luis de Castro Abreu*[a], *Sameer Chopra*[a], *Andre K. Berger*[b], *Dennis Lee*[a], *Andrew J. Hung*[a], *Jie Cai*[a], *Mihir M. Desai*[a], *Inderbir S. Gill*[a,*]

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Background: Anatomic partial nephrectomy (PN) techniques aim to decrease or eliminate global renal ischemia.

Objective: To report the technical feasibility of completely unclamped "minimal-margin" robotic PN. We also illustrate the stepwise evolution of anatomic PN surgery with related outcomes data.

Design, setting, and participants: This study was a retrospective analysis of 179 contemporary patients undergoing anatomic PN at a tertiary academic institution between October 2009 and February 2013. Consecutive consented patients were grouped into three cohorts: group 1, with superselective clamping and developmental-curve experience (n = 70); group 2, with superselective clamping and mature experience (n = 60); and group 3, which had completely unclamped, minimal-margin PN (n = 49).

Surgical procedure: Patients in groups 1 and 2 underwent superselective tumor-specific devascularization, whereas patients in group 3 underwent completely unclamped minimal-margin PN adjacent to the tumor edge, a technique that takes advantage of the radially oriented intrarenal architecture and anatomy.

2.3.1. *Anatomic partial nephrectomy with tumor-specific devascularization (superselective clamping)*

This technique involves vascular microdissection in which the specific higher order arterial branch (occasionally, two branches) feeding the tumor is identified [12]. Knowledge of arterial anatomy is facilitated by careful preoperative study of the arteriogram phase of 3D computed tomography (CT) scan images, with 0.5-mm slice thickness [6,12]. Neurosurgical aneurysm micro–bulldog clamps (AROSurgical, Newport Beach, CA, USA) are applied to carefully achieve tumor-specific devascularization. This is confirmed by fluorescence imaging using intravenous indocyanine green, which also documents ongoing perfusion of the remainder of the kidney. Tumor excision is performed with a combination of electrocautery and cold scissors. Hem-o-lok clips are applied to small vessels supplying the tumor from the resection bed; these clips are subsequently undersewn to prevent migration into the caliceal system. Precise, point-specific hemostatic suturing is performed using 3-0 Vicryl (Ethicon, Johnson & Johnson, New Brunswick, NJ, USA) on an SH-1 needle; large, indiscriminate, compressive parenchymal whip stitches are avoided. Any collecting system entry is suture repaired and tested for water-tightness with retrograde injection. Because hemostasis is achieved with precise suturing in the perfused kidney, a Surgicel (Ethicon) bolster is not required in most cases; this minimizes potential pressure ischemia to the adjacent parenchyma. A hemostatic agent (FloSeal; Baxter Corporation, Deerfield, IL, USA) is layered onto the PN bed.

2.3.2. *Completely unclamped, zero-ischemia, minimal-margin partial nephrectomy*

This technique is characterized by complete elimination of all vascular clamping and tumor excision with a minimal margin adjacent to the tumor capsular edge. This technique is grounded in anatomic and pathologic bases: (1) The natural architecture of the kidney parenchyma and intrarenal vasculature is radially oriented; (2) the vast majority of renal tumors have a distinct fibrous pseudocapsule; (3) the tumor–parenchyma interface is histologically altered with evidence of glomerulosclerosis, nephrosclerosis, and arteriosclerosis adjacent to the tumor edge; and (4) intrarenal vessels in this histologically altered zone immediately adjacent to the tumor edge are generally smaller in caliber and fewer in number [13]. As such, the anatomic plane of dissection immediately adjacent to the tumor capsule (termed the *minimal-margin plane*) appears histologically and oncologically safe for PN surgery, with the least chance of hemorrhage. Our technical aim is to maintain a 1-mm sliver of parenchymal tissue on the tumor capsular surface (Fig. 1) rather than completely baring the capsule, as would be the goal during tumor enucleation.

The tumor edge is scored circumferentially using ultrasound guidance. Typically, we do not prepare the main renal artery for possible clamping; however, per the operating surgeon's preference, this may certainly be done. Using the fourth robotic arm, the perirenal fat directly overlying the tumor is retracted, thereby elevating the tumor away from the kidney. Minimal-margin PN commences by creating a radial nephrotomy 2- to 3-mm deep along the cephalad and caudal edges of the tumor, along the scored margin, using electrocautery. This relatively bloodless, radially oriented incision is now developed bluntly by placing the tip of the robotic bipolar forceps in the left robotic arm into the nephrotomy incision and gently opening its jaws; doing so starts to "open the kidney like a book" along the natural radial plane adjacent to the tumor. Typically, this maneuver is achieved with cold dissection, with occasional strategic use of electrocautery for point coagulation (cautery setting at 100 W). The capsular incision is circumferentially developed around the tumor and deepened with blunt dissection; the tumor is gently yet tautly lifted off the partial nephrectomy bed with robotic forceps. It is important to note that the renal parenchyma is not cut but rather is bluntly separated. Doing so keeps the dissection along the natural, relatively avascular intrarenal plane, avoiding interlobar vessels. On reaching the renal sinus, larger (visible) vessels directly entering the tumor are defined and controlled with Hem-o-lok clips. The bedside assistant's suction cannula is used to transiently compress any bleeding vessel until point-specific suturing can be performed. For this reason, we typically use two suction apparatuses, one strictly for parenchymal compression and the other for judicious suction and irrigation. Once the tumor is completely excised, hemostasis is exclusively achieved with point-specific suturing, and any caliceal system entry is repaired (3-0 Vicryl on an SH-1 needle). Use of a compressive bolster is infrequent.

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Surgery in Motion

Robotic Unclamped "Minimal-margin" Partial Nephrectomy: Ongoing Refinement of the Anatomic Zero-ischemia Concept

Raj Satkunasivam [a,†], Sheaumei Tsai [a,†], Sumeet Syan [a], Jean-Christophe Bernhard [a], Andre Luis de Castro Abreu [a], Sameer Chopra [a], Andre K. Berger [b], Dennis Lee [a], Andrew J. Hung [a], Jie Cai [a], Mihir M. Desai [a], Inderbir S. Gill [a,]*

[a] *USC Institute of Urology, Catherine and Joseph Aresty Department of Urology, University of Southern California, Los Angeles, CA, USA;* [b] *Department of Urology, University of Miami Miller School of Medicine, Miami, FL, USA*

Int J Urol. 2015 Nov;22(11):1075-7. doi: 10.1111/iju.12897. Epub 2015 Aug 24.

Laparoscopic upper-pole heminephrectomy for duplicated renal collecting system with superselective artery clamping using virtual partial nephrectomy analysis of Synapse Vincent: A case report.

Yoshida K[1], Kinoshita H[1], Hayami Y[1], Nakamoto T[1], Takayasu K[1], Sugi M[1], Matsuda T[1].

Author information

Abstract

A 22-year-old woman was diagnosed with a duplicated renal collecting system with hydronephrosis and parenchymal loss in the upper pole of the left kidney. She underwent laparoscopic left upper-pole nephrectomy. Although a complex hilar vascular anatomy was identified during the operation, preoperative three-dimensional computed tomographic reconstruction using a three-dimensional image analysis device (Synapse Vincent; Fuji Medical Systems, Tokyo, Japan) greatly helped to accurately identify the anatomical renal hilum. For further detail, virtual partial nephrectomy analysis using a Voronoi decomposition was used to visualize the area supplied by a selected arterial branch including the atrophic cleavage line. We controlled the bleeding with selective clamping and safely carried out upper-pole heminephrectomy according to the preoperative plan.

KEYWORDS: Synapse Vincent; duplicated renal collecting systems; three-dimensional image analysis system; upper-pole nephrectomy

Comment in

Editorial Comment to Laparoscopic upper-pole heminephrectomy for duplicated renal collecting system with superselective artery clamping using virtual partial nephrectomy analysis of Synapse Vincent: A case report. [Int J Urol. 2015]

PMID: 26300298 DOI: 10.1111/iju.12897

[PubMed - indexed for MEDLINE]

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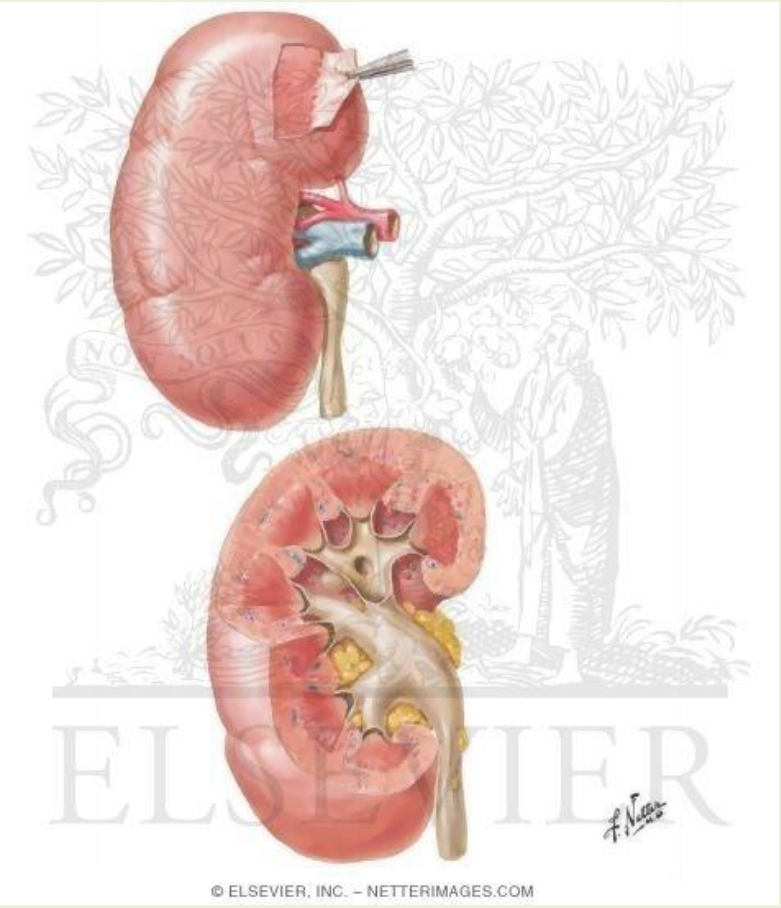
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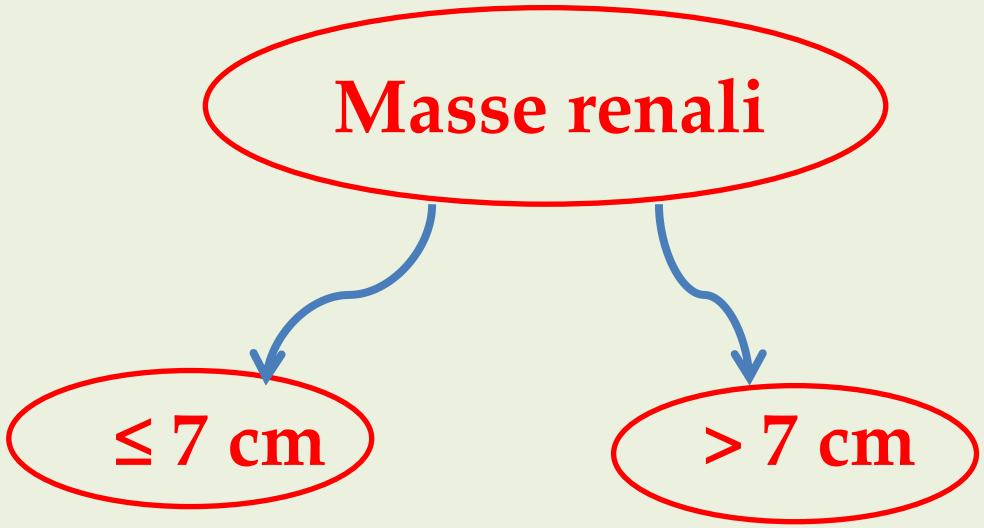
Masse renali
≤ 7 cm
> 7 cm

What is the current role of partial nephrectomy for T2 tumors?

Bruno Nahar, MD, Mark L. Gonzalgo, MD
Department of Urology, University of Miami Miller School of Medicine, Miami, Florida, USA

NAHAR B, GONZALGO ML. What is the current role of partial nephrectomy for T2 tumors? *Can J Urol* 2017;24(2):8698-8704.

Introduction: *To review oncological and functional outcomes for partial nephrectomy in the setting of T2 tumors.*
Materials and methods: *We performed a comprehensive literature review on partial nephrectomy for T2 tumors, focusing on major primary series reporting oncological and functional outcomes, as well as complication rates in the last 10 years.*
Results: *Recent series have reported comparable oncological outcomes between partial nephrectomy and radical nephrectomy for ≥ T2 tumors. However, most of these studies are retrospective in design with small sample sizes. With regard to functional outcomes, partial nephrectomy outperforms radical nephrectomy. However, outcomes are dependent on the amount of residual renal parenchyma left after partial nephrectomy for larger tumors. Partial nephrectomy is associated with an increased rate of complications when compared to radical nephrectomy, but in experienced hands this increase tends to remain at an acceptable level. There are few studies that have investigated the role of minimally invasive surgery (MIS) in the setting of T2 tumors. Although MIS techniques may be underutilized for management of T2 tumors, it is a feasible approach in highly selected patients.*
Conclusions: *Partial nephrectomy has emerged as an acceptable alternative for surgical management of T2 renal tumors over the last decade. Nephron-sparing surgery demonstrates similar oncological outcomes compared to radical nephrectomy and can be considered even for larger tumors in carefully selected patients whenever feasible.*

Key Words: T2 tumor, partial nephrectomy, radical nephrectomy

TABLE 1. **Major series comparing partial nephrectomy (PN) and radical nephrectomy (RN) for T2 tumors**

		Margulis et al[14]	Jeidres et al[21]	Breau et al[18]	Kopp et al[19]
# of patients	RN	567	45	207	122
	PN	34	17	69	80
Tumor size, cm	RN	9.3†	8.8	8.5	10.2
	PN	5.2†	8.9	7.5	8.8
Estimated blood loss, mL	RN	994.9	n/a	200	225†
	PN	975	n/a	400	325†
Perioperative* complications (%)	RN	2.9†	n/a	31	24.6†
	PN	9†	n/a	39.5	37.5†
Overall survivor (%)	RN	n/a	n/a	n/a	80
	PN	n/a	83.8	70	83.3
Cancer specific survival (%)	RN	74	87.2†	75	82.5
	PN	78	67†	83	86.7
Recurrence free survival (%)	RN	62†	n/a	n/a	69.8
	PN	82†	n/a	n/a	79.9
Disease progression (%)	RN	43.4	n/a	36	23.7
	PN	62.1	n/a	28	10
Follow up, months	RN	43.4	46.8	38.4	47.4
	PN	62.1	32.4	38.4	35.1

†$p < 0.05$
*Margulis et al reported only procedure-related complications
n/a = not available
Disease progression = metastatic disease or local recurrence

Tumori oltre T1 e nefrectomia parziale

Curr Urol Rep. 2016 Jan;17(1):5. doi: 10.1007/s11934-015-0558-y.

Contemporary Experience with Partial Nephrectomy for Stage T2 or Greater Renal Tumors.

Alanee S[1], Herberts M[2], Holland B[2], Dynda D[3].

Author information

Abstract

The purpose of this paper is to review current studies on the topic of partial nephrectomy (PN) for renal masses stage T2 and greater. We conducted a PubMed literature review of English language articles published from 2000 onward. Eight studies were selected for this review including 359 PN patients. Median tumor size was 7.5 to 8.7, and tumor histology was mainly clear cell. Technique was mainly open, the reported median ischemia time was 29-45 min, and median operative time 170-221 min. Positive margin rates were 0-31%. On a median follow-up range of 13.1 to 70 months, 5-year progression-free survival was 71-92.5%, and 5-year overall survival was 66-94.5% in the study populations. There is limited retrospective evidence in favor of preserved oncologic efficacy in patients with renal tumors larger than 7 cm in size treated with nephron-sparing surgery. This review emphasizes the need for more studies and long-term follow-up data to determine the proper role of partial nephrectomy in large kidney tumors.

Tumori oltre T1 e nefrectomia parziale

Eur Urol. 2016 Sep 7. pii: S0302-2838(16)30533-4. doi: 10.1016/j.eururo.2016.08.060. [Epub ahead of print]

Partial Nephrectomy Versus Radical Nephrectomy for Clinical T1b and T2 Renal Tumors: A Systematic Review and Meta-analysis of Comparative Studies.

Mir MC[1], Derweesh I[2], Porpiglia F[3], Zargar H[4], Mottrie A[5], Autorino R[6].

Author information

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[6]Urology Institute, University Hospitals, Case
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EVIDENCE SYNTHESIS: Overall, 21 case-control studies including 11204 patients (RN 8620; PN 2584) were deemed eligible and included in the analysis. Patients undergoing PN were younger (WMD -2.3 yr; p<0.001) and had smaller masses (WMD -0.65cm; p<0.001). Lower estimated blood loss was found for RN (WMD 102.6ml; p<0.001). There was a higher likelihood of postoperative complications for PN (RR 1.74, 95% CI 1.34-2.2; p<0.001). Pathology revealed a higher rate of malignant histology for the RN group (RR 0.97; p=0.02). PN was associated with better postoperative renal function, as shown by higher postoperative estimated glomerular filtration rate (eGFR; WMD 12.4ml/min; p<0.001), lower likelihood of postoperative onset of chronic kidney disease (RR 0.36; p<0.001), and lower decline in eGFR (WMD -8.6ml/min; p<0.001). The PN group had a lower likelihood of tumor recurrence (OR 0.6; p<0.001), cancer-specific mortality (OR 0.58; p=0.001), and all-cause mortality (OR 0.67; p=0.005). Four studies compared PN (n=212) to RN (n=1792) in

CONCLUSIONS: PN is a viable treatment option for larger renal tumors, as it offers acceptable surgical morbidity, equivalent cancer control, and better preservation of renal function, with potential for better long-term survival. For T2 tumors, PN use should be more selective, and specific patient and tumor factors should be considered. Further investigation, ideally in a prospective randomized fashion, is warranted to better define the role of PN in this challenging clinical scenario.

ıated blood loss was higher for PN p<0.001). Both the recurrence rate ower for PN.

PATIENT SUMMARY: We performed a cumulative analysis of the literature to determine the best treatment option in cases of localized kidney tumor of higher clinical stage (T1b and T2, as based on preoperative imaging). Our findings suggest that removing only the tumor and saving the kidney might be an effective treatment modality in terms of cancer control, with the advantage of preserving the kidney function. However, a higher risk of perioperative complications should be taken into account when facing larger tumors (clinical stage T2) with kidney-sparing surgery.

Urol Oncol. 2017 Dec 6. pii: S1078-1439(17)30594-X. doi: 10.1016/j.urolonc.2017.11.009. [Epub ahead of print]

Impact of positive surgical margins on overall survival after partial nephrectomy-A matched comparison based on the National Cancer Database.

Shum CF[1], Bahler CD[1], Sundaram CP[2].

Author information

Abstract

INTRODUCTION: The impact of positive surgical margins (PSM) in partial nephrectomy (PN) has been a controversy. Previous studies on the relationship between PSM and overall survival (OS) were either underpowered or had highly dissimilar groups. We used the National Cancer Database with propensity score matching to determine the association between PSM and OS after PN.

MATERIALS AND METHODS: We identified patients with T1/T2 N0M0 renal cancer treated with PN between 2004 and 2009, and divided them into 2 groups based on their margin status. We used propensity score matching to ensure similarities in age, comorbidity score (CCI), tumor size, histology, and grade between groups. Covariates were compared by χ^2 test. Cox multiple regression was used to estimate the hazard ratios (HR) for all-cause mortality. OS between matched groups were compared by log-rank, Breslow and Tarone-Ware tests.

RESULTS: After excluding those with missing data on margin or survival status, 20,762 patients were eligible for matching. Each matched group had 1,265 patients, similar in age, sex, race, CCI, tumor size, histology, and grade. There were 386 recorded all-cause mortalities over a median follow-up duration of 72.6 months. Cox multiple regression showed a higher risk of all-cause mortality among cases with PSM (HR: 1.393, P = 0.001). Old age, high CCI, and large tumors had higher risks, while papillary and chromophore histologic subtypes had lower risks. PSM was associated with significantly worse OS by log-rank, Breslow, and Tarone-Ware tests.

CONCLUSION: PSM is associated with significantly worse OS after PN.

Il carcinoma uroteliale delle alte vie: possibile chirurgia di risparmio?

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MINIREVIEWS

Upper tract urothelial carcinoma: Paradigm shift towards nephron sparing management

Julia V Fiuk, Brad F Schwartz

NEPHRON SPARING TREATMENTS FOR UTUC

The rationale for conservative surgery for UTUC stems from the fact that most UTUC is superficial and low grade[38]. Thus, coupled with the aforementioned drawbacks of renal loss and decreased GFR, as well as improvements in endoscopic technology, allow for pursuit of renal sparing techniques. Currently available nephron-sparing treatments for UTUC include ureteroscopic retrograde tumor ablation, percutaneous antegrade tumor ablation, or segmental ureterectomy. As the focus of this review is endoscopic management of UTUC, segmental will not be discussed further here.

Patient selection is critical, as currently endoscopic management techniques are only advisable for low grade, small volume tumors or for patients who would otherwise not be fit to undergo RNU[7] (Figure 1). The decision

Grazie dell'attenzione