An anatomical illustration of a human kidney in cross-section. A localized tumor is visible on the surface of the kidney. A surgical approach is shown, involving the use of laparoscopic instruments to access the kidney. The renal artery and vein are highlighted in purple and red, respectively. The surrounding structures, including the adrenal gland and the retroperitoneum, are also visible.

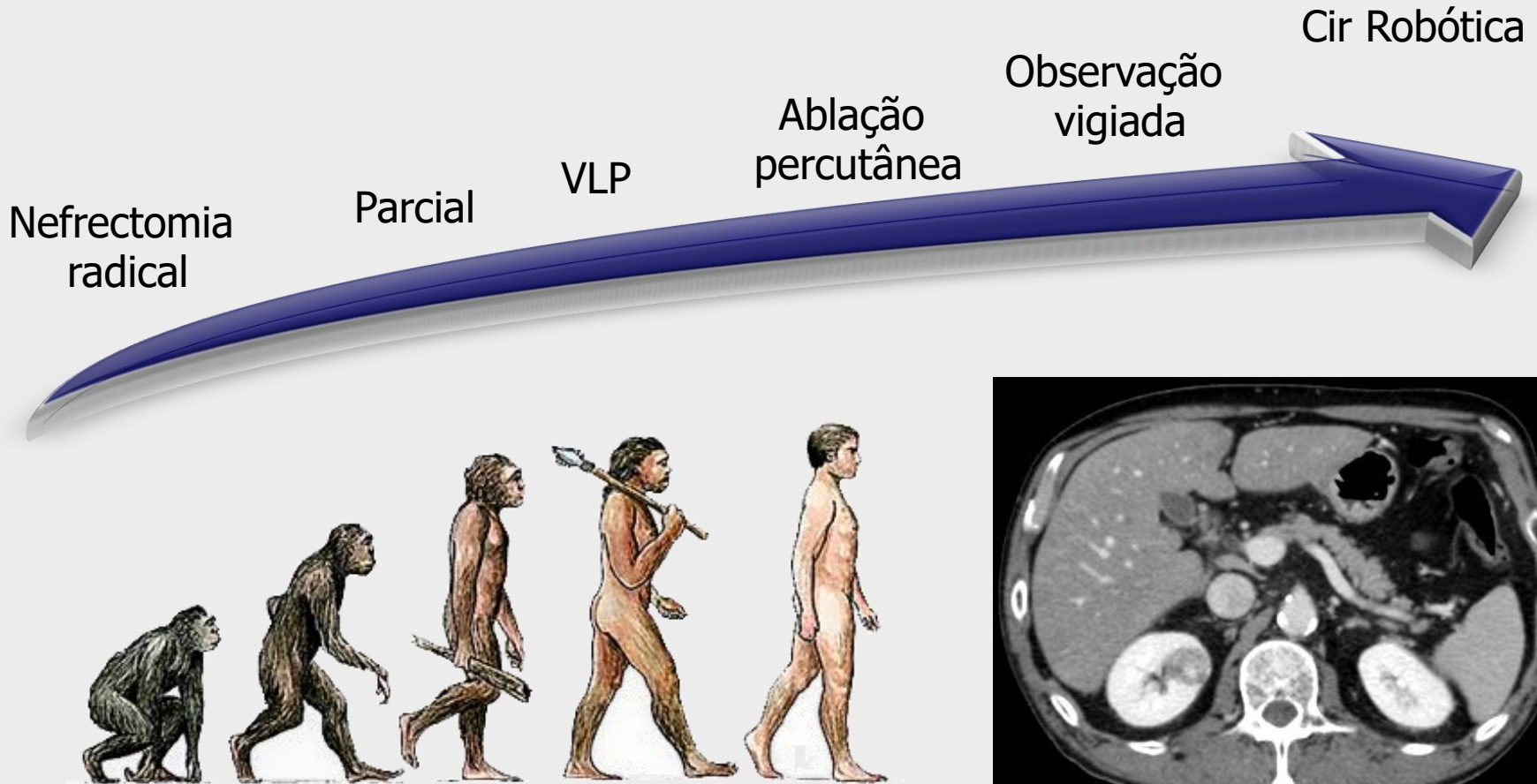
Câncer Renal Localizado

Cirurgia minimamente invasiva: prós e contras

William C Nahas

Epidemiologia

57 a 61% tumores renais são achados incidentais



A grande maioria T1

Jayson M, Sanders H. Urology 1998; 51 (2): 203-205
Kane et al Cancer 2008;113(1):78-83

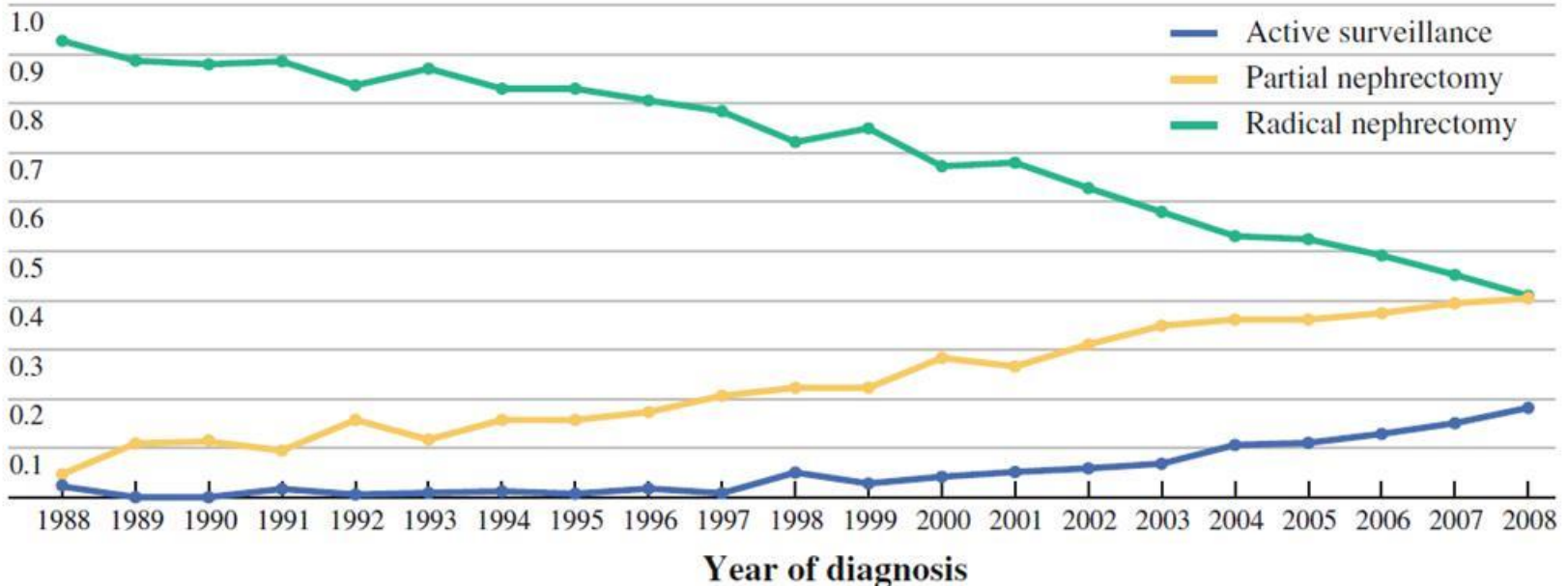
Ann Surg Oncol (2012) 19:2380–2387
DOI 10.1245/s10434-012-2247-0

Annals of
SURGICAL ONCOLOGY
OFFICIAL JOURNAL OF THE SOCIETY OF SURGICAL ONCOLOGY

ORIGINAL ARTICLE – UROLOGIC ONCOLOGY

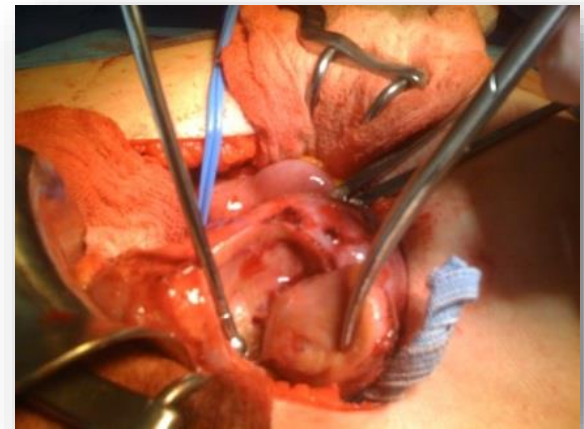
Treatment Management of Small Renal Masses in the 21st Century: A Paradigm Shift

Proportion (%)



Utilization rate of **Proportion (%)** active surveillance, partial nephrectomy and radical nephrectomy in T1aN0M0 renal cell carcinoma patients, US surveillance, epidemiology, and end results, 1988–2008

- Causa: Indicação limitada da Nefre parcial
 - Preferência do cirurgião
 - Treinamento avançado
 - Maior incidência de complicações
 - Reembolso inferior



↑ Incidência tu renais

Melhora propedêutica
(Incidentaloma)

Tu \leq 4 cm

Baixo grau

•EUA entre 1988 e 2002

– Nefre parcial < 10% casos

Hollebeck et al 2006

Miller et al 2006

Método de Investigação

- Memorial Sloan Kattering
 - 2000 a 2007 55% tu – nefre parcial

	2000	2007
Tu \leq 4 cm	69%	89%
Tu 4 a 7 cm	20%	60%

Thompson et al 2009

Impacto negativo Nefre radical X parcial

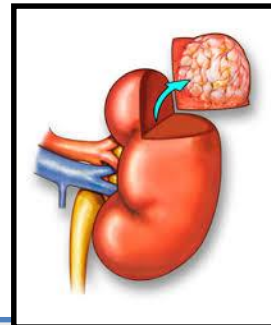
↑ Risco IRC



↑ Risco Eventos cardiológicos

Hospitalizações

Mortalidade



Impacto negativo nefre radical X parcial

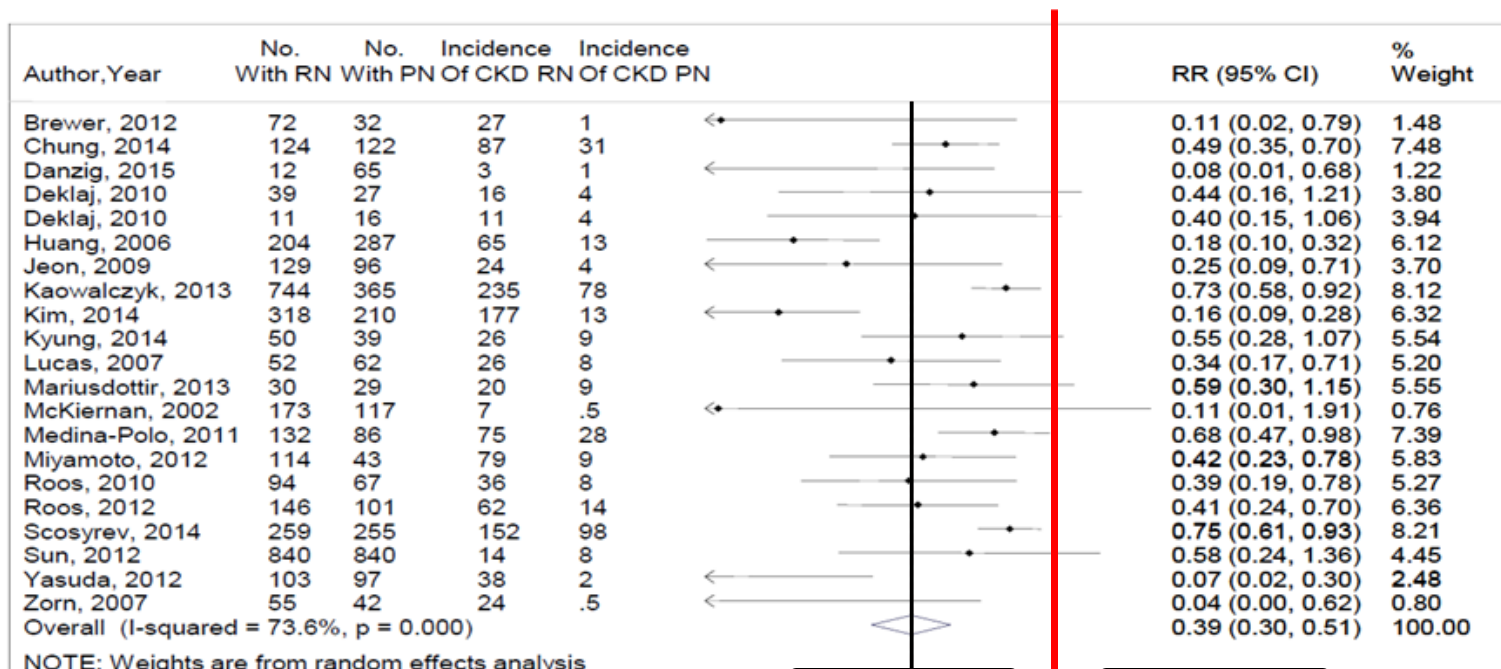
↑ Risco IRC



↑ Risco eventos cardiológicos
Hospitalizações
Mortalidade



Meta-analysis of the Incidence of Stage 3 CKD with RN vs. PN



NOTE: Weights are from random effects analysis

.1 **Favors PN** 1 **Favors RN**

Risk Ratio and 95% Confidence Intervals of Incidence of CKD stage 3

CKD = chronic kidney disease; No. = number; PN = partial nephrectomy; RN = radical nephrectomy; RR = risk ratio; TA = thermal ablation; WMD = weighted mean difference
 Note: The width of the horizontal lines represents the 95 percent confidence intervals for each study. The diamond at the bottom of the graph indicates the 95 percent confidence interval.

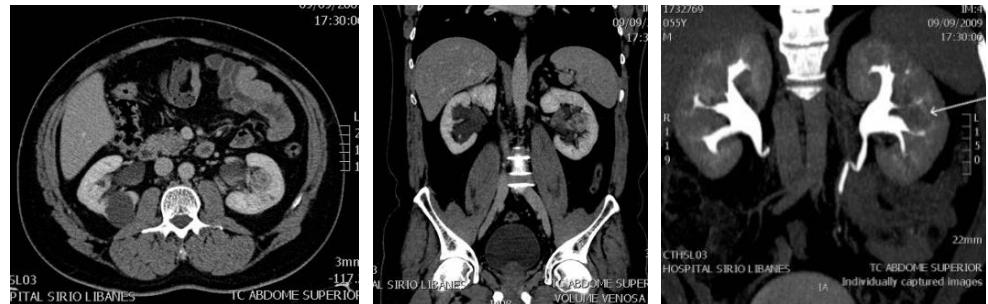
Dificuldade técnica e morbidade associada

Dependente

- Tamanho: até 4 cm
de 4 a 7 cm
- Forma de crescimento
Exofítico
Endofítico
- Localização
Polo Superior
Inferior
Hilar/ central

Método de Investigação

- CT / MRI
 - Reconstrução vascular
 - Via excretora

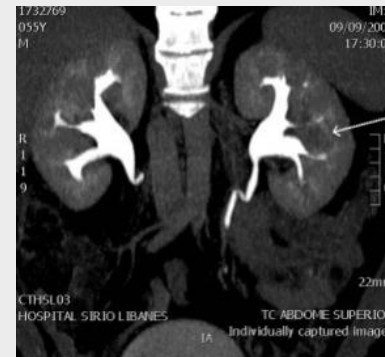
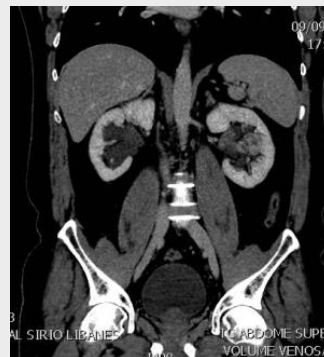


- Ultrassom intra operatório

Assintomáticos (70 a 80%) Usom: suspeição diagnóstica

- CT abdômen/pélvis com contraste: **essencial**
 - Função renal/uso hipoglicemiantes orais
 - Avalia Extensão/dimensão/relações anatómicas
 - Doença loco regional
 - Avaliação funcional (rim contra lateral)

- MRI abdômen/pélvis
 - Suspeita envolvimento vascular
 - Alergia contraste iodado
 Depuração creatina >30 ml/min.
Risco de fibrose nefrogênica sistêmica
- Rx tórax ou CT



Importância da interação com o radiologista

Causas para disseminação da nefrectomia parcial

• Laparoscopia

- Tempo de isquemia: Curva de aprendizado 100-150 cs
- Visão : tela plana
- Pinças não articuladas
- Ctr da camera
- Ergometria

Link et al J Urol 2005;173 :816-21
Kaul et al Eur Urol 2007;186-91

• Cir robótica

- Curva aprendizagem (tto) : 16-20 cs
- Tempo de isquemia: 26-30cs
- Laparosc → robótica: 5cs
- Visão tridimensional
- Liberdade maior de movimento das pinças (6 graus de liberdade)
- Filtro de tremor
- Console ergométrico

Haseebuddin et al J Endourol 2010;19; 441-5
Lavery et al JSL 2011;15:291-7

A Comparison of Robotic, Laparoscopic and Open Partial Nephrectomy

JSLs

Steven M. Lucas, MD, Matthew J. Mellon, MD, Luke Erntsberger, MD, Chandru P. Sundaram, MD

JSLs (2012)16:581–587

Introduction: Comparison of treatments for partial nephrectomy is limited by case selection. We compared robotic (RPN), laparoscopic (LPN), and open partial nephrectomy (OPN), controlling for tumor size, patient age, sex, and nephrometry score.

Methods: RPN, LPN, and OPN procedures between March 2003 and March 2010 were reviewed. All RPN and LPN were included, and 2 OPN were matched for each RPN in tumor size (0.5cm), patient age (10 y), sex, and nephrometry score. Perioperative outcomes were compared.

Results: Ninety-six partial nephrectomy procedures were reviewed: 27 RPN, 15 LPN, and 54 OPN. RPN, LPN, and OPN had similar median tumor size (2.4, 2.2, and 2.3cm, respectively), nephrometry score (6.0 each), and preoperative glomerular filtration rate (71.5, 84.6, and 77.0 mL/ min/1.73m², respectively). Blood loss was higher for OPN (250 mL) than for RPN or LPN (100 mL), *P* .001. Operative time was shorter in OPN (147 min) than in RPN (190 min) or LPN (195 min), *P* .001. Median warm ischemia time was shorter for OPN (12.0 min) than for RPN (25.0 min) or LPN (29.5 min), *P* .05. Cold ischemia time for OPN was 25.0 min. A 10% glomerular filtration rate decline occurred in 10 RPN, 5 LPN, and 29 OPN cases (*P* .252). Median hospital stay for LPN and RPN was 2.0 d versus 3.0 d for OPN (*P* .001). Urine leak occurred in 1 RPN and 3 OPN cases. Postoperative complications occurred in 4 RPN (3 were Clavien grade 2 or less), 1 LPN (grade 1), and 7 OPN (6 were grade 2 or less) cases.

Conclusion: Renal function preservation and complications are similar for each treatment modality. OPN offers faster operative and ischemia times at the expense of greater blood loss and hospital stay.

Avaliou 96 casos nefre parcial: 27 robóticas, 15 laparosc, 54 abertas (pareado : tamanho médio; complexidade do tumor, filtr glomerular)

- Tempo de cirurgia
 - **Menor aberta** 147 min x robótica 190 x laparosc 195 (*P* < 0,001)
- Tempo de isquemia
 - **Menor aberta** 12 min x robótica 25 x laparosc 29,5 min
- Perda sanguínea
 - **Maior aberta** 250 ml x 100 ml robot e laparosc
- Tempo de internação
 - **Menor laparosc e robot** (2 d) x aberta (3d) *p* < 0,001
- Ausência de diferença
 - Complicações imediatas
 - Complicações tardias

Robotic Partial Nephrectomy Shortens Warm Ischemia Time, Reducing Suturing Time Kinetics even for an Experienced Laparoscopic Surgeon: A Comparative Analysis

Eliney F. Faria, Peter A. Caputo, Christopher G. Wood, Jose A. Karam, Graciela M. Nogueras-González, and Surena F. Matin

Departments of Urology and Biostatistics, University of Texas M.D. Anderson Cancer Center



World J Urol. 2014 February ; 32(1): 265–271

Surgery Type

	Surgery type		p-value
	Laparoscopic (n = 146) Median (min-max)	Robotic (n = 137) Median (min-max)	
Warm ischemia time	26.0 (13.0 – 55.0)	20.0 (10.0 - 41.0)	< 0.001
Suturing (min)	10.0 (4.0 – 29.0)	7.0 (2.0 – 17.0)	< 0.001
Renorrhaphy (min)	9.0 (2.0 – 21.0)	6.0 (1.0 – 16.0)	< 0.001
% Kidney preserved	85.0 (25 – 97)	79.5 (50 – 95)	< 0.001
% Kidney Preserved	85,0 (25-97)	79,5(50-95)	<0.001 ^a

Robotic Versus Laparoscopic Partial Nephrectomy: A Systematic Review and Meta-Analysis

Omar M. Aboumarzouk ^{a,b,*}, Robert J. Stein ^c, Remi Eyraud ^c, Georges-Pascal Haber ^c,
Piotr L. Chlosta ^d, Bhaskar K. Somani ^e, Jihad H. Kaouk ^c

^aWales Deanery, Urology Department, Cardiff, Wales, UK; ^bIslamic University of Gaza, College of Medicine, Gaza, Palestine; ^cCleveland Clinic, Glickman Urologic and Kidney Institute, Cleveland, OH, USA; ^dDepartment of Urology, Institute of Oncology, UJK University, Kielce, Poland and Department of Urology, the Medical Centre of Postgraduate Education, Warsaw, Poland; ^eUniversity Hospitals Southampton NHS Trust, Southampton, UK



EUROPEAN UROLOGY 62 (2012) 1023 – 1033

Abstract

Context: Centres worldwide have been performing partial nephrectomies laparoscopically for greater than a decade. With the increasing use of robotics, many centres have reported their early experiences using it for nephron-sparing surgery.

Objective: To review published literature comparing robotic partial nephrectomy (RPN) with laparoscopic partial nephrectomy (LPN).

Evidence acquisition: An online systematic review of the literature according to Cochrane guidelines was conducted from 2000 to 2012 including studies comparing RPN and LPN. All studies comparing RPN with LPN were included. The outcome measures were the patient demographics, tumour size, operating time, warm ischaemic time, blood loss, transfusion rates, length of hospital stay, conversion rates, and complications. A meta-analysis of the results was conducted. For continuous data, a Mantel-Haenszel chi-square test was used; for dichotomous data, an inverse variance was used. Each was expressed as a risk ratio with a 95% confidence interval $p < 0.05$ considered significant.

Evidence synthesis: A total of 717 patients were included, 313 patients in the robotic group and 404 patients in the laparoscopic group (seven studies). There was no significant difference between the two groups in any of the demographic parameters except for age (age: $p = 0.006$; sex: $p = 0.54$; laterality: $p = 0.05$; tumour size: $p = 0.62$, tumour location: $p = 0.57$; or confirmed malignant final pathology: $p = 0.79$). There was no difference between the two groups regarding operative times ($p = 0.58$), estimated blood loss ($p = 0.76$), or conversion rates ($p = 0.84$). The RPN group had significantly less warm ischaemic time than the LPN group ($p = 0.0008$). There was no difference regarding postoperative length of hospital stay ($p = 0.37$), complications ($p = 0.86$), or positive margins ($p = 0.93$).

Metanálise: 7 estudos (2000 a 2012) 313 robot. x 404 laparosc.

Semelhantes

- Tempo de cir $p=0,58$
- Perda sanguínea $p=0,76$
- Taxa de conversão $p= 0,84$
- Complicações $p= 0,86$
- Margem + $p=0,36$
- Tempo de internação $p=0,37$

Menor

- Tempo de isquemia c/ robô $p= 0.0008$

Tamanho/ localização tu e margem de segurança

- Tu maiores, endofílicos / centrais / hilares a margem central pode ser limitada a uma simples **enucleação**. Busca-se um **mínimo de 2 mm de margem**

Patard et al 2001-

- Avaliou 379 pts submetidos a nefre parcial e 1075 pts a nefre radical
- 544 (37,4%) apresentaram recorrência

Pts com tu > 4 cm : Sobrevida câncer específica no grupo submetido a nefre parcial ou radical foi semelhante

Becker et al 2006 – nefre parcial Tu cortical > 4 cm

- 69 pts: 80% células claras segm \bar{m} 5,8 anos
- Tamanho \bar{m} 5,3 cm (4 – 10 cm)
- **Recorrência 4 pts 5,8%**

Nefrectomia parcial em tumores ≥ 4 cm

	N pts	G Furman ≥ 3	Tamanho \bar{m}, cm	Segm m ms	Recorrência local %	DSS %
Antonelli et al 2008	52	25%	-	54	1,9%	93%
Becker et al 2006	69	7%	5,3	71	0 %	100%
Leibovich et al 2004	91	25%	4,9	106	5,5%	98,3%
Pathernik et al 2008	102	11%	5	56	1%	95,8%
Patard et al 2007	247	28%	-	36	1,3%	-
Peycelon et al 2009	61	24%	5,6	70	9,8%	81%
Joniau et al 2009	67	53%	4,5	40	4%	99%

- Nefrectomia parcial em pts selecionados com tumores ≥ 4 cm pode ter evolução semelhante aos submetidos a nefre radical
Nefre parcial procedimento mais complexo e associado a > número de complicações

Patard et al 2006

- 13% complicações 2,9% hemorragia e reoperação
10% fístula urinária - duplo J
nefrostomia

Gill et al 2007

- Nefre parcial aberta (1028 pts) X laparoscópica (771 pts)
- Tumores < 7 cm operados 1998 a 2005
- Análise multivariada > **risco complicações urológicas / Não urológicas**
hemorragia pós op
necessidade de tto adicional

Terapia preservadora de néfrons sempre que possível

Mesmo tu maiores e mais complexos. Evolução oncológica frequentemente não é determinada pelo controle local, mas sim de metástases a distância não diagnosticadas.



Nefrectomia radical

- Qdo a cirurgia preservadora de néfrons não é exequível ou devido a intercorrência intra operatória
- Linfadenectomia hilar
- Não é necessária adrenalectomia exceto qdo há suspeita de invasão
- Preferencialmente acesso laparoscópico

Frente ao impacto da nefrectomia radical, a cirurgia parcial se justifica, quando tecnicamente factível, sendo do ponto de vista oncológico segura, mesmo em tumores maiores. (↑risco IRC eventos cardiológicos / mortalidade)

Objetivo maior : **cirurgia poupadora de nefrons**



Cirurgia aberta
Acesso laparoscópico
Auxilio do robô



Acesso a tecnologia
Curva de aprendizado
Possibilidade de universalização
Custos (limitante)

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717 pts : 313 pts cir Robótica x 404 Laparosc

- Ausência de diferença
 - Tempo de cirurgia ($p = 0,58$)
 - Estimativa de perda sanguínea ($p = 0,76$)
 - Taxa de conversão ($p = 0,84$)
- **Cir Robótica:** tempo de isquemia $<$ Laparosc ($p = 0,0008$)
 - Laparoscopistas c/ experiência prévia acumulada maior