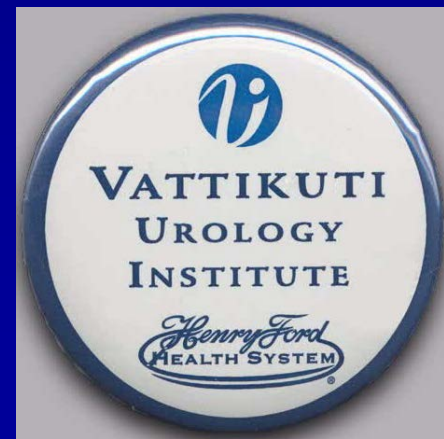


Milestones in Robotic Kidney Surgery at Henry Ford Hospital

Craig Rogers MD, FACS

Director of Renal Surgery
Director of Urologic Oncology
Fellowship Director
Vattikuti Urology Institute,
Detroit, Michigan USA



My Road to HFH

Senior Staff: 2007



Fellowship: Urologic Oncology



Residency



M.D.



Building on a Successful Robotic Prostatectomy Program

- 1st Robotic Prostatectomy program and largest experience (>6000 cases)
- Techniques developed:
 - Vattikuti Institute Prostatectomy (VIP)-2000
 - “Veil” nerve sparing-2003
 - Urethral catheter-free technique
 - Randomized Controlled Trial for double layer anastomosis

Building a Legacy in Robotic Kidney Surgery

- Among world's largest experience
- Firsts at HFH:
 - First live webcast of Robotic Partial Nephrectomy (RPN) via OR Live, 2007
 - Barbed suture reconstruction of kidney during RPN
 - Developed Robotic bulldog clamps and robotic ultrasound probe
 - First live telecast of RPN at AUA meeting from HFH, 2008-9
 - First “twittered” RPN (featured CNN and NPR) 2009
 - First RPN with cooling and early tumor evaluation 2012.
Developed “cooling syringe”
 - Hosted first AUA Hands-on course for small renal mass, 2014
 - First endovascular removal of IVC tumor thrombus to facilitate robotic cytoreductive nephrectomy, 2014

Developing a World-class Robotic Kidney Surgery Program

- Kuala Lumpur, “Mission Malaysia” 2005, 2007 (40 robotic cases in 7 days)
- “Renal Week” Sunnyvale, CA 2007
 - Developed model to create pseudotumors in pig and cadaver kidneys (Eun et al, J Urol 2008)
 - Performed robotic partial nephrectomy in pigs and cadavers



Robotic Surgery in Urology: Expanding Beyond the Prostate

Radical prostatectomy (>6000)

Simple prostatectomy

Retroperitoneal lymph node dissection

Radical cystectomy

Partial cystectomy

Anterior pelvic exenteration

Bladder diverticulum

Vesicovaginal Fistula

Sacrocolpopexy

Nephrectomy

Partial Nephrectomy

Nephroureterectomy

Adrenalectomy

Partial Adrenalectomy

Pyeloplasty

Pyelolithotomy

Ureterolithotomy

Ureteral Reimplant

Ureterectomy

Ureteroureterostomy

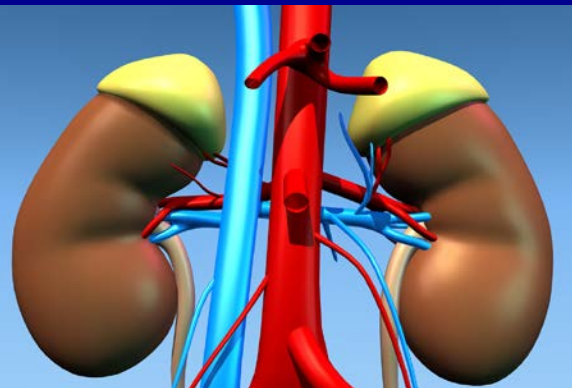
Ureterolysis

Donor nephrectomy

Renal Transplant

Kidney Cancer Facts

- Over 200,000 people alive with kidney cancer in the U.S.
- Over 55,000 new cases diagnosed annually in U.S.
- Most lethal urologic malignancy (35% 5 year mortality)
- Rising incidence 2-3% per year (>50% incidental diagnosis)



The Case for Kidney Preservation

- Association of radical nephrectomy with chronic renal insufficiency and worse survival compared to partial nephrectomy
- Decreasing GFR an independent predictor of cardiovascular events, hospitalization, and death
- Although most patients with kidney tumors would be eligible for partial nephrectomy, majority of patients still get total nephrectomy

Advantage of partial nephrectomy in preserving renal function and possibly survival



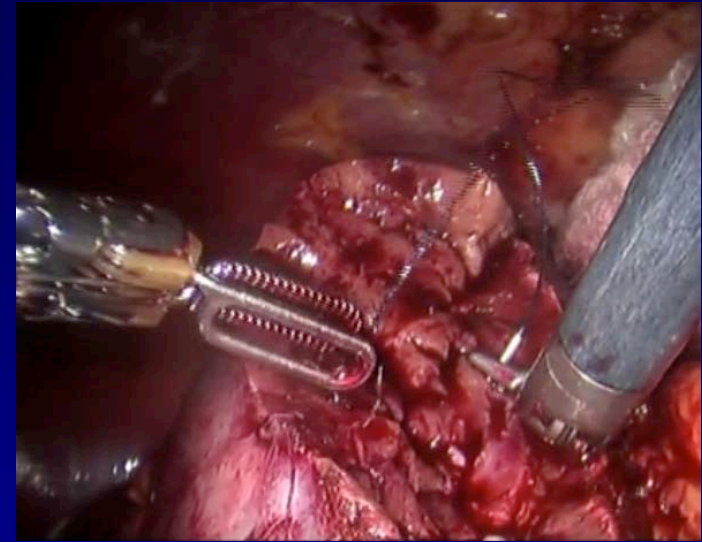
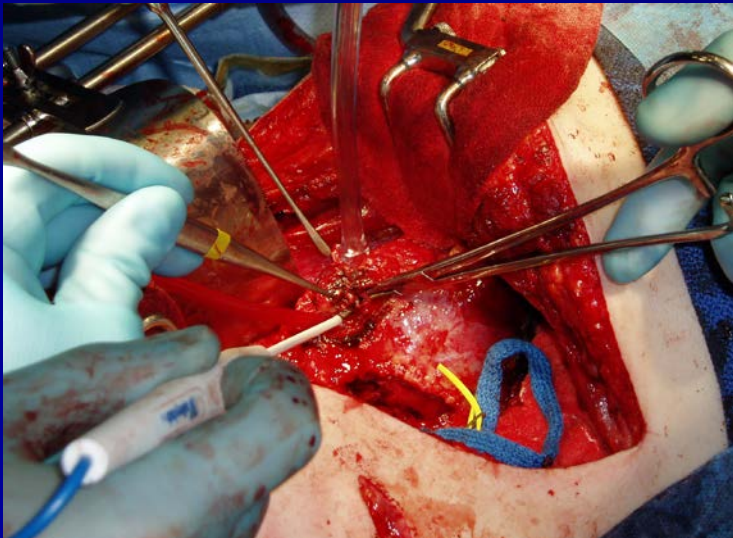
Go et al, NEJM, 2004

Thompson et al, J Urol, 2008

Miller et al, Cancer, 2008

Partial Nephrectomy

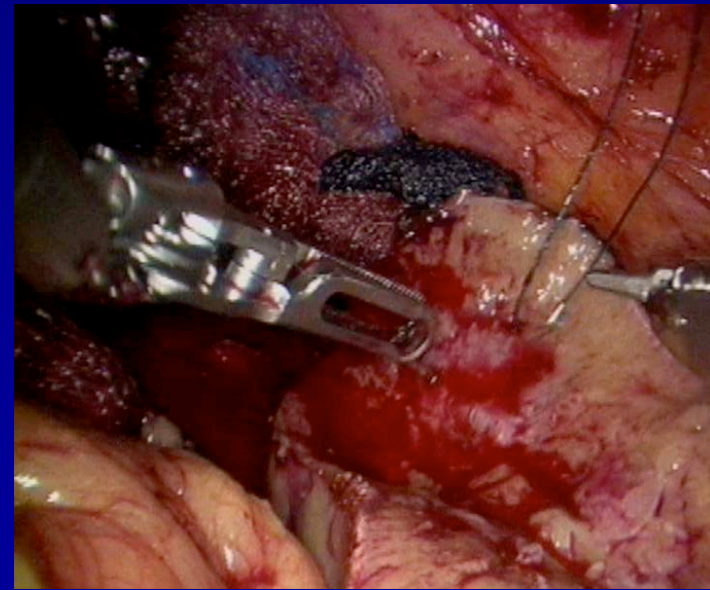
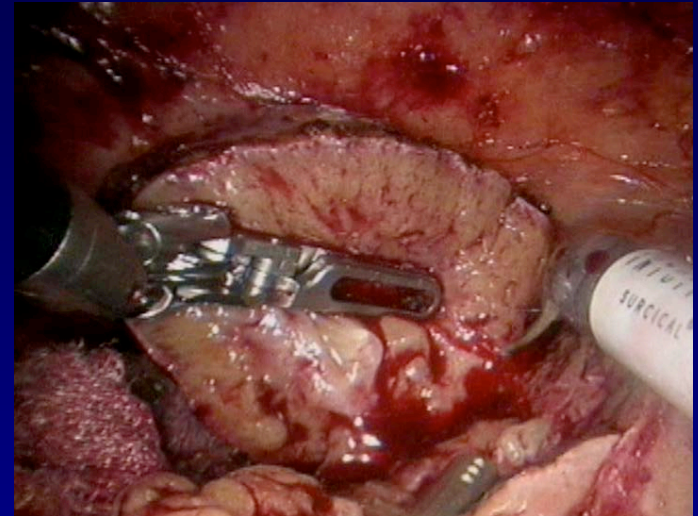
- Standard of care for early stage (T1 tumors)
- Laparoscopy: improved convalescence but challenging-limits utilization
- Robotics can bridge the gap to minimally invasive PN



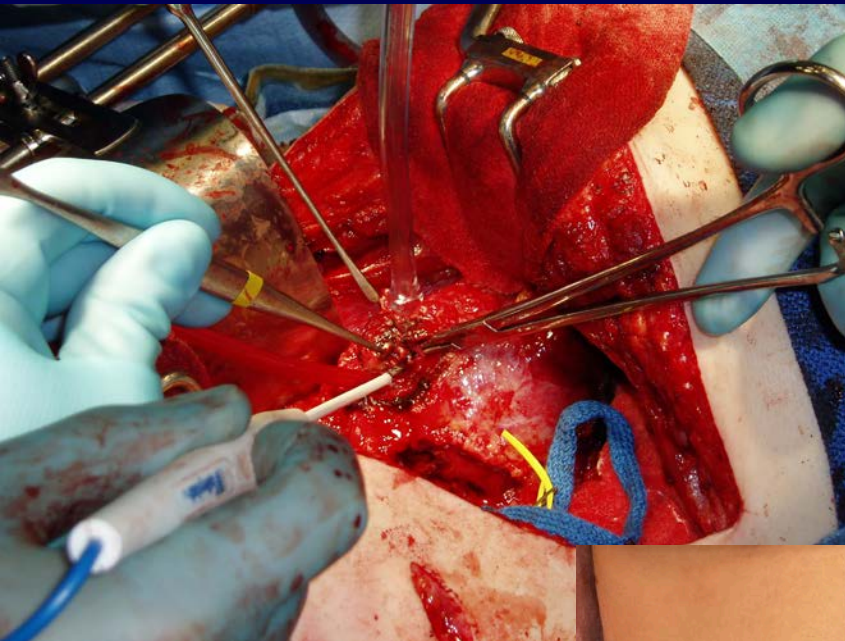
AUA and EAU Guidelines

Robotic Partial Nephrectomy: Why I do it

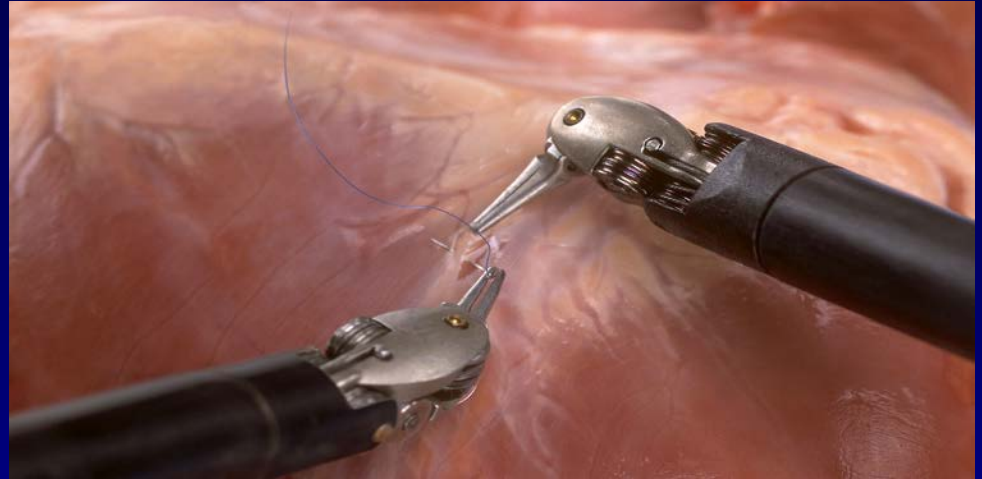
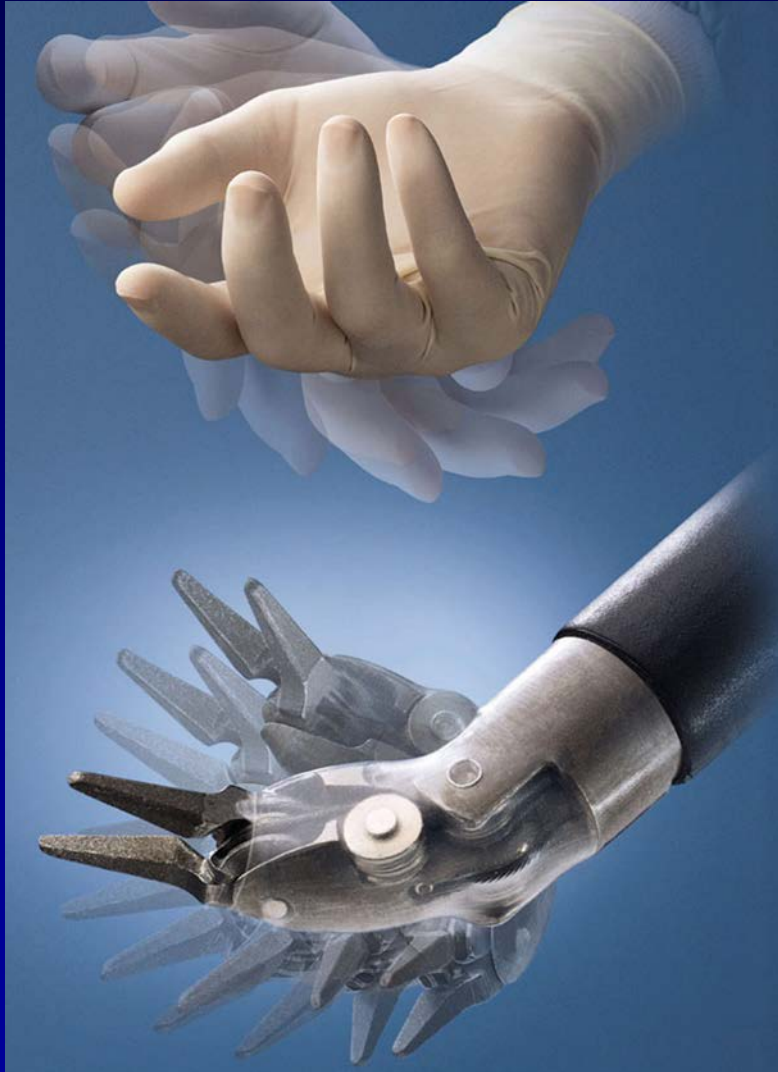
- ENABLER of minimally invasive partial nephrectomy:
 - Precise tumor excision
 - Easier, faster suturing
- Improved outcomes (ischemia time, EBL, hospital stay)
Benway et al. J Urol, 2009
- Facilitates progression to more challenging cases



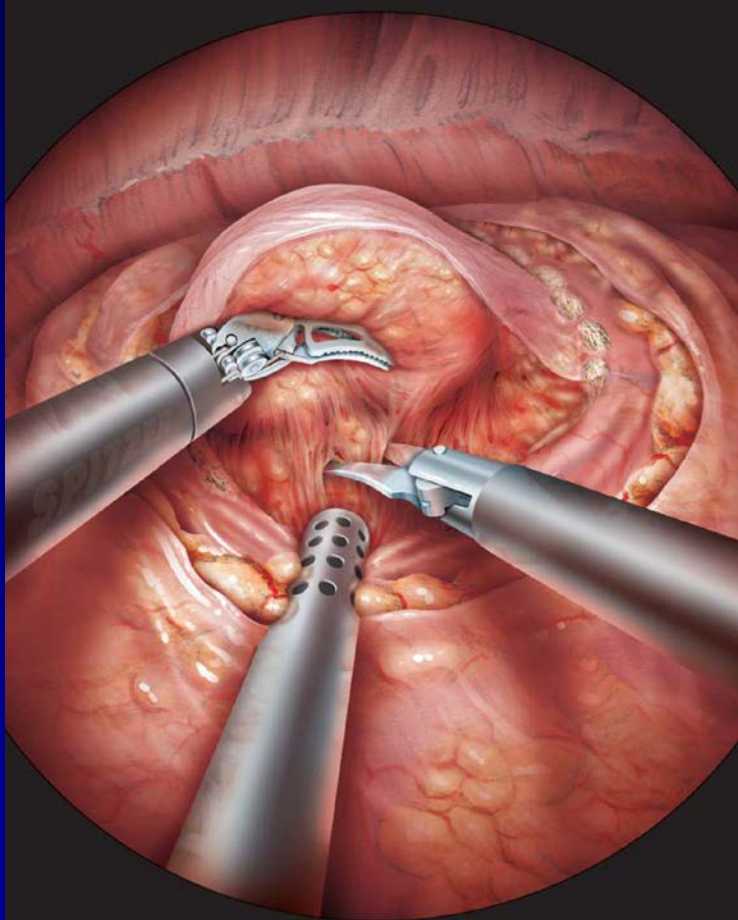
Open vs. Minimally Invasive Approach



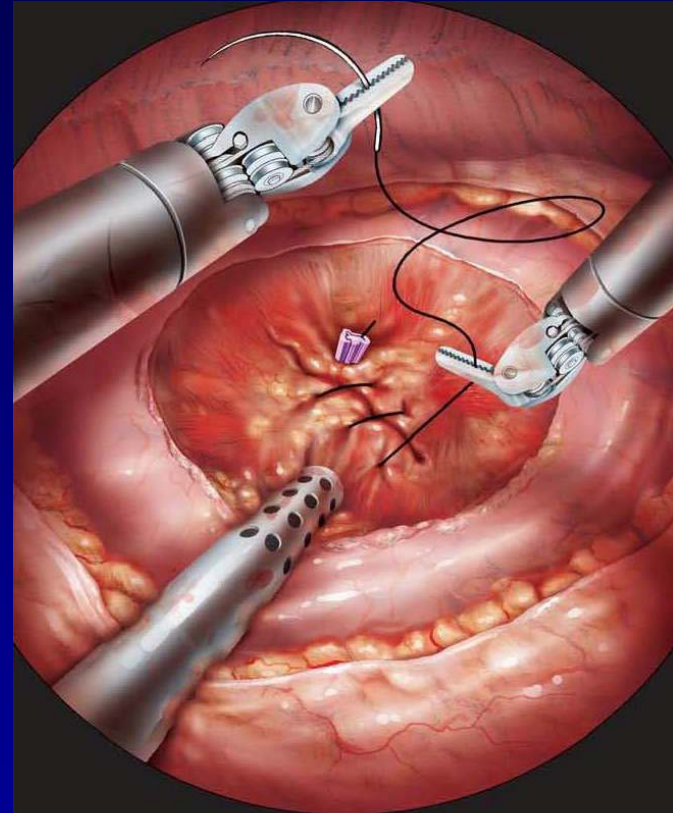
Robotic Kidney Surgery: Improved Precision and 3D Vision



Tumor Excision and Reconstruction

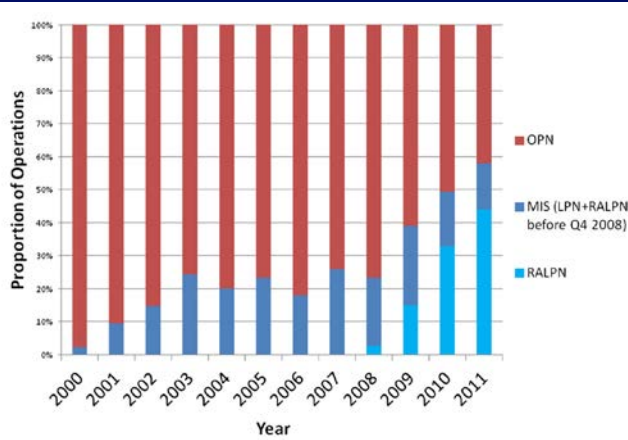
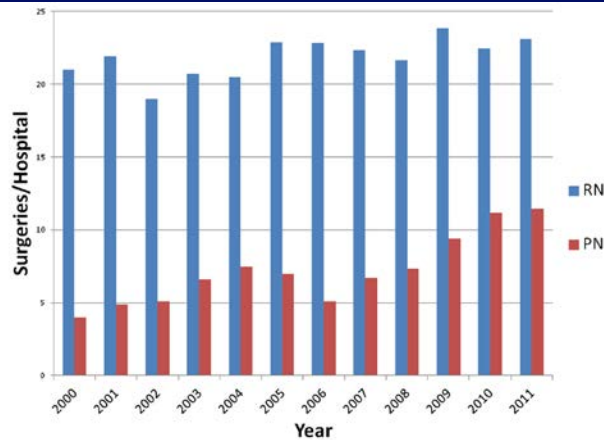


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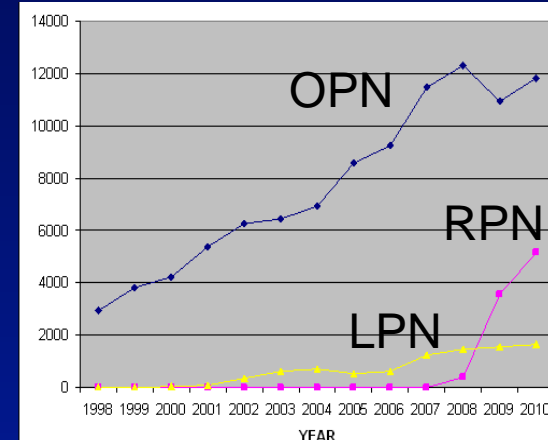


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Trends in Kidney Surgery



*From Maryland HSCRC Database
(Patel et al, J Urol, 2013)*



*From Nationwide
Inpatient Sample
(Ghani et al. J Urol, 20
14)*

- Increase in PN (relative to RN)
- Rapid adoption of robotic PN
- Robotic surgery (not University hospital) main predictor of PN
- RPN perioperative outcomes superior to OPN

Robotic Renal Consortium

- High Volume Centers
 - **Henry Ford Hospital**
 - Johns Hopkins Medical Center
 - Washington University
 - Cleveland Clinic
 - NYU Medical Center
- Data Collection
 - Prospectively collected, q6 month updates
 - IRB approved, Sharing agreements
 - Third party data base manager
 - >2500 patients
- Impact
 - >24 peer reviewed publications (J Urol, Urol, Eur Urol, BJU int)
 - 30 abstracts presented (4 at AUA, 2015)
 - 23 CME courses with > 1000 surgeons

Expanding RPN Indications to Complex Cases

Multi-Institutional Analysis of Robotic Partial Nephrectomy for Hilar Versus Nonhilar Lesions in 446 Consecutive Cases

European Urology 59: 2011

Lori M. Dulabon^a, Jihad H. Kaouk^b, Georges-Pascal Haber^b, Douglas S. Berkman^a,
Craig G. Rogers^c, Firas Petros^c, Sam B. Bhayani^d, Michael D. Stifelman^{a,*}

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

EAU
European Association of Urology



Surgery in Motion

Robotic Partial Nephrectomy for Complex Renal Tumors: Surgical Technique

Craig G. Rogers^{**}, Amar Singh, Adam M. Blatt, W. Marston Linehan, Peter A. Pinto^{*}

Urologic Oncology Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

EUROPEAN UROLOGY 57 (2010) 310–316

[europeanurology.com](http://www.europeanurology.com)



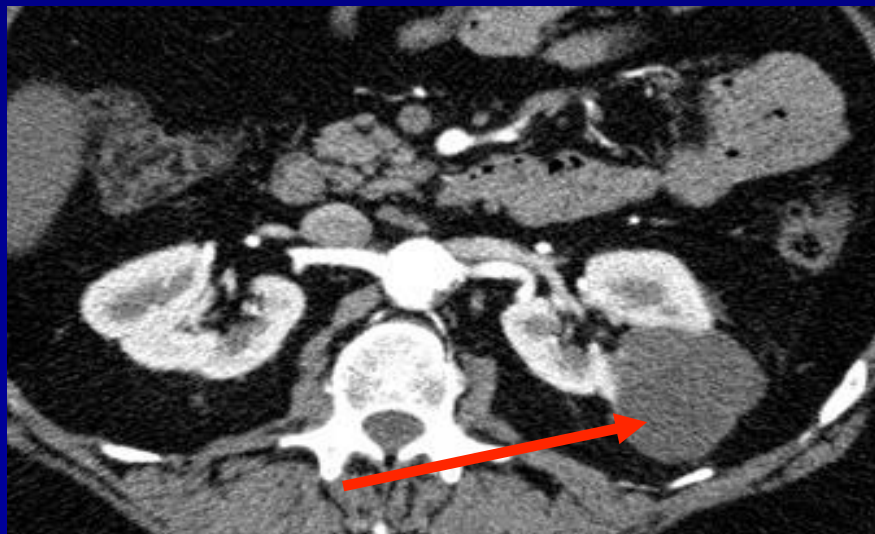
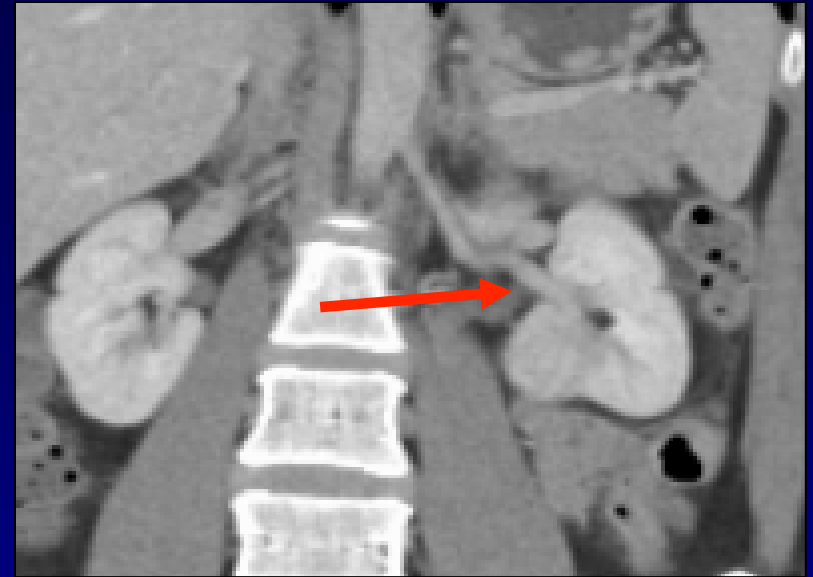
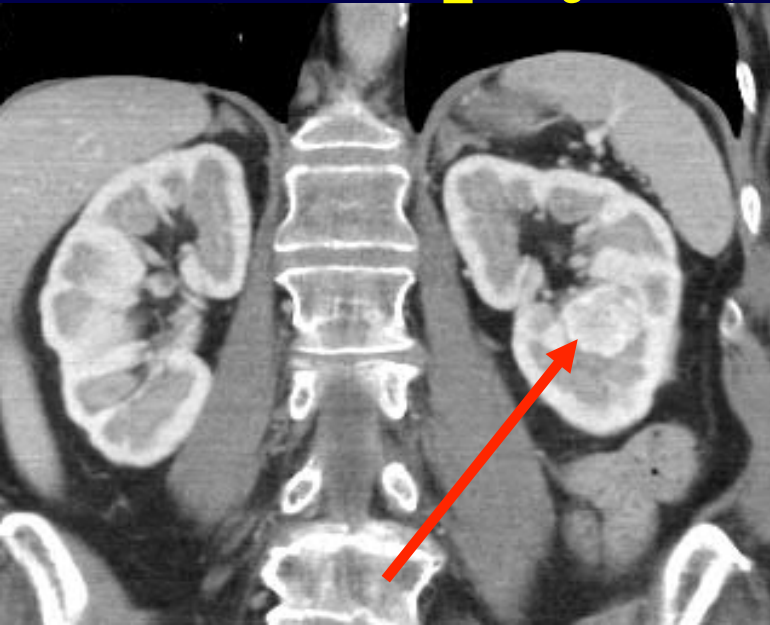
Kidney Cancer

Robotic Partial Nephrectomy for Renal Tumors Larger Than 4 cm

Manish N. Patel, L. Spencer Krane, Akshay Bhandari, Rajesh G. Laungani, Alok Shrivastava,
Sameer A. Siddiqui, Mani Menon, Craig G. Rogers^{*}

Henry Ford Hospital, Vattikuti Urology Institute, Detroit, Michigan, USA

Endophytic, Central, T1b, Hilar



Cooling the Kidney for Robotic Partial Nephrectomy

Case Series of the Month

Robotic Partial Nephrectomy with Cold Ischemia and On-clamp Tumor Extraction: Recapitulating the Open Approach

*Craig G. Rogers**, *Khurshid R. Ghani*, *Ramesh K. Kumar*, *Wooju Jeong*, *Mani Menon*

Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI, USA

European Urology 63(3): 2013

RPN achieved traditional “advantages” of open PN with renal hypothermia to help extend ischemic window



Cooling Syringe for Robotic Partial Nephrectomy



Vattikuti Urology Institute
Henry Ford Health System
Detroit, MI, USA



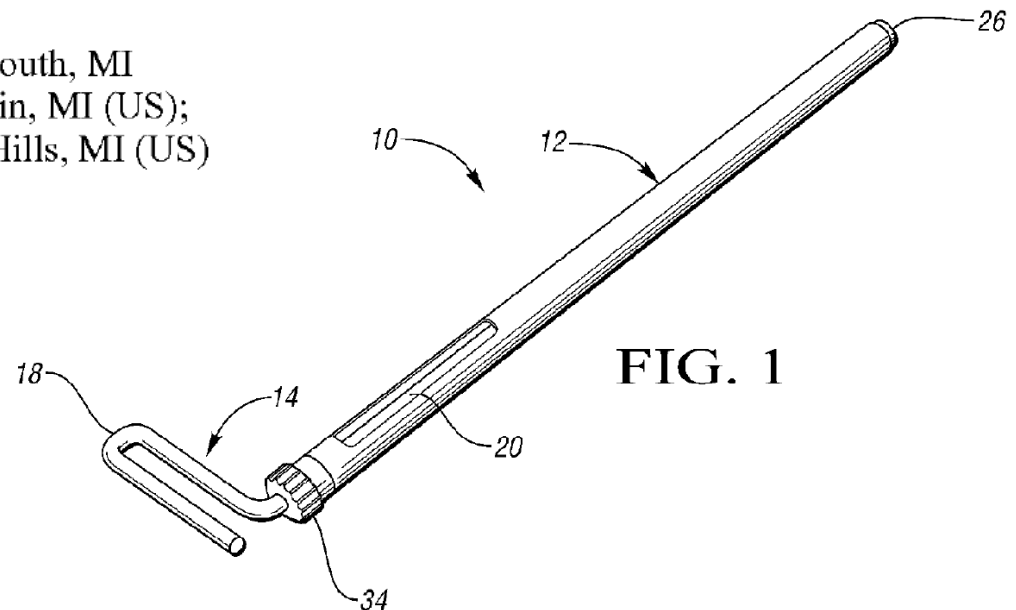
VATTIKUTI
UROLOGY INSTITUTE

Cooling Syringe Patent

COOLING SYRINGE AND METHOD FOR INDUCING SELECTIVE HYPOTHERMIA OF A BODY TISSUE DURING MINIMALLY INVASIVE SURGERY

Applicant: **HENRY FORD HEALTH SYSTEM**,
Detroit,, MI (US)

Inventors: **Craig Glenn Rogers**, Plymouth, MI
(US); **Wooju Jeong**, Franklin, MI (US);
Mani Menon, Bloomfield Hills, MI (US)



Robotic Approach for IVC Thrombus??

EUROPEAN UROLOGY 59 (2011) 652–656

available at www.sciencedirect.com
journal homepage: www.europeanurology.com



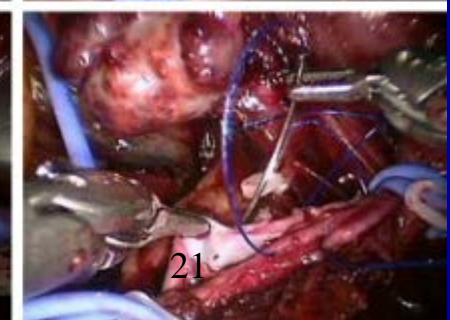
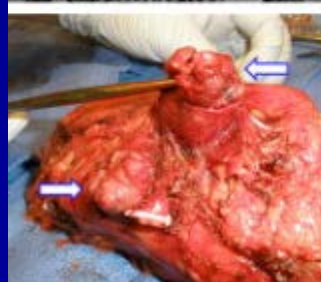
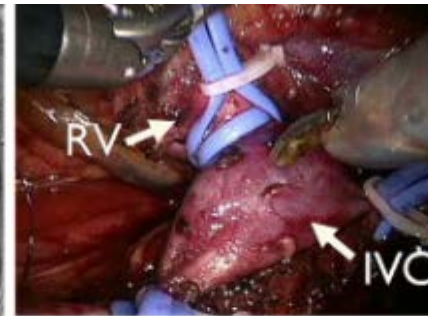
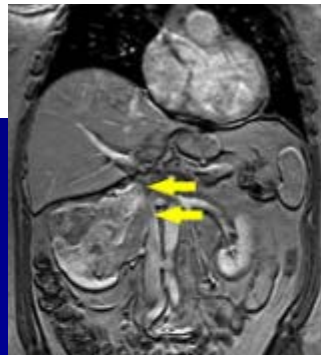
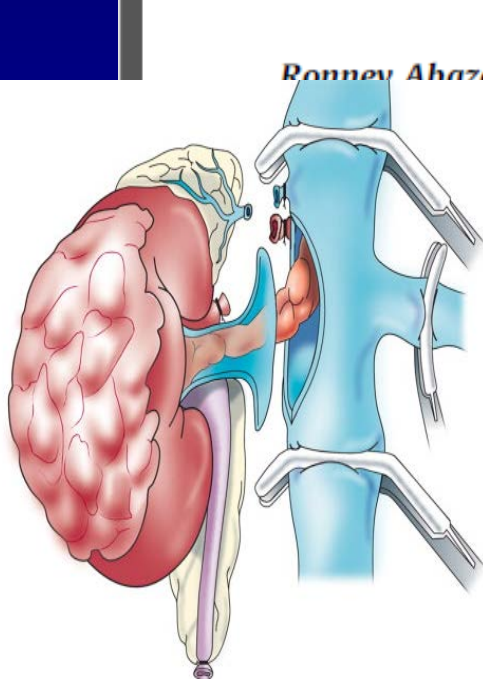
European Association of Urology



Case Series of the Month

Initial Series of Robotic Radical Nephrectomy with Vena Caval Tumor Thrombectomy

Ronney Abazq*



Endovascular Extraction of Caval Tumor Thrombus to Facilitate Minimally Invasive Cytoreductive Nephrectomy for Metastatic Kidney Cancer

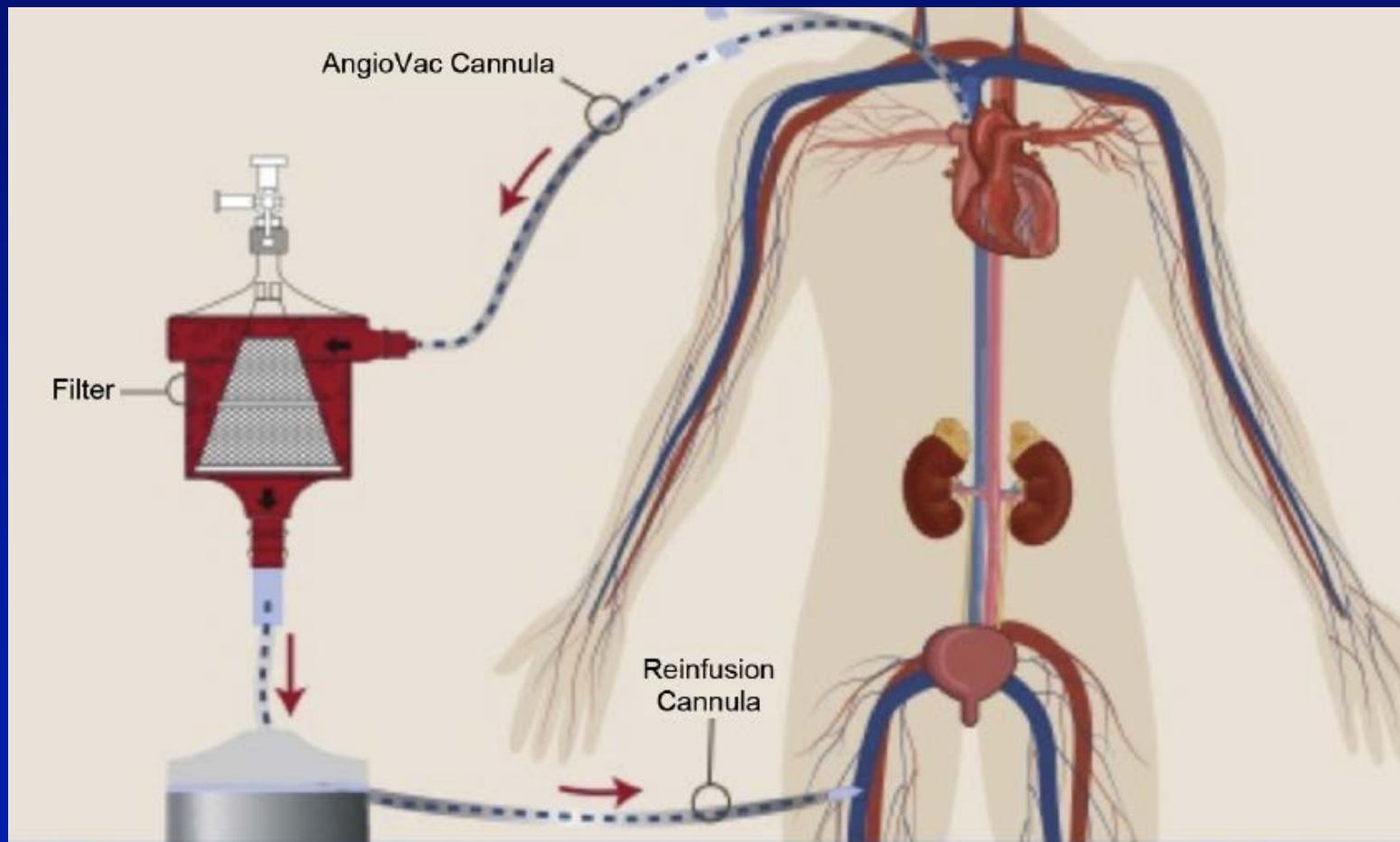


Article in Press: Corrected Proof

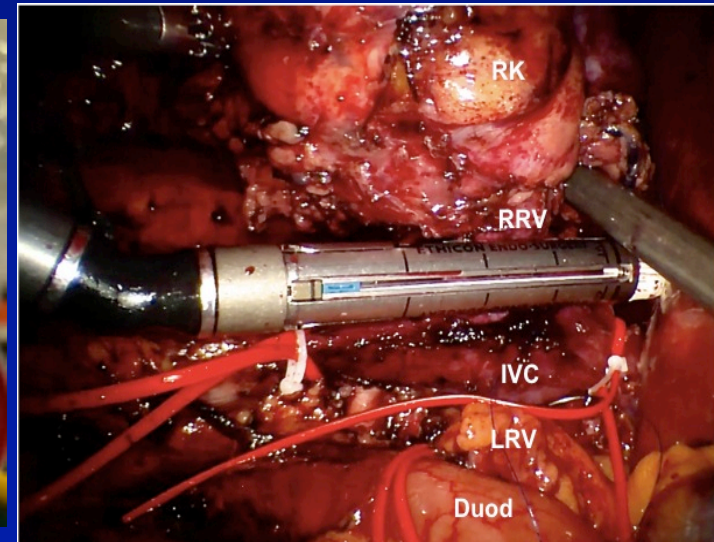
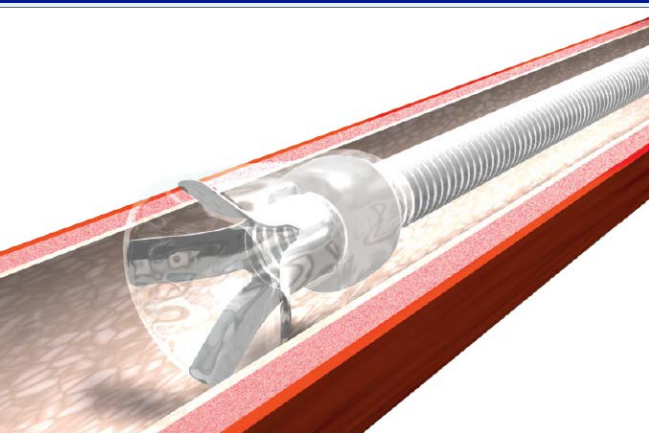
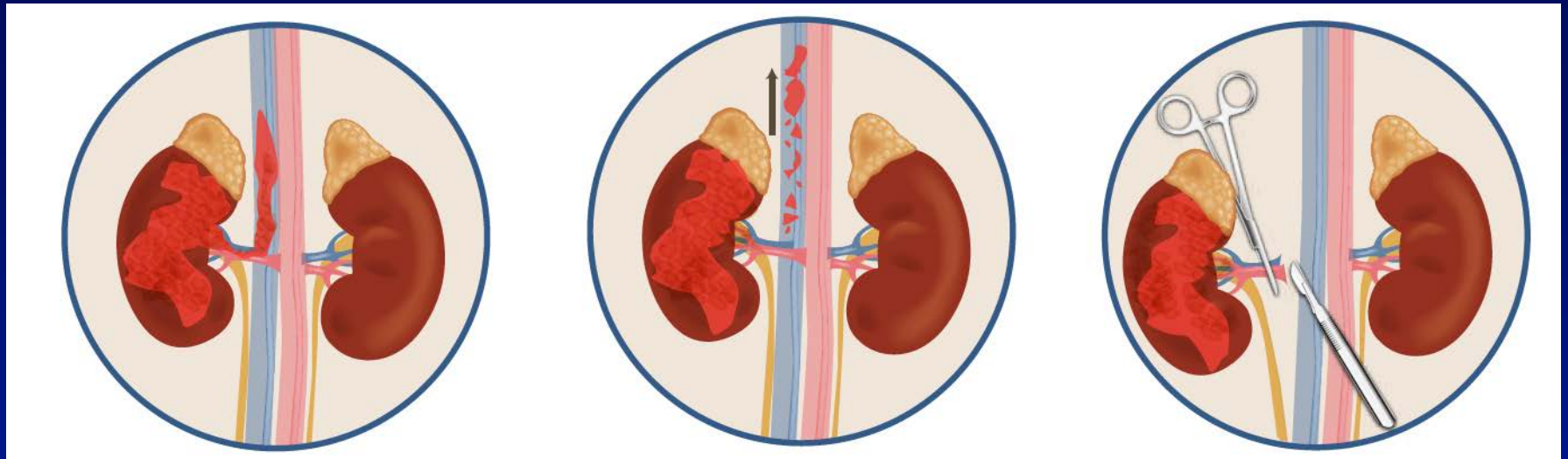
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Craig Rogers, Ravi Barod, Scott Schwartz and Mani Menon

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Endovascular Extraction of IVC Thrombus



Endovascular Extraction of IVC Thrombus

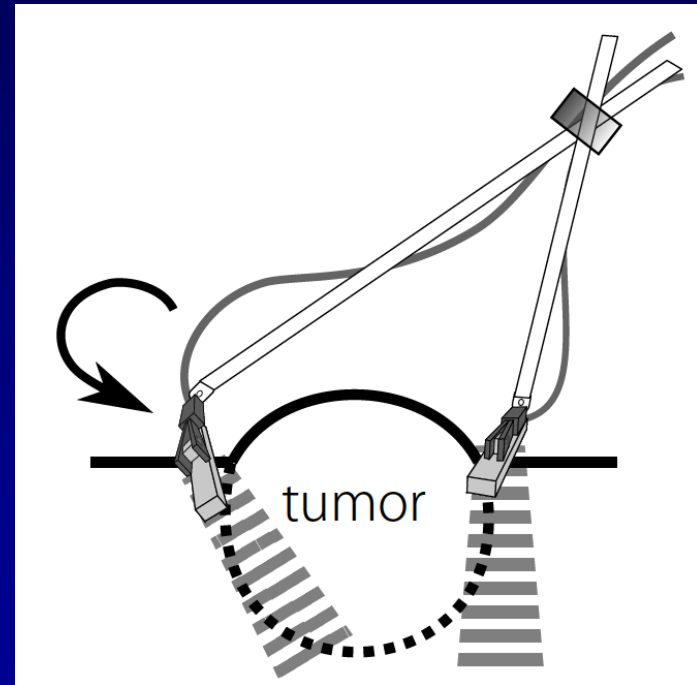


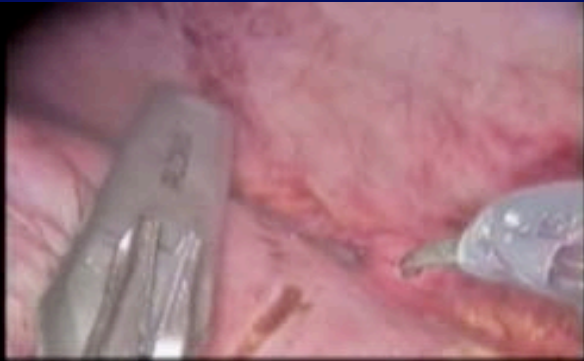
New Technologies for RPN Developed at HFH

- Robotic Doppler Probe
- Robotic Bulldog Clamps



Robotic Ultrasound Probe





ALDRICH Henry Ford Hospital No ID

04.20.11
11:22:00

M1 = 0.45 TIS = 0.4 80%

55Hz



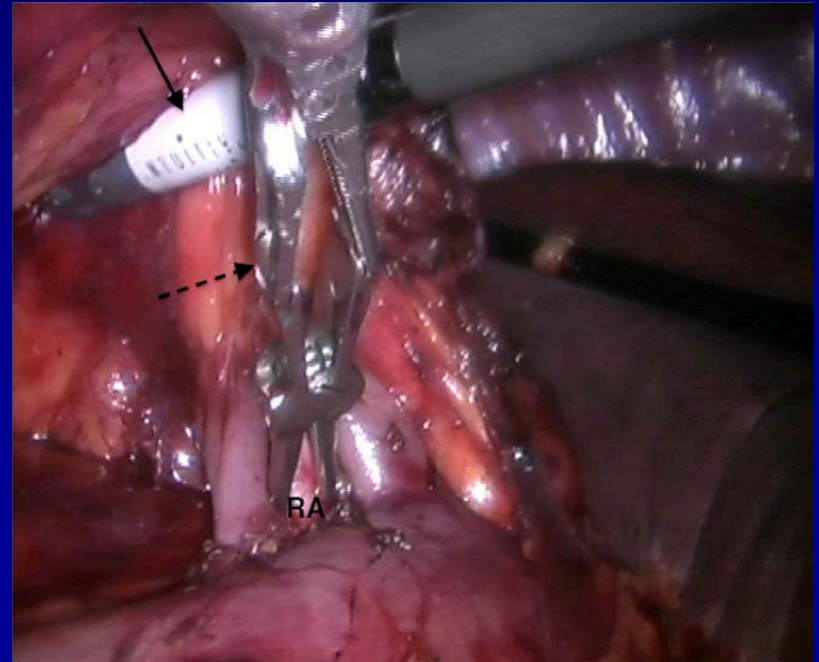
RS 0 000 C14 A3

Probe: 5550 AP



Robotic Bulldog Clamps

- Robotic Prograsp grasps notch on clamp for full articulation
- Adequate ischemia for large, endophytic, or multiple tumors and multiple renal arteries but with surgeon control of clamping



Sukumar et al, JSLS, 2012

HFH Leading the Way

1. Surgeons attend case observations with experienced surgeon at HFH on dual-console with Fluorescence-imaging
2. Annual Robotic Prostate and Kidney Surgery Course (Saturday December 5, 2015)



Henry Ford
HEALTH SYSTEM

VATTIKUTI UROLOGY INSTITUTE

ROBOTIC PROSTATE
AND KIDNEY
SURGERY COURSE

SATURDAY, OCTOBER 20, 2012
THE WESTIN DETROIT
METROPOLITAN AIRPORT

To register or for more information,
visit www.henryford.com/ARROW2012

29

Better Outcomes with Robotics

BJU Int 2014 Sept 15 [epub ahead of print]

BJUI
BJU International

Trifecta and optimal perioperative outcomes of robotic and laparoscopic partial nephrectomy in surgical treatment of small renal masses: a multi-institutional study

Homayoun Zargar*, Mohamad E. Allaf†, Sam Bhayani‡, Michael Stifelman§, Craig Rogers¶, Mark W. Ball†, Jeffrey Larson‡, Susan Marshall§, Ramesh Kumar¶ and Jihad H. Kaouk*

- 1185 Robotic PN and 646 Laparoscopic PN cases (2004-2013)
- Trifecta defined as:
 - negative surgical margin
 - No complications
 - warm ischemia time ≤ 25 min
- RPN group had higher age, comorbidities, and tumor complexity. Yet still had lower WIT (18 vs 26 min), complications (16% vs 26%), and positive margins (3.2% vs 9.7%).
- Likelihood of achieving Trifecta 6-fold greater with Robotic PN

Multiple Tumors, Multiple Vessels, Solitary Kidney

“Push the Limit”

Robotic Partial Nephrectomy:
Solitary Kidney Multiple Masses



*Jay K. Jhaveri, Ramesh Kumar &
Craig G. Rogers*

Real Patient Testimonials

Conclusions: Expanding Indications for Robotic Kidney Surgery

- Robotics an “Enabler” of minimally-invasive kidney surgery. Facilitates progression to challenging cases
- Robotics facilitates technical challenges of minimally-invasive partial nephrectomy, helping patients avoid open surgery or total nephrectomy
- RPN can expand utilization of partial nephrectomy and improve outcomes
- New robotic tools give surgeon more autonomy

Thank You!



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