PMCC Dialogue 2019

Role of Transplant Surgeon in Renal Malignancy Care – Nephron-sparing Options

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Conflicts of Interest

• NO relevant disclosures
Learning Objectives

• disadvantages & advantages of ex-vivo NSS with renal auto-transplantation

• indications/contraindications to ex-vivo NSS with renal auto-transplantation
Case #1

- 57yo male with incidental left RCC
  - 4.2cm endophytic, no mets

- PMHx
  - right Nx as teen for MVA trauma
  - DM, HTN, GERD, psoriasis

- Labs
  - creat 126, stable for past few years
  - u/a demonstrates trace RBC, protein
  - Bx shows ccRCC F2
Case #1

- Radical Nx + HD
- PNx +/- HD
- Thermal-ablation
- other
Renal Cell Carcinoma

• Indications for NSS for RCC
  - solitary kidney
  - RCC in CKD pt
  - bilateral RCC
  - RCC in genetic syndrome pt (e.g., VHL, etc)
  - RCC with renal risk factors (e.g., DM, HTN, RAS, etc)
  - elective NSS (e.g., cT1a)
Renal Cell Carcinoma

• Indications for NSS for RCC
  - solitary kidney*
  - RCC in CKD pt*
  - bilateral RCC
  - RCC in genetic syndrome pt (eg VHL, etc)
  - RCC with renal risk factors (eg DM, HTN, RAS, etc)
  - elective NSS (eg cT1a)
ex-vivo NSS + Auto-Tx for RCC

• advantages
  - extirpation in bloodless field
  - reduced parenchymal resection
  - lower EBL, ability to “test” renorrhaphy
  - shorter WIT
  - avoid ESRD
  - oncologically comparable to RN, superior to thermal-ablation

• disadvantages
  - longer OR time
  - longer overall ischemia (CIT+WIT)
  - increased morbidity
  - potential vascular complications
• 400 patients with RCC in solitary kidney
• 5yr CSS 89% (incl 38% ≥T2)
• 2 patients (0.5%) required immediate HD
  → mean pre-op creat 1.4 mg/dL
• 18 pts (4.5%) progressed to HD
  → mean 3.6yrs after OR
63 patients  }  90% prior RNx, 10% congenital
55 PNx, 8 ex-vivo PNx + KAT
5yr CSS 80.7% (incl 11% ≥T2)
temporary HD in only 1 pt
ex-vivo NSS + Auto-Tx for RCC

• Indications
  - solitary kidney or advanced CKD pt
  - thermal-ablation not recommended/not technically feasible
  
  AND

  - higher stage, RENAL nephrometry/PADUA score
  - complex renal anatomy (eg pelvic kidney, prior renal surgery, etc)
  - multifocal RCC

  *** significant EBL and prolonged WIT expected ***
ex-vivo NSS + Auto-Tx for RCC

• Contraindications

- high grade, aggressive variants
- expected residual renal mass <33%
- eGFR <30mL/min (ie ≥ stage 4 CKD)
- progressively declining renal function with ++ renal risk factors (m-CKD)
- anatomic considerations (eg R kidney with short RV, ≥3 arteries, calcified pelvic vessels, etc)
108 pts } 14 patients w/ RCC
→ solitary kidney or B/L RCC

4 of 14 developed recurrence/mets (29%)
→ 3 (21%) had concurrent mets, 8 (57%) with T1 RCC

2 of 14 required RRT (14%)
→ >2/3 of kidney removed in both cases
Kidney autotransplantation after nephrectomy and work bench surgery as an ultimate approach to nephron-sparing surgery

Martin W. W. Janssen1*, Johannes Linxweiler1, Ines Philipps1, Zentia Bütow1,2, Stefan Siemer1, Michael Stöckle1 and Carsten-Henning Ohlmann1

- 12 patients with solitary kidney
- **5 RCC, 5 UTUC, 1 nephroblastoma, 1 met**
- 3 required HD (25%)
  - 2 temp
  - 1 permanent (8%)
ex-vivo NSS + Auto-Tx for RCC

• comparable oncologic outcomes
• improved ability to prevent need for RRT
• increased morbidity cf other NSS options
Case #2

• 63yo male with Lynch syndrome
  - presented with AKI (creat 300s) requiring urgent stent

• PMHx
  - R hemicolecction 10yrs ago for ColonCa
  - left NephroU 8yrs ago for T1HG
    → few TaLG bladder recurrences since
  - HTN, GERD, CAD, remote appy, diverticulosis

• Labs
  - creat 105, stable
  - u/a demonstrates large RBCs
  - cytology -ve
Case #2

• URS Bx – LG UTUC
Case #2

- NephroU + HD +/- systemic Rx
- Segmental resection + reconstruction
- Endoscopic management
- NAC + restage
- other
### TABLE 58-3  Literature Review of Overall Survival of Patients with Upper Tract Urothelial Tumors (Renal Pelvis or Ureter) by Stage and Grade

<table>
<thead>
<tr>
<th>TUMOR GRADE</th>
<th>5-YEAR SURVIVAL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>40-87</td>
</tr>
<tr>
<td>3-4</td>
<td>0-33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TNM STAGE</th>
<th>5-YEAR SURVIVAL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ta, T1, Tcis</td>
<td>60-90</td>
</tr>
<tr>
<td>T2</td>
<td>43-75</td>
</tr>
<tr>
<td>T3</td>
<td>16-33</td>
</tr>
<tr>
<td>T4</td>
<td>0-5</td>
</tr>
<tr>
<td>N+</td>
<td>0-4</td>
</tr>
<tr>
<td>M+</td>
<td>0</td>
</tr>
</tbody>
</table>
 NSS for UTUC

Review – Urothelial Cancer

Oncologic Outcomes of Kidney-sparing Surgery Versus Radical Nephroureterectomy for Upper Tract Urothelial Carcinoma: A Systematic Review by the EAU Non-muscle Invasive Bladder Cancer Guidelines Panel


- similar CSS between SU and RNU
- similar CSS between endoscopic Rx and RNU, for LG, non-invasive UTUC
NSS for UTUC

Chronic Kidney Disease and the Risks of Death, Cardiovascular Events, and Hospitalization

Alan S. Go, M.D., Glenn M. Chertow, M.D., M.P.H., Dongjie Fan, M.S.P.H., Charles E. McCulloch, Ph.D., and Chi-yuan Hsu, M.D.

Table 2. Adjusted Hazard Ratio for Death from Any Cause, Cardiovascular Events, and Hospitalization among 1,120,295 Ambulatory Adults, According to the Estimated GFR. *

<table>
<thead>
<tr>
<th>Estimated GFR</th>
<th>Death from Any Cause</th>
<th>Any Cardiovascular Event</th>
<th>Any Hospitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥60 ml/min/1.73 m²</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>45–59 ml/min/1.73 m²</td>
<td>1.2 (1.1–1.2)</td>
<td>1.4 (1.4–1.5)</td>
<td>1.1 (1.1–1.1)</td>
</tr>
<tr>
<td>30–44 ml/min/1.73 m²</td>
<td>1.8 (1.7–1.9)</td>
<td>2.0 (1.9–2.1)</td>
<td>1.5 (1.5–1.5)</td>
</tr>
<tr>
<td>15–29 ml/min/1.73 m²</td>
<td>3.2 (3.1–3.4)</td>
<td>2.8 (2.6–2.9)</td>
<td>2.1 (2.0–2.2)</td>
</tr>
<tr>
<td>&lt;15 ml/min/1.73 m²</td>
<td>5.9 (5.4–6.5)</td>
<td>3.4 (3.1–3.8)</td>
<td>3.1 (3.0–3.3)</td>
</tr>
</tbody>
</table>

What Is the Cost of Maintaining a Kidney in Upper-Tract Transitional-Cell Carcinoma? An Objective Analysis of Cost and Survival

Raymond W. Pak, M.D., Eric J. Moskowitz, and Demetrios H. Bagley, M.D.

FIG. 2. Projected cost over 5 years.
Upper Tract Urothelial Ca

• Indications for NSS for UTUC
  - solitary kidney
  - UTUC in CKD pt
  - bilateral UTUC
  - UTUC in genetic syndrome pt (eg HNPCC)
  - UTUC with renal risk factors (eg DM, HTN, RAS, etc)
  - elective NSS (low-grade, low-stage disease)
ex-vivo NSS + Auto-Tx for UTUC

• advantages
  - extirpation in bloodless field
  - reduced risk of tumour spillage
  - better oncologic outcomes cf endoscopic options
  - avoid ESRD
  - ability to administer adjuvant nephrotoxic meds
  - can easily survey upper tract
  - more effective delivery of topical adjuvants
ex-vivo NSS + Auto-Tx for UTUC

• disadvantages

- worse oncologic outcomes cf nephroU*

- margin status issues

- increased morbidity

- potential vascular complications
# PARTIAL NEPHRECTOMY FOR RENAL UROTHELIAL TUMORS: CLINICAL UPDATE

MAHESH C. GOEL, SURENA F. MATIN, ITHAAR DERWEESH, HOWARD LEVIN, STEVAN STREEM, AND ANDREW C. NOVICK

<table>
<thead>
<tr>
<th>TABLE I. Demographics and overview of results</th>
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<tbody>
<tr>
<td>Patients (n)</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
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<tr>
<td>Mean age (yr)</td>
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<tr>
<td>Mean follow-up (mo)</td>
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<tr>
<td>Site (n)</td>
</tr>
<tr>
<td>Upper pole</td>
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<tr>
<td>Inter-pole</td>
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<tr>
<td>Lower pole</td>
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<td>T stage</td>
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<td>Tis</td>
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<td>T1</td>
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<td>T2</td>
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<tr>
<td>T3</td>
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<tr>
<td>Pathologic grade</td>
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<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Negative surgical margins (n)</td>
</tr>
<tr>
<td>Tumor free (n)</td>
</tr>
<tr>
<td>Recurrence (n)</td>
</tr>
<tr>
<td>Progression (n)</td>
</tr>
<tr>
<td>Dialysis (n)</td>
</tr>
<tr>
<td>Death (n)</td>
</tr>
<tr>
<td>Urothelial cancer related</td>
</tr>
<tr>
<td>Patients with NED (n)</td>
</tr>
<tr>
<td>Alive (n)</td>
</tr>
</tbody>
</table>

Key: NED = no evidence of disease.
12 patients with solitary kidney
5 RCC, 5 UTUC, 1 nephroblastoma, 1 met
3 required HD (25%)
  2 temp
  1 permanent
NO UTUC recurrence
Laparoscopic Nephrectomy with Autotransplantation: Safety, Efficacy and Long-Term Durability

Geraldine Tran#, Krishna Ramaswamy#, Thomas Chi†, Maxwell Meng, Christopher Freise, and Marshall L. Stoller
School of Medicine (GT), Department of Urology (KR, TC, MM, MLS) and Department of Surgery (CF), University of California, San Francisco, San Francisco, California

• 1/52 were for UTUC (CIS)
• +ve recurrence, with graft loss
Partial nephrectomy and autotransplantation with pyelovesicostomy for renal urothelial carcinoma in solitary kidneys: a clinical update

Joachim Steffens, Ulrich Humke*, Schahnaz Alloussi†, Manfred Ziegler† and Stefan Siemer†
Departments of Urology and Paediatric Urology, St. Antonius Hospital Eschweiler, *Katharinenhospital Stuttgart and †University of Saarland, Hombêrg/Saar Germany
Accepted for publication 17 November 2006

• 4 patients
  - T1LG for all (two G2, two G1)
• none required HD
• all received adjuvant BCG/MMC
• no recurrences (mean f/u >6yrs)
ex-vivo NSS + Auto-Tx for UTUC

• Indications
  - Solitary kidney/CKD pt
  AND
  - large renal pelvic/UPJ lesion
  - large lesion filling single calyceal region
  - long, multifocal ureteral lesion(s)

*** UTUC not amenable to endoscopic management, not amenable to ureteral reconstruction ***
ex-vivo NSS + Auto-Tx for UTUC

• Contraindications

  - high stage/grade lesion*

  - lesions in multiple calyceal regions

  - progressively declining renal function with ++ renal risk factors

  - anatomic considerations (eg R kidney with short RV, ≥3 arteries, pelvic vascular calcifications, etc)
Technical Considerations for UTUC

- maximal ureteral cuff dissection, early cold perfusion

- ureteric lesions
  - excise entire ureter
  - pyelovesical anastomosis
  - frozen section for UPJ/RP tumours

- renal lesions
  - map out entire collecting system
  - consider intra-op renoscopy
  - can test for leaks
  - pyelovesical anastomosis
ex-vivo NSS + Auto-Tx for UTUC

- oncologic outcomes unknown
  → renal ⇐ ureteric

- improved ability to prevent need to RRT

- increased morbidity cf other NSS options

- improved surveillance, adjuvant topical Rx
Auto-Tx in solitary kidney

- 7 cases
  - ureteral stricture 3
  - RCC 1
  - UTUC 2
  - Loin-pain hematuria 1

- 2 patients (29%) required temp HD, both had CKD
Auto-Tx for UTUC in solitary kidney

- **UPJ T1LG**  
  Bladder recurrences only, no HD req’d, f/u 8yrs

- **RP T1LG**  
  No recurrences, temp HD post-op, f/u 3.5yrs

- **LP T2HG**  
  NAC, bladder recurrences only, no HD req’d but CKD3 now, f/u ~5yrs

- **UPJ T1HG**  
  Local renal recurrence 6/12, req’d graft Nx, mets 6/12 later
Balancing Risks

• oncologic outcomes differ .. RCC >> UTUC

• up to 15-20% annual risk of mortality on HD

• avg life expectancy on HD is ~7yrs
  → 13-15yrs if in 40s
  → 2-4yrs for >65yrs

• transplant eligibility, wait times
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Jason Lee  MD, MHPE, FRCSC