Urologic Society for Transplantation and Renal Surgery 2019 Annual Meeting

Monday, May 6, 2019, 1:00–5:00 pm
McCormick Place Convention Centre West Building, Rm W192
Chicago, IL

Agenda

1:00–1:20 pm	Adding peritoneal dialysis surgery to your urology practice *Neal Rowe, MD, University of Ottawa*
1:20–1:50 pm	Prostate cancer in kidney transplant recipients: Is active surveillance an option? *Laurence Klotz, MD, University of Toronto*
1:50–2:10 pm	Recycling kidneys: Re-transplantation of previously transplanted kidneys *Jeff Veale, MD, UCLA*
2:10–2:30 pm	Robotic vs. open renal transplantation *David Goldfarb, MD, Cleveland Clinic (open surgery)* *Alberto Breda, MD, Barcelona (robotic surgery)*
2:30–2:50 pm	Is cytoreductive nephrectomy (CN) dead? *Anil Kapoor, MD, McMaster University (CN is not dead)* *Rodney Breau, MD, University of Ottawa (CN is dead)*
2:50–3:50 pm	Novick Presentations
3:50–4:30 pm	Reception, view posters & Novick Award presentation
4:30–5:00 pm	USTRS business meeting

Board of Directors

Urologic Society for Transplantation and Renal Surgery 2019 Annual Meeting Abstracts

Cite as: *Can Urol Assoc J* 2019;13(4Suppl3):S31-41. http://dx.doi.org/10.5489/cuaj.5974

Published online April 8, 2019

USTRS 2019-1

Daily use of a muscle pump activator device reduces hospitalization and improves graft function post-transplantation: A randomized controlled trial

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Introduction: Kidney and simultaneous pancreas-kidney (SPK) transplant recipients can have prolonged postoperative hospitalization due to edema, delayed mobilization, and delayed graft function. Traditionally, TED stockings with intermittent pneumatic compression devices (TED/IPC) are placed preoperatively to prevent deep vein thrombosis (DVT). The objective of this trial was to evaluate the effects of TED/IPC vs. muscle pump activator (MPA) on factors that could reduce postoperative complications and decrease length of stay.

Methods: In this single-centre, prospective, randomized-controlled trial, 221 kidney or SPK transplant recipients were randomized to either wearing TED/IPC or MPAs for seven days postoperatively. Groups were compared with respect to days in hospital, postoperative lower limb edema, weight, mobility, urine output, serum creatinine, delayed graft function (DGF), need for dialysis, and renal blood flow.

Results: Patients assigned to wear the MPA device were found to have a significantly shorter hospital stay compared to the TED/IPC group (p=0.038). Changes in mid-calf leg circumference and patient weight were significantly lower in the MPA group (p=0.001 and p=0.003, respectively). The TED/IPC group were overall less mobile with less total steps recorded on a pedometer (p=0.009). The MPA device improved blood flow to the renal allograft with higher peak systolic velocity in the arcuate artery (p=0.001) and higher femoral vein velocity (p=0.001). There was significantly higher urine output in the MPA group (p=0.003) but objective measures of renal function, including frequency of DGF, number of dialysis runs, and serum creatinine, were not different between the two groups.

Conclusions: Postoperative use of the MPA device decreases duration of hospitalization after kidney transplantation. This may be attributable to improved renal blood flow to the transplant allograft and thus increased urine output and decreased fluid retention.

Source of funding: *Grant from First Kind Ltd.*

USTRS 2019-2

Novel cooling device for kidney transplant surgery

Thomas A. A. Skinner[1], Ali Dergham[2], Luke Witherspoon[1]
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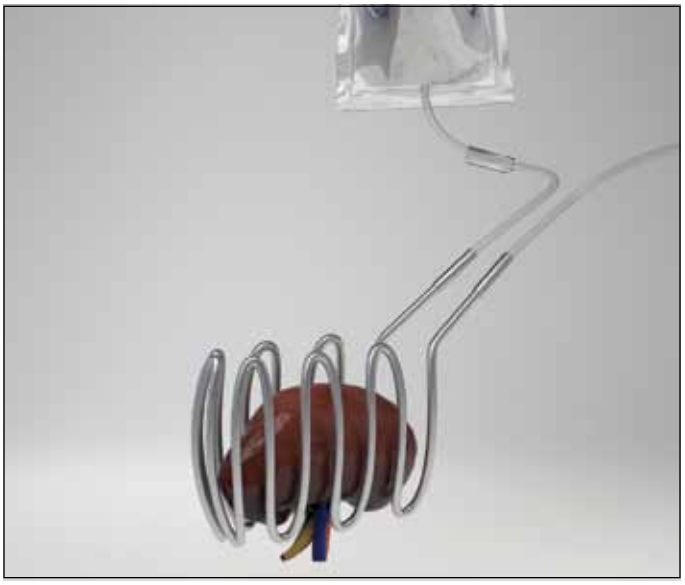
Introduction: In renal transplantation, warm ischemia time (WIT) describes the period of ischemia beginning with removal of the organ from ice and concluding at reperfusion. Metabolic activity in cooled kidneys is minimal at 5 ºC and resumes above 15 ºC, a temperature reached after only 15 minutes of WIT. We set out to develop a novel device to maintain allograft temperatures ≤5 ºC, thereby limiting ischemic damage during transplantation.

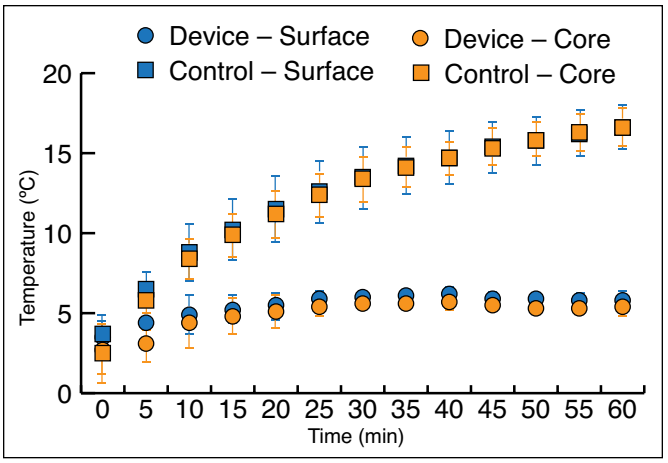
Methods: 3/16″ aluminum tubing was organized in a serpentine pattern to create a malleable, form-fitting renal allograft cooling jacket. Coolant comprised 4 ºC saline solution flowing at 240 mL/min. Adult porcine kidneys (n=4 per arm) (175 g, 13x7x3 cm LxWxH) were used to test the device. Kidneys were placed at 24 ºC ambient temperature; surface and core temperatures were monitored using implanted thermocouples. Device usability was tested by anastomosing porcine kidney vessels to GORE-TEX® vascular grafts with the cooling jacket in place in a simulated ex-vivo operative field.

Results: Our cooling jacket is moldable to any size human kidney. The device resulted in mean surface and core temperatures at 60 minutes of (mean ± standard deviation (SD]) 5.8±0.6 ºC and 5.4±0.5 ºC, respectively, significantly less than those of the control, 16.6±1.4 ºC and 16.6±1.2 ºC ($p<0.00001$ in both), respectively. Moreover, our device mitigated surface temperature increases (2.4±1.3 ºC vs. 12.9±0.9 ºC) and core temperature increases (2.8±1.7 ºC vs. 14.1±1.5 ºC) at 60 minutes ($p<0.00001$). Ex-vivo anastomotic testing was not inhibited or delayed by our device.

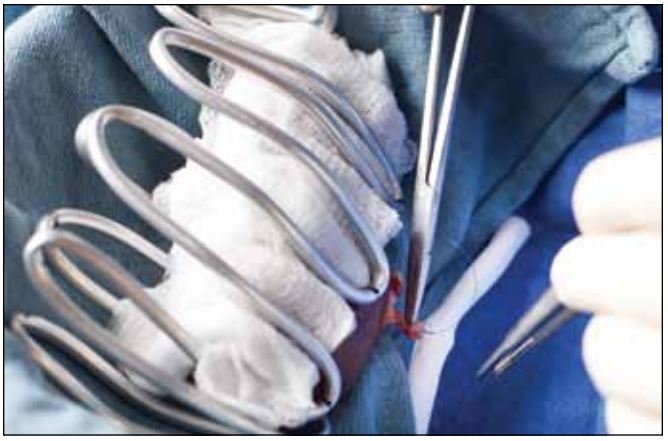
Conclusions: WIT is associated with many adverse outcomes. We developed a novel, easy-to-use, aluminum cooling jacket that mitigated temperature increase and maintained renal temperatures below metabolically active levels.



USTRS 2019-2. Fig.1.



USTRS 2019-2. Fig. 2.



USTRS 2019-2. Fig. 3.

USTRS 2019-3

Development of a patient decision aid for the management of small renal masses

Kristen McAlpine[1], Rodney H. Breau[1,2], Dawn Stacey[2,3], Christopher Knee[2], Michael A.S. Jewett[4], Ilias Cagiannos[1,2], Christopher Morash[1,2], Luke T. Lavallée[1,2]

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Introduction: Patients with small renal masses are candidates for various types of management. The decision to proceed with operative intervention, ablation, or surveillance requires a complex assessment of benefits and risks of each intervention and incorporation of patients' personal values. We sought to develop a patient decision aid to facilitate shared decision-making and patient-centred care for individuals with small renal masses.

Methods: A structured development process followed the International Patient Decision Aid Standards and the Ottawa Decision Support Framework. A literature review was performed to identify patient-important outcomes of management options for small renal masses (T1a). An iterative feedback process with a steering committee of content and process experts was used to determine the content of the decision aid. Figures and narrative text were developed to explain management options and outcome rates to users. A 10-question, mixed-methods survey was created to assess the acceptability of the patient decision aid with patients, patient advocates, urologists, and methodological experts.

Results: An evidence-based patient decision aid was created following the International Patient Decision Aids Standards. The management options included were partial nephrectomy, radical nephrectomy, ablation, and surveillance. The benefits included on the decision aid were rates of recurrence-free survival, metastasis-free survival, and length of hospital stay. The risks included were rates of post-procedural urine leak, post-procedural bleeding, and rate of renal failure. A validated tool was included to explicitly explore patients' values and preferences. Pictures, diagrams, and plain language were used to allow use by patients of various educational backgrounds. Knowledge questions were included to assess patients' understanding. The decision aid met the International Patient Decision Aids Standards defining (6 of 6), certification (6 of 6), and quality criteria (17 of 23).

Conclusions: A novel patient decision aid was created for the management of small renal masses following a systematic and evidence-based process. Acceptability testing of the decision aid is being performed in a prospective fashion with patients, urologists, and methodological experts.

Source of funding: *International Kidney Cancer Coalition, Kidney Cancer Research Network of Canada, Canadian Urological Oncology Group, Canadian Urology Association Scholarship Foundation, The Ottawa Hospital Academic Medical Organization.*

USTRS 2019-4

Routine cross-matching for blood transfusion in renal transplantation is a low-value clinical practice: A quality improvement project

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Introduction: Routine crossmatch of packed red blood cells (pRBC) is completed preoperatively at many transplantation centres. However, contemporary evidence suggests that transfusion rates are quite low, with most operations requiring no blood products. Furthermore, judicious and medically appropriate resource adjudication remains a concern: the cost per pRBC is $522–1183, in addition to time and personnel delay, and routine crossmatch may be of low value. The objective of this study was to determine the incidence of early postoperative pRBC transfusion and predictors of transfusion in patients undergoing renal transplantation.

Methods: A retrospective review of patients undergoing renal transplantation at our institution from January 2013 to May 2016 was performed. Demographic, biochemical, and clinical parameters were recorded. The incidence of early postoperative, intraoperative, and total inpatient transfusion was determined. Early postoperative transfusion was the primary outcome and defined as an intraoperative transfusion or transfusion within two days of surgery. Multivariable logistic regression was performed for predictors of early postoperative transfusion.

Results: We identified 428 patients during the study period (average age 55 years, 60% male, 67% deceased donor, and 43% preoperative blood thinner use). Forty (9.3%) patients required early postoperative transfusion with a mean of 2.8 pRBCs per transfusion; however, most of these patients experienced a slow hemoglobin decline over two days. Twenty (4.7%) patients required an intraoperative transfusion (mean 3.1 pRBCs per patient). On multivariable regression analysis, lower preoperative hemoglobin count (per g/L: odds ratio [OR] 0.952 [0.927–0.977]; p<0.001), female gender (OR 2.452 [1.242–4.986]; p=0.011), and prior renal transplantation (OR 3.057 [1.012–8.229]; p=0.034) predicted early postoperative transfusion.

Conclusions: In our cohort, transfusion in the early postoperative period was less than 10%, suggesting that routine crossmatch may not be necessary. Preoperative hemoglobin, female gender, and prior renal transplantation status were associated with increased risk of transfusion. Clinically, these indicators may be useful to risk-stratify patients for crossmatch.

USTRS 2019-5

Tubeless extra-peritoneal kidney transplantation in pediatrics: No drain, no stent. The introduction of liver and kidney mobilization technique

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Introduction: The transplantation of adult renal allografts in children can be accomplished with a variety of surgical techniques. The intra-abdominal approach is most common but carries substantial intraperitoneal risks of gastrointestinal complications and early vascular compromise of the allograft. The purpose of this study is to describe a technique in pediatric kidney transplant recipients that entails an extra-peritoneal approach with en-bloc mobilization of the liver and native kidney and without surgical drainage or ureteral stent placement.

Methods: The operation begins with a right para median incision that can be extended to the costal margin. The peritoneum is identified and mobilized medially to expose the inferior vena cava (IVC), aorta, and right iliac vessels in the retroperitoneal space. Lumbar veins are ligated to facilitate mobilization of the IVC. Dissection in the retroperitoneal space is extended cephalad to mobilize the liver and kidney en-bloc to create space for the new renal allograft (Figs. 1 and 2). The allograft renal vein was anastomosed to the IVC (end to side, n=12) and the renal artery to the aorta (n=2) or the right common iliac artery (n=10). The ureteroneocystostomy, a modification of the Lich-Gregoir technique, was performed to the bladder (n=7), or to the augmented bladder with small intestine (n=1), ureter (n=3), or sigmoid (n=1). No patients required a ureteral stent or surgical drain. We reviewed the safety and outcomes of this procedure.

Results: Twelve patients were retrospectively identified from January 2015 to December 2017. The mean age of recipients was 5.8±0.8 years, weighing 18.5±1.09 kg. The mean length of kidney allograft was 10.2±0.3 cm. The average donor age was 30.3±2.6 years, with seven allografts from deceased donors and five from living donors. Warm ischemia time was 27±1.4 minutes and estimated blood loss was 18.3±1.1 ml. One intraoperative complication occurred, which was a small bowel perforation that was repaired primarily. Postoperatively, all patients had immediate graft function without urine leak or allograft thrombosis. Both one-year allograft and overall survival rates were 100%, with an average serum creatinine of 0.4±0.1 mg/dl at one year postoperatively.

Conclusions: The tubeless extra-peritoneal kidney transplantation with en-bloc liver and kidney mobilization technique to create a retroperitoneal space is safe and has promising early outcomes. This technique reduces potential intraperitoneal complications and may expand the donor pool in the pediatric transplantation population.

USTRS 2019-6

Endovascular treatment for renal transplant arterial stenosis: A five-year followup study

Felipe Hirasaki, Rogerio S. Filho, Renato Falci, Ioannis Antonopoulos, Kleiton Yamaçake, Hideki Kanashiro, Gustavo Ebaid, Gustavo Messi, Rafael Locali, William Nahas, Affonso Piovesan
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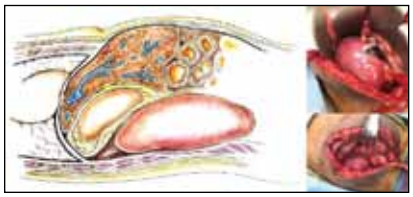
Introduction: Renal transplant arterial stenosis (RTAS) has a reported incidence of 1% in selected cohorts. With a proven efficacy, percutaneous transluminal angioplasty (PTA) with the placement of a stent is considered to be the less invasive initial approach. The study objective is to evaluate the outcomes of patients with renal transplant arterial stenosis who have undergone PTA with stenting over a five-year followup, regarding the Modification of Diet in Renal Disease Study equation (MDRD) and blood pressure variation.

USTRS 2019-5. Fig. 1. Space is created for the adult renal allograft.



USTRS 2019-5. Fig. 2. The adult renal allograft is placed in the retroperitoneal space.

Methods: A retrospective search was performed searching for cases of RTAS with PTA with stenting between January 2005 and January 2016. The analyzed parameters were MDRD and number of antihypertensive drugs before the RTAS diagnosis, before PTA, and one week, one month, one year, and five years after the intervention. Data were analyzed using sample t-test. The mean followup time was 68 months

Results: In the eleven-year period analyzed, 2180 renal transplantations were performed. Of these, 23 patients were included. Regarding renal function evaluation, the mean rise of MDRD parameter (25.47 to 43.32; $p<0.005$) after one week and one month following the intervention, showed a significant statistical difference. MDRD stabilized after one month following the intervention and showed no significant reduction of the kidney function at the end of the five-year followup period (Fig. 1). Regarding blood pressure variation, there was a significant statistical difference between the number of antihypertensive drugs before PTA and at the diagnosis (1.67 to 2.52; $p<0.001$), but there was no significant statistical reduction following the intervention (2.5 to 1.96; $p=0.141$). Restenosis did not recur.

Conclusions: Endovascular treatment with PTA with stenting is an effective option for managing TRAS, as it preserves vascular permeability over a long-term period, ensuring the functionality of the graft, normalization of blood pressure, and preservation of renal function.

USTRS 2019-7

Prospective assessment of the need for mannitol during renal transplantation

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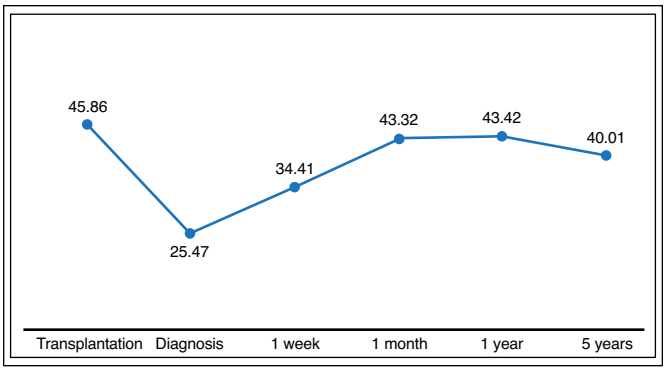
Introduction: During renal transplantation, mannitol has been used to minimize cellular swelling, scavenge free radicals, and promote diuresis. However, it has been suggested to promote hyperkalemia in the early postoperative period. The overall benefit of mannitol in the clinical setting is unclear, and its use has been variable between surgeons and institutions. The purpose of this study is to examine the rates of delayed graft function (DGF) and postoperative hyperkalemia in kidney transplant recipients when mannitol was administered intraoperatively vs. an alternative diuretic (furosemide).

Methods: An analysis of all kidney transplant recipients performed by two surgeons at our institution from March 1, 2018 to December 31, 2018 was performed. At the start of this period, one surgeon provided furosemide (F) and the other continued routine mannitol (M) administration (0.50 g/kg).



USTRS 2019-6. Fig. 1. Modification of Diet in Renal Disease Study (MMDR) parameters up to five years post-transplant.

Data was extracted from a prospectively maintained database. Descriptive statistics characterized our two groups and comparisons were made using t-test and Chi-square where appropriate.

Results: Ninety-nine patients received a kidney transplant in the study period, with 46 in the F group. The M group did not significantly differ from the F group with respect to mean age (52 vs. 47; p=0.12), body mass index (BMI) (27.4 vs. 28.5; p=0.25), and anastomosis time (41 minutes vs. 43 minutes; p=0.41). DGF rates were not significantly different (20% vs. 11%; p=0.24). Furthermore, donor profiles did not differ between the M and F groups (donation after cardiac death [DCD] 17% vs. 24%; neurologic determination of death [NDD] 49% vs 26%; living donor [LD] 34% vs. 50%; p=0.06). Potassium levels did not differ between the groups in the pre- or postoperative period and the one-month creatinine levels were not different between groups. Cold ischemic time was the only variable that statistically differed between the groups (505 minutes vs. 363 minutes; p=0.03). Complete data is shown in Table 1.

Conclusions: The administration of mannitol vs. an alternative diuretic during kidney transplant surgery did not influence DGF rates, potassium levels, or renal function at one month. The interpretation of results is limited by the non-randomized design. Further study is warranted to better define the role and utility of intraoperative diuretics during renal transplant.

USTRS 2019-7. Table 1. Summary of data

	Furosemide	Mannitol	p
n	46	53	
DCD (%)	11(24%)	9 (17%)	0.24
NDD (%)	12 (26%)	26 (49%)	
LD (%)	23 (50%)	18 (34%)	
Age (years)	52.3 (15)	47.4 (16)	0.12
Number of males (%)	30 (65%)	31 (58%)	0.32
BMI	27.4 (4.2)	28.5 (4.9)	0.58
Mean anastomosis time (min)	41 (9)	43 (14)	0.41
CIT (min)	363 (319)	505 (306)	0.03
WIT for DCD (min)	26 (11)	31 (20)	0.50
Mean postoperative K	5.0 (0.9)	4.9 (0.9)	0.74
Mean preoperative K	4.5 (0.6)	4.4 (0.6)	0.35
Mean K change	0.5	0.6	0.72
Cr at 1 month (umol/L)	127 (55)	124 (70)	0.81
DGF (%)	6 (17%)	3 (8%)	0.25

Values are reported as mean (standard deviation [SD]) unless otherwise indicated. BMI: body mass index; CIT: cold ischemic time; Cr: creatinine; DCD: donation after cardiac death; DGF: delayed graft function; K: potassium; LD: living donor; NDD: neurologic determination of death; WIT: warm ischemic time.

USTRS 2019-8

Safety of ureterolysis in the management of retroperitoneal fibrosis

James P. Ross, Neal E. Rowe
Division of Urology, Department of Surgery, University of Ottawa, Ottawa, ON, Canada

Introduction: Retroperitoneal fibrosis (RPF) is rare and can progress to extrinsic ureteric obstruction. Surgical management with ureterolysis is typically reserved for patients failing medical treatment, however, current literature on complications is limited to small, single-centred series. In this study, we aim to use a large, multicentre database to assess short-term surgical outcomes of ureterolysis in patients with RPF.

Methods: Using the American College of Surgeons National Quality Improvement Program (NSQIP) database, a retrospective review was conducted on patients who underwent ureterolysis for RPF between January 1, 2006 and December 31, 2016. Only patients who underwent ureterolysis as a principle operative procedure by a urologist were included. Complications within 30 days of surgery were captured in the dataset and organized based on the Clavien-Dindo classification system. The frequency of secondary urological procedures at the time of initial ureterolysis (ureteroureterostomy, ureteroneocystostomy, and ureteroneocystostomy with psoas hitch/bladder flap) was identified.

Results: One hundred patients (51 male, 49 female) were included in the cohort, with a mean age of 57 (interquartile range [IQR] 43, 66). Of these patients, four underwent a secondary urological procedure at the time of ureoterolysis: one ureteroureterostomy, two ureteoneocystostomy, and one ureteroneocystostomy with psoas hitch/bladder flap. The overall complication rate was 12%, of which almost all were Clavien grade I or II (wound or urinary infection). Only one patient required return to the operating room (grade III) and there were no high-grade complications (grade IV or V).

Conclusions: This is the largest study of perioperative complications from ureterolysis in the setting of RPF. The overall complication rate was low and most complications were low-grade. As such, ureterolysis likely represents a safe treatment option for ureteric obstruction secondary to RPF.

USTRS 2019-9

Kidney transplantation in pediatric patients with bladder augmentation: Long-term outcomes

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Introduction: Small bladder capacity and inadequate bladder compliance are the main causes of refractory bladder dysfunction in pediatric patients. Augmentation cystoplasty is a surgical option when medical treatment has failed. The aim of this study was to assess the results of kidney transplant in pediatric patients with bladder augmentation.

Methods: We reviewed 41 patients younger than 19 years with bladder augmentation that underwent kidney transplantation due to significant lower urinary tract dysfunction. Nine second kidney transplant and one third kidney transplant were performed, comprising 51 kidney transplants in 41 patients. Thirty-two (62.74%) were from living donors and 19 (37.25%) from deceased donors. Mean age at first transplantation was 14.02±6.77 years and mean age at first bladder augmentation was 10±4.14 years (range 2–18). The etiology of bladder dysfunction was neurogenic bladder due to spina bifida (14 patients), posterior urethral valve (12 patients), vesicourethral reflux (five patients), bladder extrophy (two patients), and other causes (eight patients). The bowel segments used in the augmentation included ileum in 26 (63.4%) patients, ileocecal in two (4.5%) patients, and sigmoid in two (4.5%) patients. The ureter was used in 11 (26.8%)

patients. Redo bladder augmentation was performed in three patients (one ureterocystoplasty and two ileocystoplasty), all after ureterocystoplasty. In two patients, it was performed before the first kidney transplant.
Results: Mean followup after first bladder augmentation was 164.95±102.09 (range 16–522) months. Overall patient survival was 87.7% and actuarial graft survival at one, two, five seven, nine, and ten years was 92.1%, 85.5%, 75.7%, 60.8%, 57.6%, and 44.3%, respectively. Thirty-four (82.9%) patients were in clean intermittent catheterization. At least one episode of symptomatic or febrile urinary tract infection occurred 78% of patients. Six (75%) patients died of unrelated cause and two (25%) patients died due to related causes.
Conclusions: Augmentation cystoplasty is a safe and effective treatment for lower urinary dysfunction in the pediatric population. Successful pediatric transplantation program requires an individualized approach for each patient.

USTRS 2019-10

Critical comparative analysis of outcomes after major renal surgery in patients on dialysis – A database review

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Introduction: The prevalence of patients requiring chronic dialysis has increased over the past decade. Many of these patients may also require major urological intervention such as radical nephrectomy (RN), partial nephrectomy (PN), or nephroureterectomy (NU). There is scant literature comparing minimally invasive renal surgeries (MIRS) to open renal surgeries (ORS) in dialysis patients undergoing these operations. The goal of this study is to evaluate whether short-term outcomes of dialysis patients who have MIRS are superior to those who have ORS.
Methods: The National Quality Improvement Program (NSQIP) database was queried for all patients on dialysis who underwent RN, PN, and NU from 2013–2014. Data was collected on patient demographics, procedure characteristics, and short-term outcome measures. Identified patients were then divided into MIRS and ORS groups. Appropriate statistical tests were used to compare the groups.
Results: Of the 367 patients identified, 242 had MIRS and 125 had ORS. Procedure distribution was 86% (n=208) RN, 7.85% (n=19) PN, and 2.07% (n=5) NU in the MIRS group, and 84% (n=105) RN, 11.2% (n=14) PN, and 4.8% (n=6) NU in the ORS group. In the MIRS group, 67.8% (n=164) were male and 45.9% (n=111) were Caucasian. In the ORS group, 52.8% (n=66) were male and 59.2% (n=74) were Caucasian. There were no significant differences in preoperative considerations such as patient age, body mass index, or American Society of Anesthesiologists classification. Postoperatively, patients in the ORS group had significantly higher rates of pulmonary and wound complications, longer length of hospital stay, and higher transfusion rate. Operative time, re-operative rate, readmission rate, or mortality were not significantly different between the groups.
Conclusions: Patients on dialysis who had MIRS had shorter length of stay, lower transfusion rates, and lower pulmonary and wound complication rates compared to patients who had ORS. This suggests that minimally invasive techniques could be offered preferentially to dialysis patients who require major renal surgery when feasible.

USTRS 2019-11

Laparoscopic pyeloplasty practice patterns in Canada

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Introduction: Ureteropelvic junction obstruction (UPJO) is a condition characterized by partial or complete obstruction of urine transport from the renal pelvis to the ureter and can present with intermittent flank pain, recurrent urinary tract infections, renal stones, or renal dysfunction. While historically, open pyeloplasty was the gold standard for surgical management, laparoscopic methods to repair UPJO have largely taken over as the preferred approach for adolescent and adult patients. Despite near universal adoption of laparoscopic pyeloplasty among Canadian urologists, it remains a technically complex procedure and considerable variability exists in the procedural steps performed.
Methods: An online survey was distributed to all urologists registered with the Canadian Urology Association (CUA), as well as to attendees at the 73rd CUA annual meeting. Participants were asked to describe their training background, comfort level with laparoscopic pyeloplasty, positioning preferences, procedural steps, and stenting practices.
Results: One hundred board-certified urologists completed our survey, with approximately half from a community setting and half with academic affiliations (56% and 43%, respectively). The vast majority (98%) reported preferring the Anderson-Hynes (dismembered) pyeloplasty technique. Other technical steps of the procedure were variable among respondents, with no discernable pattern. Those who felt most comfortable with the procedure tended to perform a larger volume of laparoscopic pyeloplasties annually or work at higher-volume institutions.
Conclusions: Laparoscopic pyeloplasty remains a technically challenging procedure that many Canadian urologists are uncomfortable performing. We hope to create discussion among urologists and share procedural tips that will improve comfort in tackling these complex cases.

USTRS 2019-12

Impact of transplant ureteral stricture location and type of ureteral revision on long-term graft survival and patient outcomes in kidney transplantation

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Introduction: Ureteral strictures (US) are a major cause of morbidity following kidney transplantation and often require surgical revision, including ureteroureterostomy (UU) and neocystoureterostomy (NC). Our objective was to determine the long-term graft survival and outcomes based on the site of US and type of ureteral revision surgery.
Methods: We conducted a retrospective, longitudinal cohort study of kidney recipients that developed urological complications necessitating surgical intervention following transplantation over 10 years.
Results: Twenty-seven patients were identified; four had proximal US, one had a mid-ureteral stricture, 18 had distal US, and four had pan-ureteral strictures. Readmission rates and renal function pre- and post-revision were similar among groups. Patients with pan-ureteral strictures tended to have more recurrent US (4/9 vs. 4/18; p=0.233), while also being less likely to develop infections (5/9 vs. 11/18; p=0.077). Rejection rates were similar among proximal US (25%), distal US (42.8%), and pan-ureteral strictures (25%). When comparing NC with UU, there was no difference in readmission rates (13/24 vs. 2/4; p=0.735) or pre- and post-revision creatinine (mean 2.67 vs. 1.59 mg/dL); however, those with NC were more than twice as likely to develop infections (16/24 vs. 1/4; p=0.114) but were only half as likely to develop recurrent US (7/24 vs. 2/4; p=0.409). Overall, graft survival was 85.7% and patient survival was 96.4% with a mean followup of 6.2 years. Average baseline creatinine was 2.6 mg/dL prior to surgical revision with an average nadir creatinine of 1.5 mg/dL post-revision. There were four graft failures over the study period, all in the NC group, with average time to graft failure of 8.1 years. When comparing patients who received a kidney from a deceased donor (n=20) vs. a living donor (n=7), rates of infection (12/20 vs. 4/7; p=0.895) and readmission (10/20 vs. 4/7; p=0.745) were similar. However, deceased donors were more likely to develop rejection (7/20 vs. 1/7; p=0.302), graft failure (4/20 vs. 0/7; p=0.199), and US recurrence (7/20 vs. 1/7; p=0.302) after ureteral revision.
Conclusions: US location and revision type do not significantly impact renal function or readmission rates, but may influence US recurrence

and infections. However, long-term graft and patient survival is better than expected in this cohort of transplant recipients undergoing surgical intervention for complicated US.

USTRS 2019-13

Hypogonadism in men of a kidney transplant waiting list (KTWL): Comparison and assessment of hormone profile, quality of life, and sexual function between age-matched hypogonadic and non-hypogonadic men

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Introduction: Hypogonadism may affect up to 70% of men with end-stage renal disease (ESRD). This disorder has significant impact on sexual function, lean body mass, body mass index (BMI), bone mineralization, hemoglobin levels, and cardiovascular disease-associated mortality. Our objective was to evaluate the incidence of hypogonadism in men with ESRD on a KTWL, as well as its impact on quality of life and sexual function.

Methods: Patients with ESRD (40–70 years old), with at least six months on hemodialysis were selected (n=89). The studied parameters were age, total (TT) and free testosterone, follicle-stimulating hormone (FSH), luteinizing hormone (LH), prolactin, sex hormone-binding globulin (SHBG), hemoglobin, albumin, and BMI. Comparison between hypogonadic (GI, TT<300 ng/ml on two separate measurements) and non-hypogonadic (GII) men was carried out. The World Health Organization Quality of Life (WHO QoL) and International Index of Erectile Function (IIEF) questionnaires were completed.

Results: Hypogonadism was observed in 24 (26.9%) men. Population data are showed in Table 1. The mean TT was 205.83±63.1 ng/dL (49–289) in GI and 476.89±141.67 ng/dL (306–861) in GII. Comparison between groups is summarized in Table 2. Hypogonadic men have higher BMI (p=0.001). There was no statistically difference regarding WHO QoL and IIEF questionnaires between groups.

Conclusions: The incidence of hypogonadism in the studied population differs significantly from the literature, suggesting the need for specific approaches. Patients with hypogonadism showed higher levels of BMI. QoL and IIEF scores were not different between groups

USTRS 2019-13. Table 1. Population data

	Mean ± standard deviation, n=89
Age (years)	54.5±7.64 (40–70)
Total testosterone (ng/dl)	403.80±173.99 (49–861)
Free testosterone (pmol/l)	283.25±98.53 (20–549)
FSH (IU/L)	9.79±9.87 (1–57.7)
LH (IU/L)	12.98±11.57 (3–70.8)
SHBG (nmol/L)	38.1±17.57 (13.6–90.3)
Prolactin (ng/ml)	21.18±17.65 (6.6–112.1)
Albumin (g/dl)	4.43±0.49 (3–5.2)
Glucose (mg/dl)	117.17±56.81 (62–406)
PSA (ng/ml)	1.63±1.6 (0.2–7.9)
Hemoglobin (g/dl)	11.78±1.62 (6.5–15.4)
BMI (kg/m^2)	25.86±4.94 (17.41–39)

BMI: body mass index; FSH: follicle-stimulating hormone; LH: luteinizing hormone; PSA: prostate-specific antigen; SHBG: sex hormone-binding globulin.

USTRS 2019-13. Table 2. Comparison between study groups

	Hypogonadism n=24	Normal testosterone n=65	p
Age (years)	53.66±8.27	54.9±7.43	0.499
Total testosterone (ng/dl)	205.83±63.1 (49–289)	476.89±141.67 (306–861	0.001
Free testosterone (pmol/l)	175.5±70.26 (20–318)	323.03±74.93 (162–549)	0.0107
FHS (IU/L)	13.34±14.2 (3.1–57.7	8.48±7.43 (1–40.2)	0.0108
LH (IU/L)	12.94±14.68 (3–70.8)	12.9±10.33 (4–69.1)	0.038
SHBG (nmol/L)	30.35±11.64 (15.2–63.3)	40.96±18.58 (13.6–69.1)	0.984
Prolactin (ng/ml)	28.95±26.43 (6.6–112.1)	18.31±12.1 (7.3–77.4)	0.6212
Albumin (g/dl)	4.44±0.49 (3.5–5.2)	4.43±0.5 (3.5–5.2)	0.539
Glucose (mg/dl)	119.52±70.03 (62–406)	116.32±51.79 (67–300)	0.818
PSA (ng/ml)	1.46±1.48 (0.2–6.3)	1.69±1.64 (0.2–7.9)	0.338
Hemoglobin (g/dl)	11.5±1.45 (8.6–14.1)	11.88±1.68 (6.5–15.4)	0.338
BMI (kg/m^2)	28.83±6 (19.8–39)	24.51±3.74 (17.41)	0.001
Total IIEF score	45.69±16.33 (10–69)	38.191±20.69 (8–69)	0.2332
Global WHO QoL score	65.62±18.6 (25–75)	66.66±15.16 (25–75)	0.870

BMI: body mass index; FSH: follicle-stimulating hormone; IIEF: International Index of Erectile Function; LH: luteinizing hormone; PSA: prostate-specific antigen; SHBG: sex hormone-binding globulin; WHO QoL: World Health Organization quality of life.

USTRS 2019-14

Penile Doppler ultrasonography assessment for low-intensity extracorporeal shockwave therapy for erectile dysfunction in kidney transplant recipients: Is it useful? Results of a prospective, randomized, double-blinded, sham-controlled study

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Introduction: Erectile dysfunction (ED) in kidney transplant patients is not uncommon. Low-intensity shockwave therapy extracorporeal (Li-ESWT) has been of interest due to its angiogenic properties and has shown interesting results with cardiovascular diseases and erectile dysfunction (ED). Our objective is to study the penile doppler ultrasound parameters after Li- ESWT for the treatment of ED in kidney transplanted men of probable vascular etiology.

Methods: Twenty men (mean age 53.7 years, range 46–61) that have been submitted to kidney transplant for at least six months and have been suffering from ED for at least six months were selected. This was a double-blinded, single-centre, prospective, randomized, sham-controlled trial. The ESWT protocol was based on two treatment sessions per week for three weeks. The sham treatment was performed using the same device, replacing the effective probe for one that emits zero energy but delivers

a sound and pulse sensation during treatment. Followup assessment was performed with International Index of Erectile Function Questionnaire (IIEF) score and Erection Hardness Score (EHS) after one, four, and 12 months. Penile Doppler ultrasound with pharmaco-induced erection was performed before and after treatment (3–4 months). The diameter of the cavernous arteries was measured before and after intracavernosal injection of 20 mcg alprostadil (Caverject®). The systolic and diastolic velocities of the cavernous arteries were evaluated after drug injection. Cavernous arteries diameters were evaluated and resistivity index was calculated

Results: A total of 20 patients were recruited into the study. Ten patients were randomized into the sham therapy arm and 10 patients into the Li-ESWT arm. Groups were similar regarding the baseline IIEF score and EHS. IIEF score improvement was higher than 5 in 70% (range 0–10) and in 10% (range 1–14) of Li-ESWT and sham groups, respectively. Mean peak systolic velocity, mean diastolic velocity, diameter of cavernous arteries before and after injection at each side, and resistivity index were similar between groups, before and after treatment, and did not present noticeable improvements.

Conclusions: Li-ESWT is a non-pharmacological treatment with clinical efficacy. Further studies are needed to determine the optimal treatment protocols. Despite evidences suggesting neoagiogenesis, our short protocol had no impact on penile Doppler parameters.

USTRS 2019-15

Third and subsequent renal transplantation: Is previous transplantectomy necessary?

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USTRS 2019-15. Table 1. Study results and statistical analysis

	Group 1	Group 2	Total	p
Blood transfusion				0.3848*
No	22 (71.0%)	5 (55.6%)	27 (67.5%)	
Yes	9 (29.0%)	4 (44.4%)	13 (32.5%)	
Surgical re-intervention				0.8862*
No	27 (87.1%)	8 (88.8%)	35 (87.5%)	
Yes	4 (12.9%)	1 (11.1%)	5 (12.5%)	
Venous thrombosis				0.3393*
No	30 (96.8%)	8 (88.9%)	38 (95.0%)	
Yes	1 (3.2%)	1 (11.1%)	2 (5.0%)	
Arterial thrombosis				0.89968*
No	28 (90.3%)	8 (88.9%)	36 (90.0%)	
Yes	3 (9.7%)	1 (11.1%)	4 (10.0%)	
Urinary fistula				0.4343*
No	29 (93.5%)	9 (100.0%)	38 (95.0%)	
Yes	2 (6.5%)	0 (0.0%)	2 (5.0%)	
ICN necessity				0.2294*
No	21 (66.7%)	4 (44.4%)	25 (61.5%)	
Yes	10 (33.3%)	5 (55.6%)	15 (38.5%)	
Surgical time (minutes)	315 (34)	345 (50)		0.7981**
Time to hospital discharge (days)	25 (18.2)	24.9 (17.2)		0.8748**

*Fischer test. **Student t-test.

Introduction: Third and subsequent renal transplantation are a challenging procedure. These surgeries are related to higher operative time, transfusion rates, and allograft failure. The aim of this study is to report preliminary results of an alternative surgical approach for these patients.

Methods: The charts of 40 patients submitted to third or subsequent renal transplantation were reviewed. They were divided in two groups: group 1: 31 patients previously submitted to transplantectomy; and group 2: nine patients in whom renal transplantation was made with an occupied iliac fossa (without previously removal of the allografts). Five patients of this group required transplantectomy during the renal transplantation due to lack of space for the new graft. The remaining four patients did further procedure, as the graft fitted on the upper position of the iliac fossa. Rates of transfusion, surgical reintervention, surgical complications (venous or arterial thrombosis, urinary fistula), ICU necessity, length of surgical procedure, and time of hospital discharge were compared in both groups

Results: Results and statistical analysis are presented in Table 1. There was no difference between surgical outcomes in any of the parameters analyzed.

Conclusions: Third and subsequent renal transplantation without previous transplantectomy is a feasible procedure and is not related to higher surgical complication rates. In spite of a small number of procedures, results obtained are very encouraging, sparing these patients an additional surgical intervention.

USTRS 2019-16

Analysis of lactic acid response in renal transplant patients

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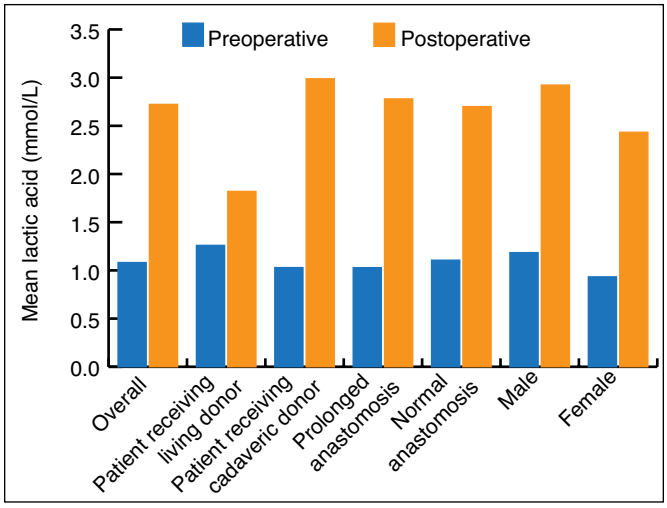
Introduction: Lactic acid (LA) serves as an important biomarker in the evaluation of ischemia, sepsis, metabolic acidosis, and trauma. During renal transplantation (RT), there is cross-clamping of the iliac vessels and implantation of an ischemic organ. There is a paucity of literature on the effect that RT has on serum LA. This is important, considering that many hospitals use LA as part of the automated sepsis workup.

Methods: A retrospective review of patients undergoing RT at the University of Missouri from August 2017 to November 2018 was performed. Serum LA was obtained at admission and in the first postoperative lab draw. Comparisons were made between pre/postoperative LA of all patients. Statistics used included t-test and unequal variance t-test with an alpha value of 0.05.

Results: Twenty-two patients met inclusion criteria during our study period and none were diagnosed with sepsis. Overall, there was a



USTRS 2019-16. Fig. 1. Comparing preoperative and postoperative serum lactic acid in renal transplant.

significant increase in serum LA postoperatively (p=0.001). Significant increases in preoperative vs. postoperative serum LA levels were seen in patients receiving cadaveric RT, prolonged anastomosis (greater than 60 minutes), normal anastomosis, male, and female groups (p=0.001, 0.037, 0.011, 0.019, and 0.012, respectively) (Fig. 1). Unlike in patients receiving cadaveric RT, patients receiving living donor RT did not see a significant increase in LA (n=5; p=0.222). When comparing the postoperative LA in cadaveric vs. living, prolonged anastomosis vs. normal anastomosis, and male vs. female, there were no significant differences noted (p=0.077, 0.936, and 0.562, respectively).
Conclusions: Our results suggest that there is an increase in serum LA following RT in most settings except for living donor RT. Further evaluation is needed to assess the significance of LA levels in transplant patients when evaluating for sepsis, as none of our patients were diagnosed with sepsis.

USTRS 2019-17

Renal auto-transplantation for the treatment of vascular anomalies: A case series

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Introduction: Renal artery aneurysm and nutcracker syndrome are uncommon vasculature anomalies that can be difficult to treat and sometimes require surgical correction. There are multiple ways to treat these conditions noted in the literature. Our objective was to present unique cases in renal artery aneurysm repair and nutcracker syndrome that responded to transplantation or auto-transplantation.
Methods: Four cases were reviewed from three surgeons at a single centre: two cases of renal artery aneurysm and two of symptomatic nutcracker syndrome. One renal artery aneurysm reconstruction was performed on a living altruistic donor kidney prior to allotransplantation, while the other was performed as an auto-transplant with back table repair by vascular surgery using a saphenous vein patch. Both nutcracker syndrome cases were successfully managed with auto-transplantation.
Results: Both renal arterial aneurysm repairs were successful. Postoperative kidney function was excellent and there was no impaired blood flow or recurrence. Both patients with nutcracker syndrome reported years of pain and inability to work. The first patient had normal renal venogram studies but proceeded with auto-transplantation because there was no other obvious cause for his symptoms. After undergoing surgery, his pain resolved completely and he was able to return to a normal life. The other patient with nutcracker syndrome recently underwent auto-transplantation and her postoperative course is ongoing. She did, however, endorse alleviation of her flank and groin pain at the time of discharge from hospital.
Conclusions: Auto-transplantation is a reasonable alternative to renal vein interposition for nutcracker syndrome in carefully selected patients. We also demonstrate successful transplantation and reconstruction of kidneys with renal artery aneurysms. While many options exist, this series adds support to auto-transplantation as a management choice for carefully selected patients with vascular anomalies.

USTRS 2019-18

Medical illustrations of various techniques to suspend the kidney during the vascular anastomosis

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Introduction: While performing the vascular anastomosis during renal transplant, every effort should be made to decrease warm ischemic time. Along with preparation of the iliac fossa for ideal exposure, it is important to have the donor kidney and vessels optimized for the anastomosis. While performing the anastomosis, the kidney can be suspended by various methods. The goal of this abstract is to use medical illustrators to demonstrate four methods of suspending the kidney while performing an end-to-side vascular anastomosis to the external iliac vessels.
Methods: Medical illlustrators created a visual reconstruction of the various surgical techniques.
Results: Four methods of kidney suspension were identified to be included in the graphical illustration: 1) the kidney can be suspended from the opposing side of the table with a hand; 2) the kidney can be placed in a glove with holes cut out the finger to expose the vessels; 3) a narrow Deaver can be used to expose the vessels while keeping the field free of the hand; and 4) a hammock made of umbilical tape and a sponge can be used support the kidney over the retractor to allow the surgeon to assist with both hands.
Conclusions: Various techniques exist for to suspend the kidney while performing the vascular anastomosis and each provides unique advantages and disadvantages.

USTRS 2019-19

Extension of right renal vein using vascular stapler in decease donor renal transplantation

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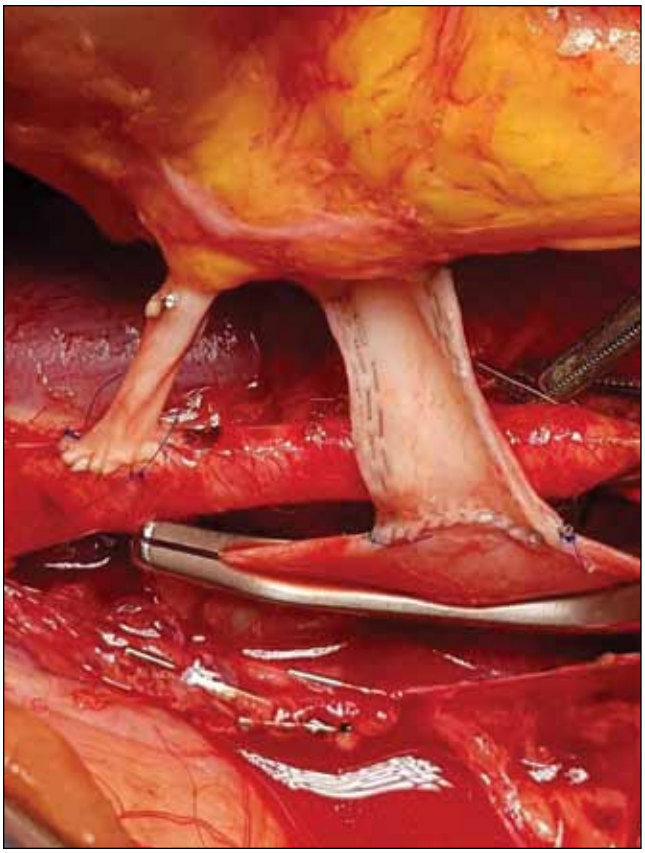
Introduction: A familiar technical challenge in transplanting a right kidney is short length of right renal vein (RRV), especially in obese patients with a deep pelvis. To negate this technical challenge, RRV length is extended using inferior vena cava (IVC) either by clamshell technique, transverse closure of the IVC, or cava conduit. We describe our modification of a previous technique using Endo GIA™ 45 mm reload with Tri-Staple™ technology stapler to extend the right renal vein.
Methods: The RRV is usually retrieved along with IVC. After adequate trimming of kidney and tying the tributaries, stay sutures are taken along the edges of IVC (Fig. 1). IVC is used in different ways to gain length for right renal vein. We commonly use the left renal ostium on the IVC by occluding the superior and inferior cut edge of IVC; alternatively, a neo-ostium can be created. IVC is stapled proximally and distally in the line of RRV (Fig. 2).
Results: In our retrospective study, we reviewed 62 right kidney transplants where elongation of the right renal vein was performed by either running non-absorbable sutures or vascular stapler. Twenty-nine recipients received extension of RRV using IVC by vascular stapler and others had usual suture repair. In all cases, the venous anastomosis was performed to external iliac vein. In our initial experience, after vascular anastomosis and removal of clamps, there has been no significant bleeding

USTRS 2019-19. Fig. 1. Stay sutures are taken along the edges of inferior vena cava.



USTRS 2019-19. Fig. 2. Inferior vena cava stapled proximally and distally in the line of right renal vein.

from the stapled site and no venous thrombosis or bleeding from the vein has been reported during the early postoperative phase.
Conclusions: Extension of right renal vein with IVC using vascular stapler in deceased donor renal transplantation is technically feasible, safe, and counters the technical challenges posed by short RRV.

USTRS 2019-20

Results of vesicoureteral reflux treatment with endoscopic injection of bulking agents in renal transplant patients

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Introduction: Recurrent urinary tract infections (UTI) with vesicoureteral reflux (VUR) into the transplanted kidney are associated with significantly decreased graft survival1. The objective is to evaluate the success rate of VUR treatment in renal transplant patients using endoscopic injection of bulking agents.
Methods: From January 1998 to July 2018, 3468 renal transplants with extravesical ureterovesical anastomosis were performed at our institution. After an acute graft pyelonephritis episode, 31 patients (nine men, 22 women) were diagnosed with VUR and submitted to a bulking agent endoscopic injection. Median age was 39.6 years, 17 deceased and 14 living donors. Mean time between renal transplantation and injection was 1641 days and and the average number of UTIs from renal transplantation to endoscopic injection was 2.2 per patient. The two groups were separated to compare treatment success (pyelonephritis resolution and/or improvement of reflux grade): group A with 14 patients with VUR grades I–III; and group B with 17 patients with VUR grades IV–V. To analyze renal function, patients were divided into three other groups: 1: UTI clinical resolution, VUR radiological resolution; 2: UTI clinical resolution, VUR radiological persistence; and 3: UTI clinical persistence, VUR radiological persistence (therapeutic fail). Renal function was evaluated by the highest creatinine after renal transplantation (basal), creatinine at the time of injection and two years after treatment. The groups were compared using paired t-test and analysis performed with SPSS 19.0 software. Statistical significance was $p<0.05$.
Results: According to the initial VUR grade, success rate after injection was calculated. as: radiological 18.2% in group A, 29.4% in group B; clinical 71.4% in group A, 52.9% in group B. No statistical difference between these groups was found. Function loss was observed despite clinical or radiological success, with no difference in creatinine evolution between all three groups.
Conclusions: VUR treatment with bulking agents has a low rate of radiological resolution but can prevent new pyelonephritis episodes in most patients. VUR grade did not interfere with the procedure's success rate. Regardless of clinical and/or radiological success, treatment did not prevent renal function impairment.