Robotic Reconstruction: Current Concepts

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Disclosures

• No relevant financial disclosure
LAPAROSCOPIC NEPHRECTOMY: INITIAL CASE REPORT

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ABSTRACT

A tumor-bearing right kidney was completely excised from an 85-year-old woman using a laparoscopic approach. A newly devised method for intra-abdominal organ entrapment and a recently developed laparoscopic tissue morcellator made it possible to deliver the 190 gm. kidney through an 11 mm. incision.

KEY WORDS: kidney neoplasms, nephrectomy, laparoscopy, carcinoma

Although major advances in laparoscopic surgery have been made in the area of gynecology, its application in the realm of general surgery and urology has been limited.1 Recently, with the development of laparoscopic cholecystectomy, more interest in minimally invasive laparoscopic procedures has occurred.2 The advantages of this approach are obvious to the patient and surgeon, including shorter hospitalization, lower morbidity and more rapid convalescence. However, while small lesions (diminutive uterine myomas) or small hollow organs (appendix or gallbladder) can be removed laparoscopically, there have been 3 deterrents to the spread of laparoscopy into other areas of traditional abdominal surgery: 1) the need for extensive tissue dissection and vascular control, 2) the requirement for proper organ isolation to preclude abdominal contamination with bacteria or cancerous cells from the diseased organ and 3) the development of an instrument to allow for the safe and rapid removal of tissue through an 11 mm. laparoscopic port. We describe how each of these problems was addressed to accomplish a modified radical nephrectomy using laparoscopic techniques.

FIG. 1. Preoperative CT scan reveals 3 cm. renal mass (arrows) occupying lateral border of mid portion of right kidney. Right kidney measures 6.5 × 5.5 × 6.5 cm.
LAPAROSCOPIC RADICAL PROSTATECTOMY WITH A REMOTE CONTROLLED ROBOT

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ABSTRACT

Purpose: Robotics in surgery is a recent innovation. This technology offers a number of attractive features in laparoscopy. It overcomes the difficulties with fixed port sites by restoring all 6 degrees of freedom at the instrument tips, provides new possibilities for miniaturization of surgical tasks and allows remote controlled surgery. We investigated the applicability of remote controlled robotic surgery to laparoscopic radical prostatectomy.

Materials and Methods: Our previous experience with laparoscopic prostatectomy served as a basis for adapting robotic surgery to this procedure. A surgeon at a different location who activated the tele-manipulators of the da Vinci® robotic system performed all steps of the intervention. A scrub nurse and second surgeon who stood at patient side had limited roles to port and instrument placement, exposure of the operative field, assistance in hemostasis and removal of the operative specimen. Our patient was a 63-year-old man presenting with a T1c tumor discovered on 1 positive sextant biopsy with a 3+3 Gleason score and 7 ng/ml. preoperative serum prostate specific antigen.

Results: The robot provided an ergonomic surgical environment and remarkable dexterity enhancement. Operating time was 420 minutes, and the hospital stay lasted 4 days. The bladder catheter was removed 3 days postoperatively, and 1 week later the patient was fully continent. Pathological examination showed a pT3a tumor with negative margins.

Conclusions: Robotically assisted laparoscopic radical prostatectomy is feasible. This new technology enhances surgical dexterity. Further developments in this field may have new applications in laparoscopic tele-surgery.

KEY WORDS: robotics, feasibility studies, laparoscopy, prostatectomy, prostatic neoplasms
Surgeons
Accommodating Change

Shock
Bargaining
Anger
Denial
Panic
Depression

Acceptance
Resignation
Accommodation and Growth
Open vs Minimally-invasive Pyeloplasty

- Success rates similar
- MIP
  - Shorter length of stay
  - OR times similar
- ? Cost
- ? New “Gold Standard”

- Oberlin, Urol, 2015
Is it better?
Or is it...

• A gimmick?
Robot vs Open

• Advantages
  – Less blood loss
  – Shorter length of stay
  – Less narcotic requirement/less pain
  – Less wound infections
  – Easier on surgeon
Challenges

- “Barriers to implementation”
  - Longer operative time -> complications?
  - Difficulties docking
  - Loss of tactile feedback
  - Reoperative fields
  - Access to foley/perineum

- More expensive
“Traditional Robotic Reconstruction”

- Pyeloplasty
- Lower ureter
- Urinary diversion after cystectomy
“Newer” case reports/series

- Upper ureteral strictures
- Uretero-ureterostomy/Transuretero-ureterostomy
- Buccal graft ureteroplasty
- Ureterointestinal stricture
- Autotransplantation
- Allotransplantation
- Bladder augmentation
- Ileal ureter
- Ileovesicostomy (continent and incontinent)
- Boari flap
Case #1

- 19 yo female, otherwise healthy
- Grade II VUR despite Deflux, unilateral
- Multiple episodes of pyelonephritis, function preserved on nuclear imaging
- Options discussed with patient
- BMI 22, concerned about scars
Open Vs Minimally Invasive Adult Ureteral Reimplantation: Analysis of 30-day Outcomes in the National Surgical Quality Improvement Program (NSQIP) Database


OBJECTIVE
To examine 30-day outcomes of robotic-assisted and pure laparoscopic ureteral reimplantation (LUR) vs open ureteral reimplantation (OUR) in adult patients for benign disease.

METHODS
We identified adult patients undergoing LUR or OUR by urologists between 2006 and 2013 using the American College of Surgeons National Surgical Quality Improvement Program database, excluding those with concomitant partial cystectomy or ureterectomy. Multivariable regression modeling was used to assess for the independent association of minimally invasive surgery (MIS) with 30-day complications, reoperations, or readmissions.

RESULTS
Of 512 patients identified, 300 underwent LUR and 212 underwent OUR. Baseline characteristics including age, race, body mass index, and cardiovascular comorbidities were similar between LUR and OUR (all P > .05). Patients who underwent LUR had higher median preoperative serum creatinine (1.1 mg/dL vs. 1.0 mg/dL, P = .03), increased presence of a resident (51% vs 34%, P < .01), and shorter hospitalization (1 [interquartile range 0–3] days vs 4 [interquartile range 3–6] days, P < .01) compared to patients who underwent OUR. LUR had lower overall complications (9% vs 28%, P < .01), especially with regard to transfusions (1% vs 11%, P < .01), superficial wound infections (0% vs 5%, P < .01), and urinary tract infections (5% vs 11%, P = .03). On multiple regression analysis, MIS was an independent predictor of lower overall complication rate (odds ratio [OR] 0.24 [0.14–0.40], P < .01), but was not predictive of readmission (OR 0.93 [0.44–1.98], P = .16) or reoperation (OR 2.09 [0.90–4.42], P = .10).

CONCLUSION
In the largest current series assessing the impact of MIS on adult ureteral reimplantation, data from the National Surgical Quality Improvement Program demonstrate that LUR results in decreased 30-day complications. UROLOGY 94: 123–128, 2016. © 2016 Elsevier Inc.
Table 2. Univariate analysis of patients undergoing ureteral reimplantation stratified according to surgical approach (open vs minimally invasive)

<table>
<thead>
<tr>
<th></th>
<th>OUR</th>
<th>LUR</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients, n (%)</td>
<td>212 (41.4)</td>
<td>300 (58.6)</td>
<td></td>
</tr>
<tr>
<td>Overall complications, n (%)</td>
<td>60 (28.3)</td>
<td>27 (9.0)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Wound complications</td>
<td>19 (9.0)</td>
<td>2 (0.7)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Superficial infection</td>
<td>10 (4.7)</td>
<td>0</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Deep infection</td>
<td>1 (0.5)</td>
<td>0</td>
<td>.41</td>
</tr>
<tr>
<td>Organ space infection</td>
<td>5 (2.4)</td>
<td>1 (0.3)</td>
<td>.09</td>
</tr>
<tr>
<td>Wound disruption</td>
<td>4 (1.9)</td>
<td>1 (0.3)</td>
<td>.17</td>
</tr>
<tr>
<td>Renal complications</td>
<td>2 (0.9)</td>
<td>3 (1.0)</td>
<td>1.0</td>
</tr>
<tr>
<td>Renal insufficiency</td>
<td>2 (0.9)</td>
<td>2 (0.7)</td>
<td>1.0</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>0</td>
<td>1 (0.3)</td>
<td>1.0</td>
</tr>
<tr>
<td>Thromboembolic complications</td>
<td>3 (1.4)</td>
<td>1 (0.3)</td>
<td>.31</td>
</tr>
<tr>
<td>Deep vein thrombosis</td>
<td>2 (0.9)</td>
<td>1 (0.3)</td>
<td>.57</td>
</tr>
<tr>
<td>Pulmonary embolism</td>
<td>2 (0.5)</td>
<td>0</td>
<td>.17</td>
</tr>
<tr>
<td>Infectious complications</td>
<td>27 (12.7)</td>
<td>19 (6.3)</td>
<td>.02</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>23 (10.9)</td>
<td>16 (5.3)</td>
<td>.03</td>
</tr>
<tr>
<td>Sepsis/Septic shock</td>
<td>11 (5.2)</td>
<td>7 (2.3)</td>
<td>.09</td>
</tr>
<tr>
<td>Cardiac complications</td>
<td>2 (0.9)</td>
<td>0</td>
<td>.17</td>
</tr>
<tr>
<td>Pulmonary complications</td>
<td>2 (0.9)</td>
<td>7 (5.3)</td>
<td>.32</td>
</tr>
<tr>
<td>Neurologic complications</td>
<td>1 (0.5)</td>
<td>2 (0.7)</td>
<td>1.0</td>
</tr>
<tr>
<td>Transfusion, n (%)</td>
<td>24 (11.3)</td>
<td>4 (1.3)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>LOS, days [median, IQR]</td>
<td>4 [3,6]</td>
<td>1 [0,3]</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Reoperation, n (%)</td>
<td>8 (3.7)</td>
<td>26 (8.7)</td>
<td>.03</td>
</tr>
<tr>
<td>Readmission*, n (%)</td>
<td>22 (15.3)</td>
<td>14 (13.0)</td>
<td>.72</td>
</tr>
<tr>
<td>Death, n (%)</td>
<td>0</td>
<td>4 (1.3)</td>
<td>.15</td>
</tr>
</tbody>
</table>

LOS, length of stay; other abbreviations as in Table 1.
All significant (P < .05) values are bolded.
* Readmission data available only for years 2011-2013.
Robot vs Open

- LOS = 1 vs 4
- Higher transfusions in open group
- 4/300 mortalities in robot group
- More wound infections and UTI in the open group
- Equal readmissions
- More reoperations in the robot group (8% vs 3%)
- No long-term outcomes
Robot-assisted ureteroneocystostomy: technique and comparative outcomes.


Abstract

BACKGROUND AND PURPOSE: Ureteroneocystostomy can be used for the treatment of patients with a wide variety of ureteral pathology. Over the last decade, robot-assisted surgery has become more commonly used as a minimally invasive approach for reconstructive upper urinary tract procedures. The aim of this study is to present our experience with robot-assisted ureteroneocystostomy (RUNC) with a comparison with that of open ureteroneocystostomy (OUNC).

PATIENTS AND METHODS: Medical records of 25 patients who underwent RUNC and 41 patients who underwent OUNC or at our institution between 2000 and 2010 were retrospectively analyzed. Perioperative and postoperative data including demographics, surgical outcomes, and clinical and radiographic findings at postoperative follow-up were considered in the comparative analysis. Descriptive statistics were used to present the data. The significance of the difference between variables was evaluated using the Wilcoxon rank sum test for continuous and Fisher exact test for categorical variables.

RESULTS: No significant differences were detected in terms of baseline patient characteristics between the two groups. The OUNC procedures were performed with a shorter median operative time (200 vs 279 min., P=0.0008), whereas RUNC patients had a shorter hospital stay (median 3 vs 5 days, P=0.0004), less narcotic pain requirement (morphine equivalent, mg 104.6 vs 290, P=0.0001), and less estimated blood loss (100 vs 150 mL, P=0.0002). There was no significant difference in the rate of reoperation between groups: RUNC 2/25 (7.6%) vs OUNC 4/41 (9.7%) P=0.8. Limitations include the retrospective nature of the study and the difference in indications for surgery.

CONCLUSION: RUNC provides excellent outcomes with shorter hospital stay, less narcotic pain requirement, and decreased blood loss when compared with the open procedure. Advantages of the robotic platform for dissection and suturing can be useful for complex minimally
Ureteroneocystostomy

• Isac et al
  – Less blood loss
  – Less pain
  – Shorter length of stay
  – Longer OR time (279 vs 200 minutes)
  – Complications and reoperations equivalent
Case #2

- 46 yo female referred after laparoscopic hysterectomy for dysfunctional uterine bleeding
- Morbidly obese with truncal obesity
Problem?

- She has the “gynecologic trifecta”
  1) Right ureteral injury
  2) Left ureteral injury
  3) Vesicovaginal fistula

Another Pfannenstiel?
Challenge

• Morbidly obese patients
  – May be easier to access deep into the pelvis
  – Harder to gain lap access
  – May not tolerate Trendelenburg as well
  – ? Equal outcomes
The impact of body mass index on surgical outcomes of robotic partial nephrectomy

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Accepted for publication 8 February 2012

Study Type – Therapy (case series)
Level of Evidence 4

OBJECTIVE

• To assess the impact of body mass index (BMI) on the surgical outcomes of robotic partial nephrectomy (RPN).

PATIENTS AND METHODS

• Medical charts of 250 consecutive patients who underwent RP at our institution between 2006 and 2010 were reviewed.
• Patients were categorized based on their BMI into four groups per international classification of obesity into: normal (BMI < 25 kg/m²), overweight (25–29.9), obese (30–39.9) and morbidly obese (≥40).
• Preoperative characteristics as well as perioperative and postoperative outcomes were analysed and compared between the groups.

"What's known on the subject?" and "What does the study add?"

Obesity is associated with higher incidence of renal cell carcinoma. Laparoscopic and robotic partial nephrectomy (RPN) was shown to be technically feasible in the obese population. In the present study we evaluated the impact of obesity on outcome of RPN, in a large cohort of patients.

In the present study, obese patients had a higher American Society of Anesthesiologists score and larger tumour size. We evaluated obesity as a categorical and a continuous variable, and we adjusted for confounding factors. We categorized obesity based according to the WHO classification of obesity. We described our technical modifications to overcome difficulties that can be encountered during the surgery. Obese patients had a higher estimated blood loss, but no difference in blood transfusion rate, operation duration or warm ischaemia time.

• Groups were similar in terms of age, gender, history of previous surgery and nephrectomy score (P = 0.5).
• Patients with higher BMI had a higher American Society of Anesthesiologists (ASA) score (median 3 for obese and morbidly obese groups vs 2 for non-obese groups; P = 0.002) and tumour size (median 3.6, 2.9, 2.5 and 2.3 cm in those categories).
• No significant difference was detected between the groups in terms of operation duration, warm ischaemia time, transfusion rate and postoperative complications.

CONCLUSION

• Robotic partial nephrectomy represents an effective treatment modality for renal cell carcinoma, and can be performed in obese patients.

[Further details and findings discussed in the full text]
Case #3

- 70 yo female with h/o radiation for cervical cancer 7 years ago
- Managed with indwelling left ureteral stent for 5 years for ureteral stricture
- Now desires to be “tube-free”
- Preserved function at 30%
- Bladder small on UDS, but has safe storage pressures
Case #4

- 64 yo female with refractory IC
- Arrives with AUA Guidelines printed and dates of all the failed treatments
- Requests “robotic cystectomy and ileal conduit”
- Adamant that she does not want continent diversion
Intracorporeal Diversion

- 2 cases of intracorporeal diversion
- Both prolonged operative times
  - 330 and 400 minutes
  - Ileal ureter required a position change
Challenge

• Intracorporeal bowel anastomosis
  – Mimic open techniques
  – No incision for recon cases (no specimen)
  – How to improve times?
Intracorporeal Bowel Anastomosis

RESEARCH ARTICLE

Robotic Assisted Radical Cystectomy with Extracorporeal Urinary Diversion Does Not Show a Benefit over Open Radical Cystectomy: A Systematic Review and Meta-Analysis of Randomised Controlled Trials

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Abstract

Background

The number of robotic assisted radical cystectomy (RARC) procedures is increasing despite the lack of Level I evidence showing any advantages over open radical cystectomy (ORC). However, several systematic reviews with meta-analyses including non-randomised studies, suggest an overall benefit for RARC compared to ORC. We performed a
Robotic intracorporeal urinary diversion: technical details to improve time efficiency.


Abstract

OBJECTIVES: To present time-efficiency data during our initial experience with intracorporeal urinary diversion and technical tips that may shorten operative time early in the learning curve.

PATIENTS AND METHODS: Data were analyzed in the initial 37 consecutive patients undergoing robotic radical cystectomy and intracorporeal urinary diversion in whom detailed stepwise operative time data were available. Median age was 65 years and median body mass index was 27. Neoadjuvant chemotherapy was administered in 6 patients and 11 patients had clinical evidence of T3 or lymph node-positive disease. Each component of the operation was subdivided into specific steps and operative time for each step was prospectively recorded. Peri-operative and follow-up data up to 90 days and final pathological data were recorded.

RESULTS: All procedures were completed intracorporeally and robotically without need for conversion to open surgery or extracorporeal diversion. Median total operative time was 387 vs 386 minutes (p=0.2) and median total console time was 361 vs 295 minutes (p<0.007) for orthotopic neobladder and ileal conduit, respectively. Median time for radical cystectomy was 77 minutes, extended pelvic lymph node dissection was 63 minutes, and diversion was 111 minutes (ileal conduit 92 minutes and orthotopic neobladder 124 minutes). Median estimated blood loss was 250 mL, and median hospital stay was 9 days. High grade (Clavien grade 3-5) complications at 30 and 90 days follow-up were recorded in 6 (16%) and 9 (24%) patients, respectively. Over a median follow-up of 16 months, 12 (32%) patients experienced disease recurrence and 9 (24%) died from bladder cancer. These correspond to 1-year recurrence-free and overall survival of 64% and 70%, respectively.

CONCLUSIONS: Intracorporeal urinary diversion following robotic radical cystectomy can be safely performed and reproducible in a time-efficient manner even during the early learning curve.
Intracorporeal Bowel Anastomosis

Current Status of Robot-Assisted Radical Cystectomy and Intracorporeal Urinary Diversion

Raj Kurpad, Michael Woods, Raj Pruthi

Abstract Robot-assisted surgery has become a widely used surgical approach in the management of urologic malignancies. With its initial experience in the treatment of prostate cancer, the technology rapidly expanded to other urologic malignancies including bladder cancer. Since its introduction in 2003, robot-assisted radical cystectomy has seen refinement and increased penetration over the last decade. Furthermore, urologic surgeons have expanded its use to perform urinary diversions. The concept of intracorporeal urinary diversion is still in development but continues to see increased refinement among high volume academic centers.

Keywords Robot-assisted radical cystectomy - Intracorporeal urinary diversion - Robotic cystectomy

diagnosed with bladder cancer in 2015 [1]. Unfortunately, bladder cancer continues to have a significant cancer-specific mortality with approximately 31,000 patients dying from their disease each year [1]. The majority of patients (70%) who are newly diagnosed present with non-muscle-invasive disease involving either the bladder mucosa or into the lamina propria (Tis, Ta, or T1) [2]. A significant minority of patients (30%) present with muscle invasive disease (T2). Due to the unfortunate aggressive nature of bladder cancer, a small number of patients unfortunately present with evidence of invasive carcinoma into perivesical fat (T3), surrounding organs (T4), or even distant metastases either into distant organs or into lymph nodes [2]. Despite the many advances that have benefitted modern medicine, bladder cancer continues to carry a heavy disease burden on those who become afflicted.
Intracorporeal Bowel Anastomosis

• Desai et al, Jendo 2014
  – OR times decreased by 61 minutes after 10 cases

• Tips/tricks
  – Add ports
  – Liberal use of traction sutures and “marionette” sutures
  – Measurement of bowel (can be done preoperatively by imaging)
    • Penrose, umbilical tape
Intracorporeal Bowel Anastomosis

• Tips/tricks continued:
  – ICG to ensure bowel is viable
  – Double J stents instead of single J stents
  – Vascular staple loads control the mesentery
Challenge

- Operative times are long
- Learning curve is undefined
- How to get over the learning curve with relatively few cases?
- Decrease operative times to keep complications low.
Complications

- Risk of complications increases with OR time
  - Intraocular pressure
  - DVT
  - Wound infection
  - Nerve/positioning injuries
  - Pneumonia
- Mostly reports of good outcomes, not complications
Learning Curve of Robotic Assisted Pyeloplasty for Pediatric Urology Fellows

Gregory E. Tasian, MD, MSc, Douglas J. Wiebe, PhD, and Pasquale Casale, MD

Abstract

Purpose—Little is known about the learning curve of robotic surgery for surgeons-in-training. We hypothesized that pediatric urology fellows could attain proficiency in robotic pyeloplasty, defined as an operative time equivalent to that of an experienced robotic surgeon, within the two-year time frame of fellowship.

Material and Methods—From 2006–2010, we performed a prospective cohort study of four pediatric urology fellows and one pediatric urology attending performing pediatric robotic pyeloplasty. The operative times and surgical outcomes of 20 consecutive robotic pyeloplasties performed by four pediatric urology fellows (n = 80 cases) and a random sample of 20 cases performed by the attending surgeon were recorded. Multivariate linear regression was used to determine the change in operative time for each case the fellows performed and to estimate the number of cases necessary for fellows to achieve the median operative time of the attending pediatric urologist.

Results—The fellows' operative times decreased at a constant rate of 3.7 minutes on average per case (95% CI 3.0–4.3 min/case). Fellows were projected to achieve the median attending operative time of 80 min/case after performing 27 cases. Upon completion of 48 cases, the fellows’ operative times were within 95% of the attending surgeon's operative time.
Operative Times

Fellow Learning Curve for Robotic Pyeloplasty

Operative time (minutes)

Cases (n)

Median operative times for fellows
Linear prediction

n=37 cases
Challenge

• Identifying the strictured ureter
  – Visualization
  – No tactile/haptic feedback
  – Infusion through nephrostomy/ureteral catheter
  – ICG
Surgical Techniques in Urology

Novel Use of Indocyanine Green for Intraoperative, Real-time Localization of Ureteral Stenosis During Robot-assisted Ureteroureterostomy

Ziho Lee, Jay Simhan, Daniel C. Parker, Christopher Reilly, Elton Llukani, David I. Lee, Jack H. Mydlo, and Daniel D. Eun

OBJECTIVE
To present a novel method to intraoperatively localize ureteral strictures during robot-assisted ureteroureterostomy via indocyanine green (ICG) visualization under near-infrared (NIR) light.

MATERIALS AND METHODS
Seven patients underwent robot-assisted ureteroureterostomy for ureteral stricture by a single surgeon (D.D.E.). Intraoperative localization of ureteral stricture involved instilling ICG (25 mg in 10 mL distilled water) above and below the level of stenosis through a ureteral catheter or a percutaneous nephrostomy tube, or both. The fluorescent tracer was detected as a green color using the NIR modality on the da Vinci Si (Intuitive Surgical, Sunnyvale, CA). All patients consented to off-label use of ICG after full disclosure.

RESULTS
Intraoperative ICG injection and visualization under NIR light assisted in the performance of a tension-free anastomosis in all patients. At the time of surgery, mean age was 55.7 ± 12.4 years and mean body mass index was 30.3 ± 5.8 kg/m². Mean operative time was 171.3 ± 52.4 minutes, mean estimated blood loss was 175.0 ± 146.5 mL, and mean length of ureteral excision on pathologic analysis was 1.6 ± 0.7 cm. There were no immediate or delayed adverse effects attributable to intraureteral ICG administration. Mean hospital length of stay was 1.6 ± 1.5 days, with no postoperative complications. Mean follow-up was 5.9 ± 1.5 months, and all cases were clinically and radiographically successful at last follow-up.

CONCLUSION
Intraureteral injection of ICG with visualization under NIR light allows for real-time delineation of the ureter. Additionally, ICG administration aids in discerning healthy ureter from diseased tissue, further assisting successful robotic ureteral repair. UROLOGY 82: 729–733, 2013. © 2013 Elsevier Inc.
Port placement
Port Placement

• Depends on target anatomy
  – Similar to oncologic procedures in most instances
  – Nothing particularly unique about reconstruction
• May need to reposition/re-use port sites
• Easier with new models of the daVinci robot
Docking

- Side, Parallel, Over the shoulder, Lithotomy
- General Rule:
- Lithotomy/side docking for pathology *below* the iliacs and flank/over the shoulder for *above*
Upper
Upper

• Useful for:
  – Pyeloplasty
  – Upper ureter strictures
  – Heminephrectomy
  – Autotransplant – part 1
  – Ileal ureter – part 2
• Useful for:
  – Augmentation/vesicostomy
  – Lower ureter
  – Diverticulectomy
  – Autotransplant – part 2
  – Ileal ureter – part 1
  – Mid-ureter/Boari/Psoas (modified – next slide)
Lower - Left
Challenge

- Cystoscopy during robotic bladder diverticulectomy for identification of diverticulum
Side Docking

- Allows access to perineum
- Can keep patient supine
- Foley manipulation
- Cystoscopy, stent placement, ureteral manipulation
Side Docking

Patient Cart

Patient in Lithotomy
Side Docking
Challenge

- Changing positions for some complex cases
- daVinci Xi
  - Smaller arms
  - Ports placed closer together
  - Camera can be moved to any port
Challenge

Choice of incision

1- Kocher incision
2- Midline incision
3- Mc Burney incision
4- Battle incision
5- Lanz incision
6- Para median incision
7- Transverse incision
8- Rutherford Morrison incision
9- Pfannenstiel incision
Prior Surgery

- Many patients requiring reconstruction have had prior surgery
- Does not preclude lap/robotic approach
- May increase length of procedure
- Most report/series are carefully selected cohorts
Impact of Previous Abdominal Surgery on Robot-Assisted Radical Cystectomy

Bertram E. Yuh, MD, Joseph Ciccone, MD, Rameela Chandrasekhar, Zubair M. Butt, MBBS, Gregory E. Wilding, PhD, Hyung L. Kim, MD, James L. Mohler, MD, Khurshid A. Guru, MBBS

ABSTRACT

Objective: We analyzed the effect of previous abdominal surgery (PAS) on consecutive patients who underwent robot-assisted radical cystectomy (RARC).

Materials and Methods: From 2005 to 2008, 73 patients at a single institution underwent RARC with bilateral extended pelvic lymph node dissection and urinary diversion. Lysis of adhesions was performed robotically and laparoscopically. Records were reviewed to assess the impact of PAS on operative outcomes and complications up to 3 months after surgery.

Results: Of the 73 patients, 37 (51%) had undergone PAS. Of these, 6 (16%) had PAS above the umbilicus, and 31 (84%) had surgery either above and below or strictly below the umbilicus. Patients with PAS were significantly older than those without (P<0.01). No statistically significant difference was seen with respect to blood loss, transfusion requirement, operative time, lysis of adhesion time, length of ICU stay, overall hospital stay, or the need for reoperation between patients with PAS and those without PAS. The overall postoperative complication rate was higher in the group with PAS (P=0.04). Lymph node yield safely completed robotic operation. Patients should be counseled about their risk of obstacles after surgery.

Key Words: Cystectomy, Robot-assisted radical cystectomy, Abdominal surgery.

INTRODUCTION

Previous abdominal surgery (PAS) frequently results in adhesions that potentially complicate subsequent minimally invasive surgical attempts. Adhesions can form in up to 95% of abdominal surgeries. The possible pitfalls associated with operating in a poorly defined field must be weighed against the potential benefits of minimally invasive surgery.

In colorectal surgery, the safety of laparoscopy in patients with PAS has been well described. Several studies have also documented feasibility of laparoscopic renal surgery in the previously operated abdomen. However, the effect of abdominal adhesions on urologic pelvic surgery, in particular robot-assisted surgery, has not been extensively...
Prior Surgery

- JSLS 2009, Yuh, et al
- Robotic cystectomies
- 73 patients, 37 with prior abdominal surgery
- No increased risk of conversion
- OR times similar
- There was an increased risk of complications
Challenge

- How do you place this robotically?
Placing a Stent!

- Initially a difficult part of robotic ureteral procedures
- Refinement in technique has reduced time required
  - Additional port or percutaneous placement
  - Glidewire protruding from stent 4-5cm
  - Fill bladder with dye
  - For mid-ureter, feed wire through side hold, stabilize stent with 3rd arm
Challenge

- Surgeon is not at the bedside
TilePro

- Ability to view imaging side-by-side with robotic camera view
- Can also view endoscopic imaging
  - Guidance during diverticulectomy
  - URS for evaluation of ureter
  - Pyeloscopy for stones
Future Directions

• Competing platforms
  – Lower cost!
• Smaller arms
• Single port
daVinci SP

- Single port, multiple arms
- Larger incision (22mm), can be hidden in umbilicus
- Non-extirpative surgery
daVinci SP
Conclusions

• Robot is a useful tool for reconstruction
• Much research to be done
• Open surgery not going anywhere soon
Thank you!