t is a great pleasure to welcome you to Rome for the European Meeting on Laparoscopic and Robotic Urologic Surgery. "Challenges in Laparoscopy and Robotics" has reached the 7th edition and the concept that initiated this adventure is still quite alive and shows great potential for the future of Urology.

This meeting intends to bring together technological advances, education and communication in order to ameliorate knowledge of ongoing research and clinical activities.

The comprehensive scientific program will include live laparoscopic and robotic surgery performed by the world's most prominent urologic surgeons and a series of presentations of hot topics in our specialty.

In the past meetings, we have witnessed many challenging laparoscopic procedures. It is now time to expand our indications and to look forward to new challenges.

We are enthusiastically anticipating an extremely stimulating meeting. Live surgery, discussions and thought-provoking debates will take place with participation of the best urologists in the international arena.

We are very proud to host this seventh International meeting in Rome, the perfect city for old antiquities and innovative techniques to convene.

We hope that the challenging procedures that you will see will lead the way towards defining the future of Urologic Surgery.

Vito Pansadoro, Vincenzo Disanto

Course Directors, Scientific Committee, Invited Surgeons, Invited Speakers & Moderators

Challenges 2010 in Laparoscopy & Robotics

The European Congress of Laparoscopy 2010

June 10-11-12 2010

Rome, Italy

Marriott Hotel

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Congress Program

Challenges 2010 in Laparoscopy & Robotics

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Thursday June 10th,

Friday June 11th,

Saturday June 12th, 2010

Congress Program

Thursday, June 10th 2010

Thursday morning

8:00 am	Welcome
Inderbir Gill	Chairman Scientific Committee
Francesco Rocco	President SIU—Società Italiana di Urologia
Joachim Thüroff	President SIU—Société Internationale d'Urologie
Walter Artibani	Secretary adjunct EAU
Jens Rassweiler	Chairman ESUT
Vincenzo Disanto	Meeting Director
Vito Pansadoro	Meeting Director

8:30 am	Surgical Session
Moderators	**Walter Artibani, Renaud Bollens, Guglielmo Breda, Markus Hohenfellner, Michael Marberger**
Jens Uwe Stolzenburg	Single Port right Nephrectomy
Alex Mottrie	Robotic left Psoas Hitch. Left Oophorectomy
Richard Gaston	Left Nephroureterectomy and Partial Cistectomy (neobladder)
Francesco Porpiglia	Minilap Right Adrenalectomy
Inderbir Gill	Right Partial Nephrectomy
Jens Rassweiler	SMART left Pyeloplasty
Giorgio Guazzoni	Robotic Retroperitoneal left Pyeloplasty

10:30 am	Open coffee break

Thursday, June 10th 2010

Thursday afternoon

2:30 pm	Lunch
3:00 pm	Scientific Session
Moderators	**Paolo Emiliozzi, Claudio Giberti, Luis Martinez Piñeiro, Jens Uwe Stolzenburg, Tullio Sulser**
Michael Marberger	Why when and how to biopsy renal masses
Francesco Porpiglia	Assessment of renal damage following warm ischemia time during LPN: results of a prospective study
Alex Mottrie	Advantages of Robotic Partial Nephrectomy
Jens Uwe Stolzenburg	Aimes and objectives of Single Port Surgery
Giorgio Guazzoni	Advantages of retroperitoneal Robotic Pyeloplasty
Inderbir Gill	TRIFECTA in Lap/Robotic Partial Nephrectomy Ischemia<10-20 mins, neg. margins, no complications
4:30 pm	Open coffee break
5:00 pm	Scientific Session
Moderators	**Francesco Curto, Richard Gaston, Lorenzo Repetto, Francesco Rocco, Joachim Thüroff**
Frans Debruyne	The use of PCA3 in the diagnosis of prostate cancer
Luis Martinez Piñeiro	Prostatic fascial anatomy: how to preserve the neurovascular bundles during LRP
Jens Rassweiler	Ergonomy in laparoscopic and robotic surgery - where are we in 2010
Günter Janetschek	Robotics beyond da Vinci
Xu Zhang	Laparoscopic and Robotic Urology in China
Cora Sternberg	Novel treatments for Kidney cancer
6:30 pm	Adjournment

Friday, June 11th 2010

Friday morning

8:00 am	Surgical Session
Moderators	**Alessandro Amici, Jean de la Rosette, Luis Martinez Piñeiro, Francesco Porpiglia, Vincenzo Scotto di Palumbo, Pietro Signorile, Urs Studer**
Inderbir Gill	Robotic Anterior Pelvic Exenteration with extended Lymphadenectomy
Peter Wiklund	Robotic Intracorporeal Studer Neobladder
Richard Gaston	Neobladder Augmentation. Left Ureteral Reimplantation
Vincenzo Disanto	Partial Cistectomy (Fibromixoid pseudosarcomatous tumor). Right Nephrectomy
Renaud Bollens	Left Psoas Hitch. Left Oophorectomy
Günter Janetschek	RPLND. Residual Mass after Chemotherapy for Testis Cancer
10:30 am	Open coffee break

Friday, June 11th 2010

Friday afternoon

2:30 pm	Lunch

3:00 pm	Scientific Session
Moderators	**Günter Janetschek, Giorgio Guazzoni, Evangelos Liatsikos, Alex Mottrie, Alberto Pansadoro, Giuseppe Sepe**
Inderbir Gill	Robotic Lymphadenectomy: Kidney, Bladder, Prostate, Testis
Peter Wiklund	Indications, technique and results of the Robotic Neobladder
Urs Studer	Nerve sparing Cystectomy
Urs Studer	Primary Lymphatic landing sites of Bladder and Prostate
Franco Gaboardi	Single Port Radical Prostatectomy: Myth or Reality?
Vito Pansadoro	Frozen Section in Laparoscopic Radical Prostatectomy: Oncological outcomes
Pietro Giulio Signorile	New concepts in pathogenesis and therapy of Endometriosis

4:30 pm	Scientific Session
Moderators	**Francesco Curto, Franco Gaboardi, Richard Gaston, Pilar Laguna, Rosario Leonardi, Thierry Pièchaud**
Markus Hohenfellner	Critical appraisal on early continence over time. From RRP to RALP
Bernardo Rocco	Evolution of the posterior reconstruction to achieve better early continence
Mani Menon	How to achieve the best early potency
Vipul Patel	*Continence, Potency and Oncologic Outcomes after Robotic-Assisted Radical Prostatectomy: "The Search for the Trifecta".*
Richard Gaston	Comparison of 1500 LRP vs. 1500 RALP. Functional and oncological results
Thierry Pièchaud	Comparative outcomes of surgical, laparoscopic and robotic radical prostatectomy: actual review of literature
Walter Artibani	Critical analysis of Robotic Prostatectomy's complications

6:30 pm	Adjournment

Saturday, June 12th 2010

Saturday morning

8:00 am	Surgical Session
Moderators	**Frans Debruyne, Ottavio De Cobelli, Gianluca D'Elia, Thierry Pièchaud, Paolo Pierini, Jens Rassweiler, Bernardo Rocco**
Mani Menon	Nerve Sparing RALP
Richard Gaston	Nerve Sparing LRP
Xu Zhang	Extraperitoneal LRP
Franco Gaboardi	Single Port LRP
Jens Uwe Stolzenburg	Extraperitoneal LRP
Vipul Patel	Nerve Sparing RALP
10:30 am	Open coffee break
2:30 pm	Lunch
3:00 pm	Adjournment

Abstracts

Challenges 2010 in Laparoscopy & Robotics

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Why, when and how to biopsy renal masses

Michael Marberger, MD, FRCS (ed)
Professor and Chairman
Department of Urology
University of Vienna, Austria

Up to 50% of all renal tumors diagnosed today are <4cm in diameter, and they are usually detected in asymptomatic and frequently old and infirm patients. About 20% of these small renal tumors (SRT) are actually benign and the majority have a low potential to progress. As a result less invasive energy ablative and even active surveillance strategies are becoming increasingly more popular.. ~ 10% of SRTs have morphologic parameters suggesting higher aggressiveness, and this increases to ~30% in tumors 3-4cm in diameter. Imaging can not identify these more dangerous SRT´s . If a therapeutic decision other than standard surgical removal is taken it should therefore be based on a biopsy . In our experience a CT guided core needle biopsy performed in local anesthesia as a separate procedure (no frozen sections) provides adequate specimens in 97.5% of patients. It has a 95.2.% sensitivity, 100 % specificity , 100% positive predictive value and 81.3% negative predictive value for the diagnosis of malignant vs. benign tissue. Histologic subtype and Fuhrman grade can be correctly identified in 91% and 76% respectively. In contrast fine needle aspiration biopsies under similar conditions provided insufficient material in 11% of biopsies, and sensitivity and negative predictive value were only 90.6% and 70%, respectively. In 118 biopsies complications were observed in 4% of patients. They were always minor and most commonly formation of hematomas, and never needed further intervention.

Remzi,M , Marberger,M: Eur.Urol.2009:55,359-367
Schmidbauer et al.: Eur.Urol.2008:53,1003-12
Remzi et al: J.Urol. 2006:176,896-9

Assessment of renal damage following warm ischemia time during LPN: preliminary results of a prospective study

Francesco Porpiglia, MD, C. Fiori, R. Bertolo
Associate Professor
Department of Urology
A.S.O. San Luigi
Orbassano-Torino, Italy

As nephrone-sparing surgery become more widely used, there is a resurgence of interest and debate on the effects of warm ischemia time (WIT) on renal function. Determining the safe limits of WIT is essential to minimize the postoperative complications of acute kidney disease and chronic kidney disease (CKD).

Objective

The purpose of this study was to determine which is the best marker to evaluate renal ischemic injury; which are the risk factors of renal damage during laparoscopic partial nephrectomy (LPN); what is the real cut-off to consider renal injury following WIT in course of LPN reversible.

Material and methods

Fifty-nine patients preoperatively signed a consensus to participate at this protocol in agreement with ethic committee, then were treated by LPN for renal mass by the same surgeon. There was not a patient with solitary kidney and the clamp of renal artery only was always performed during LPN. The following pre-operative variables were collected: age, body mass index (BMI), Charlson's comorbidity index, lesion's size measured by computed tomography, operative time, blood losses and warm ischemia time (WIT). These variables were tested to eventually determine independent factors of renal damage. Serum creatinine (SCr), Creatinine clearance, estimated renal plasma flow (ERPF*) and split renal function (SRF*) were collected pre-operatively, at fifth day postoperatively and at third month postoperatively. ERPF and SRF were assessed by 99mTc-MAG3 renal scintigraphy. Kidney damage markers used were 20% decreased (SCr), raised Kidney Disease Outcomes Quality Initiative (K-DOQI) stage, 20% decreased operated kidney ERPF and decreased operated kidney SRF. We chose these markers due to the tested unreliability of daily proteinuria and enzyme daily urine output cause of their great variability in our previous studies. Statistical analysis was then performed as follows: Logistic Regression, to find the most correlated variable to renal ischemic injury with respect to every marker of renal damage; area under curve (AUC) in ROC curves graphs, to find the best marker of renal damage among the markers we used.

Results

We report preliminary results of our statistical analysis about the third month time point. Kidney damage is significantly correlated to age, BMI and WIT; the most predicting of renal injury is WIT (relative risk, RR = 1.5). AUC analysis performed using WIT as independent variable due to its strong association with renal damage after logistic regression analysis showed that ERPF is the best marker of renal damage ($p<0.001$) (AUC = 93%); by 2 x

2 table was then found the ideal cut-off of 20 minutes for WIT. Using this threshold the likelihood ratio for a positive result (LR+) tells us that the odds of renal damage increases 2.2 times when WIT is over 20 minutes.

Conclusions

Based on our preliminary results, the best marker to evaluate renal injury after LPN is ERPF measured by renal scintigraphy; age, BMI, WIT are risk factors of renal injury; WIT is the most correlated to renal injury; based on the AUC analysis the ideal cut off seems to be 20 minutes.

Impact of the learning curve on perioperative outcomes in patients who underwent robotic partial nephrectomy for parenchymal renal tumors

Alex Mottrie, MD[1-2] Geert De Naeyer[1], Peter Schatteman[1], Paul Carpentier[1], Mattia Sangalli[1], Vincenzo Ficarra[1]

[1] Department of Urology O.L.V.-Clinic, Aalst, Belgium

[2] Consultant in Minimal Invasive Urology, University of Gent, Belgium

Background

Robot-assisted partial nephrectomy (RPN) is an emerging, minimally-invasive technique to treat patients with small renal masses. Objective: To evaluate the impact of learning curve on perioperative outcomes such as operative and warm ischemia times, blood loss, overall complications and renal function impairment in patients who underwent robotic partial nephrectomy (RPN).

Objective

To evaluate the impact of learning curve on perioperative outcomes such as operative and warm ischemia times, blood loss, overall complications and renal function impairment in patients who underwent robotic partial nephrectomy (RPN).

Design, setting and participants

We collected prospectively the clinical and pathological records of 62 consecutive patients who underwent RPN for renal tumors at a non-academic teaching institution by a single surgeon with extensive prior robotic experience between September 2006 and November 2009.

Interventions

Transperitoneal robotic partial nephrectomy with excision of an adequate rim of healthy peritumor renal parenchyma.

Measurements

Perioperative parameters, pathological outcome and short-term outcomes for renal function were recorded. The effects of learning curve on the previous reported perioperative and functional outcomes was studied.

Results and limitations

The mean pathological tumor size was 2.8±1.3 cm. A pelvicaliceal repair was needed in 33 case (53%). The mean console time was 91±33 minutes (range 52-180) with a mean warm ischemia time of 20±7 minutes (range 9-40). Warm ischemia (shorten than 20 min) and console time were optimized after the first 30 ($p<0.001$) and 20 case ($p<0.001$), respectively. Pathologic results yielded a positive surgical margin rate of 2%. Mean creatinine level changed from baseline value of 1.02±0.38 mg/dl to 1.1±0.7 mg/dl 3-month after surgery. Estimated GFR changed from baseline value of 81.17±29 to 80.5±29 (ml/min/1.73m2) 3-month postoperatively.

Conclusions

RPN is a viable option for nephron-sparing surgery in patients with renal carcinoma. Specifically, in the hands of a surgeon with extensive robotic experience, RPN requires a short learning curve to reach WIT lower than 20 minutes, console time lower than 100 minutes, limited blood loss and acceptable overall complication rates.

Aims and objectives of LESS

Jens Uwe Stolzenburg, MD, FRCS (Ed)
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SILS or LESS surgery is the further development of laparoscopic surgery. Almost all urologic intra-abdominal and pelvic procedures have already been successfully and safely performed with the LESS approach. Current experience is limited. The technical challenges presented for the performance of the approach should be addressed before the technique can be adopted by several institutions worldwide. For the wider application, refinement of the LESS instrumentation is necessary in order to overcome the technical challenges of the approach. The ongoing intense technological advancement in terms of LESS instrumentation is probably the key to the further development of the technique. The pioneering studies are promising but further clinical evaluation is deemed necessary for the technique to be established.

Advantages of retroperitoneal Robotic Pyeloplasty

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The surgical management of ureteropelvic junction obstruction (UPJO) has dramatically evolved over the past 20 years due to the development of new technologies. The recent worldwide spread of robotic surgical machines, such as the da Vinci system (Intuitive Surgical, Inc., Sunnyvale, CA), has changed the way urologists approach complex laparoscopic reconstructive procedures. Robotic assisted pyeloplasty has been gaining popularity due to the ability to perform small and more precise cuttings and suturings more easily.

Robotic pyeloplasty is usually performed by the transperitoneal approach. However, traditional laparoscopic pyeloplasty is performed with both the trans-peritoneal and the retroperitoneal approach, depending on patient characteristics and surgeons' preferences. Based on our experience in the retroperitoneal approach to laparoscopic pyeloplasty, we wanted to replicate this approach in the field of robotic-assisted pyeloplasty.

The retroperitoneal approach is performed with the patient in full flank position. The operating bed is flexed in order to bridge the surgical area and to increase the space between the iliac crest and the costal arch. The retroperitoneum is bluntly entered at the tip of the 12th rib. The retroperitoneal space is created by inflating a home-made balloon. The 12 mm Hasson style optical port is positioned at the tip of the 12th rib. The other two operative 8 mm robotic trocars are positioned at the conjunction of the 12th rib with the "erector spinae" muscle and at the level of the anterior axillary line 6-8 cm cranially to the iliac crest, respectively. The assistant 5 mm port is positioned along the "erector spinae" muscle, a few centimeters cranially to the iliac crest and is used for suction, retraction and needle insertion/removal. The Da Vinci robotic system is then positioned with the arms entering 25°-30° anterior to the head of the patient. A 30° optic is always used.

We consider a majorexclusion criterium for robotic assisted retroperitoneal pyeloplasty a previously failed open UPJO repair. We prefer a transperitoneal approach in all the patients with previous renal surgery, a wide redoundant pelvis, a pelvic kidney and horseshoe kidney. In all other cases of UPJ repair the decision whether to employ a transperitoneal or retroperitoneoscopic approach mainly depends on the surgeon's preference.

The main advantages of the retroperitoneal approach are related to the lower risk of urine dissemination into the peritoneal cavity when the renal pelvis is transected, thus allowing to safely consider a conservative treatment whenever a urinary fistula or an anastomotic leakage occur. Moreover, the retroperitoneal approach minimizes the risk of intraperitoneal organ injury, such as the colon and small bowel.

Finally, a retroperitoneal approach can be used in patients with BMI> 30 since the full flank position and the flexion of the surgical table allows for an anterior migration of both the subcutaneous and abdominal fat, thus facilitating the surgical procedure as compared to the transperitoneal approach. On the other hand, the retroperitoneoscopic approach has some disadvantages.

Indeed, the retroperitoneal space is characterized by the lack of easily recognizable anatomical structures, by the potentially reduced surgical field due to the tight operative camera view allowed by the retroperitoneal space and finally by the potential closeness of the operative ports. These potential disadvantages may make the retroperitoneal approach more complex to surgeons who are unfamiliar with retroperitoneoscopic laparscopical procedures.

In conclusion, robotic assisted retroperitoneal pyeloplasty is a feasible and reproducible surgical alternative for the treatment of UPJ obstruction offering surgeons trained in the retroperitoneal laparoscopic approach a subjective optimal pelvic reconfiguration. Robotic surgeons should be comfortable with both the transperitoneal and the retroperitoneal approaches to pyeloplasty. In order to properly define the best option for the patient, his medical history and the clinical setting must be evaluated.

TRIFECTA in Partial Nephrectomy: Function, Oncology, Recovery

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Executive Director, USC Institute of Urology
Associate Dean (Clinical Innovation)
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Objectives

TRIFECTA in partial nephrectomy involves 3 goals: a) preserve renal function, b) negative cancer margins, and c) minimize morbidity by achieving a rapid, complication-free recovery. Over our 9 year (1999-2008) experience in more than 1000 laparoscopic partial nephrectomy (LPN) cases, outcomes have improved substantially. Herein, we describe our patient/tumor selection criteria, peri-operative outcomes, complications and renal functional outcomes in 1000 cases, to determine the frequency of trifecta outcomes after LPN.

Materials and Methods

1000 patients undergoing LPN for tumor were retrospectively divided into 3 chronologic eras: Era I: 09/1999–12/2003 (n=294), Era II: 01/2004–12/2006 (n=386), and Era III: 01/2007–11/2008 (n=320). Data, collected prospectively, were evaluated for tumor characteristics, peri-operative outcomes and renal function outcomes.

Results:

On comparing eras I, II and III, tumors in the most recent era were larger, more commonly > 4 cm and central, and less often peripheral < 4 cm (p-value significant for all). Despite increasing tumor complexity, warm ischemia times were shorter (31.9, 31.6 and 14.4min, $p<0.0001$), and overall, post-operative and urologic complications significantly lower in the most recent era. Positive parenchymal margin rates for cancer were 1%, 1%, and 0.6%, respectively. Renal functional outcomes were superior in era III, reflected by lesser percent decrease in estimated glomerular filtration rate (18%, 20% and 11%, respectively). In patients with pathologically-confirmed malignancy (n=744), 5-year overall, cancer-specific, and recurrence-free survival was 90%, 98.5%, and 96.9%, respectively.

Conclusions

TRIFECTA should be a routine goal during partial nephrectomy in 2010. Contemporary LPN outcomes are equivalent to open surgery. Despite increasing tumor complexity, three key outcomes of LPN (ischemia time, complications, renal function) have improved significantly (Figure). We now routinely offer LPN for the majority of tumors hitherto reserved for open nephron-sparing surgery.

The use of PCA3 in the diagnosis of prostate cancer.

Frans Debruyne, MD, PhD, Jack Schalken
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Although the routine use of serum PSA testing has undoubtedly increased prostate cancer detection, one of its main drawbacks has been its lack of specificity, which results in a high negative biopsy rate. Consequently, a large population of men with chronically elevated serum PSA and one or more negative biopsies has emerged. More accurate tests are needed that can help identify which patients are at high risk of developing prostate cancer, and for whom repeat prostate biopsies are mandatory. To improve the specificity of prostate cancer diagnosis, prostate-cancer-specific markers, such as prostate cancer gene 3 (PCA3), are needed. The strong association between PCA3 mRNA overexpression and malignant transformation of prostate epithelium indicates its potential as a diagnostic biomarker. Quantification of PCA3 mRNA levels in urine was found to help predict the outcome of prostate biopsies. The intensive and time-consuming reverse-transcriptase polymerase chain reaction PCA3 urine test has been translated successfully into the fast and easy transcription-mediated amplification (TMA)-based PCA3 test. This test is the first RNA-based molecular diagnostic assay in body fluids for prostate cancer that is available to urologists. The presentation describes the translation of the molecular marker PCA3 from the research laboratory to clinical practice.

Prostatic fascial anatomy: how to preserve the neurovascular bundles during LRP.

Luis Martìnez-Piñeiro, MD, PhD, FEBU
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The magnification obtained with laparoscopy has allowed urologists to rediscover prostatic anatomy. The distinction between intrafascial, interfascial and extrafascial dissection can only be made with the increased visual capability that is obtained with the laparoscopic approach. With open surgery, despite magnification with operating loupes, the surgeon can not make such a distinction between the different surgical dissection planes. Denonvilliers´ facia as described by Cuneo and Veau in 1899 evolves from the fusion of the peritoneum that covers the rectovesical pouch in the developing embryo. In the adult it is a single layer of tissue that separates the prostate from the rectum and only with electronic microscopy it is possible to distinguish a two layer quality. Strictly speaking it is impossible to differentiate between an anterior layer and a posterior layer of Denonvilliers´ fascia. However there is controversy in the literature and some authors, like Villiers et al state that the connective tissue or thin fascia that covers the posterior aspect of the seminal vesicles derives from the original embryonic peritoneum and call it the anterior layer of Denonvilliers´ fascia. S. Gil Vernet on the other hand states that Denonvilliers' fascia does not form from the fusion of the peritoneal folds at the Douglas pouch. The controversy in the anatomic nomenclature does not stop here. Evolution of the laparoscopic radical prostatectomy technique during the last years has brought new concepts and further controversies. Most laparoscopic surgeons describe 3 different types of dissection: the intrafascial, the interfascial and the extrafascial dissection. It is not clear however, if all authors mean the same when they speak about a given plane of dissection. In my opinion Denonvilliers´ fascia is a single layer, that separates the anterior rectal wall from the posterior aspect of the prostate, covered by the prostatic fascia. Denonvilliers´ fascia is attached to the prostatic base and most caudal aspect of the seminal vesicles (Fig 1). Entering the interfascial plane would require either the section of these adhesions or a double cutting of Denonvilliers´ fascia at this point (Fig 2). Furthermore, Martínez-Piñeiro et al [1] describe an anterior extension of Denonvilliers´ fascia that covers the medial aspect of the neurovascular bundles.
For these authors the interfascial plane would be an avascular plane between the prostatic fascia and Denonvilliers´ fascia posteriorly and between the prostatic fascia and the anterior extension of Denonvilliers´ fascia at the posterolateral aspect of the prostate (Fig 3). The intrafascial plane would run under the prostatic fascia. Therefore for these authors complete preservation of the neurovascular bundles can be possible either with the intrafascial or interfascial dissection technique (Fig 3).

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Figure legends
Figure 1 Sagital view of prostatic fascial anatomy

Figure 2 Entering the interfascial plane requires either the section of the adhesions of Denonvilliers' fascia to the prostatic base or a double cutting of Denonvilliers´ fascia at this point

Figure 3 Axial view of prostatic fascial anatomy as described by Martínez-Piñeiro et al [1]. a=intrafascial plane, b=interfascial plane, c1=extrafascial plane with partial preservation of neurovascular bundle, c2=extrafascial plane with no preservation of neurovascular bundle

Figure 1

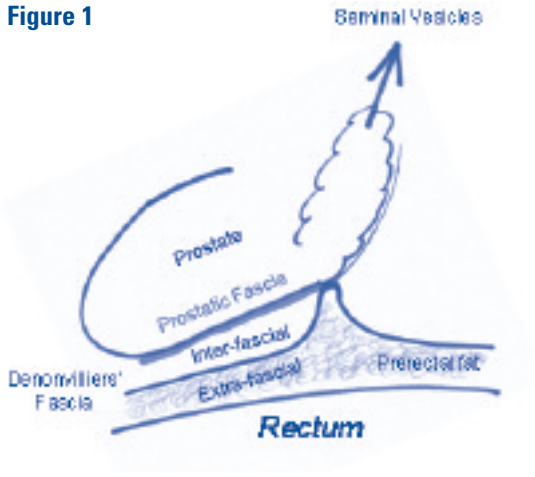


Figure 2

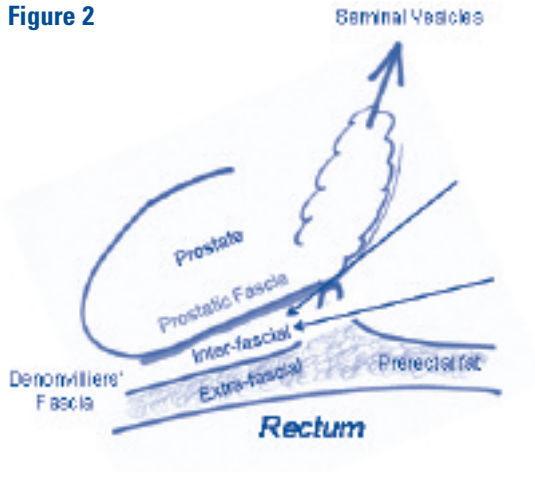
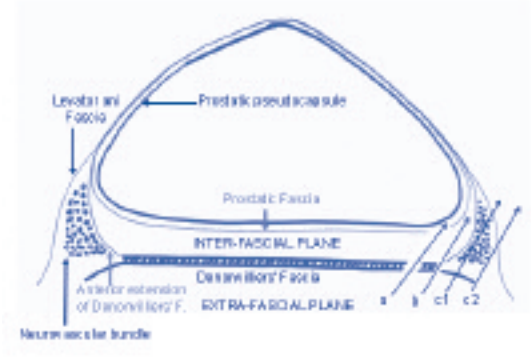


Figure 3



Ergonomy in laparoscopic and robotic surgery - where are we in 2010

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Context

In the United States more than 70% of all radical prostatectomies are performed by use of the da Vinci robot. In Europe, laparoscopic radical prostatectomy (LRP) still plays a significant role.

Objective

To evaluate the actual and future position of LRP based on the analysis of ergonomics with both procedures.

Evidence acquisition

The advantages of robot-assisted laparoscopic prostatectomy (RALP) are mainly related to ergonomic aspects of the procedure, such as the sitting position of the surgeon, the clutch-function enabling comfortable handling of the manipulators. Laparoscopic surgery deserves a significant improvement of ergonomics, such as a chair for the surgeon, specially designed OR-tables, ergonomic design of instrument handles. Future modifications of the laparoscopic technique such a single-port surgery (LESS) may also have an impact on the application and use of LRP.

Conclusion

RALP is here to stay mainly due to the improved ergonomics resulting in a shorter learning curve. Ergonomics of laparoscopy require significant improvement including the design of new OR-tables, supports for the surgeon with integrated foot pedals, mobile HDTV-monitors, new instrument handles to minimize mental and physical stress. The implement of the latter to new approaches such as LESS will close the gap between robot-assisted and pure laparoscopic surgery.

Robotics beyond da Vinci

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The da Vinci robot certainly enhances the capabilities of surgeons not familiar with laparoscopy. However, even dedicated specialists in laparoscopy have switched to robotic surgery even this could not be translated into better results. There is no doubt that the robot offers advantages to the surgeon, mainly an increased number of degrees of freedom, 3D vision, and better ergonomics. Since there are several disadvantages as well – very complex technique, no tactile feedback, separation from patient, need for competent assistance, dependence from the company Intuitive, and last but not least costs – there is an urgent need for advanced alternative technologies to close the gap between standard laparoscopy and the da Vinci robot.

Several instruments recently have come to the market which are steerable and therefore offer an increased number of degrees of freedom. A relatively simple solution is the RealHand from Novare Surgical. However, this instrument misses stability. The laparo-angle from Cambridge-Endo offers 7 degrees of freedom and 360° rotation. However, its use is not very intuitive. The same is true for the radius surgical system from Tübingen Scientific. This is a mechanical manipulator offering 6 degrees of freedom. All these devices help to enhance surgical capabilities, but they are difficult to handle. An important step forward in regard to ease of handling is the manipulator which is being developed by Terumo. This is a handheld electromechanical device which allows for a more intuitive action.

Another improvement of surgical robots can be expected when the wires used for steering are being replaced by a hydraulic system. A respective patent has been placed last year. 3D vision has always been claimed as a major advantage of the da Vinci system. However, 3D systems have inherent disadvantages as well (loss of resolution and limited focal area because of fixed angle of conversion, loss of brightness). Therefore they have never gained acceptance in conventional laparoscopy where they are available for more than 15 years now. In contrast, 3D video is an absolute requirement for the da Vinci robot because it has to compensate for the missing tactile feedback. This year, at the CES 2010 (consumer electronics show) in Las Vegas, the main topic was 3D video. The big players in the field have invested a lot to improve 3D technology. Therefore – because of this world-wide interest – it can be expected that also the endoscopic 3D video systems will be improved to such an extent that they become useful for conventional laparoscopy as well. Robotic surgery is here to stay in laparoscopy. However, robotics will not just mean da Vinci in the future, but new technologies will close the now existing gap between conventional laparoscopy and the actually dominating da Vinci system.

Laparoscopic and Robotic Urology in China

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In Mainland China, the first laparoscopic nephrectomy was performed in 1992. However, the first ten years of twenty-first century witnessed the booming of urological laparoscopic surgery in China. The present status of urologic laparoscopic surgery in China is characterized by following features:

1. The result of a national survey showed that retroperitoneoscopy was the preferred minimally invasive approach, more than 95%, for the adrenal and upper urinary tract pathologic findings. The retroperitoneal laparoscopic Adrenalectomy is one of the procedures most widely accepted in China. I have performed over 1400 cases of the anatomical retroperitoneoscopic Adrenalectomy. The retroperitoneal laparoscopic simple or radical nephrectomy has become the routine surgery in over 100 large comprehensive hospitals or hospitals affiliated to medical university. The challenging reconstructive surgeries including nephron-sparing surgery and Pyeloplasty were also performed in half of the hospitals in China.

2. Because of the low incidence of prostate cancer and the demanding surgical techniques, laparoscopic radical Prostatectomy was performed only in few medical centers in China, mainly in Beijing, Guangzhou and Shanghai. In Mainland China, the first laparoscopic radical prostatectomy was performed in 2002. Nationwide so far an estimated number of 1500 cases have been performed.

3. The first laparoscopic radical Cystectomy was performed in Mainland China in 2003. Actually this challenging procedure is performed by now in over fifty large comprehensive hospitals or hospitals affiliated to medical universities. The orthotopic ileal neobladder and ileal conduit are the preferred urinary diversions. Extracorporeal urinary diversion is performed via a mini-incision, in most cases.

4. Particularly, comparing with the reports from the western countries, the length of hospital stay was not significantly shortened by urologic laparoscopic surgery in China. This might be mainly caused by the difference of health insurance system and traditions between China and the other countries. In China, it is a common practice that patients are discharged from hospital after the stitches of surgical wounds have been removed. Therefore, the mean postoperative stay is longer.

In Mainland China, the first da Vinci surgical system was installed in an army hospital (Chinese PLA General Hospital) in 2007. By the end of 2009, the urology team in this hospital has performed more than 130 robotic surgeries, including radical Prostatectomy, radical Cystectomy, partial Nephrectomy, ureteral reimplantation and Pyeloplasty. By now, there are 21 da Vinci surgical systems installed in China: 3 in Beijing, 4 in Shanghai, 1 in

Nanjing, 1 in Chongqing, 7 in Hong Kong and 5 in Taiwan. However, due to the unique conditions in the developing countries as China, the socioeconomic backgrounds remain as the main bottleneck in popularization of the da Vinci system. In conclusion, the urologic robotic surgery in China is rapidly extending its indications, technical modifications and rapidly accumulating high number of cases.

Novel Treatments for Kidney cancer

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Approvals of sunitinib, sorafenib, bevacizumab plus interferon (IFN)-α and temsirolimus, everolimus and now pazopanib have dramatically altered the management of advanced renal cell carcinoma (RCC). Recent focus has been upon improving the sequencing of these therapies, combination therapy and use of these therapies in the neo-adjuvant and adjuvant setting.

Sunitinib

Sunitinib, a multitargeted TKI (tyrosine kinase inhibitor), was compared with IFN-α in a trial of 750 patients in the frontline setting with clear cell RCC (1). Sunitinib yielded a significantly longer median progression-free survival (PFS) (11 vs 5.1 months) and response rate (RR) (39% vs 8%). In an update, the median OS improved with sunitinib (26.4 vs 21.8 months, p=0.051) (2). Based on these data, cytokines have been supplanted by sunitinib for first-line treatment. Sunitinib has also been demonstrated in separate phase II trials to have significant activity following prior cytokines or bevacizumab (3-5).

Bevacizumab

The AVOREN (Avastin for renal cell cancer) trial randomized 649 previously untreated patients with a significant clear-cell component (>50%) to frontline IFN-α 2a plus placebo or IFN-α 2a plus bevacizumab, a humanized monoclonal antibody to vascular endothelial growth factor (6). The addition of bevacizumab to IFN-α 2a significantly increased median PFS (10.2 vs 5.4 months, HR=0.63, p<0.0001). There was no improvement in OS (overall survival) due to the high amount of crossover (7).
A similar but not placebo-controlled CALGB trial confirmed the improved outcomes with bevacizumab plus IFN-α compared to IFN-α alone (8). The median time to progression was 8.5 months in patients receiving bevacizumab plus IFN compared to 5.2 months with IFN monotherapy (HR 0.71, p<0.0001). Given the PFS reported in a previous trial of bevacizumab alone of 8.5 months in the frontline setting, the value of adding IFN-α 2a is unclear (9). Again no difference in OS was seen due to the rate of crossover (10). The combination of bevacizumab and IFN-α 2a is a legitimate option for the frontline therapy of advanced good and intermediate risk RCC.

Pazopanib

Pazopanib, another oral multikinase angiogenesis inhibitor, has shown clinical efficacy in patients with advanced RCC. 435 patients with clear cell advanced RCC and measurable disease, with no prior treatment or 1 prior cytokine-based treatment, were stratified and randomized (2:1) to oral pazopanib or placebo. The primary end

point was PFS. Secondary endpoints included OS, response rate (RR), and safety. Upon disease progression, placebo patients could receive pazopanib via an extension study (11). A total of 233 treatment-naïve and 202 cytokine-pretreated patients were enrolled. PFS was significantly prolonged with pazopanib in the overall study population (9.2 vs 4.2 months; HR: 0.46; 95% CI: 0.34, 0.62; P < 0.0000001), in treatment-naïve patients (11.1 vs 2.8 months; HR: 0.40; 95% CI: 0.27, 0.60; P < 0.0000001), and in cytokine-pretreated patients (7.4 vs 4.2 months; HR: 0.54; 95% CI: 0.35, 0.84; P < 0.001). Objective RR was 30% with pazopanib compared with 3% with placebo and median duration of response was 58.7 weeks. Pazopanib monotherapy was well tolerated and demonstrated a significant improvement in PFS and RR compared to placebo. Final OS results are awaited.

Temsirolimus

In a randomized phase II trial of 3 different doses of the mTOR (mammalian target of rapamycin) inhibitor, temsirolimus, in the setting of prior cytokine therapy in most patients, an objective response rate of 7% and minor response rate of 26% was observed. Median time to tumor progression was 5.8 months and median survival was 15.0 months. Intermediate and poor risk patients appeared to selectively benefit compared to historical controls (12). Temsirolimus, IFN-α 2a and combination temsirolimus plus IFN-α 2a were compared in a subsequent 626 patient phase III trial that selected patients with primarily poor-risk RCC (13). When compared with interferon alone this translated into a 49% improvement in median survival in patients treated on the single agent temsirolimus arm, while the combination of temsirolimus plus IFN did not improve OS. Temsirolimus is the preferred agent for poor-risk RCC, and perhaps the preferred agent for non clear cell RCC, although this needs further evaluation.

Sorafenib

The TARGET (Treatment Approaches in Renal Cancer Global Evaluation Trial) trial enrolled 903 patients with RCC and compared sorafenib, a multitargeted TKI, to placebo following prior cytokines (14). The median PFS was 5.5 months with sorafenib and 2.8 months with placebo (hazard ratio 0.44, p<0.01). Responses were seen in 10% of patients receiving sorafenib and in 2% of those receiving placebo (p<0.001). The survival improvement was not significant (median 17.8 v 15.2 months; HR=0.88; p=0.146). However, secondary analysis censoring crossover data showed a significant OS benefit for sorafenib (HR=0.78; p=0.0287), since patients did benefit from sorafenib upon crossover (15;16). A smaller randomized phase II trial in the frontline setting did not demonstrate improved outcomes with sorafenib compared to IFN-α (17).

Everolimus

A phase III trial of a novel mTOR kinase inhibitor, everolimus (RAD-001) versus placebo with a 2:1 randomization was completed (18). 410 patients that had received sunitinib, sorafenib or both were enrolled. Additionally, 50% had received prior IFN, and some 50% received IL-2, chemotherapy or bevacizumab. Most patients had undergone prior nephrectomy. Treatment with everolimus was associated with a significant improvement in PFS compared with placebo, the primary endpoint of the trial (4.9 months versus 1.87 months, HR = 0.33; 95% CI 0.25-0.43; p < 0.001). Based on these data, everolimus should be considered a standard for patients with progressive RCC following prior TKIs.

Other novel agents

Other novel agents reveal promise. Of the most active in late stage phase III clinical trials are axitinib (19) and tivozanib. Both are being compared to sorafenib. Axitinib is being evaluated in the second-line setting and Tivozanib is being evaluated as first line therapy.

Role of Cytoreductive Nephrectomy

Randomized trials have demonstrated a significant survival advantage in metastatic RCC with cytoreductive nephrectomy followed by IFN-α (20;21). The vast majority of patients accrued on trials with novel TKIs have undergone prior nephrectomy. However, the role of prior nephrectomy in improving outcomes in the era of novel highly active agents remains to be defined. The paradigm of presurgical systemic therapy followed by cytoreductive nephrectomy may be employed to develop individualized therapy, elucidate mechanisms of resistance and develop reliable prognostic and predictive biomarkers. Early data suggest that administration of the novel anti-angiogenic agents prior to surgery is not associated with increased perioperative mortality or morbidity (22). Data have emerged that demonstrate the feasibility and activity of novel VEGF targeting agents administered as neoadjuvant therapy before cytoreductive nephrectomy in a series of 22 patients treated with sunitinib with the primary tumor in place (23). Two partial responses were reported in the primary tumor, although some response to therapy (18–60% decrease in tumor volume) was recorded in 13 primary tumors overall. Other reports also suggest that sunitinib has substantial activity on the primary renal tumor mass and concurrently controls metastatic sites (24). In one study, 32% of nephrectomy patients had progression of disease during the treatment break with surgery, but 63% of these responded or stabilized on continued post-operative sunitinib (25). A preliminary report shows the slight increase in perioperative complications following neoadjuvant sunitinib (hemorrhage, delayed wound healing and altered surgical field (26). Patients whose primary tumors were in place enrolled in a trial at M.D. Anderson to receive bevacizumab plus erlotinib (n = 23) or bevacizumab alone (n = 27) for 8 weeks followed by restaging. 42 patients underwent nephrectomy and the median PFS was 11.0 months with a median overall survival of 25.4 months. Cytoreduction occurred in both primary and metastatic sites of disease. Therefore, these outcomes appear similar to outcomes in patients that received bevacizumab-IFN and had undergone nephrectomy in the aforementioned large phase III trials (27). Randomized EORTC (SURTIME) and French (CARMENA) trials are trying to further elucidate the role of cytoreductive nephrectomy in the era of targeted therapy.

Conclusions

Six novel agents for the therapy of RCC have been approved. The rational selection of currently approved medicines for the therapy of patients with RCC in different settings is feasible. Since the majority of patients are not cured with currently approved agents, continued research is essential. The future management of RCC is promising with the emergence of novel active agents.

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Robotic & Laparoscopic Lymphadenectomy:Kidney, Bladder, Prostate, & Testis Cancer

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Context

In appropriately selected patients with urologic cancer, definitive surgical therapy implies a concomitant, adequately-performed lymphadenectomy. Until reliable data to the contrary are available, the extended templates described in open uro-oncologic surgery must be replicated during minimally invasive surgery with diligence and rigor. Herein, we present the technical feasibility & outcomes of extended lymphadenectomy during robotic and laparoscopic uro-oncologic surgery.

Methods

Our institutional data from University of Southern California, as well as the reported data in the literature will be presented as they pertain to minimally invasive lymph node dissection.

Results

Kidney cancer and Upper Tract TCC: In select patients undergoing radical nephrectomy for high-risk renal cancer (cT2/T3/T4 disease, sarcomatoid histology, venous involvement, CT evidence of lymphadenopathy) emerging data indicate that concomitant lymphadenectomy confers diagnostic advantage; its therapeutic benefits are controversial. In patients undergoing laparoscopic/robotic radical nephroureterectomy for upper tract TCC, regional lymph node dissection is an integral part of the procedure. Since June 2010, we have implemented a strategy for template nodal dissection in these patients. Our nodal yield has ranged up to 34 nodes, with positive nodes identifies in the inter aorto-caval region.

Bladder cancer

Between 01/2007 through 09/2009, we performed high-extended pelvic lymph node dissection (defined as extending upto the inferior mesenteric artery [N=10] or aortic bifurcation [N=5]) in 15 patients undergoing robotic or laparoscopic radical cystectomy. Mean lymph nodal yield was 36 (range, 15-78), and mean number of positive nodes were 2 (range, 0-23). Mean total operative time was 6.2 hours, and estimated blood loss was 642 cc. Over a mean follow-up of 13 mos (range, 1-32), no recurrences were noted. All procedures were technically successful without need for open conversion. Our report documents the highest nodal yield during minimally invasive radical cystectomy in the literature.

Prostate Cancer

In appropriate patients with high-risk disease, an extended template dissection upto the common iliac artery has been reported from various institutions, and data will be presented.

Testis Cancer

Contemporary literature documenting outcomes of laparoscopic RPLND for testis cancer indicate nodal yields comparable to open surgery will be presented.

Conclusions

Extended lymphadenectomy templates, nodal yields and node-positive rates identical to open surgery are technically feasible during robotic/laparoscopic uro-oncological surgery. We believe that routine demonstration of such oncologic adequacy is the next bar for minimally invasive surgery to surpass.

Indications, Technique and Results of the Robotic Neobladder

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Background

The use of robotic technology for laparoscopic cystectomy is steadily growing worldwide. The number of publication in the scientific literature on the outcome after robot-assisted cystectomy (RARC) is still scarce. We present our technique and experience of this procedure using intracorporeal technique for the urinary diversion.

Method

From 2003 to 2009, 41 patients underwent RARC and urinary diversion. Clinical stage: 2 Tis, 15 T1, 21 T2 and 3 T3, respectively. Surgical procedure: Our technique for RARC involves posterior dissection, lateral pedicle control, anterior dissection and lymphadenectomy prior to either ileal conduit urinary diversion or Studer pouch reconstruction performed intracorporeally. Demographic and peroperative data were recorded prospectively. Oncological and functional outcomes were assessed at three to six months' intervals.

Results

To date, 41 patients have undergone this procedure at our institution. Of those, eight had ileal loop urinary diversion and 33 were suitable for Studer reconstruction. Median total operative time was 478 (range 325 - 760) min. Median blood loss was 525 (range 200 - 2200) ml. Surgical margins were clear in all patients but one. In the 26 patients with extended lymph node dissection a median of 30 (range 17 - 52) lymph nodes was retrieved. The early (< 31 days) complication rate was 34% and the long time (> 30 days) complication rate was 27%. At a mean follow-up of 24 (range 1 - 62) months, two patients had died of metastatic disease and three other is alive with metastases. The remaining 36 patients are alive without recurrence. At 24 months the cancer specific cumulative survival is 89.7% and the cumulative occurrence of metastasis is 20.1%.

Conclusions

RARC remains a procedure in evolution. Our initial experience confirms that it is feasible with acceptable morbidity and oncological outcome.

Nerve Sparing Cystectomy

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Nerve sparing cystectomy has a significant impact on erectile function and urinary continence and should be performed in all patients provided radical tumor resection is not compromised. For successful nerve preservation we advocate 1) dissection ventral to the seminal vesicle, 2) preservation of nerve tissues at the vesicoprostatic angle, and 3) incision and cleavage of the dorsolateral prostatic fascia to avoid damage of the neurovascular bundle. Seminal vescicles sparing surgery in carefully selected patients may facilitate the preservation of the pelvic plexus.

Primary Lymphatic Landing Sites of the Bladder and Prostate

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The role of pelvic lymph node dissection (PLND) in both bladder and prostate cancer has recently been generating renewed interest. In an attempt to avoid PLND, both nomograms and imaging studies have been evaluated; however, so far they have shown limited success because of inadequate accuracy in staging patients. The three primary objectives of this presentation are: to define patients in whom PLND should be performed, to define the extent and consequences of the template for PLND, and to identify the staging and prognostic benefits seen with PLND in bladder and prostate cancer.

Less Radical prostatectomy . Myth or reality? A pilot feasibility study with a personal original technique.

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Introduction

The feasibility and the potential advantages of the single-port laparoscopic radical prostatectomy using a perium-bilical multichannel port plus a second port placed in the left iliac fossa has been evaluated. The aim of this modified procedure is to have an adequate working angle during the most critical steps of the procedure.

Materials and Methods

Between March 2009 and January 2010 I operated on 10 patients with early stage prostate cancer (T1c) and a normal body mass index (<25). The procedure was carried out with a specially-designed multichannel trocar (ASC, TriPort Laparoscopic Access Device, Wicklow, Ireland) which contains two 5mm and one 10mm ports. The device allows up to three instruments to be simultaneously used: a 0° lens laparoscope with a flexible tip (Olympus Surgical, Orangeburg, NY,USA) and two operative instruments: we used standard laparoscopic instruments and three special devices: an harmonic scalpel for obese patients (Sonosurg, Olympus Surgical, Orangeburg, NY, USA), 5mm flexible forceps (Roticulator™, Covidian Autosuture, Mansfield, MA, USA), Suction irrigation canula longer (Elefant™ suction-irrigation cannula, Coloplast, Humlebæk, Denmark). Four patients received a nerve sparing radical prostatectomy. We compared perioperative parameters (pathologic stage, positive surgical margins, operative time, intraoperative blood losses, hospital stay and time of catheterization) with 100 patients operated on conventional multiport radical prostatectomy. We retrospectively selected from our institutional review board–approved database the last 100 patients (mean age 65) with early-stage prostate cancer (T1c) and a normal body mass index (<25) which were operated on conventional five ports laparoscopic radical prostatectomy. The two groups of patients were similar in terms of age, preoperative PSA and bioptic Gleason score. A comparison of the following perioperative parameters was performed: pathologic stage, positive surgical margins, operative time, intraoperative blood losses, hospital stay and time of catheterization. Categorical variables were summarized in frequency tables, the continuous by median and range. Differences among patient characteristics were compared by means of univariate tests. Comparisons were performed by the Pearson's chi-squared test and the Mann-Whitney-Wilcoxon method for categorical and continuous variables respectively.

Results

All cases were completed successfully, without conversion to open surgery or to a standard laparoscopic approach, in a mean operative time of 230 minutes (range 200-260) overall, including lymph node dissection. Blood losses were less than 100ml in all cases. All patients were discharged from the hospital in 3rd postoperative day. The Foley catheter was always removed seven days from surgery. No intraoperative complications occurred. The pathological tumour stage revealed pT2bN0 prostate cancer in 9 cases and pT2cN0 prostate cancer in one case (all without positive surgical margins). After a mean follow-up of 5 months (range 1-11) all patients have an undetectable prostate-specific antigen level and no postoperative early major complications. The first six patients were fully continent within 12 weeks after surgery, one patient uses one safety pad after four months from surgery. The last three patients have a moderate incontinence and are currently under rehabilitation. Regarding potency two patients had intercourses without any therapies within three months from surgery while one patient (6 months follow up) has partial penile tumescence using oral vardenafil. One is currently under rehabilitation. The comparison with the conventional five ports laparoscopic radical prostatectomy (table), which is the standard technique at our Institution, showed that the LESS approach was significantly longer but was associated with a significant reduction of hospital stay. However, the numerical unbalancement of the two groups suggests great caution in the interpretation of the results.

Conclusions

The LESS approach was longer than the conventional multiport approach but it was associated with a shorter hospital stay. Two ports laparoscopic radical prostatectomy is feasible in very selected cases, with few dedicated instruments, however our study should be still considered a technical report and the limits of the technique must still be defined in a larger population by other investigators.

Table. Comparison with conventional five ports laparoscopic radical prostatectomy

Variable	Comparison	LESS Tot. 10	CONTROLS Tot. 100	p-value#
Age	Median (range)	60 (50-75)	65 (48-77)	0.72
Preop. PSA	Median (range)	6.5 (4.8-16.0)	6.2 (2.0-18.9)	0.31
Biopsy Gleason score	Median (range)	6 (6-7)	6 (5-7)	0.97
pTNM	pT2b	9	13	<0.001
	PT2c	1	64	<0.001
	PT3a	0	14	
	PT3b	0	9	
Surgical margins	Positive (%)	0 (0)	20 (20)	0.26
Operative time (min)	Median (range)	220 (200-260)	175 (100-330)	0.026
Blood loss (mL)	Median (range)	100 (0-150)	100 (0-800)	0.08
Hospital stay (days)	Median (range)	3 (3-3)	4 (3-9)	<0.001
Catheter removal (days)	Median (range)	7 (7-7)	8 (7-22)	0.031

 # medians compared by non-parametric Wilcoxon's test; frequencies by Chi-square test.

Frozen Section in Laparoscopic Radical Prostatectomy: Oncological outcomes

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Initially introduced to detect positive lymph nodes, frozen section (FS) has been lately used to identify positive surgical margins (PSM) at radical prostatectomy (RP). Some Authors have reported a PSM rate reduction from 33-42% to 6-12%, with resection of further tissue on the site of PSM at FS. However, the oncological meaning of this negativization of previously PSM has never been investigated. The aim of this report is to confirm or contradict the assumption that a positive margin at FS, with no tumor at further local resection, is oncologically equivalent to a negative margin (NSM).

From March 2001 to May 2009, 270 consecutive pts. underwent laparoscopic RP. FS was performed in all pts., with step sections of inked margins at postero-lateral surface, at the base and at the apex of the gland. In 113 pts a nerve-sparing (NS) procedure was performed. Further resection of tissue corresponding to the PSM was always done. Biochemical recurrence rate (BRR) was considered the endpoint.

Median f-up was 67 mos (4-102). Gleason score was 6 in 40% and 7 in 54% of pts. PSM occurred in 67 pts. (24.8%). After further resection, no residual cancer was found in 33 pts, with overall PSM rate reduction from 24.8% to 12.6%. At 67 mos, PSA recurrence was 2.45%, 15.1% and 11.7% in pts. with NSM, with no residual cancer after further resection of PSM at FS, and with residual cancer after further resection of PSM at FS, respectively. The difference after further resection between no residual cancer and residual cancer was not significant. In 113 pts undergoing NS technique, PSM occurred in 28 pts. (24.7%). After further resection, no residual cancer was found in 13 pts, with overall PSM rate reduction from 24.8% to 12.6%. At 71 mos, PSA recurrence was 10.5%, 30.7% and 26.7% in pts. with NSM, with no residual cancer after further resection of PSM at FS, and with residual cancer after further resection of PSM at FS, respectively. The difference after further resection between no residual cancer and residual cancer was not significant.

In 175 pts with pT2 prostate cancer, PSM occurred in 24 pts. (13.7%). After further resection, no residual cancer was found in 13 pts, with overall PSM rate reduction from 13.7% to 4.6%. At 71 mos, PSA recurrence was 2.45%, 0% and 0% in pts. with NSM, with no residual cancer after further resection of PSM at FS, and with residual cancer after further resection of PSM at FS, respectively. These data are conflicting and could deserve further investigation.Frozen section in 270 patients, submitted to LRP, allowed us to reduce the PSM from 25% to 13%. The original PSM patients, even if the subsequent resection was negative, had the same BRR as the PSM patients with further positive resection. The advantage of frozen section and eventual further resection is questioned.

Critical appraisal on early continence over time. From RRP to RALP

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In the pre-PSA time, every diagnosed prostate cancer could be regarded as potentially lethal. Saving the patients life allowed for wide margins of error in the dissection, especially at the apex followed by disabling incontinence. Today, sensitive diagnostic tools stand for a prime incidence of prostate cancer. Yet, the pathologic significance of many of those tumors is questionable at best. Overtreatment rates of more than 70% are reported. Obviously not all, or probably not even a significant part of the patients, who may be eligeable for active surveillance, is filtered out of the so-called potential curative therapy algorithms. Therefore, the functional outcome of the various treatment options are getting progressively under scrutinity.

During the last 30 years, we have seen continuous improvement in the functional results of radical prostatectomy. Initially the handling of the dorsal venous plexus was the primary problem, since severe bleeding was almost a regular calamity during the operation with the side effect of impaired visibility while dissecting the apex. New insights into the anatomy of the external continence mechanism further advanced its surgical preservation.

Beside the anatomy of the dorsal venous plexus several important anatomical and physiological features were defined:
- the function of the puboprostatic ligaments
- the microscopic relation of the apex to the external sphincter
- the innervation of the external sphincter
- the urethral submucous sealing mechanism
- the anatomy and function of the rectourethral muscle
- the mobility of the urethra and the bladder neck after the vesicourethral anastomosis

This evolution facilitated distinct surgical developments, such as:
- clear separation of the apex from the striated continence mechanism
- reconstruction of the bladder neck
- preservation of the puboprostatic ligaments
- intrafascial radical prostatectomy in the superveil technique
- posterior, lateral and anterior urethral suspension
- preservation of the bladder neck

Obviously there is an ongoing exchange between laparoscopic robotic and open techniques. Some of the newer techniques were advanced by robotic groups, a transfer back to open techniques seems to be feasible. Vice verse

were open elements transfered to robotic strategies. Another important observation is, that many publications report exceptional good functional results during the last 2 decades. Nevertheless continue the same groups to work on improving their results. Consequently one may conclude, that there is still a lot of space left for finetuning the technique of open and robotic radical prostatectomy.

However, a significant contemporary challenge is robotic salvage prostatectomy. Here, incontinence rates of up to 67% are reported, surpassing the already not good results of open surgery distinctly. The reason for these disappointing results remain unclear at present.

Evolution of the posterior reconstruction to achieve better early continence

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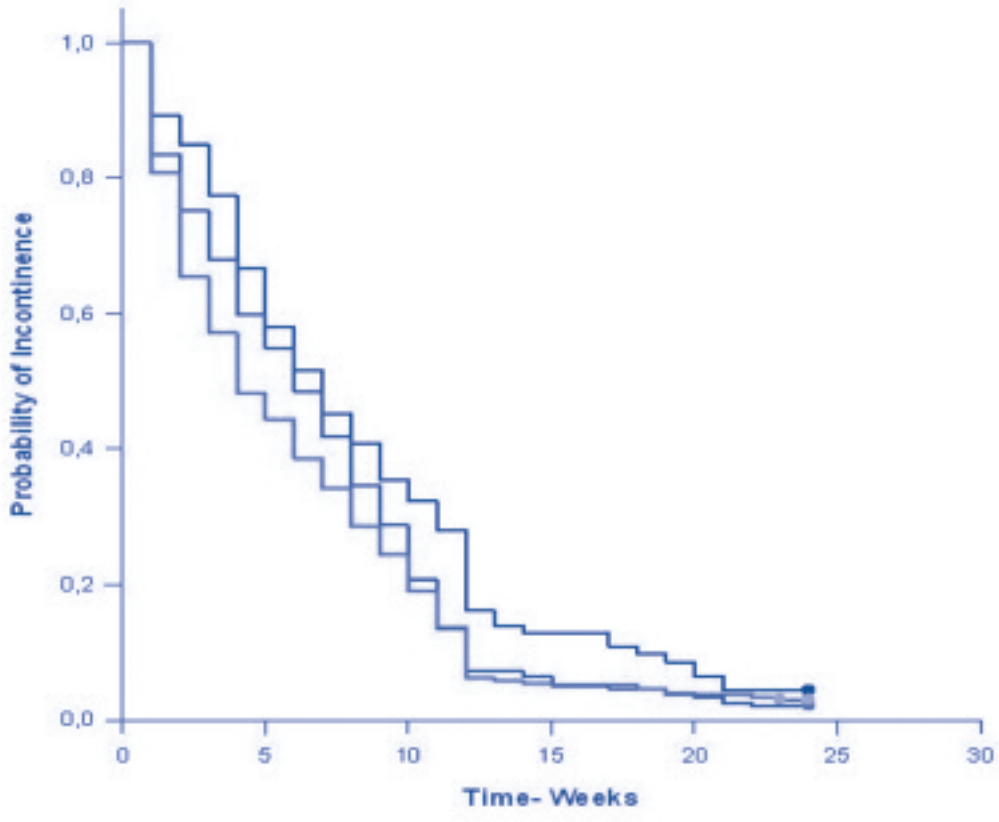
Introduction and Objectives

We have recently reported two technical refinements during RALP aiming to improve the early continence rates: first, the placement of a periurethral suspension stitch (PSS); and, subsequently, the modified posterior reconstruction of the rhabdosphincter (PR). We hereby analyzed the impact of these technical refinements on early continence rates after RALP.

Material & Methods

We analyze prospectively 768 consecutive patients who underwent RALP, 94 without PSS or PR (group 1), 237 with PSS only (group 2) and 437 with PSS plus PR (group 3). Continence rates were assessed with a self-administered validated questionnaire (Expanded Prostate Cancer Index Composite [EPIC]) at 1, 3 and 6 months after the procedure. Continence was defined as the use of "no pads" based on the patient responses to the EPIC questions.



Results

There was no significant difference between the groups with respect to patient age, BMI, PSA levels, prostate weight, AUA-SS, biopsy Gleason score, EBL, operative time, number of nerve sparing procedures and catheterization time. The continence rates at 1, 3 and 6 mo postoperatively in group 1 were 33%, 83% and 94.7%, respectively; in group 2, 40%, 92.8%, 97.9%, respectively; and in group 3 51.6%, 91.1% and 97%, respectively. The suspension technique (group 2) resulted in significantly greater continence rates at 3 mo after RALP compared to group 1 (p = 0.013). Group 3 had higher continence rate 1 month after RALP compared to group 2 (p=0.005).The mean interval to recovery of continence was also shorter in the group 2 (mean: 7.338 wk; 95% confidence interval [CI]: 6.387–8.288) compared to the Group 1 (mean: 9.585 wk; 95% CI: 7.558–11.612; p <0.01) and in group 3 (mean: 5.941 wk; 95% confidence interval [CI]: 5.459-6.422) compared to group 2. The Kapler Mier analysis is shown in figure 1. On Log rant test, the p value was found to be statistically significant (p=0.001).

Comparison	Difference of means	P value (Student-Newman-Keuls method)
Group 1 vs Group 3	3.659	<0.001
Group 1 vs Group 2	2.248	0.006
Group 2 vs Group 3	1.41	0.008

Conclusions

The PR combined with PSS resulted in a **Statistically** significant shorter interval to recovery of continence after RALP compared to PSS without PR.

How to achieve the best early potency

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The first robotic program in Urology in the world started at the Vattikuti Urology Institute at Henry Ford Hospital in Detroit, Michigan in November of 2000. The program was primarily designed to developing techniques of robotic radical prostatectomy, but since has expanded to encompass all areas in Urology as well as in other specialties. As of this writing, over 4500 radical prostatectomies have been performed at the VUI.
This presentation focuses on newer techniques incorporated since 2006.

We describe techniques of bladder drainage with percutaneous suprapubic tube, and limited node dissection of the opturator and internal iliac nodes in preference to the external iliac nodes in select patients. Percutaneous suprapubic tube bladder drainage resulted in less patient discomfort: visual analog scores were 2 at two days after prostatectomy and 0 at six days after prostatectomy. The modified lymphadenectomy harvested few overall nodes, but it increased the yield of positive nodes > 13 Fold in patients with low risk disease.

Continence, Potency and Oncologic Outcomes after Robotic-Assisted Radical Prostatectomy: "The Search for the Trifecta"

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Introduction

The three long-term goals of radical prostatectomy (RP) are cancer control, recovery of urinary continence and sexual function. However, these three outcomes are not independent of each other, i.e., improvement in 1 outcome may come at the expense of the two other outcomes. Therefore, assessing individual results after RP may not truly inform the patient regarding what to expect in terms of overall cancer control and quality of life after surgery. This has led to the concept of reporting the likelihood of achieving the three outcomes concurrently after RP: the so called "trifecta". Although each specific outcome of RP has been extensively described, few series analyzing the trifecta rates after RP have been previously reported. We report herein trifecta outcomes after RARP performed by a single surgeon in a cohort of preoperative potent patients. Additionally, potency, continence and oncologic outcomes stratified by age are analyzed.

Methods

We evaluated prospectively 1100 consecutive patients who underwent RARP performed by a single surgeon from January 2008 to September 2009. Baseline and postoperative urinary and sexual functions were assessed using self-administered validated questionnaires (Expanded Prostate Cancer Index Composite [EPIC] and Sexual Health Inventory for Men [SHIM]). We selected for this study patients with no preoperative erectile dysfunction (SHIM score >21) and who underwent bilateral full nerve-sparing procedure. Five hundred and forty one patients were considered potent before RARP; of these patients, 404 underwent bilateral full nerve-sparing and were included in this analysis. Postoperative continence was defined as the use of no pads; potency was defined as the ability to achieve and maintain erections firm enough for sexual intercourse >50% of times, with or without the use of oral PDE-5 inhibitors; Biochemical recurrence (BCR) was defined as two consecutive values of PSA > 0.2 ng/mL after RARP. Continence, Potency, BCR-free and Trifecta rates were compared between three age groups: Group 1— 55 years or younger, Group 2—56 to 65 years and Group 3—older than 65 years.

Results

The mean follow up of our cohort was of 12 months, ranging from 6 weeks to 23 months. The overall BCR-free rates at 6 weeks, 3, 6, 12, and 18 months after RARP were 98.2%, 96.9%, 96.1% 94.1% and 91.6%, respectively; the continence rates were 67.7%, 85.4%, 95.7%, 97.4% and 97.9%, respectively; the potency rates were 53.5%, 68.8%, 91.5%, 97.4% and 96.6%, respectively; and, finally, the trifecta rates were 42.8%, 65.3%, 80.3%, 86% and 91%, respectively. Continence, potency, BCR-free and trifecta rates stratified by age groups are summarized in Table 1. No statistically significant difference was found in the continence and BCR-free rates between the three age groups at all intervals analyzed. Nevertheless, younger patients had higher potency rates when compared to older patients at 6 weeks, 3,6 and 12 months after RARP ($P<0.01$ at all time points). Although there was a trend to higher potency rates for younger patients at 18 months after surgery ($P=0.07$), this difference didn't achieve statistical significance. Similarly, younger patients also had higher trifecta rates at 6 weeks, 3 and 6 months after RARP compared to elderly patients ($P<0.01$ at all time points). The trifecta rates were also higher for younger patients at 12 months (91.3% vs. 85.6% vs. 77.7%; $p=0.272$) and 18 months (96.4% vs. 88.3% vs. 87.5%, $p=0.455$) after RARP, however this difference was not statistically significant.

Conclusion

RARP offers excellent trifecta outcomes when performed by an experienced surgeon. Although the BCR-free rates and continence rates were similar among the age groups at all intervals analyzed, the trifecta rates were significantly higher in younger patients when compared to elderly patients at 6 weeks, 3 months and 6 months after RARP. The higher trifecta rates in these patients can be attributed to the superior potency outcomes reported in the younger age groups. These findings should be considered when counseling patients undergoing RARP.

Age (years)	≤ 55	56-65	>65	*p-value*
Number of patients	142	168	94	
Continence Rates % (n/total)				
6 weeks	71.4% (100/140)	66.4% (109/164)	64% (57/89)	0.461
3 months	88.4% (99/112)	84.5% (120/142)	82.4% (61/74)	0.492
6 Months	97.8% (88/90)	95.2% (120/126)	93.7% (59/63)	0.543
12 months	100% (60/60)	96.2% (83/86)	95.7% (44/46)	0.298
18 months	100% (29/29)	97.9% (47/48)	94.8% (18/19)	0.459
Potency Rates % (n/total)				
6 weeks	71.3 % (97/136)	49.7% (81/163)	33% (29/88)	<0.001
3 months	79.7% (90/113)	66.9% (91/136)	53.9% (35/65)	0.001
6 Months	88.1% (82/93)	82% (90/110)	70% (38/54)	0.027
12 months	95% (57/60)	94.8% (74/78)	79.5% (31/39)	0.009
18 months	100% (28/28)	97.7% (42/43)	87.5% (14/16)	0.07
BCR-free Rates % (n/total)				
6 weeks	97.1% (137/141)	97% (161/166)	100% (93/93)	0.247
3 months	96.8%(123/127)	96.1% (147/153)	98.8% (80/81)	0.522
6 Months	97.1% (100/103)	94.7% (124/131)	97.3% (73/75)	0.521
12 months	95.6% (65/68)	92% (80/87)	95.8% (46/48)	0.535
18 months	90.3% (28/31)	90.7% (39/43)	94.8% (18/19)	0.560
Trifecta Rates % (n/total)				
6 weeks	57.7% (78/135)	41.3% (67/162)	22.7 % (20/88)	<0.001
3 months	72.6%(77/106)	64.4% (78/121)	52.7% (29/55)	0.041
6 Months	85.5% (71/83)	75.2% (79/105)	66.6% (34/51)	0.036
12 months	91.3% (53/58)	85.8% (67/78)	77.7% (28/36)	0.272
18 months	96.4% (27/28)	88.3% (38/43)	87.5%(14/16)	0.455

Comparison of 1500 Lap and 1500 Ralp. Functional and oncological results

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Since 1997, the radical prostatectomy by laparoscopic approach has been introduced into our centre.

Several thousand patients were treated by this technique and since 2001 gradually the robotic surgery was developed to become daily since December 2004.

At present, the robotics surgery represents, according to the different surgeons of the group, between 50 and 90 % of the indications of radical Prostatectomies.

We compare the last 1500 patients treated by laparoscopy with 1500 patients treated by robotic surgery. We noticed that the age of patients decreased and especially the stage of the disease changed because about 80% of the pathological stages are now T2.

The rate of positive margins decreased between the laparoscopic surgery and the robotic surgery and the study of our series allows us to see very clearly that the positive margins rate depends on the experience of the surgeon both with coelioscopy and robotic surgery.

Nevertheless, if we refer to the announced publication by Francesco Curto in 2006, the rate of margins sharply declined between the laparoscopic and robotics experience because we moved from 30 to 18 %.

Other very important element, operating time decreased very sharply moving from 120 min to approximately 90 min for the robotics surgery.

The rate of transfusion also decreased from 1 % to 3 % on the laparoscopic series.

The most interesting outcome are the functional results. If continence seems to be the same at 4 months it is reached faster with the robot with an average rate of 80 % of dry patients from the first month, the results in 1 year being identical.

Concerning the erectile function, we passed from a global rate of 60 % at 1 year to 80 % for the whole team, with an immediate recovery which can reach 80 % for the most experienced surgeons.

In conclusion, it exist a rather clear difference of results between the laparoscopic surgery and the robotic surgery in terms of length of procedure, of blood losses and also concerning the speed of recovery on continence but especially on sexual function.

Complications following robot-assisted laparoscopic radical prostatectomy

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The outcome data of many centres has focused on perioperative results and oncological and functional outcome, with little detail reserved for complications. Although there is a trend towards the use of validated classification systems such as the Clavien classification [1] for reporting complications, an important limitation of the current published literature is the poor quality of complication reporting[2].

Martin et al identified ten essential elements including methods of data accruing, duration of follow-up, presence of outpatient information, definitions of complications, mortality and morbidity rates, procedure-specific complications, severity grading, length of in-hospital stay, and analysis of risk factors that should be used to ensure accurate recording of morbidity data [3]. Sadly, these criteria are underused. Most series do not use a standardised reporting system and complications are not clearly defined leading to wide discrepancy in complication rates (4.4-26%) between those centres using a standardised system and those who do not [4].

Three papers have focused entirely on complications relating to RALP [5-7] and two further papers [8, 9] have also adopted the Clavien system for reporting complications. Table two summarises the findings from these publications with respect to complications.

To date, only Novara et al define and report the complications in their RALP series of 415 patients following all the Martin criteria [7]. Using such standardized criteria, an overall complication rate of 21.6% was demonstrated with Clavien I-II complications accounting for 18.6% of the series.

Practically speaking, it is likely that the higher the methodological quality of the data collection, the higher the reported complication rates and the more validity that can be presumed. Therefore use of standardised criteria for complication recording and reporting must be encouraged.

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Notes