
LEGENDS IN UROLOGY

*Roland F. P. van Velthoven, MD, PhD
Institut Jules Bordet
Université Libre de Bruxelles
Brussels, Belgium*



I am honored to be invited to look back over my urology career and share some highlights that show how the field is always evolving.

I was born and educated in Brussels, a European crossroad of cultures and languages, and I graduated from the medical school at l'Université Libre de Bruxelles (ULB) in 1976. I planned to specialize in surgical urology, since I had been influenced by mentors such as G. Primo, P. Kinnaert, and L. Clerckx, during the three years of my basic surgical training. Soon after graduating, I met Willy Grégoir, a true pioneer and builder of modern European urology who made such major contributions as developing the extravesical antireflux procedure (known as Lich-Grégoir) and retropubic hemostatic adenomectomy for BPH, often called Millin's procedure.

As a teacher and mentor, W. Grégoir strongly influenced my curiosity for technical topics and I soon focused my interest on genito-urinary cancers. A founding member of the European Urological Association (EAU) in the late 1970s, Grégoir maintained several fruitful contacts with W. Whitmore, W. Goodwin, and H. Hendren, and he encouraged me to develop the use of ultrasound for the lower urinary tract, laser for non-muscle invasive bladder cancer (NMIBC), percutaneous nephrolithotomy (PCNL) for stones, and semi-rigid ureteroscopy.

In 1984, Grégoir returned from the AUA annual meeting with a drawing printed on the front page of the congress journal illustrating Kock's pouch. The following year, I visited Nils G. Kock in Salgrenska Hospital, Göteborg and soon after I started to apply the principles I learned there about detubulation and reconfiguration of carefully selected bowel segments ending in complex diversions instead of conduits leading to an external bag.

This decade produced many innovative solutions in this field, but it soon appeared that solutions able to withstand the test of time would be elaborated elsewhere, in larger centers with more patients.

In 1987, I asked Donald G. Skinner if, as a trained urologist, I could visit his recently built new department at the University of Southern California (USC). This 3-month visit to Norris Centre was extremely rewarding and gave me the opportunity to learn in detail the tricks and tips of a sound model of continent urinary diversion to the skin. This low-pressure ileal reservoir still needed catheterization through the stoma, which represented a drawback for patients but offered an elegant alternative to wet stoma for the worst cases among them. On the other hand, the validity of detubularization and reconfiguration maneuvers, the construction of continent valves as well as the choice of terminal ileum with regard to mid- and long-term complications enabled surgeons to propose elegant and efficient solutions to patients. Nearly half of the patients became eligible for alternative solutions to a permanent urinary stoma, after surgery for invasive bladder cancer or other major pelvic malignancies. The stability of a reservoir working at low pressure made us confident in the use of low-pressure neobladders anastomosed to the urethral stump. This opened in 1990 the era of orthotopic bladder replacement, soon accompanied by preservation of the neuro-vascular bundle, enabling nerve sparing cystectomies with an obvious and dramatic impact on a patient's quality of life.

As a member of the Société Belge d'Urologie, I had the opportunity in 1991 to collect all these new concepts into a written report, which I presented at the annual meeting where colleagues and future friends such as T. Ahlering, R. Hautmann, and U. Studer also presented some of their preliminary results.

Meanwhile, in 1987, I had been appointed first as consultant, then as a part-time attending urologist at the Jules Bordet Institute in Brussels. This cancer center, which was very modern when it was built in 1939 around radiation therapy,

functioned after World War II as an integrated cancer center, inspired by the Memorial Sloan Kettering Cancer Center in New York and the Gustave Roussy cancer-research institute in Paris. I had the opportunity to start working there in an ancillary activity to larger departments of surgery and radiation therapy and to start from nearly scratch a modern department of oncologic urology, which benefited from the best available equipment in this field. Soon trainees from the urologic residency program at Université libre de Bruxelles were sent to assist me to meet the increasing demand for care; some of them were selected as coworkers and helped set up the staff of academic specialists that are there today.

As a member of the European Organization for Research and Treatment of Cancers (EORTC) since 1988, I had the opportunity to meet fascinating colleagues from medical and radiation oncology, discuss or participate in many collaborative protocols, and learn the basics of rigorous investigation and data handling methods, for the benefit of students and coworkers of my very young department. Another opportunity was given to me by R. Kiss who offered me access to the academic laboratory of histology, where image analysis of Feulgen-stained nuclei was applied to various types of cancer cells. This gave birth to several collaborative papers about renal, bladder, and prostate tumors, related to urology. I focused my interest on bladder tumors in parallel with my participation in several EORTC protocols about non-muscle invasive bladder tumors. These papers were collected into what would become my PhD thesis, "Contribution by image analysis to the definition of the biology and of the prognosis of bladder tumors".

The 1990s were also marked by two major evolutions in urology. First, the PSA era enabled urologists to identify patients who were eligible for radical treatments. Radical prostatectomy soon evolved from the Campbell's model through the anatomic lessons described by P. Walsh and then to the principles of neurovascular bundle preservation and continence improvements. During this decade, minimally invasive surgical approaches were developed to replace procedures such as cholecystectomy. In 1991, after the publication of Schuessler's paper, our team embarked on the practice of doing coelioscopic lymphadenectomy preceding open prostatectomy to benefit from definitive histology, and we also began to perform minimally invasive surgery (MIS) nephrectomies, according to R. Clayman's pioneering work. Both of these directions brought us skills and a volume of activity that allowed us in 1999 to merge these experiences, when I performed the first laparoscopic radical prostatectomy in Belgium, a year after the initial series initiated at Montsouris Institute by G. Vallancien and B. Guillonnet.

Since the beginning of this transition to a minimally invasive surgical procedure, I was convinced that the sound principles issued from the open-surgery Walsh's procedure should not be sacrificed for the general advantages of minimally invasive surgery. On the contrary, it soon appeared essential to benefit from the improved and magnified vision to increase the understanding of micro-anatomy and to turn this into functional advantages of maintained continence and restored erectile function.

One of the most challenging exercises in this era of surgical enthusiasm was to unify procedures and codify tips and identify tricks, to be able to translate surgical maneuvers into reproducible and teachable procedures. This challenge was largely helped by the emergence of teaching institutions and permanent training centers, such as the IRCAD- EITS in Strasbourg and the Center for MISCC in Caceres, Spain. Since 2000, I have been associated as a foreign expert with the IRCAD- EITS, with my colleagues and friends, T. Piechaud, CC Abbou and E. Mandron, and this demanding discipline of translating intuitive or unconscious maneuvers into procedures helped a lot in sorting out useful gestures from wastes of time, and to identify true tools among useless gadgets. Another challenge was to progressively leave the exciting era of discovery and invention to reach a process of careful evaluation and honest analysis of our results. This transition occurred in the decade starting in the year 2000 and it matched of the evolution of robotic assisted laparoscopic urology.

Benefiting from an easy access to the three-arm Da Vinci System nr 3, I performed my first robot-assisted prostatectomy in October 2000. Monopolar scissors and bipolar forceps were still lacking, and there was limited interest for investment in this system before 2005 when these tools became available. The integration of these tools into the laparoscopic procedure along with the improved lenses and camera in the Da Vinci system enabled many urologists around the world to attain optimal quality when performing radical prostatectomies.

One of the difficult moments of robot-assisted prostatectomy remains the time of vesico-urethral anastomosis. This happens at the end of a long procedure, in a workspace reduced to the dimensions of the deep pelvis and with high expectations regarding early water tightness, absence of leaking during the first postoperative days and subsequently, absence of iatrogenic stenosis, and no negative impact on the quick recovery of continence.

The idea of a suspended running suture, made of monolayer absorbable threads, keeping the vision on the urethral stump unaffected by the placement of successive stitches, emerged at the end of December 2000 and was immediately adopted for all our patients undergoing robot-assisted prostatectomy. Since 1999 we had tested interrupted suture and running sutures with uneven success. I performed the “van Velthoven’s stitch” for the first time abroad, in a live demonstration in 2001, when T. Ahlering invited me to UC Irvine. My friend and colleague was convinced of the advantages of this method and showed it a few months later to R. Clayman, the new chairman at Irvine. Since then, the model has been widely used, first as a training tool, and later as a routine technique for use in patients; it made it easier for surgeons to adopt the da Vinci system for prostatectomy and it improved patient outcomes.

The same principles were later applied to vesicourethral anastomosis (VUA) in neobladders, with some modifications to large bladder necks ensuring healing without leaking or to prostatectomies done after previous surgery for BPH.

The field of radical cystectomy was very stable on the ablative side thanks to D. Skinner and H. Herr, but then surgeons investigated whether this procedure could benefit from minimally invasive approach. This work was done during the decade that followed the year 2000 by pioneers in laparoscopy such as F. Gaboardi, and later by surgeons such as P. Wiklund who performed robot-assisted surgery. I was happy to take part in the adventure of laparoscopic cystectomy and to lead a study group under the auspices of the European Society for Uro-Technology (ESUT), a section of EAU. Our results largely reproduced those of comparable open-surgeries; we had low complication rates and equivalent oncological outcomes. Nevertheless, I remain puzzled by the observation we made of early metastasis in patients who had a good prognosis. The role of pneumoperitoneum in the spreading of bladder cancer cells deserves to be studied further in view of the role of the venous Batson’s plexus known to be involved in the progression of other pelvic or abdominal tumors.

I feel very honored and rewarded when colleagues still give credit to my technique of vesico-urethral anastomosis for its contribution to their practices. This technique has stood the test of time and will remain as long as prostatectomy remains a valid option to treat organ-confined or locally advanced prostate cancer.

This condition opens a new field of debate and investigation. Initially, alternative techniques to prostatectomy were mainly developed for the elderly, in order to treat localized prostate cancer while avoiding the drawbacks of surgical, radiation or hormone therapies.

High intensity focused ultrasound was applied to patients since around 1996, and my own experience with this technique started in 2001 with A. Gelet as mentor, a gift for which I remain forever thankful. This technique has evolved from treatment planning, without real-time imaging of the prostate during the treatment, to a probe with integrated ultrasound imaging enabling the urologist to keep an eye on the adequacy of his planning with the outcome of the prostate during treatment. The combination of this probe with MRI of the prostate and targeted as well as random ultrasound biopsies has allowed urologists to treat the index lesion of prostate cancer, reducing the side effects of the treatment without affecting the oncologic outcome.

A dramatic turn in favor of this approach was made with the recently available focal One® device. The device combines the variability of the transducer geometry, the image fusion with MRI pictures, the real-time control of the treatment at any moment, and the quality control of the ablation of the main tumor burden through contrast-enhanced ultrasound. Combined with the concept of the index lesion of prostate cancer, this device opens up the prospect of focal therapy or at least zonal or partial therapy of the prostate, which will take a true place between active surveillance and more extensive surgery. I am convinced that this approach will pass the test of time and offer a true alternative treatment for prostate cancer with efficient cancer control and reduced morbidity for the benefit of our patients.

Needle ablation of tissues is not a new concept, whatever the ablation energy source could be; today with 3D guided biopsies of the prostate, moreover with MRI fusion biopsies, we are able to place a diagnostic needle into a tumor with reproducible accuracy. No doubt that focal treatment of prostate visible tumors will soon make additional steps forward with the emergence of safe ablative energies adequately guided into their target. This will represent a dramatic improvement for the patient’s quality of life. If over-diagnosis and over-treatment of prostate cancer are actually behind us, young urologists of today should carefully consider learning new technical skills for the future of their work and the overall well-being of their patients.

Roland F. P. van Velthoven, MD, PhD