



SURGICAL SIMULATION

SEAN P. HEDICAN, MD
ASSOCIATE PROFESSOR OF UROLOGY



The past two decades have marked tremendous increase in the complexity of the technology utilized in urologic surgery. Advanced video-endoscopic, laparoscopic and, most recently, robotic urologic procedures not available 20 years ago are now commonplace and actively pursued by discerning patients. Unique views of the anatomy together with remote structure visualization in two dimensions, reduction of tactile feedback, fulcrum effects on instrumentation, and maintenance of visual orientation are just a few of the problems faced by surgeons attempting to learn these techniques prior to mastering the steps of the procedure itself. These unique technical demands have created challenges in resident training which are further amplified by concerns for patient safety, physician productivity, and varying access to index cases throughout the hierarchy of residency.

Options for acquiring the skills necessary to perform such complex tasks include the use of pelvic trainers and live animal or cadaver laboratories. Although pelvic trainers can provide the rudimentary skills necessary to perform laparoscopy, the lack of realistic tissue handling and the absence of anatomic representation limit their utility. Animal laboratories offer the animate tissue handling experience encountered during laparoscopy, yet the anatomy often does not accurately reflect what is found in humans and the facility, staffing, and time requirements can be prohibitive. Cadaver surgery provides an anatomically correct experience, but is limited by the availability of fresh cadavers as well as the significant expense and altered response of tissues in non-living specimens.



A more viable option which allows the trainee to practice their skills during multiple scheduled sessions and to experience the outcome of potential surgical mishaps that don't place others at risk (similar to the training of airline pilots) is the use of simulation. Advances in computer-based virtual reality (VR) have enabled the development of surgical simulators with remarkably realistic three-dimensional tissue and organ renderings that include the way tissues respond to simulated surgical handling. A complex series of interactive equations and haptic devices have also been developed to provide actual tactile feedback to the trainee appropriate for the tissue being manipulated with simulated instrumentation.

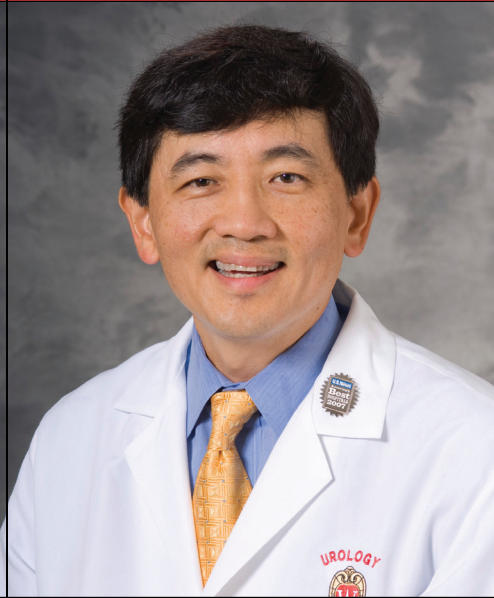
The American Urological Association (AUA) has recently joined forces with Medical Education Technologies, Inc (METI) a worldwide leader in surgical simulation to develop a curriculum

and learning modules geared toward training in urologic surgery. METI SurgicalSIM (See Figure) is an expandable educational VR simulator that supports multi-task and multi-user training with "advanced life-like surgical anatomy and the most advanced intracorporeal suturing and knot-tying exercises on the market." The system also records performance and allows the development of individualized training programs that provide structured skills acquisition or concentrated repetition of isolated problem areas.

The University of Wisconsin surgical departments have begun initial evaluations of the METI SurgicalSIM as part of an ongoing effort to develop a multi-disciplinary training laboratory to facilitate resident training in minimally invasive surgery. In addition to laparoscopic task performance, METI SurgicalSIM offers specific surgical training modules such as laparoscopic cholecystectomy which incorporate intra-operative video clips, three-dimensional animations, and simulations with structured testing of the various steps of an operative procedure. A similar module is currently being developed for laparoscopic nephrectomy as well as robotic surgery.

Surgical simulation is not likely to completely replace the experience gained from observing, assisting, and performing surgery in the operating room, nor will it eliminate the need for surgical educators. It will, however, provide yet another important adjunct to the urology training curriculum of the future. **WU**

>> A MESSAGE FROM THE CHAIR



STEPHEN Y. NAKADA, MD

I am most delighted to bring you the 2008 summer issue of Wisconsin Urology. This is our first issue as a Department, as we became the sixteenth clinical department at the University of Wisconsin School of Medicine and Public Health on July 1. There are so many people to thank along the way, but I would most like to acknowledge the efforts of our faculty, staff, and residents. I also want to thank our vice chairs, David Jarrard, Wade Bushman, and John Wegenke for their unwavering support.

How will this make us different? In the short run, departmental distinction remains primarily an internal reorganization, but externally becoming a department will enable us to recruit the absolute top faculty and researchers to Madison. I believe we will solidify our academic and clinical base, and the department will become more nimble as we move forward strategically. There will be challenges ahead for us, but there always are.

Speaking of challenges, I would like to congratulate Dr. Jason Gee

for spearheading our robotic cystectomy initiative. We have now successfully performed two cases, with several more on the schedule this summer. We had three great visiting professors thus far this calendar year, highlighted by Peter Langenstroer from MCW, Gerry Jordan from Norfolk, and David Joseph from Alabama.

We said goodbye to Curtis Crylen and Brian Benway at the Fluno Center last month. They were both outstanding residents, and we wish Curtis all the best with his practice in Greeley, Colorado. Brian Benway is starting his endourology fellowship at Washington University. We are very excited for both of them!

Kudos to Dr. John Kryger, the current President of the Wisconsin Medical Alumni Association. This is a great honor indeed, and we wish him the best in this role. Moreover, John continues to do a wonderful job in his first full year as program director. Drs. Wade Bushman, David Jarrard and Kris Penniston all received awards at this year's AUA. I am so pleased with all the success they have had at the national level!

Finally, I hope to see you all at the 2008 Uehling Lectures at the Fluno Center in October. Dr. John Libertino, Professor and Chairman at the Lahey Clinic, is the 2008 Uehling Lecturer. Dr. Jason Gee has put together a wonderful program for all of us. I sincerely hope to see you all this fall! **WU**

STEPHEN Y. NAKADA, MD
CHAIRMAN AND THE UEHLING
PROFESSOR OF UROLOGY

>> CLINICAL TRIALS IN WISCONSIN



JOHN
WEGENKE, MD
CLINICAL PROFESSOR

With increasing age, men and women experience an increase in urinary tract symptoms. These symptoms may be divided into obstructive symptoms (for example, hesitancy, weak stream, intermittency) due to bladder outlet obstruction, or irritative symptoms (for example, frequency, urgency, incontinence) due to overactive bladder. Overactive bladder is more common in men than women of the same age. Fifty percent of men with bladder outlet obstruction have symptoms of overactive bladder.

Alpha blockers are commonly used to treat bladder outlet obstruction. Approximately one-third of these men with bladder outlet obstruction and overactive bladder experience some relief of symptoms with alpha blockers alone; whereas, three-fourths of men treated with alpha blockers plus antimuscarinic drugs improve their symptom complex.

Fesoterodine fumarate is an antimuscarinic approved in Europe in 2007, for treatment of overactive bladder. "A randomized, double-blind, placebo-controlled study to evaluate the efficacy and safety of fesoterodine as an 'add-on' therapy for men with persistent overactive bladder symptoms under monotherapy of alpha blockers for lower urinary tract symptoms" is being conducted at the Urology Department, 1 South Park, Madison, Wisconsin. Typical side effects of dry mouth or constipation seen with antimuscarinics may be observed.

Patients interested in participating can contact the University of Wisconsin, Office of Clinical Trials at (608) 287-2850. **WU**

>> PROGRAM NEWS

WELCOME TO THE 2008 PGY-1 UROLOGY RESIDENTS

TRICIA THAKER, APNP

She has been actively involved in numerous volunteer organizations which focus on providing medical care to underserved populations in Mexico, Guatemala, and Los Angeles. She recently participated in a research project on the laser treatment of large ureteral calculi with Dr. Peter Schulam at UCLA. Her hobbies include sketching, sculpture, and cooking.

and served as a medical student liason to inner city women in prenatal clinics. Her hobbies include running, hiking, camping, water skiing, and snorkeling.

ANNOUNCING THE 2009-2010 ENDOUROLOGY FELLOW MATCH RESULT



**OREOLUWA
OGUNYEMI, MD**

Dr. Ogunyemi received her medical degree from the David Geffen School of Medicine at UCLA. She completed her undergraduate education at Stanford University, graduating with a major in psychology and a minor in biology.



**LAUREN
WAGNER, MD**

Dr. Wagner received her medical degree from the University of Cincinnati College of Medicine. She was recently nominated for the Alpha Omega Alpha Honor Society. Dr. Wagner completed her undergraduate training at the University of Notre Dame. She has demonstrated an ongoing commitment to community service

SUTCHIN PATEL, MD

Dr. Patel is currently completing his residency at Rhode Island Hospital in Providence, Rhode Island. He attended Brown Medical School, also in Providence. **WU**



UW UROLOGY 2008 FACULTY AND RESIDENTS

>> NOTABLE AND NEWSWORTHY

- We are proud to report that, in the last seven years, the Department of Urology has more than **DOUBLED** the number of bladder and prostate patients we treat at University of Wisconsin Hospital and Clinics.
- **DR. JOHN KRYGER** has been named the 2009 President Elect of the Wisconsin Urological Society. He is also involved in the UW MF Physician Leadership Development Program.
- The University recently awarded Distinguished Scientist, **WALT HOPKINS, PhD**, the additional title of *Research Professor*. This title is given in recognition of outstanding contributions to the University and research fields. Walt is the PI on NIH grants totaling \$4.5 million and the co-PI on NIH grants totaling \$2.2 million. His research focuses on host immunity to infections of the urinary tract and genetic predisposition to urinary tract infections. He has authored 40 publications on these and other topics.
- Kudos to **KRIS PENNISTON, PhD, RD**, for receiving "best poster" award at the May 2008 American Urological Association meeting. Her poster entitled "Vitamin D repletion does not alter urinary calcium excretion in postmenopausal women" was presented at the stone disease research session and reported results in a study done with Karen E. Hansen, of the Department of Medicine.
- **DR. SEAN HEDICAN** was invited to lecture at the Annual Big Sky (Montana) Urology Meeting in February 2009. He will deliver three talks on minimally invasive surgery.
- Exciting news for **DR. DAVID JARRARD** who recently received not only an AFUD bridging award at the May 2008 AUA meeting, but also a one year (\$249,689) R56 NIH grant, titled Modulation of IGF2 Imprinting in the Aging Prostate!
- **KRIS PENNISTON, PhD, RD**, was elected a member of the Research on Calculus Kinetics (ROCK) Society at its annual meeting this past June. The ROCK Society is an organization of scientists, urologists and nephrologists who are involved in research related to urinary tract stones. Membership is limited to those who are actively engaged and publishing relevant work in the field.

- **DR. SARA BEST**, a PGY-5 resident, won first place at the Wisconsin Urological Society Annual Meeting for her paper entitled, "Flexible Ureteroscopy for Proximal Ureteral Stones: 2-Year Single Surgeon Experience". Congratulations Dr. Best!
- Congrats to **DR. CHRIS MANAKAS**, a PGY-4 resident, for taking second place at the Wisconsin Urological Society Annual Meeting for his paper entitled, "Identification and Preservation of Accessory Pudendal Vessels During Robotic-Assisted Laparoscopic Radical Retropubic Prostatectomy".
- **DR. DAN WILLIAMS**, has been selected as the recipient of the Society for Male Reproduction and Urology Prize Paper Award for his abstract entitled "The Use of Biased Language and Inaccurate Information About Male Factor Infertility on Fertility Clinic Web Sites in the United States". He will present at their annual meeting on November 10, 2008.
- **DR. DAVID JARRARD**, and group, won the Basic Research II Session Best Poster award at the May 2008 AUA meeting for their poster titled "A Novel High Throughput Screen Identifies Potent Senescence-Inducing Activity of Diaziquone (AZQ) in Prostate Cancer Cells. Congratulations! **WU**

>> UPCOMING WISCONSIN EVENTS

TRICIA MAIER

- **Department Picnic**
The Department of Urology will hold its first Annual Summer Picnic on **Saturday, September 13, 2008** from **12-4 PM** at Elver Park in Madison. Activities include kids and adult games, prizes and music.
- **Uehling Lecture Series**
2008 UEHLING LECTURES
The University of Wisconsin, Department of Urology will be holding its annual David T. Uehling Lectures on October 17, 2008 at The Fluno Center in Madison, Wisconsin. This year the topic of the Uehling Lecture series, one-day event, will be Multidisciplinary Trends in Prostate, Kidney and Bladder Cancer. Lecture topics will encompass renal, prostate and bladder cancers including oncologic and functional outcomes in robotic surgery for prostate and bladder cancers as well as treatment and reconstructive options for bladder cancer.

Our keynote speaker is John A. Libertino, MD, Professor and Chair of Urology at Lahey Clinic Medical Center and Tufts University School of Medicine in Burlington, Massachusetts. Dr. Libertino is world-renowned for his innovative techniques in urologic oncology and the management of complications for urinary diversion. Please be sure to join us in October! Brochure and registration materials will be forthcoming soon.



JOHN A. LIBERTINO, MD

FUTURE UEHLING LECTURES AT THE FLUNO CENTER:

2009 Uehling Lectures

The 2009 Uehling Lecture is scheduled to take place October 23, 2009. We have invited Anthony Atala, MD, Professor and Chair of the Department of Urology and Director of the Institute of Regenerative Medicine at Wake Forest University School of Medicine.

2010 Uehling Lectures

The 2010 Uehling Lecture is scheduled for October 29, 2010. Our keynote speaker is William D. Steers, MD, Hovey Dabney Professor of Urology and Chair of the Department of Urology at the University of Virginia, School of Medicine.

• 2009 Visiting Professor

2008-2009 AUAER/PFIZER VISITING PROFESSORSHIP IN UROLOGY

The UW Department of Urology is pleased to announce that it has been selected as a 2008-2009 AUAER/Pfizer Visiting Professorship grant recipient. The department will be hosting Dr. Larry Lipshultz, a Professor in the Scott Department of Urology at Baylor College of Medicine in Houston, Texas. Dr. Lipshultz holds the Lester and Sue Smith Chair in Reproductive Medicine and is Chief of the Division of Male Reproductive Medicine and Surgery. This program provides opportunities for academic institutions to host a recognized expert for three days of educational exchange. This is a nationally competitive unrestricted educational grant. We are pleased to host Dr. Lipshultz in the Spring of 2009. **WU**

INFLAMMATION IN THE PROSTATE: A REPRISE OF NORMAL ORGAN DEVELOPMENT?



TRAVIS J. JERDE, PhD
POST-DOCTORAL
RESEARCH ASSOCIATE,
BUSHMAN LABORATORY

Prostate cancer is the most common soft tissue malignancy in American men and the second leading cause of cancer-related death. Localized disease is treatable by surgery or radiation therapy, but many men present with non-localized tumors or develop recurrent disease after attempted curative treatment. As such, there is an urgent need to prevent the development of prostate cancer, retard tumor progression and develop new and effective therapies for non-localized disease.

There are many potential causes of prostate cancer, including genetic, lifestyle, and environmental factors. However, chronic inflammation has recently been identified as the primary precursor event in the formation of proposed pre-cancerous lesions in the prostate. Inflammation is very commonly found in association with prostate cancer, and classic inflammatory products are well-known to induce

tumor growth in experimental models. In addition, inflammation is known to cause formation of DNA damage, a common event in carcinogenesis. On the basis of these studies, inflammation is now widely considered a critical element in the genesis of prostate cancer.

In research funded by the National Institutes of Health, the Department of Defense, and the Prostate Cancer Foundation, we have found that mediators of inflammation actually have a conserved role in normal prostate development. We found that one inflammatory mediator in particular, interleukin-1 α (IL-1 α), is highly expressed during prostate development in mice but not expressed in the normal adult prostate. This cytokine is well-known to be induced in inflamed prostates and during prostate cancer in humans. We found that IL-1 α can induce prostate growth in organ culture and can stimulate prostate cells to proliferate in cell culture. Remarkably, we found that mice deficient for the primary receptor for IL-1 α do not grow normal prostates. Further, these mice do not respond to induced inflammation like wild-type mice in that they do not develop a common highly proliferative response termed, "reactive hyperplasia".

The implications for these findings are profound in the prostate biology field. They suggest that the proliferative response of the

prostate to inflammation might be a reiteration of developmental biology. Given the well-characterized similarities between developmental biology and cancer, our findings suggest that one mechanism by which inflammation might generate tumors or promote tumor growth is to resurrect a 'developmental-like' state. A study of developmental mechanisms might be a missing link in researching how inflammation promotes tumor genesis or growth. Indeed, early studies from our group show that cellular mechanisms that are critical to prostate development are involved in the hyperplastic response of the prostate to inflammation. In fact, our work shows that these developmental mediators are actually expressed in the inflammatory cells that infiltrate the prostate during inflammation.

Much research in prostate biology has focused on the cross-talk between epithelial and stromal cells during cancer and during development. It is clear that such *epithelial-stromal* interactions drive growth of the organ during development and cancer. Our work opens an entirely new chapter in this story: *epithelial-stromal-leukocytic* interactions in prostate growth. We are grateful to our funding agencies and to those who have supported the Department of Urology for fostering a home for our unique and innovative research. **WU**

RESEARCH FOCUS

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