



Cleveland Clinic

2023 INNOVATIONS IN UROLOGY

GLICKMAN UROLOGICAL INSTITUTE



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ON THE COVER

Mohamed Eltemamy, MD, leads a kidney transplant case using the single-port robot system.

AT A GLANCE

Cleveland Clinic Urology encompasses a unique combination of high-volume and challenging clinical cases, extensive basic and translational scientific efforts, and innovative laboratory research conducted in an environment that nurtures the future leaders of its subspecialties.



Cleveland Clinic Urology

BY THE NUMBERS

(2023 — Ohio locations only)

70

staff

39

advanced practice providers

40

residents

24

fellows

229,319

outpatient visits

(through Nov. 30)

16,475

surgical procedures

(through Nov. 30)



DEAR COLLEAGUES,

Looking back, 2023 was a year defined by significant growth in Cleveland Clinic's Department of Urology, achieved while maintaining the highest-quality care for which we are always striving. This growth mindset has allowed us to continually help more patients and their families and invest in our greatest asset: our people.

We hired 14 new staff members — each an emerging leader within their subspecialty. We expanded our residency program, which was again ranked No. 1 for reputation by Doximity, from five to six trainees a year, making it the largest and most reputable urology training program in the country. We've also been fortunate enough to hire several of those trainees over the past few years. I am grateful to have witnessed their training journeys and now their continuing achievement as colleagues in our department.

We've also more than doubled the number of patients served. This was all done so we can reach more people and offer more specialized care in our Cleveland Clinic locations around the world. In addition to growing, we are improving: In 2023, we achieved our best outcomes yet in terms of quality and safety.

This growth is extraordinary given the backdrop of physician shortages and the growing decline of practicing urologists per capita. This is a sobering reality that we must address within the field by continuing to advocate for the specialty and to meet the needs of our patients.

We are also advancing academic excellence — we had a record showing at the American Urological Association's Annual Meeting in Chicago. Our

team was involved in more than 100 posters, presentations, moderated debates, courses and skills trainings. It was also our first year with an on-site hospitality booth, which was a success by all accounts. We look forward to returning in 2024.

Through innovation, access to care, academic leadership and a robust training program, I am hopeful that in the coming year — and the years ahead — we will continue to grow and continually pursue quality care within our department and across our healthcare system.

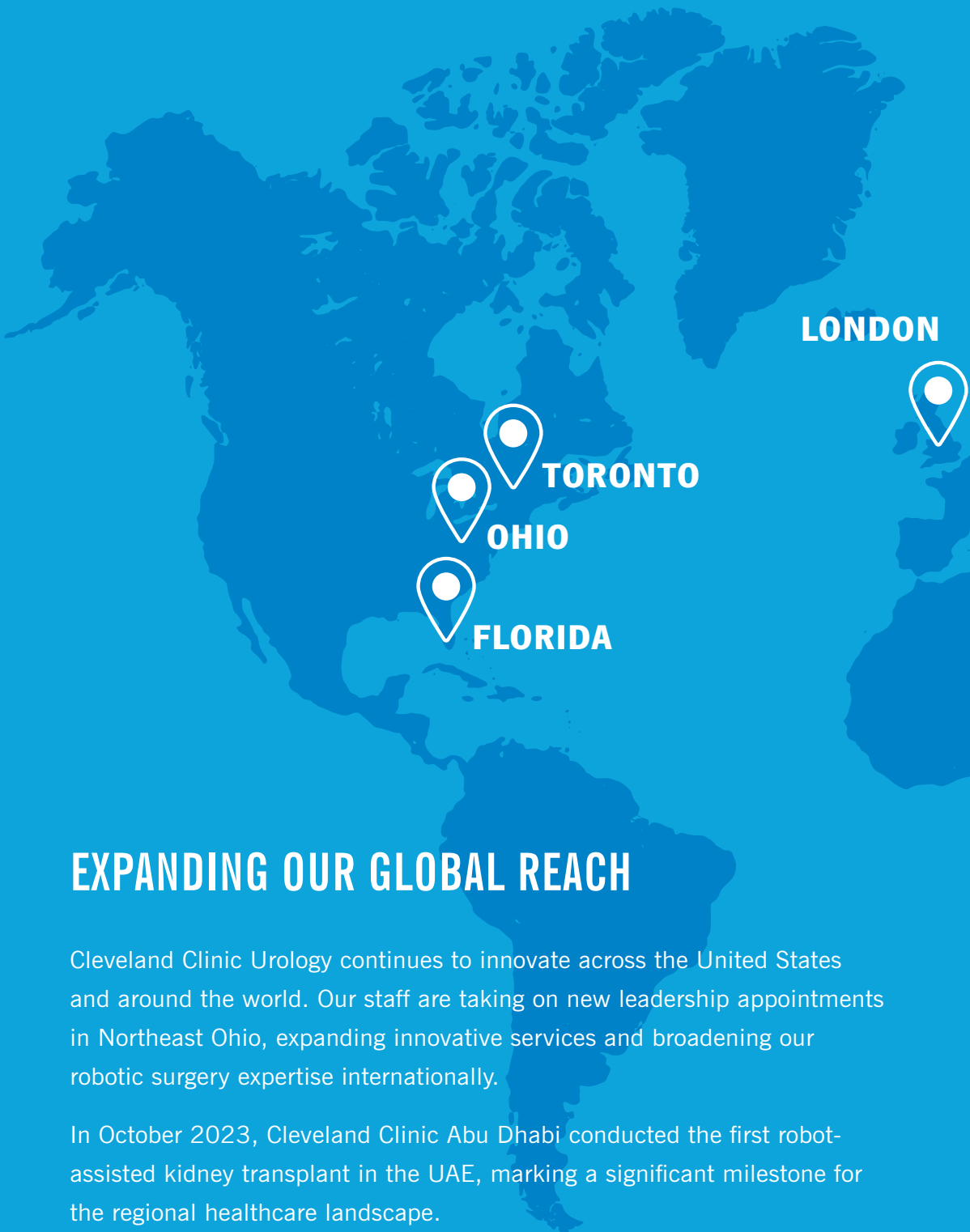
I hope you enjoy this publication, which captures news and highlights from the past year. From scientific collaborations and cutting-edge technological advancements to new surgical techniques and much more, we are proudly at the forefront of urologic care.

With gratitude,



Georges-Pascal Haber, MD, PhD

Professor and Chair, Glickman Urological Institute
Enterprise Chair, Cleveland Clinic Urology



LONDON

TORONTO

OHIO

FLORIDA

EXPANDING OUR GLOBAL REACH

Cleveland Clinic Urology continues to innovate across the United States and around the world. Our staff are taking on new leadership appointments in Northeast Ohio, expanding innovative services and broadening our robotic surgery expertise internationally.

In October 2023, Cleveland Clinic Abu Dhabi conducted the first robot-assisted kidney transplant in the UAE, marking a significant milestone for the regional healthcare landscape.

As we continue to grow domestically and internationally, patient-centered care, scientific discovery and effective training remain essential to our academic mission.



ABU DHABI

2023 HIGHLIGHT

TARGETED NEOADJUVANT THERAPY FOR HIGH-COMPLEXITY RENAL MASSES IN A SOLITARY KIDNEY

Tyrosine kinase inhibitors (TKI) in the neoadjuvant setting are associated with greater use of partial nephrectomy (PN) when treating patients diagnosed with renal masses in a solitary kidney (RMSK), according to the findings of a new Cleveland Clinic-led study, published in *European Urology Oncology*.

New questions arise in the management of RMSK

“We asked ourselves, ‘What can we learn about the most challenging RMSK cases?’ These are the ones with the highest risk of postoperative complications or loss of renal function — the ones with a RENAL score of 10 to 12,” senior author Steven C. Campbell, MD, PhD, explains.

Complications could mean converting to radical nephrectomy and, ultimately, progression to dialysis. Though precarious, high-complexity RMSK is relatively uncommon. Still, most urologists will likely encounter a few in their professional lifetimes.

Introduction of TKI for kidney cancers

Cleveland Clinic began administering TKI as a neoadjuvant therapy for RMSK in 2009. The medication is an angiogenesis inhibitor, blocking the vascular endothelial growth factor receptors involved in the growth of clear cell renal cell carcinoma — a tumor subtype that accounts for about 70% of kidney cancers.

In the right patients, it offers a clear benefit. “You might have a 7 cm tumor shrink to a 5 cm tumor, which sounds modest but is significant if it offers greater accessibility and makes the surgery less technically challenging, allowing us to save more renal parenchyma,” Dr. Campbell explains.

Analysis of high-complexity RMSK cases

The research team extracted from the Cleveland Clinic kidney cancer database (1999-2022) 499 RMSK records that had an available RENAL score. Of those, the team focused only on the 133 patients who had scores of 10 to 12.

They then divided the data set into two cohorts: patients who predated the availability of TKI

(1999-2008) (N = 80) and those managed in the neoadjuvant TKI era, as determined by the date of their surgery (2009-2022) (N = 53).

Of the 53 patients with clear cell histology in the TKI era, 23 were selected for the neoadjuvant therapy based on having greater median tumor diameters and higher RENAL scores than those not selected for the neoadjuvant therapy. These were the most challenging of cases, and they generally responded well to TKI therapy, with decreases in both median tumor diameter (from 7.1 cm to 5.6 cm) and RENAL score (from 11 to 9). Tumor volume was reduced by 59%.

Nearly all of these patients (21/23), or 91%, could be managed with PN. Overall, in the TKI era, 48/53 patients (90%) were managed with PN. In contrast, in the pre-TKI era, only 65% (52/80) could be managed with PN.

New evidence in a limited data set

These data not only offer new information on a historically limited data set but also set the stage for a randomized controlled trial, which would offer a higher level of evidence about the use of TKI therapy in this patient population.

Still, Dr. Campbell advises prudent use of TKI therapy and careful consideration of the costs versus benefits for patients. Clear cell histology alone is not an indication for TKI therapy, and if there is limited benefit to downsizing the tumor from the surgeon’s perspective, the patient may proceed with surgery and PN without TKI therapy. But with more complicated tumors, the potential advantages of TKI cannot be overlooked.

“In cases where the tumor shrinks substantially, well, that can turn an incredibly difficult case into an easy one,” Dr. Campbell concludes.





2023 HIGHLIGHT

NOVEL APPROACH SHOWS EFFICACY IN FRAGMENTING KIDNEY STONES

An innovative approach to fragmenting kidney stones using photonic nanoparticles is effective for several common types of stones. That is the major finding of a proof-of-concept study by Cleveland Clinic researchers published in *Nano Letters*.

Kidney stones affect nearly 1 in 10 people in the United States, and the prevalence is expected to increase to 13% by 2030. They are associated with morbidity and sometimes mortality and can be difficult to treat. The most common treatments are ureteroscopy with laser lithotripsy and extracorporeal shock wave lithotripsy; if those treatments aren't feasible, more invasive procedures (like percutaneous nephrolithotomy) are an option. Recent studies using more sensitive scans report that typically only 60% of patients have no stones following treatment; the residual stones can cause complications and require repeat procedures to remove them.

"There's a lot of room for improvement in treating kidney stones. In complex cases, it can be difficult to access the stones, and some patients aren't good candidates for the more common treatment options," says endourologist and co-author Smita De, MD, PhD.

Nanoparticles have been used in various medical applications, including drug delivery in chemotherapy and the COVID-19 vaccine. Vijay Krishna, PhD, assistant staff in Lerner Research Institute's Department of Biomedical Engineering, developed photonic nanoparticles for cancer treatment but had not yet expanded this approach to target hard materials like kidney stones.

Dr. Krishna, senior author on the paper, and Ian Houlihan, PhD, a postdoctoral fellow in his lab and first author, teamed up with Dr. De for the proof-of-concept demonstration of photonic lithotripsy as a viable treatment option.

"We can potentially break up kidney stones from a distance using photonic nanoparticles that are activated with deep-tissue penetrating, low-intensity lasers," says Dr. Krishna. "It's an unexplored area of photonic nanoparticle technology but one with major potential for patient care."

Investigating nanoparticles

Using human kidney stones obtained from the Cleveland Clinic Pathology Laboratory, the research

team experimented with different carbon- and gold-based nanomaterials, as well as laser settings, wavelengths and distances. They coated the kidney stones with the nanoparticles and activated the nanoparticles with low-intensity near-infrared lasers from a distance. In comparison, current laser lithotripsy uses high-intensity lasers that must touch the stones to be effective.

The technique they developed, photonic lithotripsy, was effective across all nanoparticles in breaking down common stone types including calcium oxalate dihydrate, calcium phosphate, uric acid and the hardest type, calcium oxalate monohydrate, using lasers ranging from 2-4 W at 1-2 cm.

"We are very pleased at how well this technique works with different types of stones and nanoparticles. It changes how we think about kidney stone treatment," says Dr. De.

As a noncontact, low-intensity treatment, photonic lithotripsy has the potential to reduce procedure time and complexity, minimize risk of injury to tissues, improve surgeon ergonomics, increase surgical success rates, and decrease the need for radiation.

"It could be an alternative for patients who don't succeed with current techniques or can't have them," says Dr. De.

Future prospects for photonic lithotripsy

The research team is continuing its work on photonic lithotripsy to better understand the mechanism of stone breakdown and to refine the process. They are also planning animal studies to evaluate the technique's safety and efficacy.

"The research is at an early stage, but based on our findings so far, the prospects are good that photonic lithotripsy could become a safe and effective kidney stone treatment," says Dr. De.

LEFT — Smita De, MD, PhD, and Vijay Krishna, PhD, pictured in the lab, say photonic nanoparticle technology has major potential for patient care.

2023 HIGHLIGHT

FIRST-IN-HUMAN STUDY SHOWS SAFETY, FEASIBILITY OF UROMONITOR

The UroMonitor, a wireless, insertable pressure sensor to assist in the diagnosis of urinary incontinence and other bladder disorders, is safe, feasible and well tolerated in women with refractory overactive bladder (OAB), according to clinical trial data reported in *The Journal of Urology*.

Findings from the trial, led by urogynecologist and reconstructive pelvic surgeon Howard Goldman, MD, represent the first step in validating the device's clinical benefit compared to that of conventional urodynamics (UDS). The innovation, first developed by Margot Damaser, PhD, and colleagues in Cleveland Clinic Lerner Research Institute's Department of Biomedical Engineering, was designed in response to the limitations of conventional UDS.

An alternative to conventional urodynamics

Catheter-based testing can be painful and embarrassing. Because of the artificial conditions of the test, the simulation is not always an accurate reflection of patients' underlying bladder condition. This can be diagnostically problematic for physicians.

The trial consisted of 11 adult female patients, all with refractory OAB, and began with a baseline assessment using standard multichannel UDS. After that, the investigators inserted the device transurethraly, as would be done in cystoscopy or catheter placement, with a silk suture attached to one end of the device and taped to the patient's thigh for easy retrieval from the bladder.

The device's medical silicone-coated sheath that houses the pressure-sensing technology curls into a pigtail shape upon insertion to keep it in the bladder. It transmits vesical pressure data at 10 Hz to a device taped to the patient's abdomen.

Once the UDS catheter was removed, leaving only the UroMonitor in place, the patient was encouraged to ambulate and void. The team assessed patient discomfort at every stage using visual-analog pain scales and evaluated overall comfort and safety during testing.

Noteworthy findings

In addition to being easily inserted and extracted in all participants, the device successfully captured 98% (85/87) of voiding and nonvoiding urodynamic events, report the authors. Additionally, they note low post-void residual volume and low overall pain. Median ambulatory pain score with the device was rated 0 (0-2). Patients reported no infections or changes in voiding after the procedure.

"Patients reported minimal discomfort during the insertion phase but nothing unexpected, and there were no postprocedure complications," says Dr. Goldman.

Clinical benefit for other patient populations

Another arm of the trial to evaluate the device in patients with multiple sclerosis is now open. Dr. Goldman is hopeful that the device may one day play a therapeutic role for patients with neurogenic etiologies, noting that possible applications include controlled drug delivery and feedback to a neuromodulation or electrical stimulation system. The device may also restore sensation for patients with pelvic floor dysfunction or inform them about when to empty their bladder.

The bottom line

The team is pleased to report the feasibility of a catheter-free wireless bladder pressure-sensing device that can be used safely in humans during ambulation and voiding. Extended monitoring times — in the comfort of patients' homes — could offer a more accurate and patient-centered approach to diagnosing lower urinary tract dysfunction.

RIGHT — Howard Goldman, MD, discusses the UroMonitor with a patient. Findings from the clinical trial conclude that use of the device is safe and feasible.





2023 HIGHLIGHT

YES, VASECTOMIES MAY ACTUALLY HAVE RISEN SINCE SCOTUS RULING

The number of men seeking vasectomies appears to have risen following the U.S. Supreme Court's overturning of *Roe v. Wade*, according to new Cleveland Clinic findings that reinforce previous anecdotal reports.

In June 2022, the U.S. Supreme Court ruled in the case of *Dobbs v. Jackson* to overturn the 1973 *Roe v. Wade* ruling that had established a federally protected right to abortion in the United States. Soon after, there were some reports, largely based on analyses of Google searches, suggesting increased interest in vasectomies among men. Now, urologists Sarah C. Vij, MD, Raevti Bole, MD, and colleagues are the first to publish actual data showing both increased interest in vasectomy and follow-through with the procedure since the *Dobbs* decision.

"People think of these laws as impacting women, and they most certainly do, but they also impact healthcare decisions for men too," says Dr. Vij, who leads the Center for Male Fertility at Cleveland Clinic.

Comparing pre- and post-*Dobbs* data

In the study, published in the *International Journal of Impotence Research*, Dr. Vij and colleagues compared Cleveland Clinic records for all adults seeking consultation for vasectomy during July and August 2022 ("post-*Dobbs*") with those during July-August 2021 ("pre-*Dobbs*").

Post-*Dobbs*, 166 men initiated requests for a vasectomy consultation and 142 men actually attended the appointment, compared with just 123 and 116, respectively, pre-*Dobbs*. This corresponds to a 35% increase in vasectomy consultation requests and a 22% rise in vasectomy consultations.

Men expressing interest in vasectomy post-*Dobbs* were significantly younger, with a median age of 35 years, compared with 38 years pre-*Dobbs* ($P = 0.01$). There was also a significant increase in post-*Dobbs* men younger than 30 years seeking vasectomy, 24% versus 10% ($P = 0.005$).

White men comprised a higher proportion of men seeking vasectomy consultation post-*Dobbs*, 84% versus 71% earlier ($P = 0.01$). Slightly fewer men

were married, 72% versus 79% pre-*Dobbs*, but that difference wasn't significant ($P = 0.29$).

However, men seeking vasectomy post-*Dobbs* were significantly more likely to be childless, 17% versus 9% ($P = 0.05$). "Often when a childless man goes for a vasectomy, it raises eyebrows. I've argued many times that it shouldn't. But just to think, this type of political landscape is going to drive a 22-year-old guy who's never had kids to get a vasectomy. Again, it just shows the impact," Dr. Vij observes.

At three months post-consultation, 59% of pre-*Dobbs* men had undergone their vasectomies versus 66% of post-*Dobbs* men, not a significant difference ($P = 0.21$).

Separate analysis accounts for lag time

Since there is often a longer lag time between consultation and procedure, which also tends to be seasonal, the investigators conducted a separate analysis of billing data for all patients who underwent vasectomies within the Cleveland Clinic healthcare system from 2018 through August 2022. Here, they found more than a doubling in median vasectomy procedural volume from pre- to post-*Dobbs*, which rose from 104 to 218 per month ($P = 0.03$).

The data on tubal ligation are less clear

Whether or not the Supreme Court's decision has had an impact on tubal ligation among women is less clear, and no data on that topic have been published. Even though vasectomy is less invasive and safer than tubal ligation, it is still far less common as a permanent contraceptive approach.

Dr. Vij notes that tubal ligation data are more difficult to gather since women often undergo that procedure at the time of Cesarean sections. "I think that's going to be very interesting to look at. But the timeline will be several years away."

LEFT — Raevti Bole, MD, counsels a patient in her clinic. Dr. Bole was a co-author on a new study that shows increased interest in vasectomy after SCOTUS overturned *Roe v. Wade*.

2023 HIGHLIGHT

THE COMPLEX BACTERIAL COLONIZATION OF PENILE IMPLANTS

Even in the absence of infection, penile implants may harbor more — and more complex — surface-level microbiota than previously understood, according to findings from a recent Cleveland Clinic-led study.

In the study, published in *Scientific Reports*, researchers found a unique microbe-metabolite interaction network in the biofilms of those who are infected and asymptomatic, raising new questions about potential pathways to infection.

In the treatment of refractory erectile dysfunction, penile prostheses can be an effective surgical option. Implants have advanced considerably since first introduced in the 1950s, including developments in anti-infective irrigants and coatings to help prevent infection. Yet device-associated infections comprise about 25% of hospital-acquired infections.

“Historically, it was thought that the devices were devoid of microbes in the absence of infection, but recent evidence has shown that even noninfected devices may harbor bacteria,” says first author Glenn Werneburg, MD, PhD, a urology fellow.

Co-author Scott Lundy, MD, PhD, associate staff urologist, adds, “Infection is a devastating complication for 1% to 2% of men who undergo penile prosthesis implantation. The device must be removed and may not be able to be replaced immediately.”

The research team set out to understand better the composition of the microbiota present in the biofilms of penile prosthetic devices and determine the propensity of the isolated microbes to reconstitute biofilm formation on a range of material types.

Aaron Miller, PhD, senior author, argues that clinical infections should be prevented or treated through approaches that target specific infectious processes, rather than by using the broad-brush antibiotic measures that are common today. Dr. Miller’s lab, within Cleveland Clinic Lerner Research Institute, is one of the few laboratories in the world to focus such broad expertise on the etiology of urologic conditions. The team recently led efforts to develop a global consensus on a set of standards for conducting genitourinary microbiome research.

He says this implant study — and the continued need to tackle problems presented by device-associated

infections and other diseases with urinary tract microbiome origins — relies on such standards.

Robust and uncommon biofilms found

The research team swabbed the biofilms from patients who were scheduled for device removal or revision. Of the 27 devices that were explanted and analyzed, four were removed for infection and four for pain.

Biofilm samples and controls were subjected to a series of assays including next-generation sequencing, metabolomics and culture-based assessments to determine the bacterial composition. Researchers also analyzed clinical associations with microbial composition.

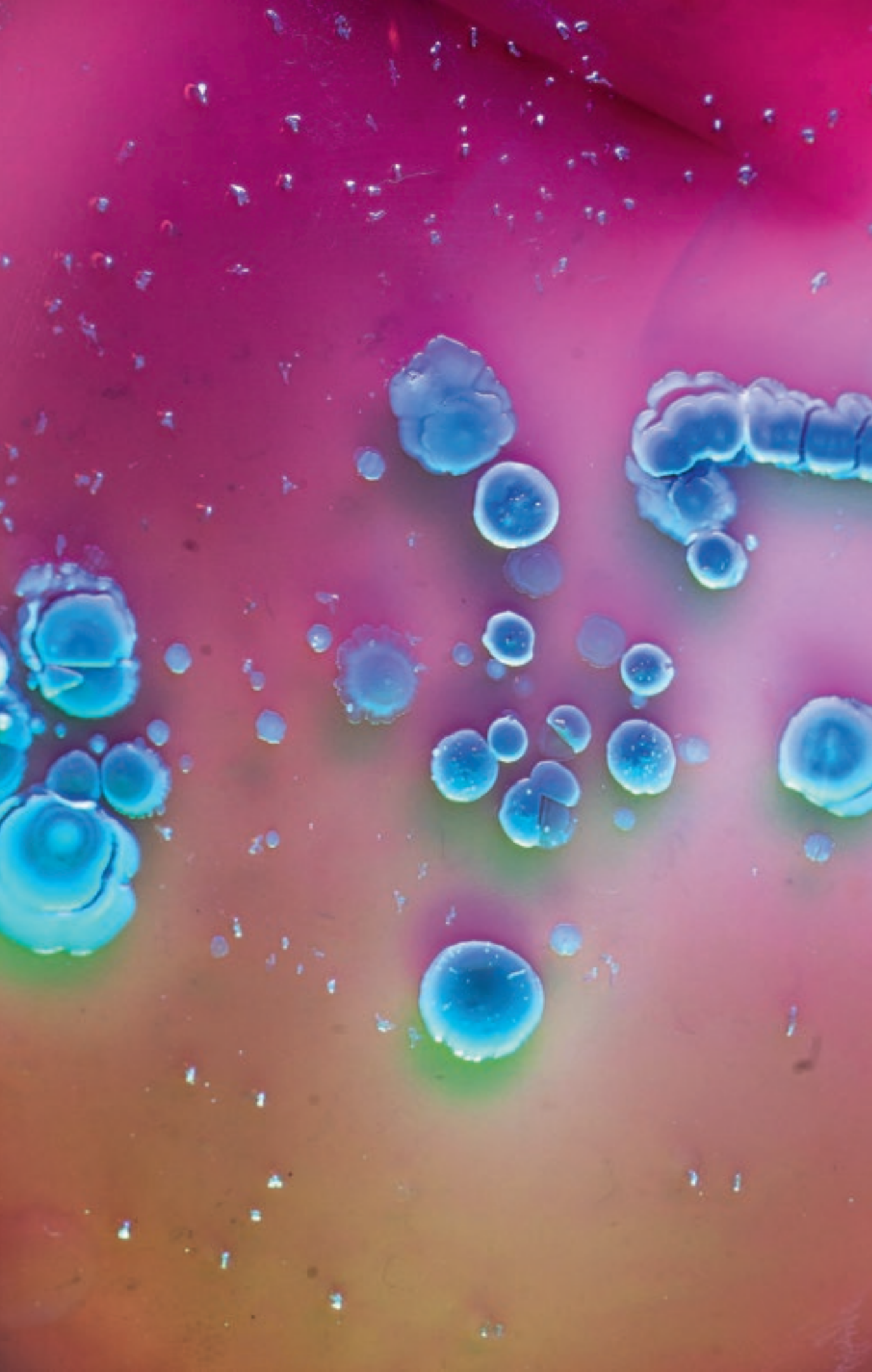
They isolated and replicated the bacteria on various surfaces — including silicone, polytetrafluoroethylene, polyurethane, polycarbonate and titanium — in an in vivo environment designed to simulate interaction with human tissue. Explains Dr. Werneburg, “In this way, we could screen both microbes and material types for biofilm deposition.”

Their results show that nearly all the devices in the study harbored robust microbiota, even in the absence of infection. *Staphylococcus* and *Escherichia*, historically linked to infection in conventional culture techniques, did not correlate with infection status. However, other uncommon genera and metabolites did, suggesting a more complex pattern at hand.

Could future improvements prevent infection?

Dr. Werneburg asserts, “Ultimately, we hope that the understanding generated from this study, and the methods used, may lead to the identification and development of new materials and coatings for penile prostheses and other medical devices to reduce infection risk.”

“This study truly changes the paradigm of infections and suggests we need to work smarter, not harder, to prevent infections,” concludes Dr. Lundy. “More antibiotics is not always better, and using the knowledge from this study, we are optimistic that other targeted interventions may be available in the future.”





Julie M. Wood, M.D.

2023 HIGHLIGHT

RETHINKING CREATININE TO ESTIMATE KIDNEY FUNCTION IN NONWEIGHT-BEARING INDIVIDUALS

A Cleveland Clinic-led study evaluates the accuracy of using serum creatinine alone when estimating kidney function in individuals who are nonweight-bearing and concludes that cystatin C or estimated glomerular filtration rate (eGFR) equations may offer a more accurate assessment in this patient population.

Creatinine levels are contingent upon muscle mass

Creatinine-based eGFR equations have been primarily validated in patients who are weight-bearing. However, as such levels are determined by muscle mass, they may not accurately reflect kidney function in a nonweight-bearing patient population at risk of sarcopenia.

Urologist Hadley Wood, MD, who specializes in the urologic management of patients with acquired and congenital spinal diseases, says she's long surmised that creatinine is a suboptimal measure for kidney function in this patient population.

"Someone who isn't ambulating or who has undergone leg amputation is not going to have creatinine production normalized to weight-bearing patients. Therefore, their creatinine will never be a good marker of how well their kidneys are filtering," says Dr. Wood, senior author of the study, published in *The Journal of Urology*.

The importance of an accurate eGFR

The main advantage of identifying a truly accurate eGFR, explains Cleveland Clinic nephrologist Jonathan Taliercio, DO, co-author of the study, is recognizing the presence and cause of kidney disease and trying to prevent its progression through lifestyle modification and medications. "We know that there is a stepwise increased risk of death associated with the severity of kidney disease," he says. Patients with neurogenic lower urinary tract dysfunction are already at greater risk for kidney dysfunction.

Testing the new eGFR equations in a nonweight-bearing population

In 2021, the National Kidney Foundation and the American Society of Nephrology published a recommendation to adopt a new set of equations, free of a race variable, to estimate kidney function.

The organizations endorsed the 2021 Chronic Kidney Disease (CKD)-Epidemiology (EPI) equations to be used with creatinine or cystatin C alone or a combination of the two. These calculations have been validated in an ambulating population but not in nonweight-bearing individuals.

The authors reviewed Cleveland Clinic adult records with a diagnostic code indicating nonweight-bearing status. They calculated the respective eGFR using the 2021 CKD-EPI equations — with creatinine (CKD-EPICr), cystatin C (CKD-EPICys) and a combination (CKD-EPICr+Cys). The eGFR was significantly lower when calculated with cystatin C compared to creatinine. And the differences in eGFR values were more varied in the nonweight-bearing cohort (N = 102) relative to the matched ambulatory control cohort (N = 204) ($P < .001$).

In a separate analysis, the research team matched available imaging and/or evidence of proteinuria in nonweight-bearing individuals, again showing variation among the three calculations ($P < .001$). This led to the reclassification of 58% of nonweight-bearing individuals to a lower eGFR when using cystatin C rather than creatinine.

Getting to the truth

Comparing the respective equations to the gold standard for GFR measurement, an iothalamate nuclear renal scan, may clarify which biomarker better approximates kidney function. But nuclear renal scanning isn't practical for every patient.

Next, the researchers plan to identify nonweight-bearing individuals with a wide discrepancy in eGFR values, complete an iothalamate study and "triangulate the truth," says Dr. Wood. Findings could confirm that the use of cystatin C is optimal in nonweight-bearing individuals, or they might indicate the need to generate a new equation or adjust the existing one.

LEFT — Hadley Wood, MD, examines a patient in her clinic. Findings from her study suggest a new strategy for assessing kidney function in the nonweight-bearing patient population.

2023 HIGHLIGHT

ROBOTIC RADICAL PROSTATECTOMY IN PATIENTS WITH A HOSTILE SURGICAL ABDOMEN

Excessive scar tissue in the abdomen historically has excluded patients from prostate surgery, owing to their higher risk of bowel injury. A new surgical technique made possible with the single-port (SP) robotic system is enabling safe access to the prostate.

“The SP robot has low-profile instruments that allow us to go through narrow areas that otherwise are prohibitive with the multiport robot’s comparatively bulky instruments,” explains Jihad Kaouk, MD, Director of the Center of Advanced Robotic and Image-Guided Surgery. The single arm allows 360-degree multi-quadrant access. This design enables the robot to operate in a smaller anatomical space.

Applying this technique to patients with a hostile abdomen is the latest adaptation of the SP robot by Dr. Kaouk and team. Over the past several years, the robotic technology has enabled modified surgeries and novel approaches that allow urologists to perform radical prostatectomy extraperitoneally, avoiding the sac that contains the bowel, and transvesically, providing surgical access to the prostate directly through the bladder.

These SP approaches have resulted in improved recovery times, low complication rates and decreased operative pain, resulting in limited use of opioids for pain control. SP transvesical prostatectomy, typically indicated for patients with lower-risk prostate cancer and prostates less than 100 grams, has shown improved postoperative urine control. Both techniques were first described by Dr. Kaouk.

“In our latest series, we were able to avoid the entire amount of scar tissue by navigating around the abdomen. So, this approach allows us to reach the prostate to do an effective prostatectomy without the need for lysing of adhesions or increasing the risk of bowel injury,” explains Dr. Kaouk.

The technique and its benefits

Dr. Kaouk explains: “During the transvesical approach, the bladder is entered through one incision, and a gas bubble is created within the bladder. The surgeon introduces a camera and three other narrow-profile instruments through one cannula, where the gas bubble is limited, and the prostate surgery is done from within the bladder. To re-establish the urine path,

the anastomosis is also done from within the bladder to the urethra.” He says patients have experienced extremely low morbidity from this procedure, resulting in the following:

- › Earlier removal of the Foley catheter (in about three days compared to the typical seven).
- › Hospital discharge usually within four hours (compared to overnight).
- › Generally, no narcotics needed because postoperative pain is not significant.
- › Immediate urine control noted in almost half of patients.
- › Decreased risk of hernia and bowel injuries (none noted in the entire series).

Considerations for candidates: J-pouches and more

Beyond patients who have surgery-prohibiting scar tissue, others have variation in their anatomy, such as a prominent pubic bone or wide dorsal vein complex. Others may have undergone attempted radical prostatectomy that was ultimately aborted by their physician because of various complications.

The most significant subset of patients in the series has undergone J-pouch surgery, also known as ileal pouch-anal anastomosis, a procedure performed after a patient has had a proctocolectomy to create a pouch out of part of the small intestine.

“Because the prostate sits deep in the pelvis on top of the rectum, it’s extremely difficult to access due to adhesions, particularly in patients who have undergone J-pouch surgery, but this procedure makes it possible,” notes Dr. Kaouk.

“We’ve continued to demonstrate the benefit of this new-generation robot with respect to regionalizing urologic surgeries. We are exceedingly pleased to improve access to treatment for patients who were previously not eligible for a radical prostatectomy because of a hostile surgical abdomen.”





2023 HIGHLIGHT

MINI-INCISION KIDNEY TRANSPLANT OFFERS BIG BENEFITS

Several years ago, kidney transplant surgeons at Cleveland Clinic adopted a new, less invasive incision for kidney transplant known as the anterior rectus sheath (ARS) approach. They now use the approach in almost 90% of kidney transplant cases.

What is the ARS approach?

The mini-incision seemingly offers improved pain outcomes, but there has been no scientific evidence to corroborate that — until now. Kidney transplant surgeon Mohamed Eltemamy, MD, and Cleveland Clinic colleagues led a single-center prospective trial that randomized 75 patients into one of two incision cohorts: the smaller, muscle-splitting ARS approach versus the conventional muscle-cutting Gibson approach.

Study participants were followed for a minimum of one year following transplantation. The authors published findings from the trial in *Clinical Transplantation*.

“Previous studies have demonstrated the benefit of ARS in patients with obesity, but ours was the first to implement the approach in a larger cohort, without the exclusion of obesity, and evaluate outcomes alongside the Gibson approach,” says Dr. Eltemamy.

The ARS approach offers a cosmetic advantage over the Gibson approach, although the study was not powered to evaluate aesthetic outcomes. The ARS approach includes a 7 cm to 12 cm oblique skin incision 2 cm to 5 cm above and parallel to the inguinal ligament. It’s typically half or less than half the size of the conventional incision.

The authors note that the technique involves a muscle-splitting approach to the iliopsoas fossa, in contrast to the muscle-cutting Gibson approach.

No significant difference noted in wound-related complications

In addition to pain outcomes, the investigators evaluated wound-related complications associated

with each approach, although they did not find a notable difference between the two cohorts ($P = .23$). Still, Dr. Eltemamy emphasizes the importance of surgeon-led efforts to minimize risk for wound-related complications. This is particularly germane in the context of rising annual rates of kidney transplantation and the increasing comorbidity burden within the patient population.

A modest investment with great returns

The approach does not require specialized technology or expertise in laparoscopic or robotic surgery to perform. What does it require? Dr. Eltemamy says, “A modest investment in small, slim-profile retractors to make the incision possible and the initial learning curve.”

In terms of exclusion criteria, there are two scenarios where he would avoid ARS: when patients have severe calcifications of the external artery that require a higher incision or when more complex vascular reconstruction is warranted.

Narcotic-free kidney transplant is a near-future reality

Dr. Eltemamy and colleagues have also completed a follow-up analysis examining ARS in conjunction with transversus abdominis plane block, an intraoperative analgesic. While this study is pending final publication, it represents continued efforts by the Cleveland Clinic team to explore improved patient outcomes following kidney transplant.

“Our goal is to get to a point where patients won’t need any narcotics following kidney transplant — and we think that’s a near-future reality,” concludes Dr. Eltemamy.

2023 UPDATES

The following updates from our subspecialty centers represent just a few highlights and accomplishments from 2023.

Kidney and Pancreas Transplant

Cleveland Clinic's Kidney Transplant program celebrated its 60th anniversary in 2023.

From the creation of the first artificial kidney and hospital-based dialysis program to modern surgical innovation, such as use of the single-port robot for kidney transplant, Cleveland Clinic continues to lead advancements in the field.

AT A GLANCE

300+

kidney transplants performed in 2023.

6,000+

kidney transplants performed at Cleveland Clinic main campus and affiliate and partnership sites since 1963.

15.6 months

average time from listing to transplantation at our center this year.

Urologic Oncology

Leveraging artificial intelligence (AI) to predict renal oncologic outcomes

Christopher Weight, MD, Center Director of Urologic Oncology, and research fellow Nour Abdallah, MD, show the superiority of AI-generated R.E.N.A.L.+ scoring compared with the conventional scoring method generated by human experts.



Deep learning to predict kidney cancer outcomes

In partnership with IBM, Dr. Weight and colleagues were awarded a \$1.5 million grant from the U.S. Department of Defense to study deep learning and multiomics data approaches to predict kidney cancer outcomes.

Improving outcomes and experience in prostate cancer care

Petar Bajic, MD, Director of the Center for Men's Health, and male infertility specialist Raevti Bole, MD, received a VeloSano Impact Award to better understand penile shock wave therapy for erectile dysfunction and pelvic pain.

Dr. Bajic also received an RPC grant, alongside resident Shree Agrawal, MD, examining the impact of peer mentors on decisional regret in newly diagnosed prostate cancer patients who received treatment associated with sexual side effects.

Advancing bladder cancer surgery

Nima Almassi, MD, received a \$250,000 grant from the Mandel Accelerator Fund to launch a clinical trial to assess the safety and efficacy of surgical approaches to muscle-invasive bladder cancer using the standard-of-care perioperative systemic therapy.



Men's Health

New training opportunity

Petar Bajic, MD, was named Center Director for Men's Health. He also launched a genitourinary medicine and men's health fellowship at Cleveland Clinic for eligible internal medicine or family medicine graduates.

Expanding treatment for benign prostatic hyperplasia

More than 80 aquablation therapy procedures have been performed across Cleveland Clinic main campus, Cleveland Clinic Akron and Cleveland Clinic Florida.

Endourology and Stone Disease

Fragmenting kidney stones with nanoparticles

Smita De, MD, PhD, and biomedical engineers Vijay Krishna, PhD, and Ian Houlihan, PhD, published a proof-of-concept study showing photonic lithotripsy, a technique they developed, as an effective approach to fragmenting common stone types (see page 11).

New investigations

Dr. De also received funding from two Cleveland Clinic-sponsored awards, including a Catalyst Grant to investigate novel nanoparticle-based antimicrobials for urologic implants and a Research Program Committee Award to measure muscle and nerve responses of surgeons during ureteroscopy.

Male Fertility

New funding

Sarah Vij, MD, Center Director for Male Fertility, was awarded an Envision Award from the Cystic Fibrosis Foundation for \$180,000.

Political impact on reproductive care

Dr. Vij and colleagues led a study that found a 35% increase in vasectomy consultation requests at Cleveland Clinic following the U.S. Supreme Court's decision to overturn *Roe v. Wade* (see page 15).

Unlocking potential new treatment

Scott Lundy, MD, PhD, and colleagues found that the aromatase inhibitor anastrozole improves sperm count even in men who don't have elevated estrogen levels — a startling discovery that holds major potential for noninvasive treatment of idiopathic male infertility.



Pediatric Urology

Predicting hydronephrosis and chronic kidney disease progression in kids with spina bifida

John (Jack) Weaver, MD, has been selected to receive a one-year NIH Loan Repayment Program for Pediatric Research Award through the National Institute of Diabetes and Digestive and Kidney Diseases for his project “Deep Learning of Videourodynamics to Predict Hydronephrosis and Chronic Kidney Disease Progression in Children with Spina Bifida.”

Funding supports surgical mission trip

Congratulations to Jessica Hannick, MD, who was recently awarded a Urology Care Foundation grant to fund an upcoming surgical mission trip to Azua, Dominican Republic, where she will provide pediatric urologic care to underserved children.



Urogynecology and Reconstructive Pelvic Surgery

First-in-human trial

Howard Goldman, MD, Margot Damaser, PhD, and colleagues demonstrate that the UroMonitor, a wireless, insertable pressure sensor to assist in the diagnosis of urinary incontinence and other bladder disorders, is safe, feasible and well tolerated in women with refractory overactive bladder (see page 12).

Practice-changing research

Bradley Gill, MD, led a study investigating intraoperative sacral neuromodulation lead placement that identifies factors associated with successful outcomes in patients with overactive bladder who

received the treatment. The study, published in *The Journal of Urology*, was featured as the journal's cover story in August 2023.

Noteworthy awards

Dr. Goldman received several industry-sponsored grants including Boston Scientific and Medtronic FPMRS fellowship grants and a Medtronic investigator-initiated research grant.

Dr. Damaser, a biomedical engineer in Lerner Research Institute, was named one of eight senior members of the National Academy of Inventors.

Robotic and Image-Guided Surgery

Another milestone moment in single-port surgery

More than 1,000 single-port (SP) robotic urologic surgeries have been performed to date.

In August, Jihad Kaouk, MD, and team celebrated this milestone. Dr. Kaouk has been utilizing the technique to further regionalize urologic surgeries since 2018.

Dr. Kaouk and team also used the SP system to complete the first low anterior retroperitoneal partial nephrectomy. They've utilized the approach for suspicious renal mass, pyeloplasty and ureteric reimplant. The benefits include enhanced postoperative recovery with opioid-sparing same-day discharges, preservation of accessory respiratory muscles and improved cosmesis.



Genitourinary Reconstruction

Expanded services for gender affirmation surgery

Michele (Mike) Fascelli, MD, (he/him), who joined the department in 2023, is expanding sexual health and urologic access for the LGBTQIA+ community while working in gender-affirming surgical care alongside colleagues in ob/gyn, head and neck surgery, and plastic surgery. The Department of Urology is now offering vaginoplasty, metoidioplasty and phalloplasty.

Rethinking the role of creatinine

In a new study, Hadley Wood, MD, evaluates the accuracy of using serum creatinine alone to estimate kidney function in nonweight-bearing individuals (see page 19).



Global Achievements

Cleveland Clinic Abu Dhabi surgeons complete a robotic kidney transplant and a noninvasive robotic focal high-intensity focused ultrasound (HIFU) procedure — both are firsts in the United Arab Emirates and in the region.

Education and Training

Cleveland Clinic's urology residency program was ranked No. 1 in reputation (out of 150 programs) by Doximity, its eighth year in a row to receive this distinction.

The residency program expanded from five residents per year to six, making it the largest such program in the country.



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Back by popular demand, Cleveland Clinic Urology will again have an on-site hospitality booth at the meeting. Interested in connecting or reconnecting with our team? Stop by booth 122 to say hello and learn more about our program.



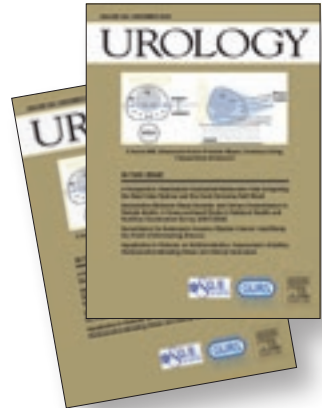
Academic Leadership and Recognition

Urology names Hadley Wood, MD, as new editor-in-chief

Hadley Wood, MD, assumed the role of editor-in-chief for *Urology*, the “Gold Journal” on Jan. 1, 2024, following a national search for candidates. Dr. Wood, a genitourinary reconstructive surgeon, replaces Eric Klein, MD, Chair Emeritus of Cleveland Clinic’s Glickman Urological & Kidney Institute.

Dr. Wood has long been a section editor for *Urology* and is an associate editor for *Urology Practice*. In addition to having a robust clinical practice, including leading a multidisciplinary adult spina bifida clinic, she has published extensively in the field, authoring numerous research papers and book chapters and, most recently, serving as co-editor of a first-edition textbook on urologic congenitalism.

Says Dr. Klein: “I am thrilled that my friend and colleague will take over as editor-in-chief. Dr. Wood embodies the spirit of the publication in its quest to publish high-impact, patient-centered urologic research. It has been an absolute honor to serve in this role for 15 years, and I am equally honored to pass the leadership baton to a colleague who assuredly will uphold and build on the legacy of this esteemed publication.”



National Recognition

- Sarah Vij, MD, was named a 2023 Young Urologist of the Year by the American Urological Association.
- Petar Bajic, MD, was named chair-elect of the Public Media Committee for the American Urological Association. The chairmanship is a three-year commitment, and the term will begin May 2024.
- Steven Campbell, MD, PhD, residency program director for nearly 20 years, was nominated for the lifetime achievement award by the American Urological Association for his contributions to urology in service, education and research.

He received the Kaiser Clinical Faculty Award for outstanding teaching and mentoring at Case Western Reserve University and Cleveland Clinic Lerner School of Medicine.

New Staff

Jamal Alamiri, MD
 Raevti Bole, MD
 Michele (Mike) Fascelli, MD
 Jessica Hannick, MD
 Fabrice Henry, MD
 Juan Antonio Jimenez, MD, PhD
 Melinda Knight, MD
 Christopher Lohr, MD
 Matthew Maurice, MD
 Brittany Mbanugo, DO
 Jeffrey Siminovitch, MD
 John (Jack) Weaver, MD
 Lawrence Wolkoff, MD
 Lynn Woo, MD



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