

## + EAU CONGRESS 2020

Reviewed

### + CONGRESS INTERVIEWS

Prof Arnulf Stenzl and Prof Evangelos Liatsikos spoke to us about their ambitions for EAU and ESU.

### + ABSTRACT REVIEWS

We are pleased to offer a range of engaging abstract summaries of research presented at EAU20.

# Contents

*“Within the following pages are highlights from the 35<sup>th</sup> Annual EAU Congress (EAU20), which was held virtually this year.”*

Spencer Gore, CEO

+ EDITORIAL BOARD	4
+ WELCOME	7
+ CONGRESS REVIEW	
Review of the 35 <sup>th</sup> Annual European Association of Urology (EAU) Congress, 17 <sup>th</sup> –19 <sup>th</sup> July 2020	11
+ CONGRESS FEATURE	
Seeing the Complete Picture: Imaging in Prostate Cancer Layla Southcombe	19
+ ABSTRACT REVIEWS	23
+ CONGRESS INTERVIEWS	
Arnulf Stenzl	36
Evangelos Liatsikos	39



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# EMJ Urology EAU Congress Supplement

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# Welcome

Dear Readers,

It is with great pleasure that I welcome you to the eagerly awaited European Association of Urology (EAU) Congress Review section of *EMJ Urology*. Within the following pages are highlights from the 35<sup>th</sup> Annual EAU Congress (EAU20), which was held virtually this year. Across the congress, there were numerous breakthroughs in research and treatment of urological conditions, which we have collated in our congress review for you.

Among the array of fascinating presentations that took place at this year's congress were thousands of poster and abstract presentations, and we have compiled a hand-selected collection of abstract summaries written by the presenters themselves. Included in the important topics covered are new technological therapies in chronic prostatitis, sacral neuromodulation in urinary voiding dysfunctions, and the use of artificial intelligence in CT imaging of kidney tumours. Furthermore, the authors provide insight into advancements in the understanding of acute urinary retention, neurogenic bladder dysfunction, and nocturia.

Following last year's updated EAU guidelines for treating prostate cancer, many sessions reported on their impact on treatment pathways. One aspect of importance was the shift towards image-guided diagnostics, with many speakers at EAU20 discussing the potential consequences of this. Inspired by this change in approach, we have summarised two EAU20 sessions on innovative imaging techniques for the diagnosis of prostate cancer for an article sharing imaging insights from the congress, titled 'Seeing the Complete Picture: Imaging in Prostate Cancer.'

Complementing the EAU20 content, we spoke with two key members of the EAU: Prof Arnulf Stenzl, Adjunct Secretary General of the EAU Executive Office, and Prof Evangelos Liatsikos, Chairman of the European School of Urology (ESU). We are pleased to present our interviews in this congress update, discussing their roles within EAU and their current research.

Finally, I would like to take this moment to thank all our contributors, Editorial Board, and Publishing Team who made this congress review possible. Without further ado, I hope you enjoy reading this excellent supplement to *EMJ Urology*, and I look forward to the next EAU Congress in March 2021.

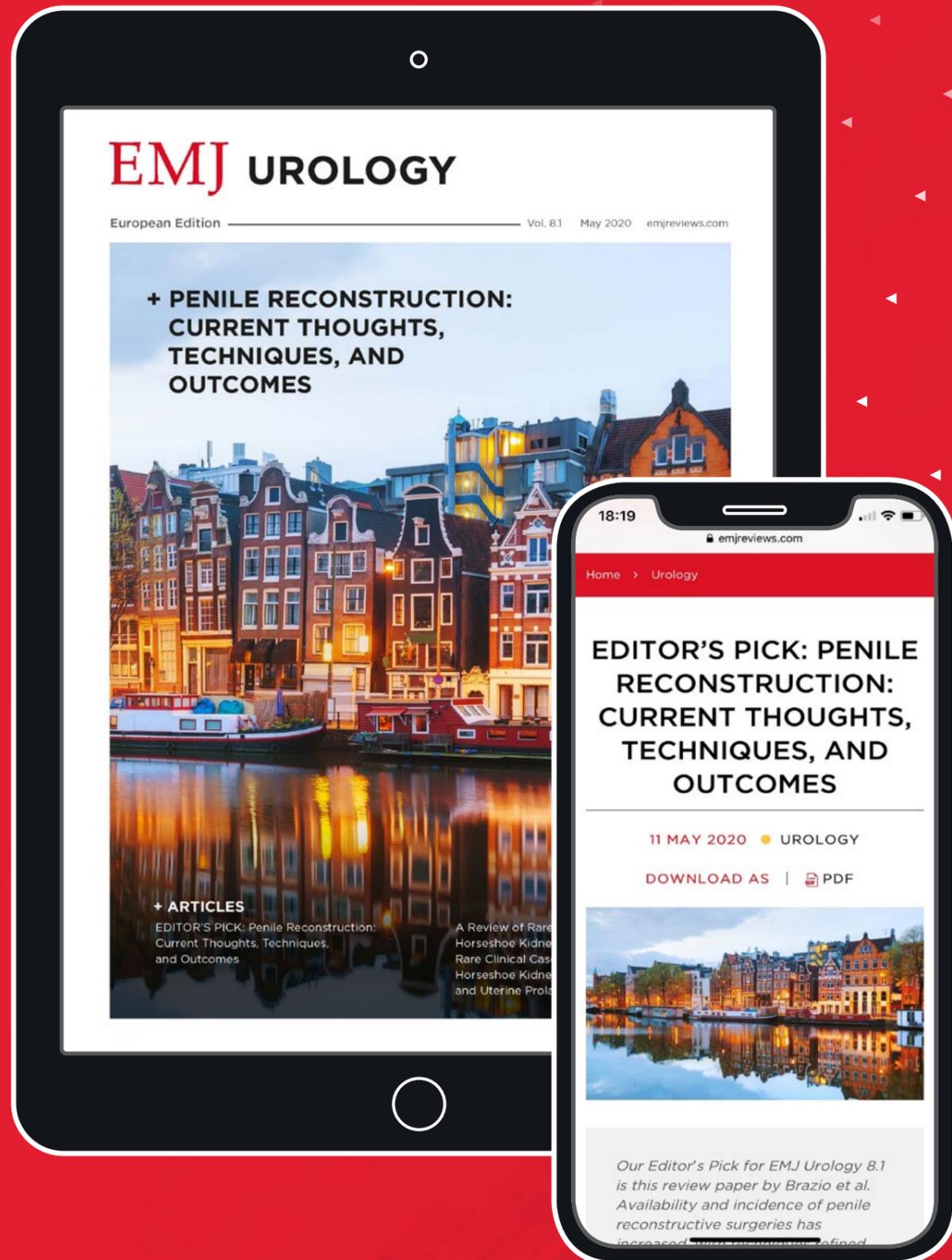


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# Congress Review

## Review of the 35<sup>th</sup> Annual European Association of Urology (EAU) Congress

Location: Annual EAU Congress 2020  
Date: 17<sup>th</sup>-19<sup>th</sup> July 2020  
Citation: EMJ Urol. 2020;8[Suppl 2]:11-18. Congress Review.

CROWDS spilling along canals, the brilliance of centuries of art waiting to be enjoyed at dozens of galleries, and the bright explosion of colour from millions of tulips in bloom. The beautiful city of Amsterdam, the Netherlands, is an absolute delight, and certainly accustomed to hosting visitors with more than 20 million tourists visiting the city of fewer than 1 million every year. But this year, closed borders, cancelled flights, and limited gatherings saw the European Association of Urology (EAU) move their 35<sup>th</sup> Annual Congress, EAU20, entirely online for the first time.

Undeterred by a new virtual format, more than 13,000 urologists, researchers, and industry specialists joined the congress to share in the latest urology research, hear the insights of experts in the field,

and connect with a community sharing a goal of providing better care for every patient. The original congress date, 20<sup>th</sup>-24<sup>th</sup> March, was postponed as addressing the initial wave of COVID-19 in Europe took precedence. However, the delay allowed for better preparation of the new digital format, launched 17<sup>th</sup>-26<sup>th</sup> July, with the formal congress underway from 17<sup>th</sup>-19<sup>th</sup> July, 2020.

Discussing changing to a virtual programme in a press release ahead of the congress, Scientific Congress Office Chair Prof Peter Albers, Düsseldorf, Germany, highlighted the decision to shorten many of the presentations and schedule more time for discussion and question-and-answer sessions: "The virtual meeting should become a very vivid and interesting discussion event." These planned changes worked brilliantly, as limiting the

*"Undeterred by a new virtual format, more than 13,000 urologists, researchers, and industry specialists joined the congress"*



*"EAU20 was an opportunity for EAU to recognise the contributions of standout urologists and researchers."*

prerecorded time of any one speaker avoided a didactic, lecture-style event, and instead fuelled a truly collaborative, shared experience for the thousands of attendees.

EAU Secretary General Prof Chris Chapple welcomed congress attendees from his home institution in Sheffield, UK, via video. Lecture presentations by scheduled speakers were prerecorded, enabling the congress to run smoothly. Speakers then hosted live, moderated discussions, debates, and question-and-answer sessions to provide a more engaging, interactive tone for the congress.

Breaking news and hot-topic research shared at EAU20 included oncological insights, such as the results of the largest-ever study by patients revealing the impact of prostate cancer treatment on quality of life, and a Belgian study examining the role of a genetic 'switch' in metastasis in high-risk prostate cancer. Beyond oncology, EAU20 shared the findings of a study considering the role of hormone replacement therapy in recurrent urinary tract infections in women, alongside

the insights from a 10-year study in Milan, Italy, about the reasons why men attend sexual health clinics. We share summaries of these studies in this EAU20 congress review, alongside a detailed review of the insights shared in the Plenary Session 'Modern Prostate Cancer Imaging in Daily Practice'.

The abundance of abstracts submitted to EAU20 was so great that, following the completion of the main virtual congress 17<sup>th</sup>-19<sup>th</sup> July, a full week of themed evening abstract presentations continued from 20<sup>th</sup>-26<sup>th</sup> July. Some of these excellent abstracts have been summarised by the authors and are shared in our congress review, including work by Heller et al. describing the global challenge of using artificial intelligence in 3-dimensional imaging techniques for kidney tumours, von Siebenthal et al. sharing their findings of gene expression in bladder dysfunction, and Rochester et al. introducing the 12-month outcomes of the PULSAR study.

EAU20 was an opportunity for EAU to recognise the contributions of standout urologists and

researchers. The EAU Willy Gregoir Medal 'for a significant contribution to the development of the urological specialty in Europe' was awarded to Manfred Wirth, Dresden, Germany, while the EAU Frans Debruyne Lifetime Achievement Award celebrated the career of Hendrik Van Poppel, Leuven, Belgium, 'for a longstanding and important contribution to the activities and development of the EAU.' With a view to the future, the EAU Crystal Matula Award 'for a young promising European urologist' was presented to Derya Tilki, Hamburg, Germany, and the EAU Innovators in Urology Award 'for inventions and clinical contributions which have had a major impact on influencing the treatment and/or diagnosis of a urological disease' celebrated the work of Jelle Barentsz, Nijmegen, the Netherlands. Many other prizes were awarded, honouring the best presentations, abstracts, and videos out

of the rich abundance of clinical insight shared at EAU20.

Prof Albers closed the main congress by highlighting the value uncovered by hosting an online meeting: "For the future, I think it is important to realise that such meetings also have possible advantages over in-person meetings. We reached a lot of people in continents that usually are not able to afford a European meeting." He articulated his hope that future meetings will be able to go ahead in person, beginning with next year's meeting in Milan, Italy, but that the congress will retain virtual components to continue to share in the remarkable global networking experience of EAU20.

*"For the future, I think it is important to realise that such meetings also have possible advantages over in-person meetings."*



EAU 2020 REVIEWED →



## Treatment Calculator Advises When to Treat Prostate Cancer

CLARITY is a closer reality for men with prostate cancer, as a new nomogram is under development to help identify when it is most appropriate to recommend active surveillance versus treatment. Analysis of the world's largest prostate cancer patient database has helped to determine the factors that best predict progression and need for treatment.

The nomogram is a treatment calculator, intended to be a global resource to help clinicians determine when to recommend treatment for prostate cancer. Clinicians can input patient details including age, prostate-specific antigen, and time on active surveillance, and cancer details such as size and condition of the tumour, biopsy details, and genetic factors. The nomogram aims to clarify how aggressive the cancer is, so that clinicians can then provide tailored advice. The GAP3 consortium of researchers used the Movember database of 14,380 patients to provide insights on cancer progression.

Similar nomograms exist in several local healthcare services, but data studied by the researchers revealed significant variation in proportions of these low- and intermediate-risk

patients undergoing active surveillance. The aim was to build a global methodology that would be able to reassure clinicians in their treatment recommendations for their patients. Lead researcher Dr Mieke Van Hemelrijck, King's College London, London, UK, highlighted the value of this reassurance: "Prostate cancer treatment can have significant side-effects such as erectile dysfunction and incontinence, so often avoiding intrusive surgery or radiotherapy can benefit the patient. Nevertheless, being told you have cancer puts great psychological pressure on men to agree to treatment, so understanding just how aggressive the cancer is before deciding on treatment is essential."

*"The nomogram aims to clarify how aggressive the cancer is, so that clinicians can then provide tailored advice."*

The Movember database findings and plans for the nomogram were presented at the 35<sup>th</sup> Annual EAU Congress in a press release dated 19<sup>th</sup> July 2020 to a global community of urologists. EAU Adjunct Secretary General Prof Hendrik Van Poppel, University of Leuven, Leuven, Belgium, commented on the potential of the study: "This work shows that it should be possible to develop a global nomogram – in other words, a system which allows us to predict whether active surveillance will be suitable for individual low and intermediate risk prostate cancer patients."

# Quality of Life Impacts of Prostate Cancer Treatment

CONDUCTED by patients themselves, the first international quality of life (QoL) study of those with prostate cancer has found that large numbers of men are negatively impacted by continence problems and loss of sexual function following treatment.

The results of the Europa Uomo Patient Reported Outcomes Study (EUPROMS) were announced at the 35<sup>th</sup> Annual EAU Congress in a press release dated 18<sup>th</sup> July 2020.

Data from 2,943 men from 25 European countries were collected; the participant average age was 70 (all were aged >45 years), average age at diagnosis was 64 years, and therefore, on average, they were reporting on their QoL 6 years after treatment initiation. The respondents completed a 20-minute online survey, which included three standard, validated QoL questionnaires (EPIC-26, EORTC-QLQ-C30, and EQ-5D-5L).

50% of the participants treated for prostate cancer reported that the loss of sexual function was either a 'big' (28%) or 'moderate' (22%) issue for them. These results contrast with previous clinical studies, which have not rated urinary incontinence and sexual function with QoL scores as low as reported here.

Additionally, patients also highlighted that the treatment of radical prostatectomy was associated with the largest impact on urinary incontinence, and that radiotherapy was linked to twice as much fatigue as that associated with surgery; this score was tripled for those who underwent chemotherapy.

Prof Arnulf Stenzl, EAU Adjunct Secretary General, Tübingen University, Tübingen, Germany, commented: "Quality of life can be poor after most prostate cancer treatment, especially in advanced disease. This message is clear, and we need to listen to the voices of these patients."

Professor Monique Roobol, of the Erasmus University Medical Centre, Rotterdam, the Netherlands, and one of the study's authors, also

added: "This study is important because it was initiated by patients and meant for patients."

As the highest QoL scores were indicated by those whose cancer was discovered in the early, curable stages, this advocates for efforts to be made towards early detection and awareness.

*"Quality of life can be poor after most prostate cancer treatment, especially in advanced disease. This message is clear, and we need to listen to the voices of these patients."*





## Metastatic Prostate Cancer Linked to *AZIN1* Gene

YEARLY, more than 1 million European men undergo prostate cancer biopsies. With around 400,000 new cases every year in Europe, prostate cancer is the most common cancer in males. Fortunately, according to a new study presented in a press release at the 35<sup>th</sup> Annual EAU Congress on 17<sup>th</sup> July 2020, researchers have discovered a switch associated with metastasis.

The researchers from the University of Leuven, Leuven, Belgium, recruited 44 high-risk prostate cancer patients. Following treatment, 25 of the patients were cured and 19 developed metastatic prostate cancer. To gain a better understanding of the cancer mechanism, the number of DNA segments in the two groups were compared. The *AZIN1* gene was found to be associated with a more aggressive disease, as findings revealed more copies of the gene in patients who went on to develop metastatic cancer. To further test this, *AZIN1* gene expression was reduced in both cell culture and mouse models with results confirming that a decreased expression of the gene resulted in reduced metastases.

Because the work is still in early stages and requires further investigation, it is not known whether this applies to all prostate cancers and therefore the researchers urge caution to their findings. However; “What we can say is that this finding applies to the patients we tested, who were followed up over a period of 10 years, as well as our mouse and *in vitro* models. There are also some initial findings that this gene may have an effect in other cancers,” stated lead researcher Dr Lisa Moris.

In their work, the researchers were able to demonstrate the close relationship between metastatic prostate cancer and the regulation of the *AZIN1* gene. Currently, the team is investigating the exact function of the gene to determine whether it can be regulated in real-life cancers, and although still far from clinical application, this may pave the way to controlling prostate cancer in the future.

*“There are also some initial findings that this gene may have an effect in other cancers”*



*"[...] this is the first focussed analysis of the bacteria in the urogenital tract of postmenopausal women, and the results indicate that oestrogen use is associated with high levels of Lactobacilli in the urine, which could possibly offer some protection against infection."*

## Hormone Replacement Therapy May Lead to Development of Probiotics for Urinary Tract Infection

FEMALES are more likely to endure urinary tract infections (UTI) than males; recurrent UTI is a clinical concern which disproportionally affects postmenopausal women and 50–60% of females experience a painful UTI during their lifetimes.

Analysis has shown that females who are administered hormone replacement therapy have a diverse range of bacteria in their urine which are potentially able to inhibit UTI. This is according to the results of a new study presented as part of a press release dated 18<sup>th</sup> July at the 35<sup>th</sup> Annual EAU Congress.

Healthy urine is not sterile and contains bacteria, fungi, and viruses; the body plays host to an array of harmless resident bacteria thought to help with bodily processes such as digestion. Females who experience recurrent infections do not have a variety of bacteria in their urine compared to those who do not and are more prone to infections. Scientists from the University of Texas at Dallas, Richardson, Texas, USA, carried out a controlled, systematic analysis of postmenopausal females' urine for bacterial diversity to test the relationship between different bacteria and susceptibility to recurrent urinary infections.

The research group tested the urine of 75 postmenopausal females using bacterial DNA analysis. The results showed that females with no infections had 10 times more varied bacteria in their urine compared to females who do not experience recurrent UTI. Of the 75 females, 34 were taking hormone replacement therapy and were found to have an increased number of *Lactobacillus*-type bacteria in their urine, leading the researchers to conclude that the oestrogen in menopausal hormone therapy supports *Lactobacillus* growth in the urogenital tract.

In the vagina, *Lactobacilli* play a protective role against infections. If this is exhibited in the urogenital tract, it may give rise to the development of a probiotic for use with hormone replacement therapy and may present a case for females to stop using antibiotics.

Dr Nicole De Nisco commented on the results of the study: "[...] this is the first focussed analysis of the bacteria in the urogenital tract of postmenopausal women, and the results indicate that oestrogen use is associated with high levels of *Lactobacilli* in the urine, which could possibly offer some protection against infection."

# Male Sexual Problems Have Changed Over the Last Decade

ATTITUDES of males towards sexual health problems and attending sexual health clinics have changed over the last 10 years, according to a study from the San Raffaele Hospital, Milan, Italy, and summarised in a press release from the 35<sup>th</sup> Annual EAU Congress 2020 dated 19<sup>th</sup> July.

Since the widespread success of erectile dysfunction treatments such as sildenafil and tadalafil, the sexual problems males are reporting at sexual health clinics are changing. Fewer males are seeking help for erectile dysfunction and premature ejaculation, and more males, in particular those who are younger, are presenting with low sexual desire and curvature of the penis (Peyronie's disease).

In the observational study, 3,244 male visitors to the San Raffaele Hospital Sexual Health Clinic from 2009 to 2019 were asked to classify their main reason of visit. Over the 10-year period, males attending the clinic for help with premature ejaculation reduced by approximately 6%. Interestingly, attendance because of erectile dysfunction increased from

2009 to 2013, but then decreased. Research leader Dr Paolo Capogrosso commented: "Erectile dysfunction is still the main reason for attending the clinic, but this number is dropping, whereas around 35% of men attending the clinic now complain of Peyronie's disease, and that number has shown steady growth."

Additionally, in 2009 the number of males presenting to the clinic with reported low sex drive or Peyronie's disease was relatively low, but for both conditions the numbers of males coming forward seeking help grew during the period of the study. By 2019, males attending the clinic were approximately 30% more likely to report Peyronie's disease and 32% more likely to report low sexual desire, when compared to 2009.

*"Over a 10-year period, we have seen a real change in what concerns men when they attend sexual health clinics. This is probably driven by greater openness, and men now accepting that many sexual problems can be treated, rather than being something they don't want to talk about"*

"Over a 10-year period, we have seen a real change in what concerns men when they attend sexual health clinics. This is probably driven by greater openness, and men now accepting that many sexual problems can be treated, rather than being something they don't want to talk about," added Dr Capogrosso.



# Seeing the Complete Picture: Imaging in Prostate Cancer

**Layla Southcombe**

Editorial Assistant

Citation: EMJ Urol. 2020;8(Suppl 2):19-21.



**G**UIDELINES by the European Association of Urology (EAU) for managing prostate cancer (PCa) were updated at last year's EAU meeting, and have had profound implications on the PCa diagnostic pathway. One crucial set of changes in the recommendations was that every time a biopsy is considered necessary based on risks, an MRI needs to be conducted prior to the biopsy. Given this paradigm shift towards image-guided diagnostics, the future landscape of imaging in PCa looks to be one containing innovative approaches.

## MRI

Overdiagnosis and overtreatment are two crucial criticisms in PCa that MRI could help diminish. In the Plenary session “Modern prostate cancer imaging in daily practice,” Prof Boris Hadaschik, University Hospital Essen, Essen, Germany, outlined the use of MRI in PCa, highlighting that “MRI is an excellent tool to help us in finding the most relevant cancer in the prostate because we not only can look at anatomy, but also cell density and perfusion,” both key hallmarks of cancerous tumours.

Prof Hadaschik highlighted a comparative study of MRI versus transrectal ultrasound scan for the detection of clinically significant PCa in which MRI was far superior to transrectal ultrasound scan, having a sensitivity of 93% versus 48%, respectively.<sup>1</sup> While MRI is not the perfect method for diagnosing and grading PCa, it does allow for the detection of the bigger and more aggressive lesions, and the integration of MRI has been shown to improve PCa risk modelling.<sup>2</sup>

## ULTRASOUND

Historically, the reliability of ultrasound for detecting PCa has come under question and diagnostic performances have not been superior to systematic biopsy, despite the number of different modalities developed. The cost and availability of MRI are two key concerns of the MRI pathway and therefore ultrasound, as an inexpensive and convenient tool, may have a place in PCa diagnosis, but only if the accuracy of the modalities can be improved.

In juxtaposition to the qualitative interpretation of contrast-enhanced ultrasound, contrast-ultrasound dispersion imaging (CUDI) makes use of time intensity curves to analyse contrast dispersion dynamics. In another presentation in the Plenary session, Dr Christophe Mannaerts, Amsterdam University Medical Center, Amsterdam, the Netherlands, recounted data from a recent study investigating detection rates of CUDI-targeted biopsy, MRI-targeted biopsy, and systematic biopsy.<sup>3</sup> Despite both CUDI- and

MRI-targeted biopsy reducing the detection of Grade Group 1 PCa, both approaches missed substantial amounts of Group 2 or higher PCa when compared with systematic biopsy. In comparison to MRI, CUDI had comparable negative predictive value, but a lower positive predictive value, with more false positives most likely due to benign prostatic hyperplasia or prostatitis. While these results question the sole use of CUDI, Dr Mannaerts posed the idea of a multiparametric approach to ultrasound having value.

## Multiparametric Ultrasound

PCa is a notoriously multifocal and heterogenous disease, and therefore taking a multiparametric ultrasound approach that combines complementary biomarkers, including tissue texture, elasticity, and perfusion, could facilitate accurate detection of clinically significant PCa, noted Dr Mannaerts. Analysis of a multiparametric ultrasound combination of grey-scale, contrast-enhanced, shear wave elastography, and CUDI ultrasound showed a significant improvement in sensitivity (ranging from 74% for Epstein criteria to 85% for International Society of Urological Pathology [ISUP] Grade 3 or higher).<sup>4</sup> Overall, the multiparametric approach outperformed the modalities as singulars on a pixel-wise and region-wise analysis. Interestingly, the potential for the integration of machine learning into the approach was technically feasible and demonstrated in the study. Dr Mannaerts concluded that these findings support the rationale for further defining the usefulness of multiparametric ultrasound in the diagnostic pathway of PCa.

## PSMA PET/CT

Prostate specific membrane antigen (PSMA) PET/CT is an emerging diagnostic tool that could soon be the new gold standard for imaging PCa. The production of images with striking tumour to background contrast was exemplified by Prof Michael Hofman, Peter MacCallum Cancer Centre, Melbourne, Australia; during the first 'Game Changing' session he presented the case of

*“MRI is an excellent tool to help us in finding the most relevant cancer in the prostate because we not only can look at anatomy, but also cell density and perfusion”*

a male with Grade Group 4 PCa. Through conventional CT imaging, numerous pelvic and abdominal subcentimetre nodes were “barely visible,” but when using PSMA PET/CT they were “lighting up very brightly,” highlighted Prof Hofman. In the second presentation of the session, Dr Matthias Heck, Technical University of Munich, Munich, Germany, drew attention to the fact that with CT/MRI, lymph nodes are only treated as suspicious if they are >8–10 mm in size.<sup>5</sup> Given that up to 80% of pelvic lymph node metastases are <8 mm, this is a crucial drawback to the use of CT/MRI in the PCa diagnostic pathway, meaning that the capability of PSMA PET to detect lymph node metastases of only a few mm is an important advantage of its use for early detection of severe metastatic disease.<sup>6</sup> However, the clinical benefit of such early detection is yet to be proven.

### proPSMA

Prof Hofman presented the recent data from the proPSMA trial that analysed the diagnostic validity of PSMA PET/CT in males across Australia with untreated, biopsy-proven PCa.<sup>7</sup> A 27% greater accuracy for PSMA PET/CT versus CT plus bone scan (CT+BS), the current standard of care, was reported (92% versus 65%, respectively), which was a result of higher sensitivity and specificity.

Of note in the secondary endpoints, management change, for example from surgery to androgen deprivation therapy, occurred in 28% of males in the PSMA PET/CT arm versus only 15% in the CT+BS arm. Additionally, uncertain findings were reported in 23% of males in the CT+BS arm, compared with only 7% in PSMA PET/CT, and a reduced radiation dose was needed for PSMA PET/CT (8 mSv versus 19 mSv). At second-line crossover imaging, it was shown that the endpoint of management change was maintained in PSMA PET/CT, and that there was little value in having a CT+BS following PSMA PET/CT.

While preliminary data are promising, there is still a lack of prospective or multicentre data. Furthermore, both Prof Hofman and Dr Heck noted that the sensitivity of PSMA PET/CT in the proPSMA trial is speculated to be overestimated because the investigators were unable to define the true incidence of pelvic nodal disease as no males underwent pelvic node dissection. Prof Hofman concluded his session with acknowledgement that the cost effectiveness

*Through conventional CT imaging, numerous pelvic and abdominal subcentimetre nodes were “barely visible,” but when using PSMA PET/CT they were “lighting up very brightly”*

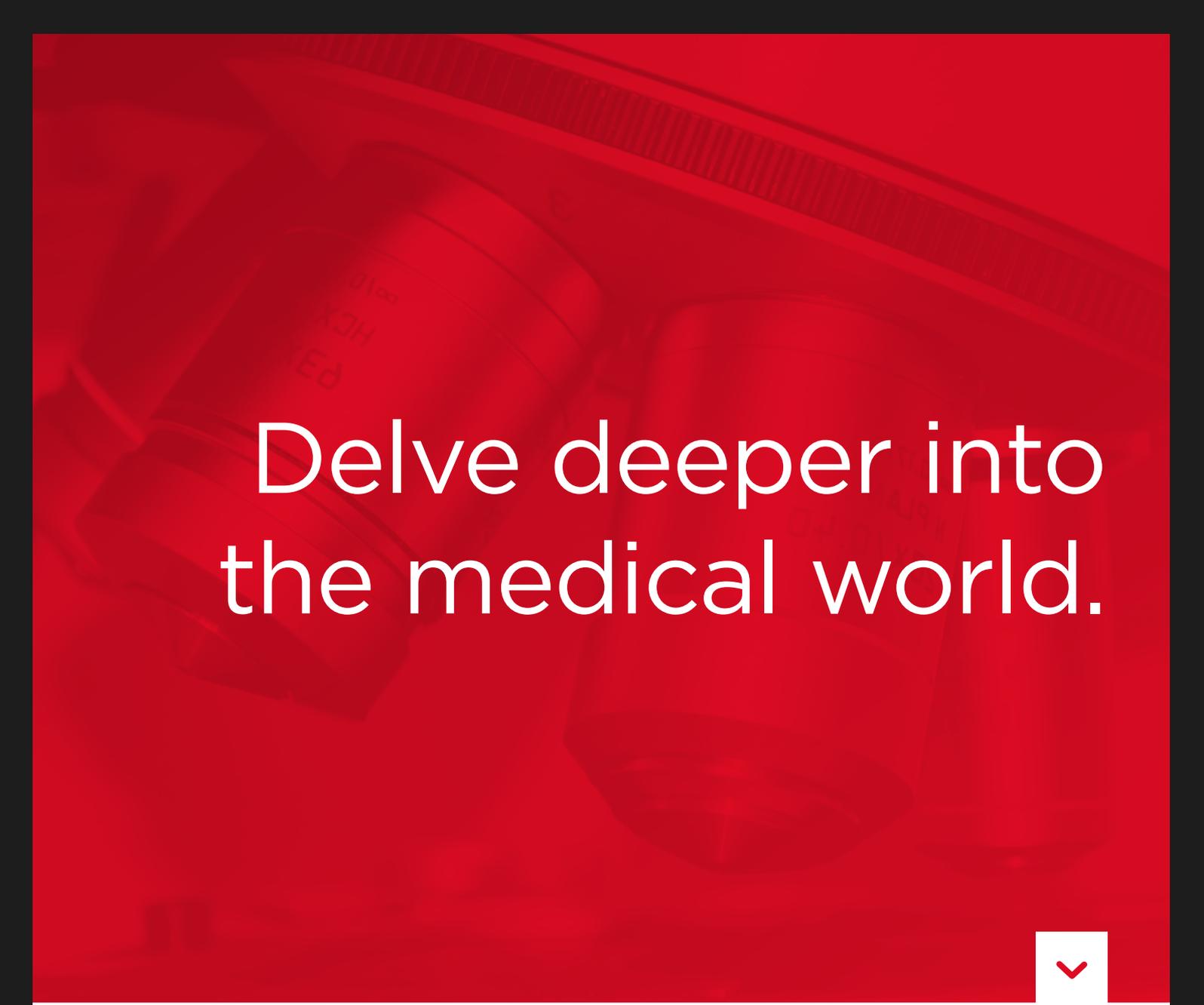
and availability of PSMA PET/CT needs to be investigated, but commented: “In summary, the proPSMA data supports PSMA PET/CT as a replacement to current standard of care CT+BS.”

### SUMMARY

The paradigm shift towards an image-guided PCa diagnostic pathway is set to drastically change PCa practice. The constant drive to improve outcomes of PCa and metastatic disease has produced innovative solutions, each with improving diagnostic sensitivity and specificity. While MRI has been hailed as the current gold standard, there is plentiful room for new or re-invented imaging modalities to better MRI and hold this accolade.

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# Abstract Reviews

Sharing insights from abstracts presented at the 35<sup>th</sup> Annual European Association of Urology (EAU) Congress, clinicians and researchers have provided these summaries of their fascinating studies.

## Long-Term Efficacy of Extracorporeal Shock Wave Therapy For Treatment Of III-a Chronic Prostatitis

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**Disclosure:** The authors have declared no conflicts of interest.

**Keywords:** Chronic pelvic pain syndrome (CPPS), chronic prostatitis (CP), extracorporeal shock wave therapy (ESWT).

**Citation:** EMJ Urol. 2020;8[Suppl 2]:23-24. Abstract Review No: AR1.

### BACKGROUND AND AIMS

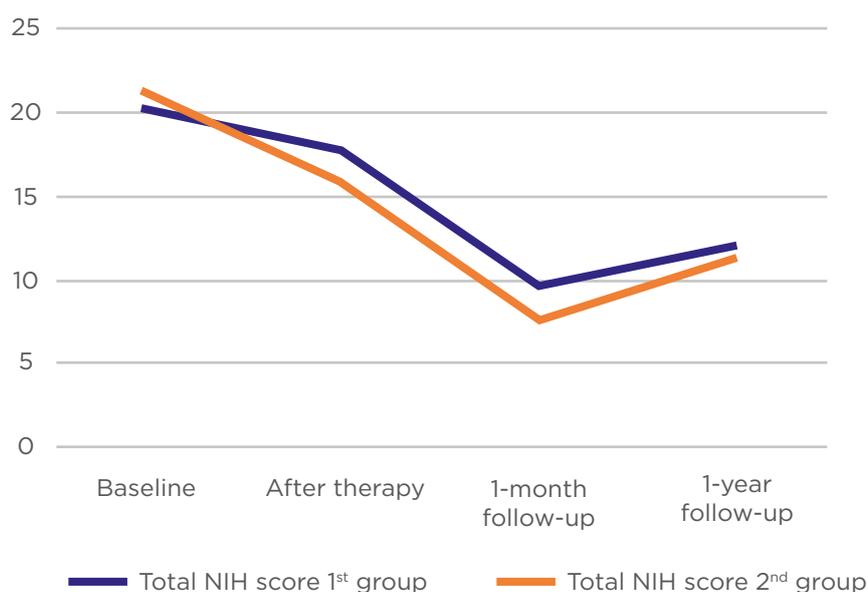
Extracorporeal shock wave therapy (ESWT) for chronic prostatitis (CP) is a popular method

because it does not require prescription of medicines, and therefore can be used in patients with allergies.

The aim of this study was to estimate long-term efficacy of ESWT as monotherapy for CP/chronic pelvic pain syndrome (CPPS), establish the maintenance of the treatment effect for up to 1 year post-treatment, and conclude whether the patients were in need of further sessions.

### MATERIALS AND METHODS

Of the total 49 CP/CPPS patients enrolled in the study, 27 patients had CP/CPPS Category III-a (first group) and 22 patients had CP/CPPS Category III-a complicated with prostatic calculi (second group). Inclusion criteria were National Institute of Health Chronic Prostatitis Symptom Index (NIH-CPSI) scores  $\geq 15$ , as well as signed informed consent. ESWT was performed with Dornier Aries (Dornier MedTech Systems GmbH, Weßling, Germany) as monotherapy. For the first group, the protocol was two procedures per week for 3 weeks, totalling a complete course of six procedures. Patients of the second group received the same therapy, but, because they had disease complicated by prostatic calculi, they received eight procedures over 4 weeks, again receiving treatment twice a week.



**Figure 1: Long-term results of extracorporeal shock wave therapy for treatment of Category III-a chronic prostatitis.**

NIH: National Institute of Health.

Efficiency was evaluated by a NIH-CPSI score calculated directly after the end of ESWT, and at 1-month follow-up (first group) and 3-month follow-up (second group). Additionally, in both groups long-term efficiency was estimated in 1-year follow-up after ESWT had finished.

## RESULTS

For 1-year follow-up, 23 patients (85.2%) in the first group and 18 patients (81.8%) in the second group were available. During this period, seven patients (24.1%) in the first group and nine patients (50.0%) in the second group had relapse of CP/ CPPS and were treated with ESWT repeatedly. However, some patients in both groups were well for the full 12 months following ESWT, despite having 1-2 relapses of CP/ CPPS every year prior to receiving ESWT.

Results were worse in the 1-year follow-up than in the 1-month after the course of ESWT, but better than baseline. NIH-CPSI scores showed statistically significant improvement in all parameters in both groups, with maintenance of the effect without any significant side-effect of the treatment over the 12 months (Figure 1).

## CONCLUSION

This study demonstrates the safety and efficacy of ESWT for at least 1-year post-treatment in CP/ CPPS, including in patients complicated by prostatic calculi. Only 24.1% of patients with CP/ CPPS Category III-a and 50.0% of CP/ CPPS Category III-a complicated with prostatic calculi needed a repeated course of ESWT after completion of the first course.

# An International Challenge to Use Artificial Intelligence for Kidney and Kidney Tumour Segmentation in CT Imaging

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**Keywords:** Benchmarking, kidney cancer, machine learning, semantic segmentation, radiomics.

**Citation:** EMJ Urol. 2020;8[Suppl 2]:25-26. Abstract Review No: AR2.

Three dimensional (3D) semantic segmentation is a powerful tool for the radiomic characterisation of lesions in cross-sectional imaging; however, its use is limited because of the extensive manual effort required to accurately delineate regions of interest. Artificial intelligence methods based on 'deep learning' have had enormous success at automating semantic segmentation tasks, but they rely on large datasets with high-quality manual

segmentations from which to learn.<sup>1</sup> The scarcity of publicly available CT and MRI segmentation datasets have slowed the development of automatic segmentation systems for 3D medical imaging data. The 2019 Kidney and Kidney Tumor Segmentation challenge<sup>2</sup> (KiTS19) was an international competition held in conjunction with the International Conference on Medical Image Computing and Computer Assisted Interventions (MICCAI) that sought to stimulate progress on this automatic segmentation frontier.

This competition was based around a first-of-its-kind dataset of 300 patients with preoperative CT imaging and corresponding high-quality 3D segmentation labels for the depicted kidneys and tumours. Of these cases, 210 were publicly released at the start of the challenge for teams to develop their systems. The imaging alone for the remaining 90 cases was released prior to a 2-week submission period, during which teams used their systems to automatically segment the kidney and tumour regions. Those automatic segmentations were then submitted to an online platform, which measured each team's performance in terms of their Sørensen-Dice coefficient with the manually produced segmentations and ranked them on a public leader board. A total of 106 teams from five continents competed for a \$5,000 USD cash prize sponsored by Intuitive Surgical Inc. Teams were required to also submit a manuscript detailing the methods they used to build and train their systems. These, in conjunction with the objective and standardised comparison of their performance, allow for rapid progress in artificial intelligence research and democratise the systems it produces.

The winning method,<sup>3</sup> led by researchers at the German Cancer Research Center, Heidelberg, Germany, achieved a Sørensen-Dice coefficient of 0.974 for the kidney regions and 0.851 for the tumours, approaching the human inter-annotator performance on kidneys (0.983), but falling short on tumours (0.923). This challenge has now entered an 'open leader board' phase, in which researchers can continue to develop new systems and submit them to the online platform to be ranked on the leader board.

The results of the KiTS19 challenge show deep learning methods are fully capable of reliable segmentation of kidneys and kidney tumours. Fully segmented kidneys and tumours allow for

automated extraction of all types of nephrometry scores,<sup>4</sup> as well as tumour textural features and an opportunity to accelerate the discovery of new predictive features important for personalised medicine and accurate prediction of patient-relevant outcomes. The KiTS19 challenge attracted the highest number of submissions at MICCAI 2019 and serves as an important and challenging benchmark in automatic 3D segmentation.

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# Retrograde Ureteroscopic Thulium Fiber Laser Endopyelotomy Versus Laparoscopic Dismembered Anderson-Hynes Pyeloplasty: A Single-Centre Experience

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**Disclosure:** The authors have declared no conflicts of interest.

**Keywords:** Laparoscopic pyeloplasty, thulium laser endopyelotomy, thulium fiber laser, ureteropelvic junction obstruction.

**Citation:** *EMJ Urol.* 2020;8[Suppl 2]:26-27. Abstract Review No: AR3.

## BACKGROUND AND AIMS

Retrograde ureteroscopic endopyelotomy is an alternative treatment of short (<1 cm) ureteropelvic junction (UPJ) obstruction. In current literature, the use of holmium laser (Auriga™, Boston Scientific, Massachusetts, USA) for this kind of surgery is still not widely described. With regard to the thulium fiber laser (FiberLase U1®, IRE-Polyus), there is limited similar data. Recently, the authors reported initial results of thulium fiber laser application for UPJ stricture management.<sup>1</sup> The advantage of thulium laser application is low penetration depth (0.2 mm) while obtaining a controlled and safe tissue cut.<sup>2</sup> Recent comparative studies showed fewer favourable outcomes regarding endopyelotomy, compared with open or laparoscopic pyeloplasty;<sup>3</sup> however, the role of thulium laser retrograde endopyelotomy should be investigated in more detail.

## MATERIALS AND METHODS

In this study, the authors evaluated the efficacy and safety of endoscopic retrograde UPJ stricture treatment with a thulium laser. A total of 94 patients with UPJ strictures treated at Pletnev City Clinical Hospital between 2015 and 2019 was retrospectively divided into two groups. The first group included patients who had been treated with retrograde laser endopyelotomy; the second group of patients had undergone laparoscopic dismembered (Anderson-Hynes) pyeloplasty.



**Figure 1: Retrograde thulium laser endopyelotomy in a patient with ureteropelvic junction stricture.**

Surgery performed by Alexey G. Martov at Department of Urology, D.D. Pletnev City Clinical Hospital, Moscow, Russia, in 2019. Patient consent provided.

Preoperative parameters were assessed: the nature of the stricture (primary or secondary, after failed treatment), the kidney function decrease, the presence of crossing vessels, the obstruction length, and renal pelvis dilatation. All patients in the first endoscopic group had no crossing vessels and presented with obstruction length <1 cm. The indications in both groups for intervention were pain, recurrent pyelonephritis, and concomitant upper tract stones.

## RESULTS

There was a shorter operation time (24±14 min versus 82±2 min) and postoperative stay (2±1 versus 4±2 days) for retrograde thulium laser endopyelotomy patients in comparison to the laparoscopic group. One-year follow-up evaluation was undertaken for 36 patients from the first group, and for 29 patients from the second group. Two recurrences (4.2%) occurred in the first group, and one (2.2%) after laparoscopic surgery. The renal pelvis dilation decreased in 34 (94.4%) and 28 (89.6%) patients, respectively. The study demonstrated slightly better outcomes for laparoscopic pyeloplasty compared to laser endopyelotomy in terms of kidney function increase (89.6% versus 72.2% of patients experiencing any increase).

## CONCLUSION

The authors presented their initial experience of thulium laser application for the treatment of retrograde UPJ stricture (Figure 1). Suggested indications for this treatment are primary or secondary UPJ stricture with length <1 cm, no crossing vessels, and renal pelvis dilatation ≤4 cm. Current literature supports endoscopic management of UPJ strictures for cases of previously-failed open or laparoscopic reconstructive surgery.<sup>4,5</sup> As the next step of this study, the authors intend to recruit more patients and perform a 24-month follow-up of earlier treated patients. The authors consider the thulium fiber laser retrograde endopyelotomy to be a feasible and safe procedure for a variety of UPJ strictures.

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# Cardio-Thoracic Ratio Is Associated with Severe Nocturia In Men

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**Disclosure:** The authors have declared no conflicts of interest.

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**Keywords:** Cardiac load, cardio-thoracic ratio, epidemiology, nocturia.

**Citation:** EMJ Urol. 2020;8[Suppl 2]:28-29. Abstract Review No: AR4.

Nocturia has historically been considered as one aspect of lower urinary tract symptoms (LUTS). However, it has been noted that nocturia has its own multifactorial aetiologies besides LUTS. The relationship between male nocturia and brain natriuretic peptide has previously been shown,<sup>1</sup> as well as its controlling nutritional status score.<sup>2</sup> Additionally, the relationship of male nocturia with smoking exposure and chronic kidney disease has also been clarified, the research of which is to be presented at European Association of Urology congress (EAU20).

Recently, a new diagnostic algorithm was proposed, and many causative factors are summarised in the International Continence Society consensus.<sup>3</sup>

Cardiovascular causes such as hypertension and heart failure constitute one of six sections. Despite this, the association of nocturia with cardiac load has not been fully examined. The cardio-thoracic ratio (CTR) is one of the most easily available assessment tools for evaluating cardiac load. CTR is calculated as the longest diameter of the heart border divided by the internal diameter of the chest on chest radiographs. In this study, the

authors investigated the relationship of CTR with male nocturia.

The authors retrospectively evaluated 425 Japanese men whose CTR and other variables were recorded at their initial visit for LUTS between 2014 and 2018 at a single institution. The frequency of nocturnal voiding was collected using the overactive bladder symptom score questionnaire. Severe nocturia was defined as a frequency of nocturnal voiding  $\geq 3$  times. The optimal cut-off value of CTR to predict severe nocturia was 51.2%, according to receiver operating characteristic analysis. Multivariable logistic regression analyses were used to assess associations between severe nocturia and clinical parameters, including CTR, age, prostate volume, BMI, use of any medications for LUTS, serum sodium concentration, estimated glomerular filtration rate, and the presence or absence of hypertension, diabetes, insomnia, sleep apnoea syndrome, cardiovascular disease, or cerebrovascular disease.

The median patient age was 72 years. The frequencies of nocturnal voiding were 0, 1, 2, and  $\geq 3$  in 28, 86, 92, and 219 men, respectively. The median CTR was significantly higher amongst men with severe nocturia than those without (48.3% versus 47.2%;  $p=0.013$ ). Multivariable analysis (as shown in [Table 1](#)) revealed that a CTR  $\geq 51.2$  (odds ratio [OR]: 2.14;  $p<0.01$ ) was an independent risk factor for severe nocturia, as were higher age (OR: 1.65;  $p=0.03$ ), lower BMI (OR: 2.10;  $p<0.01$ ), the presence of sleep apnoea syndrome (OR: 3.46;  $p=0.03$ ), lower sodium concentration (OR: 2.16;  $p=0.02$ ), and lower estimated glomerular filtration rate (OR: 2.62;  $p<0.01$ ).

The relevance of CTR to the severity of male nocturia was demonstrated. CTR, a simple and routinely used assessment tool for cardiac load, may be a biomarker indicating the severity of nocturia associated with cardiac overload. Recently, desmopressin has been often used as a pharmaceutical therapy for nocturia, which requires a careful follow-up to assess its effects on cardiac load. These findings also caution against careless prescription of such medicine for men with nocturia; rather, it may be worth considering diuretics for men with a higher CTR. Future studies should look at whether kinetic changes in CTR reflect the therapeutic effects of diuretics.

**Table 1: Univariable and multivariable analyses of variables relationships of severe nocturia in men.**

	Univariable		Multivariable (Final model)	
	OR	p value	OR (95% CI)	p value
Age ( $\geq 75$ versus $< 75$ , years)	2.31	$< 0.01$	1.65 (1.05–2.58)	0.03
Prostate volume ( $\geq 50$ versus $< 50$ , mL)	1.19	0.46	-	-
BMI ( $< 21.7$ versus $\geq 21.7$ )	2.16	$< 0.01$	2.10 (1.38–3.21)	$< 0.01$
Hypertension (+ve versus -ve)	1.42	0.07	-	-
Diabetes (+ve versus -ve)	1.22	0.42	-	-
Insomnia (+ve versus -ve)	1.10	0.72	-	-
Sleep apnea syndrome (+ve versus -ve)	3.19	0.03	3.46 (1.13–13.0)	0.03
History of cardiovascular disease (+ve versus -ve)	1.40	0.40	-	-
History of cerebrovascular disease (+ve versus -ve)	1.78	0.13	-	-
Medication use for dysuria (+ve versus -ve)	0.79	0.35	-	-
Estimated glomerular filtration rate ( $< 45$ versus $\geq 45$ , mL/min/1.73m <sup>2</sup> )	2.81	$< 0.01$	2.62 (1.25–5.82)	$< 0.01$
Sodium concentration ( $< 139$ versus $\geq 139$ , mEq/L)	2.67	$< 0.01$	2.16 (1.12–4.32)	0.02
Cardio-thoracic ratio ( $\geq 51.2$ versus $< 51.2$ )	2.37	$< 0.01$	2.14 (1.32–3.49)	$< 0.01$

BMI: body mass index; CI: confidence interval; OR: odds ratio; +ve: positive; -ve: negative.

In conclusion, CTR is a possible biomarker associated with the severity of male nocturia. Evaluating CTR in daily practice may help clinicians select optimal treatments for nocturia.

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# Sacral Neuromodulation with the InterStim™ System for Intractable Urinary Voiding Dysfunctions (SOUNDS): Responder Rates in a Real-World French Patient Collective

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**Disclosure:** Prof Chartier-Kastler is a consultant, investigator; and/or invited speaker for Medtronic, Axonics Modulation Technologies, Allergan, Coloplast, B Braun, ConvaTec, Pierre Fabre Médicament, Astellas Pharma, Promedon, UroMems, and Boston Scientific. Prof Ruffion is a consultant, investigator, and/or speaker for Teleflex, Astellas Pharma, Axonics Modulation Technologies, Medtronic, and Allergan; an investigator and speaker for Ipsen, Boston Scientific, Takeda, Steba biotech, and Janssen; an Association Française d'Urologie (AFU) committee member; President of Collège Français des Urologues; and Chief of Urology at Lyon Sud, CHU Lyon. Dr Le Normand is a consultant for Medtronic, Allergan, Coloplast, and Astellas Pharma; and investigator for Axonics Modulation Technologies. Prof Cornu is a consultant and/or has received fees and travel grants from Allergan, Astellas Pharma, Boston Scientific, Recordati, Coloplast, Cousin Biotech, Medtronic, Mundipharma, Pierre Fabre Médicament, SAP, Ixaltis, and Pfizer; is an investigator for clinical trials funded by Astellas Pharma, GT Urological, Medtronic, Ipsen, Coloplast, Cousin Biotech, Recordati, and Allergan; and has received a research grant from Medtronic. A. Abouihia, Dr Melotti, and Dr Keller are Medtronic employees. Medtronic was the sponsor of this study and involved in design and conduct of the study; management of the data; analysis; interpretation of the data; and preparation, review, and approval of the abstract.

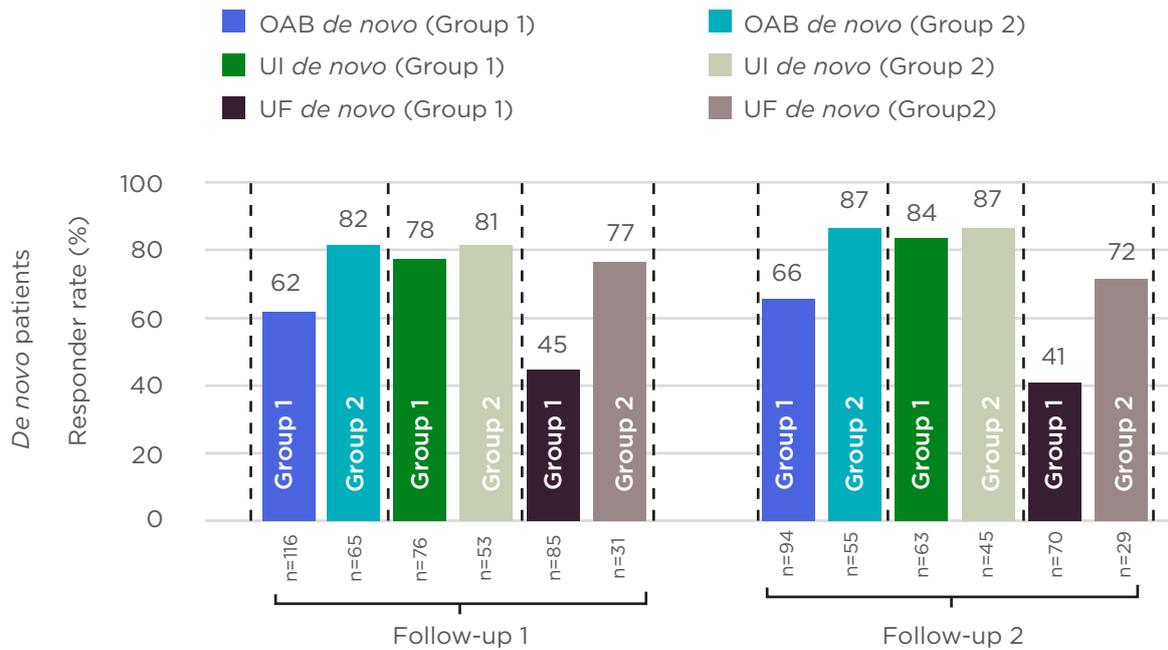
**Keywords:** Double incontinence, non-obstructive urinary retention, overactive bladder (OAB), sacral neuromodulation.

**Citation:** EMJ Urol. 2020;8[Suppl 2]:30-31. Abstract Review No: AR5.

In real-world clinical practice, the decision to permanently implant a patient with a sacral neuromodulation system is often dependent on a mix of diary-based symptom improvement, patient satisfaction, and quality of life benefits, whereas therapy response is usually defined based on diary improvements alone. In this abstract, the authors reported on therapy responder rates within 1 year after implantation in overactive bladder (OAB) patients, as well as in the urinary urge incontinence (UI) and urinary frequency (UF) subgroups, and evaluated how the criteria for permanent implantation affect response measured during follow-up. This analysis was performed post hoc using data from SOUNDS: a prospective, multicentre, observational study to evaluate clinical effectiveness, quality of life, and safety of sacral neuromodulation with the InterStim™ system for urinary voiding dysfunctions during a 5-year follow-up in a real-life setting.

Patients suffering from OAB and non-obstructive urinary retention were enrolled. Site selection aimed to represent the French market regarding volume and type of institution. Therapeutic success in OAB patients with UI or UF was defined similar to definitions used by Siegel et al.<sup>1</sup>  $\geq 50\%$  reduction in average leaks/day for UI, and  $\geq 50\%$  reduction in voids/day or a return to normal voiding frequency ( $< 8$  voids/day) for UF. Data were reported following intention-to-treat principles without missing data imputation at two follow-up visits (at an average of 3.1 and 10.0 months after implantation).

Overall, 320 patients were enrolled from 25 sites, and 247 were permanently implanted. Patients were predominantly female (84%) with a mean age of 60.5 years (standard deviation 15.1 years). Enrolled patients were affected by OAB (91%) or non-obstructive urinary retention (9%), and tested/implanted patients were scheduled for a *de novo* (78%) or a replacement of an existing InterStim™ system (22%) procedure.



**Figure 1: Response rates in patients permanently implanted with an InterStim™ sacral neuromodulation system.** OAB: overactive bladder; UF: urinary frequency; UI: urinary incontinence.

Figure 1 shows responder rates in follow-up visits for two groups of *de novo* patients: patients that were implanted without any specific test response criteria defined, at the discretion of the sites; and a subset of patients that would have received the permanent implant, based on their voiding diaries at the end of the test phase meeting responder criteria defined above.

Responder rates in SOUNDS are similar to what has been previously published.<sup>1-3</sup> These data suggest that patients responding at the end of test stimulation, based on voiding diaries, tend to have greater therapeutic success in follow-up visits. A further predictor analysis to evaluate

the effect of response during test stimulation on therapeutic success at long-term follow-up is needed to confirm these results.

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# Inflammatory Gene Expression Signature in Mouse Models of Obstructive and Neurogenic Bladder Dysfunction

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**Keywords:** Benign prostatic obstruction (BPO), experimental autoimmune encephalomyelitis (EAE), lower urinary tract dysfunction (LUTD).

**Citation:** EMJ Urol. 2020;8[Suppl 2]:32-33. Abstract Review No: AR6.

## BACKGROUND AND AIMS

Lower urinary tract dysfunction (LUTD) develops as a consequence of benign prostatic obstruction (BPO) in ageing males and in many neurological diseases, including 90% of multiple sclerosis (MS) patients.<sup>1</sup> Mouse models of BPO and MS (partial bladder outlet obstruction [pBOO] and experimental autoimmune encephalomyelitis [EAE]) develop bladder dysfunction characterised by increased micturition frequency and decreased voiding volume. Using next-generation sequencing (NGS) in biopsies of BPO patients, the authors previously established the importance

of cellular immune response pathways during disease progression.<sup>2</sup> This study investigated inflammatory mRNA and miRNA signatures in pBOO and EAE mice and compared the observed changes to human BPO patients. Urodynamic parameters were recorded in pBOO mice up to 7 weeks post-surgery to induce obstruction.

## MATERIALS AND METHODS

Female 12-week-old *C57Bl/6J* mice were implanted with a catheter into the bladder dome. After baseline urodynamic measurements, mice were given pBOO or sham surgery (n=7 per group). Urodynamic assessments were performed weekly for 1 or 7 weeks in awake mice, before the mice were euthanised and bladders collected. Urodynamic data was analysed using an adapted LabVIEW (National Instruments, Austin, Texas, USA) program. Statistical significance was tested by a one-way repeated-measures ANOVA followed by Bonferroni post hoc analysis. EAE was induced in female 8-week-old *C57Bl/6* mice (EAE n=9; control n=3) via myelin oligodendrocyte glycoprotein (MOGaa35-55) injection in complete Freund's adjuvant supplemented with inactivated *Mycobacterium tuberculosis*, followed by pertussis toxin injections on Day 1 and 3.<sup>3,4</sup> On Day 35 post-immunisation neurological impairment was assessed, and the bladders were collected. Total RNA was isolated from bladders using mirVana™ miRNA Isolation Kit and a panel of inflammatory gene expression markers were tested using quantitative reverse transcription PCR. Statistical significance was tested using the multiple two-sided t-tests. Bladder biopsies (n=6 per group) were collected from BPO patients and the transcriptome was analysed using NGS.<sup>2</sup> Groupings were based on urodynamic phenotype (detrusor overactivity, no involuntary detrusor contractions, detrusor underactivity, controls).

## RESULTS

The authors' previous NGS data in human patients with BPO revealed a significant upregulation of the inflammatory gene expression signature.<sup>2</sup> This study confirmed these findings in the pBOO mouse model, where *CCL2* and macrophage markers (*ADGRE1*, *CD68*, and *CCR2*) were significantly upregulated after 7 weeks. Urodynamic investigations revealed a significant

increase of the maximal detrusor pressure during voiding, 1-week post pBOO surgery, which normalised within 3 weeks. Occurring with a delay of 4 weeks post-surgery, threshold detrusor pressure remained decreased throughout the experiment. Pathologic bladder remodelling including muscular hypertrophy and collagen deposition were confirmed through Masson's trichrome stain and increased bladder-to-body-weight ratio. Similarly, EAE mouse bladders displayed a significant upregulation of markers indicating local inflammation, activated TNF- $\alpha$  signalling, and hypoxia. Furthermore, mRNA including F4/80, HIF1a, and NLRP3, and miRNA including miR-142 and miR-146, were elevated.

## CONCLUSION

Bladder dysfunction in mice is established within 7 weeks post pBOO as shown by the urodynamic phenotype, concomitant with specifically upregulated mRNA involved in inflammatory

signalling pathways. EAE mice with established neuroinflammatory symptoms showed signs of inflammation and hypoxia in the bladder. This indicates that bladder inflammation may play a key role in the development of LUTD induced by BPO and MS.

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## 12-Month Urodynamic and Symptom Outcomes of the PULSAR Study

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**Keywords:** Acute urinary retention (AUR),  $\beta$ -blockers, benign prostatic hyperplasia (BPH), L.I.F.T. (Luminal Improvement Following Prostatic Tissue) study, lower urinary tract symptoms, minimally invasive surgical therapy, prostatic urethral lift (PUL),

PULSAR (Prostatic Urethral Lift in Subjects with Acute Urinary Retention), urinary retention.

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## BACKGROUND AND AIMS

Acute urinary retention (AUR) is a serious complication of progressive benign prostatic hyperplasia (BPH) that produces significant discomfort to patients. Although commonly managed with first-line medical therapy, treatment failure often leads to invasive surgery such as transurethral resection of the prostate or holmium laser enucleation of the prostate, both of which are associated with morbidity and long-term complications.<sup>1</sup> The prostatic urethral lift (PUL) is a minimally-invasive surgical therapy that utilises small permanent implants to mechanically open the urinary channel, and has been shown to improve the quality of life (QoL) for BPH patients with minimal morbidity.<sup>2-4</sup> Here, the authors assess safety and feasibility of PUL in subjects with AUR.

**Table 1: Twelve-month outcomes of PULSAR patients compared with randomised L.I.F.T. study.**

Assessment (mean, SD) (n)	Studies		p value
	PULSAR	L.I.F.T.	
IPSS	8.5, 7.3 (24)	11.5, 7.3 (123)	0.07
QoL	1.3, 1.7 (24)	2.3, 1.6 (123)	0.01
Q <sub>max</sub> (mL/sec)	8.3, 8.4 (20)	12.1, 5.3 (102)	<0.01
PVR (mL)	127.2, 148.9 (21)	72.4, 99.9 (120)	0.03
BPHII	2.0, 3.4 (24)	2.8, 2.9 (123)	0.2

BPHII: Benign Prostatic Hyperplasia Impact Index; IPSS: International Prostate Symptom Score; L.I.F.T.: Luminal Improvement Following Prostatic Tissue; PULSAR: Prostatic Urethral Lift in Subjects with Acute Urinary Retention; PVR: postvoid residual urine volume; Q<sub>max</sub>: maximum flow rate; QoL: quality of life; SD: standard deviation.

## MATERIALS AND METHODS

The PULSAR study enrolled males  $\geq 50$  years of age across six UK sites with symptomatic BPH, prostate volumes  $\leq 100$  cc, and AUR with at least one failed trial without catheter while on  $\beta$ -blockers. Void trials, symptom response (measured by the International Prostate Symptom Score [IPSS] and Benign Prostatic Hyperplasia Impact Index [BPHII]), QoL, uroflowmetry (measured by maximum flow rate [Q<sub>max</sub>] and postvoid residual urine volume), and urodynamic assessments (change in detrusor pressure at maximal flow rate [pdet.Q<sub>max</sub>] and Bladder Outlet Obstruction Index [BOOI]) were examined post-PUL for 12 months. Baseline urodynamic assessment was not used for inclusion or exclusion criteria. Sexual Health Inventory for Men [SHIM] and return to normal scores were also analysed postprocedurally. Results were compared with the PUL randomised control trial (L.I.F.T. study). Rates of adverse events and catheter independence were calculated.

## RESULTS

The PULSAR study population of 52 men was significantly older ( $71.4 \pm 7.9$  years versus  $67.0 \pm 8.6$  years;  $p < 0.01$ ) and had larger prostates ( $55.2 \pm 22.8$  cc versus  $44.5 \pm 12.5$  cc;  $p < 0.0001$ ) compared with the L.I.F.T. study. Out of the subjects, 67% failed  $\geq 2$  trials without catheter prior to PUL, and mean catheter dependence was 132 days. Presence of lower urinary tract symptoms for  $> 6$  years was

experienced by 40% of the subjects. After PUL, IPSS symptom response was similar to L.I.F.T.; however, QoL was significantly better for AUR subjects throughout follow-up (Table 1), and BPHII was better for AUR subjects at 1, 3, and 6 months post-PUL. Of the subjects, 67% became catheter-free by 1 month, 77% by 3 months, and 81% by 6 months. Three subjects (5.7%) remained catheterised at the end of the study; however, all switched from an indwelling catheter to intermittent self-catheterisation. Eighty percent of subjects were able to stop treatment with  $\beta$ -blockers. Five subjects (9.6%) underwent surgery and two subjects (3.8%) had a repeat PUL. Twelve-month improvement in pdet.Q<sub>max</sub> and BOOI was seen in 12 subjects ( $-15.0 \pm 11.7$ ,  $p = 0.001$ ;  $-18.2 \pm 24.0$ ,  $p = 0.02$ , respectively). Baseline SHIM was stable or improved throughout follow-up, and 88% of subjects returned to normal in an average of 8.5 days. Adverse events were typically mild-to-moderate and resolved within 2 weeks.

## CONCLUSION

PUL safely and quickly restores normal voiding and improves lower urinary tract symptoms in BPH patients with AUR without the risks associated with cavitating procedures. Improved QoL scores in AUR patients indicate PUL can have a profound impact on these patients' lives, compared to patients who are voiding prior to PUL.

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# Congress Interviews

EMJ presents our interviews with the Adjunct Secretary General of the European Association of Urology (EAU) Executive Office and the Chairman of the European School of Urology (ESU).

Featuring: Prof Arnulf Stenzl and Prof Evangelos Liatsikos



## Prof Arnulf Stenzl

Adjunct Secretary General of the European Association of Urology (EAU) Executive Office  
Director of the Department of Urology, University of Tübingen Medical School, Tübingen, Germany

### Q1 Was there a particular event or person that encouraged you to pursue a career in urology?

I was always fascinated and intrigued by urology as a discipline because it covers all kinds of diseases of the urinary tract: from early childhood to adolescence, fertility, andrology, and to benign and malignant problems, mostly in the late stages of life. Especially during my fellowship and work at UCLA, I knew I would try to go for an academic career in urology.

### Q2 Could you explain how your patented invention the C-Trap works, and the impact it has had on patients' quality of life?

Together with a medical engineer, we developed an implantable incontinence device which is much easier to use than the current artificial sphincter. It can also be implanted much easier in women. The device consists of a sling which can either be made out of a biological material such as small intestinal submucosa or of autologous fascia, which is harvested during the implantation of the steering device and located suprapubically. Because no manipulation is necessary in the scrotum, it is not only easier but also more comfortable to use. The necessary tools for an easy implantation have also been designed.

### Q3 The Tübingen University Hospital is thought of as one of the top departments for prostate cancer treatment in Germany,

## what do you think other university hospitals could learn from the approach taken at Tübingen University?

As a certified prostate cancer treatment centre we do various forms of imaging (e.g., microultrasound, PET-MRI), fusion-assisted and navigation device-based transperineal and transrectal biopsies, photodynamic focal therapy of the prostate, different forms of nerve-sparing and non-nerve-sparing radical prostatectomy, MRT-guided radiation of the prostate and/or metastases, all forms of primary hormonal treatment, new generation hormonal ablation therapy, various forms of chemotherapy, targeted therapy, poly(ADP-ribose) polymerase (PARP)-inhibitor therapy, and prostate-specific membrane antigen (PSMA)-based ligand therapy. Some of these treatments are only available according to study protocols approved by the state authorities. Thus, we are in many ways at the forefront both in diagnosis as well as treatment of prostate cancer, which we then can report to the community.

## Q4 What changes have you brought into effect whilst serving as Adjunct Secretary General?

I have been in office less than a year and in that time I have tried to incorporate new colleagues into various offices and committees within the European Association of Urology (EAU). This is important because a large organisation such as EAU needs to incorporate new people and a new generation. Many ways of looking at a disease, diagnosing it, and treating it, or sometimes not treating it, is changing at a faster pace than several decades ago.

## Q5 How much of an impact do you believe the EAU congress has, both directly on urologists and indirectly on patients?

The EAU congress is definitely the biggest urology meeting in Europe and most probably worldwide. It thus attracts many top specialists from all over the world who exchange their views and bring new methods and techniques to the meeting and, by setting up round-table conferences and discussion groups, important consensus statements are formulated. This knowledge not only benefits the attending urologists and those who

*"we are in many ways at the forefront both in diagnosis as well as treatment of prostate cancer, which we then can report to the community."*

will later on have the possibility to see the "Best of the EAU," but also results in improved treatment of patients. Furthermore, representatives of patient groups have the opportunity to interact with the attending urologists both presenting and not presenting. In the future, we will also have contributions from patients and patient organisations for the urologists.

### **6 What are the most exciting changes that have been made to the scientific programme for EAU20 compared to EAU19?**

One of the most exciting things will be the late-breaking abstracts which show the latest results of large pharmacological and medical technology studies, which are then put into the right context by discussants (specialists in the respective field). Also exciting is the presentation of the largest patient advocacy group for prostate cancer, Europa Uomo, with regard to how prostate cancer treatment is seen in the various states in Europe. For that reason, a questionnaire has been translated into 24 different languages.

### **7 At the beginning of this year you published an article discussing the Phase III trial of PROSTVAC. Was this trial a success?**

The PROSTVAC study unfortunately was another disappointment for immunologic treatment of prostate cancer. This does not, however, mean that we should give up the concept of immunotherapy. Prostate cancer is an immunogenic disease and

we have intensively looked for the right tools to boost and/or substitute the immunologic system in order to support currently proven forms of treatment (and at times, at least prolong their treatment effects).

### **8 You have spoken of expanding the reach that your position as Adjunct Secretary General has beyond the continent. How would you like to help urologists all over the world?**

The EAU has become a major force of urologic progress in the world through the annual meeting, the meetings of the section offices and topic-oriented masterclasses, other educational efforts, and their well-recognised guidelines. It is our duty to bring this knowledge not only to the members but also to colleagues worldwide. New media allows us to have an education through the internet (e.g., webcasts, surgery in motion, roundtable discussions, and live-streaming) as well as "Road Shows" showing the "Best of the EAU," the European attitude in dealing with progress in all fields of urology and in supporting and helping local urologic communities outside Europe in dealing with specific cases. Outcome measurement for these initiatives is difficult; however, indirectly this can be seen by an improvement in the abstracts of clinical experiences, as well as research from many countries outside Europe, which in some areas has shown wonderful and sometimes even breath-taking results.





## Prof Evangelos Liatsikos

Chairman of the European School of Urology (ESU)  
Professor, Department of Urology, University of Patras, Patras,  
Greece

### **Q1** With 28 years of experience as a urologist, what initially sparked your interest to pursue a career in this field and motivated you to continue researching?

Since the beginning of my academic career, I have wanted to become a urologist. I do not really know why, but I felt very attracted to this specialty. This is most likely because the urologists at the time seemed happier and had more complete personalities and that attracted me to the field. From the very beginning, I was attracted to academics; I really enjoyed research, looking for something new, evaluating new things, and offering my service into the clinical field of research. I have been in the European urology family for many years, always trying my best to contribute my scientific and academic input.

### **Q2** You currently have more than 270 international publications for your research in laparoscopy and endourology. What do you believe to be the current gaps in literature, and what topics merit greater attention?

Research has the beauty of investigating the unknown, and in endourology and laparoscopy there are a lot of unknowns. We use a lot of instruments, technologies, tools, and new tricks, and every time one of these is applied, we need to prove that it is safe and efficient for the patient. So, this goes through a whole structured programme, starting from basic research to clinical research and then being applied to the patient. This escalation of research creates enthusiasm among the people that are doing it and drives competition among the researchers (who is going to do what faster and better) and that makes it very nice. For example, many of the new technologies are imposed in clinical practice without being extensively researched.

This includes lasers. We have been using various lasers in different settings and because it has been very appealing to the doctors; research into them only came after the establishment of the devices. Robotic surgery, for example, when it appeared in the literature everyone embraced it and then they started publishing papers and proving its efficacy and safety. So, my response to this question would be that technology needs to be well evaluated before it is applied to the patient, and proven to be efficient and safe. Of course, it must also continue to be evaluated while in use because the more you use it, the better you become at it. When it is used by an experienced surgeon, then it produces better results and this is very important. We all know the saying that 'a fool with a tool is always a fool.' There is no point in someone having a Ferrari or a Porsche if they are not a good driver; they will never reach their destination. Therefore, collaboration between humans and machines is integral.

### **Q3** As a clinical expert in robotic urologic surgery, what can you tell us about this minimally invasive leading-edge technology, and what impact do you believe robotics will play in future surgeries?

Robotics is a field where undoubtedly surgery will go towards. I mean, real robotics is really going to come out very soon because what we are doing right now is not in a strict sense robotics; it is robotic assisted. Real robotics will really boom in the next couple of years; artificial intelligence is going to come and in telecommunications, 5G is going to be predominant in the next couple of years. We will see an explosion of all these new robotic platforms and new super artificial intelligence technologies that we considered science fiction, but they will not be science fiction anymore. When we were younger, every 20 years technology would boom; nowadays,

it takes a couple of years as within 4–5 years everything changes.

**Q4** Your personal education and professional experience have involved you travelling to numerous destinations such as Italy, USA, and Germany. Where do you believe you gained the most experience and do you believe travelling was integral for you to make it to where you are today?

Well, I cannot give you a response as to where I gained the most experience because you gain experience wherever you go. Experience is gained when you are a beginner because you need to learn new things and you also gain experience when you are an expert because you see other people doing different things in different ways. This is the beauty of travelling: seeing other people operate and collaborating with international colleagues. That is why I believe that someone who travels and is not closed-minded will become a more mature doctor and surgeon. Research involves the craziness of the researcher and in different countries you have different set-ups. In the USA, for example, we had a tremendous set-up and were able to find the money for our research very easily. The infrastructure was in place; however, in other countries, like Greece and Italy, we are performing the same research, but it is a lot more difficult. It is very cumbersome to find the necessary infrastructure to back you up. But as I stated earlier, it is the craziness of the researchers that push research ahead and not the location itself.

**Q5** You have advocated education and sharing of expertise in the various live surgeries you have performed at congress. In your expert opinion, what are the benefits of attending/watching these surgeries and what would you recommend to all upcoming urologists to boost their experience?

As I stated, after travelling and operating in different areas of the world, you realise that there are so many people that want to learn from you. I would suggest that everyone gains access to people operating around the world, different ways of operating, and to standardise the approaches that they want to do. Now, they have the possibility to go to different sources like YouTube and EAU

[European Association of Urology] UROsource and watch different surgeons operate, pick up one surgery technique, stick to it, standardise, and proceed. My suggestion to the younger urologists is to expose themselves to all the available information, go online and watch videos, and talk to colleagues. It is important to communicate the complications of surgery because remember, if you don't operate you don't have complications but if you operate you will have complications and then you need to know how to deal with them. So, talk to your colleagues about not how good you are but discuss with them the complications that you have with your surgery. That is what is going to teach you how to go ahead.

I also organise my own masterclass here in Patras, Greece. Here we provide a lot of courses every month where people come from around the world for training. We organise a masterclass with the European School of Urology (ESU) on kidney stones. Patras is a heavily loaded training centre where everyone is welcome to come and learn. We have a specific and standardised way of teaching surgery and we have a lot of people coming to us to learn; I am very happy about this.

**Q6** You have recently been appointed as the Chairman of the European School of Urology (ESU). Could you please explain what this position entails and how the ESU contributes to the success of the EAU?

Well I must say that I have already been in a position within the school. I was the chairman of the EAU Section of Uro-Technology (ESUT) for many years and I have been a board member of the school at the same time. Therefore, this is not something new for me. I have been in close collaboration with the current chairman of the school and, under his guidance, we have managed to achieve standardisation of urology education for all levels of urologists and it has really been a pleasure working with the entire board of the school. Now it is a bigger pleasure for me to take the lead after the EAU meeting this year and implement minor refinements. We are not planning on doing anything extremely novel but wish to adapt on the virtual concept of training. This is something we're already doing now, because a lot of this is still going to remain after the COVID-19 crisis, and our goal is to collaborate with the companies, the attendees, and our trainees to standardise our

training. Everyone needs to have a standardised approach to training; that is the goal of the school. Guidelines and training are two big pillars of the EAU. The guidelines are famous around the world and everyone has access to them. Our guidelines office is doing a great job on this and I think we are doing very good work standardising and spreading our teaching.

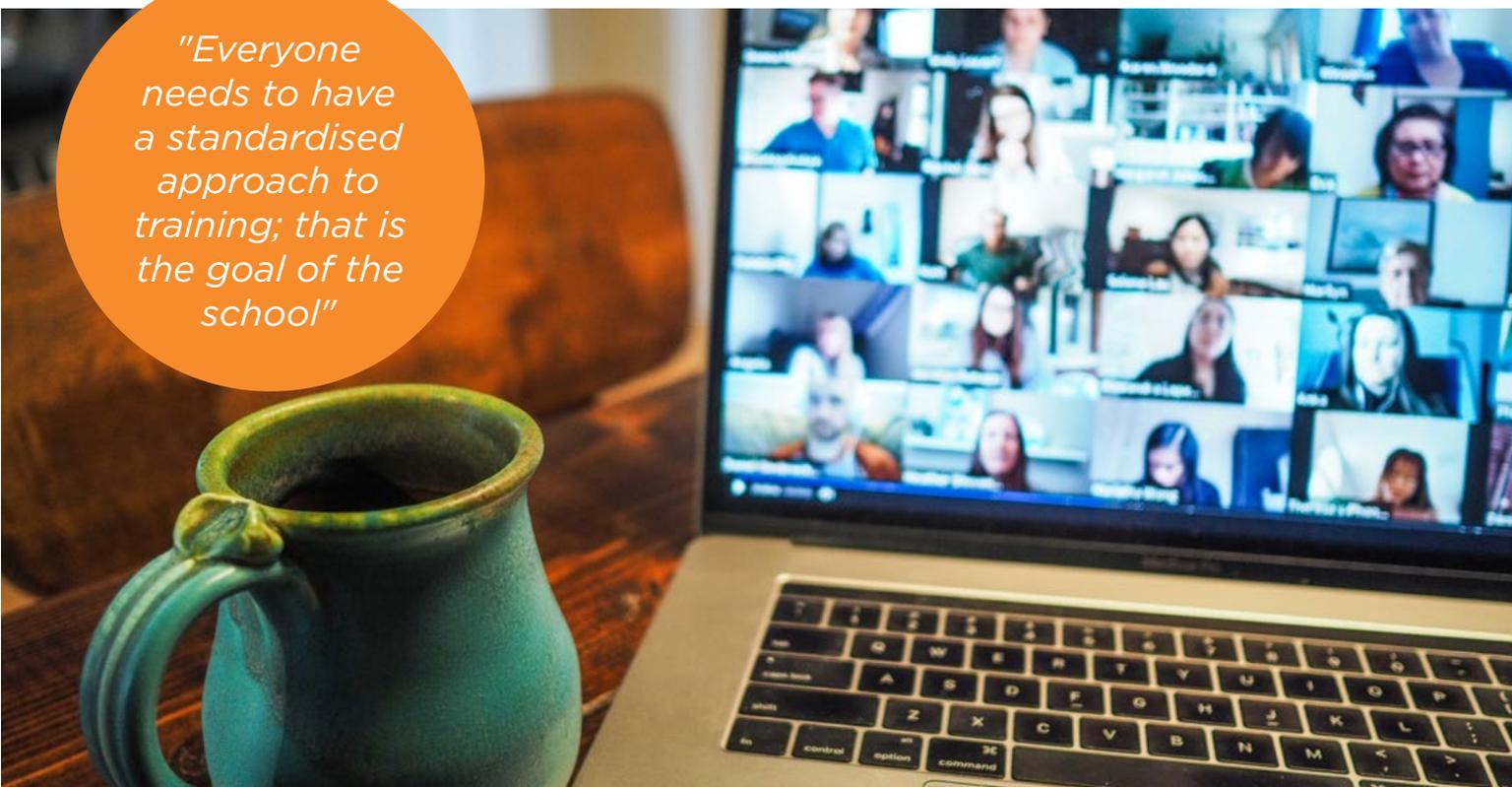
The ESU is not a one-man show as many other positions would be; here we have a big thing. We have a medical board of doctors that cover all the thematics of urology and we go over every course and every request from various companies from different countries. Then we also have a lot of administrative support, a team on virtual training, hands-on training, there is a person for everything. It is a big group of people that sit down and design the training concept. For example, we have an activity known as EUREP [European Urology Residents Education Programme], a yearly event that happens in Prague, Czech Republic. A big group of residents from Europe and other parts of the world come together and for five or six intensive days we teach them the entire urology syllabus so they can complete their final exams after this. It is something that the residents love. In fact, this year we could not do it because of the COVID-19 pandemic, and they were quite disappointed. But this is a concept

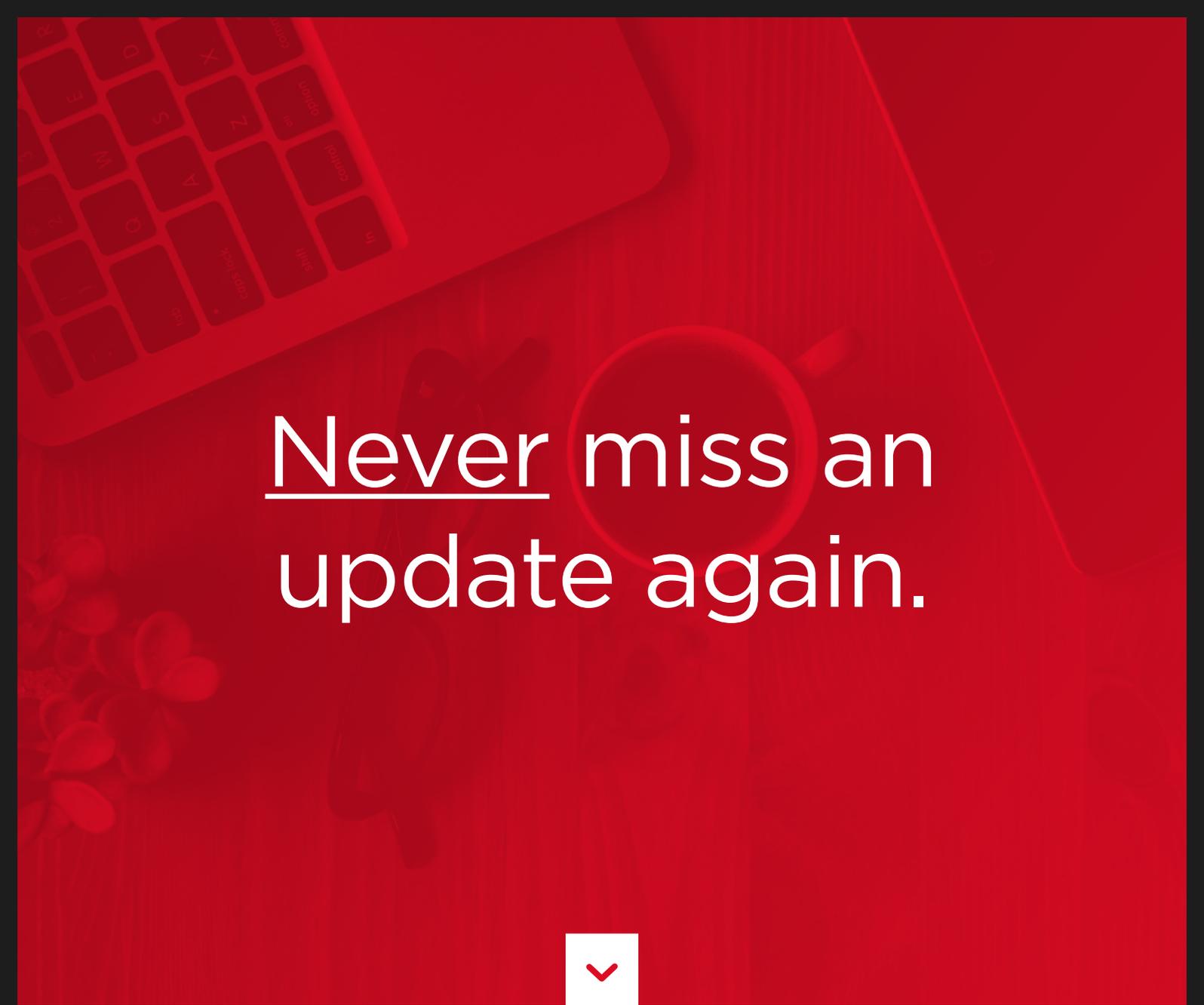
that is now spreading around the world. We are doing something similar in the Philippines and are working on something in Latin America. As I said, we standardise something and then we spread it around the world. We have ambassadors that go around the world spreading the way of our teaching.

### What are you hoping to achieve within your newly appointed role as the Chairman of ESU?

As I said previously, this is not a position that I suddenly took on a completely new scientific background, as I was on the board for 8 years. At the moment, the new refinements that I am planning to do involve moving towards virtual concepts of training and globalised virtual training because this is a need now. It was a thought in the beginning but now it has become a need. We need to see what kind of activities are going to be done virtually (live surgeries, physical talks, webinars, 'meet the experts,' different platforms for undergraduate and graduate students, masterclasses) and we need to find a balance between virtual activities and physical activities. We are still expanding as our ESU ambassadors try and approach every place in this world and pass on our way of teaching and the knowledge that we have to the people there.

*"Everyone needs to have a standardised approach to training; that is the goal of the school"*





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