W9: Novel Therapies for Benign Prostatic Obstruction – Technologies and Practical Instruction

Workshop Chair: Luca Cindolo, Italy
23 October 2024 14:00 - 15:30

Start	End	Topic	Speakers
14:00	14:05	Introduction to Workshop	Luca Cindolo
14:05	14:20	UroLift and PAE	Luca Cindolo
14:20	14:25	Questions	All
14:25	14:40	iTind and Aquablation	Feras Al Jaafari
14:40	14:45	Questions	All
14:45	15:00	TPLA and Rezum	Riccardo Giuseppe Bertolo
15:00	15:05	Questions	All
15:05	15:20	Optilume BPH and Novel Stents	Moisés Rodríguez Socarrás
15:20	15:25	Questions	All
15:25	15:30	Discussion	Luca Cindolo

Description

Background information: Recent advances in minimally invasive surgical procedures for BPH include UroLift, Rezum, iTind, Aquablation, Optilume BPH, Transperineal laser ablation (TPLA), and prostate artery embolization (PAE). This 1.5hr instructional course will focus on novel therapies and techniques for the treatment of BPH. The course will provide an overview of the technologies in terms of equipment, technical approach, and high-level review of clinical data. The faculty will provide first-hand practical instruction on best practices including patient selection, technique selection, and “tips & tricks”. The faculty will provide international experience and evidenced-based summaries of the risks and benefits of these procedures to aid with patient counselling for informed consent.

Key learning points: The treatment of male lower urinary tract symptoms has evolved significantly over the past several years with the introduction of many new technologies. The participants will hear expert lectures from international faculty and have the opportunity to ask questions in an open forum. A comprehensive, evidence-based review along with videos and personal tips will be provided. The course will review international guidelines for the evaluation of male LUTS followed by presentations on new technologies. These include Rezum water vapour ablation, UroLift prostatic urethral life, iTind temporary prostate stent, Aquablation robotic water jet ablation, anatomic enucleation of the prostate, Optilume BPH drug coated balloon, and transperineal laser ablation (TPLA). The aim is to provide a practical approach that participants can bring back to their practice.

Take home messages: Never before have there been so many options for the treatment of BPH. An interest in preserving sexual function and minimizing morbidity as led to the creation of many new technologies. Each carries its own unique profile in terms of ideal patient features and technical approach. It is our goal to have participants become well versed in these novel technologies so that they may be adopted into clinical practice and applied to the appropriate patients.

Aims of Workshop

This instructional course will focus on novel therapies for the treatment of BPH. An overview of technologies followed by faculty providing first-hand practical instruction on best practices including patient selection, technique selection, and “tips & tricks”. The faculty will provide international experience and evidenced-based summaries of the risks and benefits of these procedures to aid with patient counselling for informed consent.

The participants will hear experts and have the opportunity to ask questions in an open forum. A comprehensive, evidence-based review along with videos and personal tips will be provided. The aim is to provide a practical approach that participants can bring back to their practice.

Educational Objectives

Recent advances in minimally invasive surgical procedures for BPH have resulted in a need to understand the new equipment, technical approaches, and clinical data. The participants will hear expert lectures from international faculty and have the opportunity to ask questions in an open forum. The faculty will provide a wealth of unparalleled experience including how they chose each new technology and how best to deply each method.The outline of the workshop will provide a comprehensive, evidence-based review along with videos and personal tips. The course will review international guidelines for the evaluation of male LUTS followed by presentations on each of the new technologies. The aim is to provide a practical approach that participants can bring back to their practice including differentiating techniques for individual patient characteristics.

Learning Objectives

1. Understand the mechanism of action and technique for each of the novel BPH therapies
2. Select the best patients for each procedure type based upon patient and prostate characteristics

3. Create a framework for selecting technologies based upon best evidence

Target Audience
Urology, Urogynaecology and Female & Functional Urology, Pure and Applied Science

Advanced/Basic
Intermediate

First lecture: UROLIFT and PAE
The Prostatic Urethral Lift (PUL) procedure utilizing the UroLift® System is a very different approach to mechanically opening the prostatic urethra that minimizes permanent implant material and its exposure to the urinary system. Rather than placing a tube-like structure within the urethra like the permanent stents introduced in the 1980s, the UroLift implants (Teleflex, Pleasanton, CA) are deployed transprostatically such that only a small metal tab rests on the urethra, and deployment tension causes that tab and the urethral wall under it to invaginate into the adenoma. Approved by the US FDA in 2013, the UroLift System is the first mechanical prostatic implant to demonstrate safe and effective treatment of BPH without the clinical sequelae of prior stents, such as a migration, and high rates of encrustation, infection, and need for removal if deployed properly. The safety profile shows mild to moderate side effects that largely resolve by two to four weeks post treatment. Durability in symptom improvement has been demonstrated through five years with a surgical retreatment rate of 13.6%.

Prostate artery embolization (PAE) is a new embolization method for treating benign prostate syndrome which was first presented in 2010 in two interventional-radiological case descriptions. It was basically a “proof-of-principle” that directed the interest not only of the interventional radiologists, but also the affected patients towards this minimally invasive method.
The effect of PAE is based on multiple impact mechanisms. Embolization causes displacement of intraprostatic vessels and precapillary arterioles, resulting in irreversible ischemia. An inflammatory response and the formation of edema then result in ideally complete anoxia. The shrinking process begins after absorption of the edema components and scar formation. At the same time the level of intraprostatic testosterone and of converted highly biochemically active dihydrotestosterone decrease. Both effects lead to the shrinkage of the prostate. The administration of the adequate particle size is essential to support shrinkage. A deep penetration and a too proximal embolization increase the risk for urethral necrosis. By destroying the intraprostatic nerve ends, successful embolization results in a reduction of the α1- adrenergic receptor density causing relaxation of the smooth muscle cells. In BPH, the density of the α1-adrenergic receptors is approx. 6-times higher than in the normal prostate and induces the relaxation of smooth muscle cell tonus within the bladder neck affecting the flow from the bladder into the urethra. The receptor expression drops significantly after embolization resulting in a decrease in muscle tone. This may explain the reported early clinical successes after PAE, also due to the notable reduction in prostate volume. Embolization of at least one-half of the prostate varied from 90% to 98% in almost all published articles. However, the goal of PAE should always be to achieve bilateral embolization because it achieves better clinical results, higher primary treatment success rates, less recurrence of symptoms, and less need for re-embolization. The clinical success and failure criteria after PAE were established by the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) in December 2019. The criteria of symptomatic improvement are defined as an International Prostate Symptom Score (IPSS) of less than 18, with a decrease in score of at least 25%, a quality of life score less than or equal to 3, and at least a one-point decrease compared with the score at baseline. On the other hand, clinical failure of the procedure is defined as the persistence of severe symptoms (ie, a decrease in IPSS score of ≤25%, IPSS score ≥18, a quality of life score decrease of ≤1, and a quality of life score of ≥4) or a decrease in peak urinary flow. PAE shows success rates of 78% at 6 months and 75% at 12 months after treatment (57). PAE also shows an average reduction of 24% in prostate-specific antigen A levels and a decrease in prostate volume of 20%–30%. However, there is no statistical association between reduction in prostate volume and clinical improvement.
In patients with an indwelling bladder catheter, PAE has been shown to be effective and safe, especially for patients at high surgical risk.

Second lecture: iTind and Aquablation
Two temporary implantable nitinol devices have been produced and tested in clinical experience. Since the second-generation temporary implantable nitinol device (iTIND) is currently the only one available in the market, this handsout focus on this. The iTIND, it is made of nitinol, is 50 mm long, in order to cover the full extension of the prostatic urethra, and has an outer diameter of 33 mm. iTIND is positioned with a rigid cystoscope. Each device is preloaded into a 14 Fr delivery system and then pushed through the urethra, thanks to the cystoscope sheath. The device must be released once the bladder is full; the surgeon perceives the full “opening” of the device when the friction against the internal surface of the sheath is reduced. The plastic sheath is then withdrawn, and the knot at the end of the wire is cut. Thereafter, the cystoscope is reinserted, and, under vision, the device is located at the bladder neck. The leaflet should be located at 6 o’clock position, caudally to the bladder neck, but beyond the veru montanum. The bladder has to be voided at the end of the intervention. The device has to be removed 5 days after the implantation. Literature concerning the use of temporary implantable nitinol device for the treatment of BPH-related LUTS is limited. Only data of four studies are published. The only published RCT shows good results in terms of safety, tolerability, and efficacy in comparison with sham procedure, up to 12-month follow-up. The notable postoperative functional

results include both improvement in BPH-related symptoms and peak urinary flow, as well as preservation of sexual and ejaculatory functions.

The AquaBeam system that delivers the aquablation treatment was developed in 2014 by PROCEPT BioRobotics (Redwood Shores, California) and received FDA approval in 2018. The mechanism of aquablation can be explained by the physics of a cavitating jet[5]. The AquaBeam system delivers a high-pressured saline jet into a preplanned section of prostatic tissue. The rapid hydrodynamic pressure changes result in cavitation of the prostate. Rotation of the robot arm delivering the waterjet circumferentially ablates the prostate tissue. There are 4 unique features of aquablation: real-time, multidimensional imaging. The surgeon can obtain a comprehensive perspective of the prostate by utilizing both cystoscopic visualization and ultrasound imaging. This, in turn, allows for a customized treatment plan tailored to the individual patient's anatomy. The surgeon can identify which parts of the prostate to remove while preserving the structures responsible for erectile function, ejaculatory function, and continence. (2) Personalized treatment plan: advanced planning software enables the operator to map the contours of the prostate and select what tissue to preserve. (3) Automated robotic technology: after creating a treatment plan, the prostate tissue is removed with a heat-free waterjet that is controlled by a robot. This robotic technology ensures quick and consistent removal, regardless of the size and shape of the prostate or the surgeon's experience level. (4) Heat-free waterjet: the heat-free waterjet technology can remove prostate tissue with accuracy, focus, and regulation. A recent review encompasses 7 studies involving 551 patients that evaluated various urological parameters. At 3 months posttreatment, there was a significant improvement in the IPSS raw mean difference from baseline, which was sustained for up to 12 months. Similarly, there was an improvement in the maximum flow rate at 3 months postoperatively. Moreover, there was no significant negative impact on male sexual health, as indicated by the MSHQ. However, some outcomes exhibited large statistical heterogeneity or publication bias. In summary, aquablation appears to improve LUTS in men with BPH while preserving sexual function, but further research is necessary to validate these preliminary findings

Third lecture: TPLA and Rezum

TPLA is an ultrasound (US) guided minimally invasive procedure requiring a biplanar TRUS and EchoLaser™ system consisting of a multisource diode laser with four independent laser sources, operating at 1064 nm wavelength (EchoLaser, El.En. S.p.A, Calenzano, Italy) and a dedicated planning tool (ESI—Echolaser Smart Interface, Elesta S.p.A, Calenzano, Italy) with simulation software that allows the user to plan the treatment and to place applicators in the prostate in a safe manner. This EchoLaser application is also known as SoracteLite™ (El.En. S.p.A, Calenzano, Italy). A catheter placement and local anesthesia are needed before starting the procedure. The laser light is conveyed by the source to the tissues through 300 μm quartz optical fibers with a flat tip (Fiber Optic for PLA, Elesta S.p.A., Calenzano, Italy), which are inserted percutaneously through 21 G Chiba needles (Introducer, Elesta S.p.A., Calenzano, Italy) under transrectal ultrasound guidance. The laser light produces an ellipsoidal shape area of coagulative necrosis around the tip of the fiber (approximately 2/3 extended beyond the fiber tip and 1/3 behind it depending on the power and dose applied). A needle placement verification is required to guarantee the right safety distances from the urethra and from the bladder neck. The procedure can be planned via the Echolaser Smart Interface (ESI), a dedicated device that allows the operator to establish the correct ellipsoidal shape area of coagulative necrosis on the prostatic tissue . Once the fibers are placed, the energy can be delivered. The laser causes hyperthermia, denaturation and coagulative necrosis of proteins. maximum volume treated in a session and the extent of the ablation vary according to the prostatic volume, anatomy and surgeon preference. In some cases, especially in larger prostates, a pull back of applicators (retraction of 5–10 mm along its trajectory) during the same treatment session allows for the ablation of another part of the prostatic tissue not treated in the previous illumination; delivering additional laser energy. In a first comprehensive review providing evidence on the safety and efficacy of TPLA for patients with LUTS due to BPH, overall, promising intra-, perioperative, and functional results have been reported by different groups. EchoLaser TPLA has indeed been shown to have a good safety profile and to achieve favorable short-term functional outcomes as well as sexual outcomes. Yet, selection criteria for EchoLaser TPLA, including the ideal patient- and prostate-related characteristics, and few technical nuances regarding the procedure, were found to be heterogeneous across the published series and warrant further investigation

The mechanism of action for the Rezum system uses the principles of convective heat transfer that exploits the thermodynamic properties of water. The system comprises a radiofrequency (RF) generator and a single-use transurethral delivery device, which incorporates a standard 4 mm 30-degree cystoscopy lens. With the patient in a lithotomy position, an RF current is applied to an inductive coil heater, producing thermal energy in the form of water vapour. Water vapour is delivered through a retractable vapour needle via emitter holes in the transurethral device. This is done in 9-second bursts to the transition zone of the prostate, where, via convection, it diffuses evenly throughout the target tissue. The depth of the needle penetrating is approximately 10 mm. Upon contact with body-temperature tissue, the water vapour then condenses. This phase shift to a liquid state dispenses concentrated energy onto the cell membranes of the target tissue, triggering instant cell necrosis. Overlapping injection sites can be established with repeated applications in order to fully target areas of hypertrophy. Saline flush irrigation is used to both cool the urethra and to promote visualization.
Several reviews and papers confirm that the Rezum System is a novel minimally invasive treatment for benign prostate enlargement using transurethral water vapor thermal therapy. It seems to be an effective, safe, and costeffective procedure. Recent data show its versatility even in catheter-dependent patients with large prostates or median lobe, preserving sexual function. This procedure can be performed in an office or ambulatory setting under local anesthesia reducing anesthetic risks and recovery time.

Fourth lecture: Optilume BPH and Novel Stents

The Optilume BPH Catheter System (Urotronic, Inc./Laborie Medical Technologies, Plymouth, MN, USA) is an FDA-approved minimally invasive drug-coated balloon dilationsystem designed for addressing BPH-related LUTS. Its approval by the US Food and Drug Administration (FDA) in June 2023 marks a significant addition to the array of promising alternatives within the MIST category. Demonstrating comparable symptom improvement to other MISTs, the Optilume BPH Catheter System notably exhibited exceptional improvement in Qmax during a 1- year follow-up, surpassing outcomes observed with other MIST options. Optilume BPH is a safe and effective option, with excellent improvement in IPSS, quality of life measures (IPSS QoL and BPH-II) and Qmax through 1 year and these results continue to be observed at 2 year follow-up demonstrating maintained sexual function with improved flow and relief of LUTS. The Optilume BPH Catheter System stands out due to its unique combination of minimally invasive treatment and notable enhancements in urinary flow, surpassing the effectiveness of other minimally invasive alternatives in this regard. This treatment is particularly suitable for individuals seeking to avoid or unable to tolerate general anesthesia. Furthermore, it presents an attractive option for patients as a therapy that does not involve resective or ablative tissue removal or implant placement. The device combines the procedural advantage of balloon dilation with a localized transfer of paclitaxel to limit hyperactive cell proliferation at the treatment site during the healing process. This dual action mode allows the Optilume BPH Catheter System to achieve the intended effect to open the narrowed urethra and maintain its patency.

The need for newer stents was almost inevitable since although the past stents were effective in improving symptoms, they had a high rate of complications. The main advantage of the new stents are that they are made of a different material, nitinol, and much less material is used, so that they have a lower likelihood to become encrusted, and their design is such that they less likely migrate or move. The Allium Triangular Prostatic Urethral Stent (TPS) (Allium Urological Solutions, Caesarea, Israel) is a temporary device that might provide long-term reversible solution up to 3 years, intended for transurethral insertion. It comprises a nitinol-built coiled super-elastic structure covered with a co-polymer to prevent encrustations, composed of a main trans-prostatic body, a triangular sphincteric segment, a trans-sphincteric segment, and a triangular anchoring segment.[29] It is inserted endoscopically with the aid of its specific inserter under local anaesthesia, and it is released to allow its self-expansion. The large calibre triangular cross-section gives the stent the ability to exert varying degrees of radial force depending on prostate anatomy, with higher forces in the main body to maintain urine passage, and lower forces in the area near the external sphincter to prevent sphincteric dysfunction and urinary retention or incontinence.[29] Allium TPS is available in various lengths, ranging from 30 to 65 mm, and these serve to minimize the likelihood of stent migration. Patients should be evaluated in terms of PVR, DRE, prostate ultrasound, uroflowmetry, PSA, urethrography and urinalysis. Allium TPS has been approved for prostatic enlargement (benign or malignant), for use after minimally invasive treatments (MIT) based or thermal tissue damage of the prostate (microwave, RF thermotherapy, laser coagulation surgery, cryotherapy), or interstitial irradiation (brachytherapy) for prostate cancer, which might cause post-procedural temporary oedema and severe voiding difficulties or urinary retention.

The Spanner (The SPANNER, AbbeyMoor Medical, Inc., Parkers Prairie, MN, USA) is an FDA-approved temporary silicone elastomer prostatic stent. It is a temporary stent inserted into the urethra at the neck of the bladder. The Spanner is composed of a proximal balloon that is seated in the bladder neck, and a stent that extends from the bladder neck to just above the external sphincter. It has a tethering device (suture material) that transverses the external sphincter to allow normal sphincteric function providing continence and held by a distal anchor in the bulbar urethra, just below the sphincter to prevent device movement and migration into the bladder. It is usually placed under topical anaesthesia in an outpatient setting without cystoscopic visualization, and candidates must possess an intact detrusor reflex contraction and pelvic floor relaxation for optimal results. A study involving 30 men demonstrated a 42% enhancement in the mean *Q*max, a 64% decrease in PVR, and a 68% decrease in IPSS following Spanner implantation, with a remarkable lack of migration on radiological confirmation at up to 12 weeks follow-up (0%). Notably, patients with the Spanner in place reported increased sexual activity and erections without significant pain.

Other clinical trials are conducted on nitinol implant devices such as the ZenFlow Spring (Zenflow, South San Francisco, CA, USA) designed to be permanent but can be removed creating internal tension which helps the device incorporate into the wall of urethra and currently investigated in the contest of the ZEST CAN, a pivotal randomized control trial projected to be concluded by 2026 aimed at assessing the safety, cost-effectiveness, and overall performance of this ZenFlow Spring (NCT04309695, NCT03595735, NCT03577236, NCT02786290); the Urocross Expander System (Prodeon Medical, Inc. (PMI), Sunnyvale, CA, USA) designed to expand and reshape the prostatic urethra through mechanical tissue contraction (NCT05400980, NCT03758222); the ProVee (ProVerum, Dublin, Ireland) device is a ‘stent-like’ nitinol expander which is currently tested in a prospective trial named the ProVIDE study that is presently in the recruitment stage and is anticipated to conclude in 2028 (NCT03972371, NCT05186740); the Butterfly device (Butterfly, Medical LTD, Yokneam, Yilit, Israel) a metallic retractor of prostatic lobes implanted under local anaesthesia, which showed promising results in terms of improvement of mean IPSS and QoL,[44] but for which further studies are warranted and ongoing (NCT05341661, NCT03912558, NCT05330520).

Suggested Learning before Workshop Attendance

Review of Sexual Preservation After Novel Benign Prostatic Hyperplasia Surgical Treatment Modalities From Food and Drug Administration Clinical Trials.

Bhojani N, Yafi FA, Misrai V, Rijo E, Chughtai B, Zorn KC, Elterman D.Sex Med Rev. 2020 Dec 9:S2050-0521(20)30103-7

A shared decision: Bipolar vs. monopolar transurethral resection of the prostate for benign prostatic hyperplasia.

Bhojani N, Zorn KC, Elterman D.Can Urol Assoc J. 2020 Dec;14(12):431.

Reasons to go for Rezum steam therapy: an effective and durable outpatient minimally invasive procedure.

Arezki A, Sadri I, Couture F, Schwartz R, Nguyen DD, Zakaria AS, Elterman D, Roehrborn C, McVary K, Zorn KC.World J Urol. 2020 Sep 23.

Relief of Lower Urinary Tract Symptoms after MRI-Guided Transurethral Ultrasound Ablation (TULSA) for localized prostate cancer: Subgroup Analyses in Patients with concurrent cancer and Benign Prostatic Hyperplasia.

Elterman D, Li W, Hatiboglu G, Relle J, Zorn KC, Bhojani N, Chin JL.J Endourol. 2020 Sep 16.

Reasons to believe in vaporization: a review of the benefits of photo-selective and transurethral vaporization.

Schwartz RN, Couture F, Sadri I, Arezki A, Nguyen DD, Zakaria AS, Law K, Elterman D, Rieken M, Cash H, Zorn KC.World J Urol. 2020 Sep 15

Patient Perspectives on Benign Prostatic Hyperplasia Surgery: A Focus on Sexual Health.

Bouhadana D, Nguyen DD, Zorn KC, Elterman DS, Bhojani N.J Sex Med. 2020 Oct;17(10):2108-2112.

Reasons to overthrow TURP: bring on Aquablation.

Sadri I, Arezki A, Couture F, Nguyen DD, Schwartz R, Zakaria AS, Elterman D, Rijo E, Misrai V, Bach T, Roehrborn CG, Zorn KC.World J Urol. 2020 Aug 1.

Aquablation for benign prostatic hyperplasia in large prostates (80-150 cc): 2-year results.

Desai M, Bidair M, Bhojani N, Trainer A, Arther A, Kramolowsky E, Doumanian L, Elterman D, Kaufman RP Jr, Lingeman J, Krambeck A, Eure G, Badlani G, Plante M, Uchio E, Gin G, Goldenberg L, Paterson R, So A, Humphreys MR, Roehrborn CG, Kaplan S, Motola J, Zorn KC.Can J Urol. 2020 Apr;27(2):10147-10153

Operative time comparison of aquablation, greenlight PVP, ThuLEP, GreenLEP, and HoLEP.

Nguyen DD, Misraï V, Bach T, Bhojani N, Lingeman JE, Elterman DS, Zorn KC.World J Urol. 2020 Dec;38(12):3227-3233

Multicenter experience with photoselective vaporization of the prostate on men taking novel oral anticoagulants.

Sachs B, Misrai V, Tabatabaei S, Woo HH.Asian J Urol. 2020 Oct;7(4):340-344

Transurethral laser ablation of the prostate: from "which technique does better" to "what patient benefits the most" the real challenge in contemporary surgery.

Misrai V, Pradere B.World J Urol. 2020 Sep 21.

Systematic review of the endoscopic enucleation of the prostate learning curve.

Enikeev D, Morozov A, Taratkin M, Misrai V, Rijo E, Podoinitsin A, Gabdullina S, Herrmann TRW.World J Urol. 2020 Sep 17.

En bloc GreenLight laser enucleation of the prostate (GreenLEP): An in-depth look at the anatomical endoscopic enucleation of the prostate using a 532-nm lithium triborate laser.

Rijo E, Misrai V.Andrologia. 2020 Sep;52(8):e13729

Transfusion rates after 800 Aquablation procedures using various haemostasis methods.

Elterman D, Bach T, Rijo E, Misrai V, Anderson P, Zorn KC, Bhojani N, El Hajj A, Chughtai B, Desai M.BJU Int. 2020 Apr;125(4):568-572

Standardization of 532?nm Laser Terminology for Surgery in Benign Prostatic Hyperplasia: A Systematic Review.

Stoddard MD, Zorn KC, Elterman D, Cash H, Rijo E, Misrai V, Te A, Chughtai B.J Endourol. 2020 Feb;34(2):121-127

Anatomic GreenLight laser vaporization-incision technique for benign prostatic hyperplasia using the XPS LBO-180W system: How I do it.

Law KW, Elterman DS, Cash H, Rijo E, Chughtai B, Misrai V, Zorn KC.Can J Urol. 2019 Oct;26(5):9963-9972.

Waterjet Ablation Therapy for Endoscopic Resection of prostate tissue trial (WATER) vs WATER II: comparing Aquablation therapy for benign prostatic hyperplasia in 30-80 and 80-150 mL prostates.

Nguyen DD, Barber N, Bidair M, Gilling P, Anderson P, Zorn KC, Badlani G, Humphreys M, Kaplan S, Kaufman R, So A, Paterson R, Goldenberg L, Elterman D, Desai M, Lingeman J, Roehrborn C, Bhojani N.BJU Int. 2020 Jan;125(1):112-122

The Rezum system - a minimally invasive water vapor thermal therapy for obstructive benign prostatic hyperplasia.

Cantrill CH, Zorn KC, Elterman DS, Gonzalez RR.Can J Urol. 2019 Jun;26(3):9787-9793

Aquablation for Benign Prostatic Hyperplasia in Large Prostates (80-150 cc): 1-Year Results.

Bhojani N, Bidair M, Zorn KC, Trainer A, Arther A, Kramolowsky E, Doumanian L, Elterman D, Kaufman RP, Lingeman J, Krambeck A, Eure G, Badlani G, Plante M, Uchio E, Gin G, Goldenberg L, Paterson R, So A, Humphreys M, Kaplan S, Motola J, Desai M, Roehrborn C.Urology. 2019 Jul;129:1-7

Aquablation for benign prostatic hyperplasia in large prostates (80-150 mL): 6-month results from the WATER II trial.

Desai M, Bidair M, Zorn KC, Trainer A, Arther A, Kramolowsky E, Doumanian L, Elterman D, Kaufman RP Jr, Lingeman J, Krambeck A, Eure G, Badlani G, Plante M, Uchio E, Gin G, Goldenberg L, Paterson R, So A, Humphreys M, Roehrborn C, Kaplan S, Motola J, Bhojani N.BJU Int. 2019 Aug;124(2):321-328

Recent advances in managing benign prostatic hyperplasia: The Rezum System.

Guelce D, Thomas D, Elterman D, Chughtai B.F1000Res. 2018 Dec 10;7:F1000 Faculty Rev-1916

Canadian Urological Association guideline on male lower urinary tract symptoms/benign prostatic hyperplasia (MLUTS/BPH): 2018 update.

Nickel JC, Aaron L, Barkin J, Elterman D, Nachabé M, Zorn KC.Can Urol Assoc J. 2018 Oct;12(10):303-312

Comparison of <?100 cc prostates and >?100 cc prostates undergoing aquablation for benign prostatic hyperplasia.

Bhojani N, Nguyen DD, Kaufman RP Jr, Elterman D, Zorn KC.World J Urol. 2019 Jul;37(7):1361-1368

Aquablation among novice users in Canada: A WATER II subpopulation analysis.

Zorn KC, Goldenberg SL, Paterson R, So A, Elterman D, Bhojani N.Can Urol Assoc J. 2019 May;13(5)

Recent Publication on Topic:

A Systematic Review of Reported Ejaculatory Dysfunction in Clinical Trials Evaluating Minimally Invasive Treatment Modalities for BPH.

Lokeshwar SD, Valancy D, Lima TFN, Blachman-Braun R, Ramasamy R.Curr Urol Rep. 2020 Oct 26;21(12):54

An Indirect Comparison of Newer Minimally Invasive Treatments for Benign Prostatic Hyperplasia: A Network Meta-Analysis Model.

Tanneru K, Jazayeri S, Muhammad A, Kumar J, Bazargani S, Kuntz G, PalayapalayamGanapathi H, Bandyk M, Marino R, Koochekpour S, Gautam S, K C B, Costa J.J Endourol. 2020 Sep 22

Reasons for new MIS. Let's be fair: iTIND, Urolift and Rezum.

Suarez-Ibarrola R, Miernik A, Gratzke C, Schoeb DS.World J Urol. 2020 Sep 22

Rezum water vapour therapy: promising early outcomes from the first UK series.

Johnston MJ, Noureldin M, Abdelmotagly Y, Paramore L, Gehring T, Nedas TG, Rajkumar G, Emara A, Hindley RG.BJU Int. 2020 Nov;126(5):557-558.

3-Year results following treatment with the second generation of the temporary implantable nitinol device in men with LUTS secondary to benign prostatic obstruction.

Amparore D, Fiori C, Valerio M, Schulman C, Giannakis I, De Cillis S, Kadner G, Porpiglia F.Prostate Cancer Prostatic Dis. 2020 Oct 1.

Urinary and sexual function after treatment with temporary implantable nitinol device (iTind) in men with LUTS: 6-month interim results of the MT-06-study.

De Nunzio C, Cantiello F, Fiori C, Crocerossa F, Tognoni P, Amparore D, Baldassarri V, Elbers JR, Sancha FG, Porpiglia F.World J Urol. 2020 Aug 26

iTIND: the second-generation temporary implantable nitinol device for minimally invasive treatment of benign prostatic hyperplasia.

Balakrishnan D, Jones P, Somani BK.Ther Adv Urol. 2020 Jun 25;12:1756287220934355. doi: 10.1177/1756287220934355. eCollection 2020 Jan-Dec

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Waterjet Ablation Therapy for Endoscopic Resection of prostate tissue trial (WATER) vs WATER II: comparing Aquablation therapy for benign prostatic hyperplasia in 30-80 and 80-150 mL prostates.

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