

W33: ICS Institute - School of Female Pelvic Medicine and Reconstructive Surgery: Pelvic floor sonography for incontinence and prolapse

Workshop Chair: Nikolaus Veit-Rubin, Austria

05 September 2019 16:00 - 17:30

Start	End	Topic	Speakers
16:00	16:05	Introduction	Nikolaus Veit-Rubin
16:05	16:15	History of introitus sonography	Heinz Kölbl
16:15	16:35	Transperineal ultrasound with video on prolapse	Daniela Ulrich
16:35	16:55	The concept of pelvic floor sonography	Jacek Kociszewski
16:55	17:10	Sonography of sling complications with Video	Sebastian Kolben
17:10	17:25	Sonography of mesh complications with Video	Jacek Kociszewski
17:25	17:30	Discussion	Participants and Faculty

Aims of Workshop

Our workshop aims to give attendees an overview of the various possibilities for the use of ultrasound in the assessment of the female pelvic floor. We will present the basic methodology and clinical uses of pelvic floor sonography imaging which combines the advantages of the vaginal high-frequency probe for introitus sonography as well as the abdominal 2D/3D probe for perineal sonography. These techniques allow detailed assessment of potential trauma and dysfunction. We will put the emphasis on the pre- and post-therapeutic imaging when using transvaginal meshes and suburethral slings. We will perform live scanning including normal volunteers and patients with urinary incontinence, pelvic organ prolapse, before and after mesh surgery.

Learning Objectives

To comprehend the full potential of ultrasound imaging in female pelvic floor assessment

Target Audience

Urology, Urogynaecology, Bowel Dysfunction, Conservative Management

Advanced/Basic

Intermediate

Suggested Learning before Workshop Attendance

What is the place of ultrasound in urogynecology? A written panel.

Petri E, Koelbl H, Schaer G.

Int Urogynecol J Pelvic Floor Dysfunct. 1999;10(4):262-73. No abstract available.

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Assessment of female urinary incontinence by introital sonography.

Koelbl H, Bernaschek G, Deutinger J.

J Clin Ultrasound. 1990 May;18(4):370-4.

Imaging of the lower urinary tract.

Koelbl H, Hanzal E.

Curr Opin Obstet Gynecol. 1995 Oct;7(5):382-5. Review.

Levator ani trauma and pelvic organ prolapse - a comparison of three translabial ultrasound scoring systems.

Trutnovsky G, Kamisan Atan I, Ulrich D, Martin A, Dietz HP.

Acta Obstet Gynecol Scand. 2016 Dec;95(12):1411-1417. doi: 10.1111/aogs.13018. Epub 2016 Oct 15.

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Pomian A, Majkusiak W, Kociszewski J, Tomasik P, Horosz E, Zwierzchowska A,

Lisik W, Barcz E. Demographic features of female urethra length. Neurourol

Urodyn. 2018 Jun;37(5):1751-1756. doi: 10.1002/nau.23509. Epub 2018 Feb 10.

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Majkusiak W, Pomian A, Tomasik P, Horosz E, Zwierzchowska A, Kociszewski J,

Barcz E. Does the suburethral sling change its location? Int J Urol. 2017

Dec;24(12):848-853. doi: 10.1111/iju.13448. Epub 2017 Sep 20. PubMed PMID:

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Dresler MM, Kociszewski J, Wlazlak E, Pedraszewski P, Trzeciak A, Surkont G. Repeatability and reproducibility of measurements of the suburethral tape location obtained in pelvic floor ultrasound performed with a transvaginal probe. *J Ultrason*. 2017 Jun;17(69):101-105. doi: 10.15557/JoU.2017.0014. Epub 2017 Jun 30. PubMed PMID: 28856017; PubMed Central PMCID: PMC5516079.

Wlazlak E, Viereck V, Kociszewski J, Kuszka A, Rautenberg O, Walser C, Surkont G, Gamper M, Fehr MK. Role of intrinsic sphincter deficiency with and without urethral hypomobility on the outcome of tape insertion. *Neurourol Urodyn*. 2017 Sep;36(7):1910-1916. doi: 10.1002/nau.23211. Epub 2017 Jan 31. PubMed PMID: 28139863.

Kociszewski J, Fabian G, Grothey S, Kuszka A, Zwierzchowska A, Majkusiak W, Barcz E. Are complications of stress urinary incontinence surgery procedures associated with the position of the sling? *Int J Urol*. 2017 Feb;24(2):145-150. doi: 10.1111/iju.13262. Epub 2016 Dec 1. PubMed PMID: 27907976.

Fabian G, Kociszewski J, Kuszka A, Fabian M, Grothey S, Zwierzchowska A, Majkusiak W, Barcz E. Vaginal excision of the sub-urethral sling: analysis of indications, safety and outcome. *Arch Med Sci*. 2015 Oct 12;11(5):982-8. doi: 10.5114/aoms.2014.42305. PubMed PMID: 26528340; PubMed Central PMCID: PMC4624732.

Kociszewski J, Kolben S, Barski D, Viereck V, Barcz E. Complications following Tension-Free Vaginal Tapes: Accurate Diagnosis and Complications Management. *Biomed Res Int*. 2015;2015:538391. doi: 10.1155/2015/538391. Epub 2015 Apr 20. Review. PubMed PMID: 25973423; PubMed Central PMCID: PMC4418011.

Viereck V, Kuszka A, Rautenberg O, Wlazlak E, Surkont G, Hilgers R, Eberhard J, Kociszewski J. Do different vaginal tapes need different suburethral incisions? The one-half rule. *Neurourol Urodyn*. 2015 Nov;34(8):741-6. doi: 10.1002/nau.22658. Epub 2014 Aug 30. PubMed PMID: 25176293.

Rautenberg O, Kociszewski J, Welter J, Kuszka A, Eberhard J, Viereck V. Ultrasound and early tape mobilization--a practical solution for treating postoperative voiding dysfunction. *Neurourol Urodyn*. 2014 Sep;33(7):1147-51. doi: 10.1002/nau.22459. Epub 2013 Jul 2. PubMed PMID: 23818418.

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Kociszewski J, Rautenberg O, Kuszka A, Eberhard J, Hilgers R, Viereck V. Can we place tension-free vaginal tape where it should be? The one-third rule. *Ultrasound Obstet Gynecol*. 2012 Feb;39(2):210-4. doi: 10.1002/uog.10050. PubMed PMID: 21793084.

Kociszewski J, Rautenberg O, Perucchini D, Eberhard J, Geissbühler V, Hilgers R, Viereck V. Tape functionality: sonographic tape characteristics and outcome after TVT incontinence surgery. *Neurourol Urodyn*. 2008;27(6):485-90. doi: 10.1002/nau.20556. PubMed PMID: 18288705.

Int Urogynecol J Pelvic Floor Dysfunct. 1996;7(2):105-8.

Recommendations of the German Association of Urogynecology on functional sonography of the lower female urinary tract. Schaer G1, Koelbl H, Voigt R, Merz E, Anthuber C, Niemyer R, Ralph G, Bader W, Fink D, Grischke E.

Author information

History of introitus sonography

Heinz Kölbl

Advances in ultrasonic instrumentation have facilitated the establishment of ultrasound as a diagnostic tool in the management of female patients with lower urinary tract disorders. The use of transabdominal techniques is reported to be limited by obesity and marked vaginal prolapse which do not allow optimal sonographic demonstration of the urethrovesical anatomy behind the pubic symphysis. The transvaginal and transrectal approach often prevent free movement of the bladder, especially in patients with a marked descent of the bladder neck. In addition, the probes themselves move during stress, giving a false impression of motion; thus, distortions occurring during stress may be partially artefactual. Perineal scanning provides information similar to that obtained by radiographic techniques.

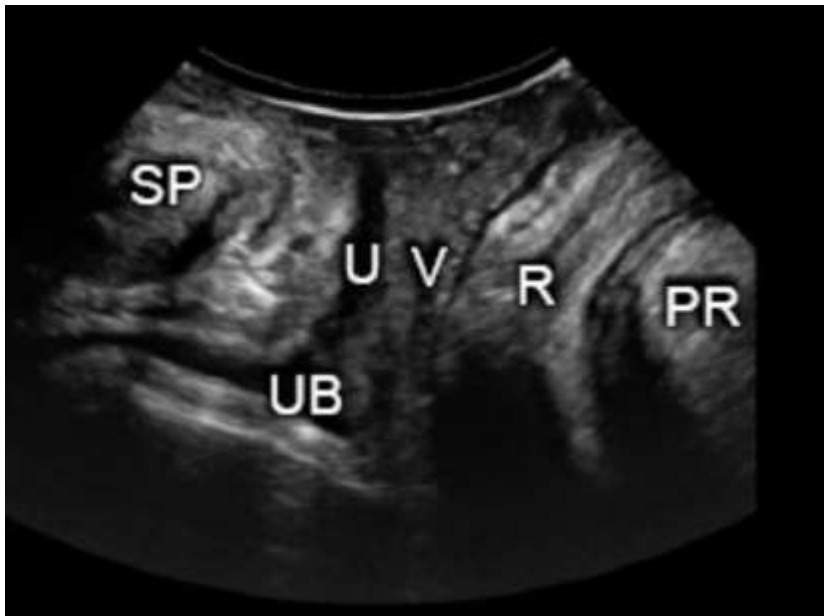
Application of ultrasound using a vaginal scanner in the introital position can be carried out without effort, irrespective of the surgical procedure (vaginal and/or abdominal approach). During introitus sonography, a vaginal transducer is positioned in the introitus area over the meatus urethrae externus. The strictly orthograde positioning of the ultrasound scanner is vitally important to take correct measurements and to describe the type of urethral descent. Thus, measuring objectively the descent of the bladder neck and the elevation of the urethrovesical junction during surgery can be carried out without difficulty. Failure of adequate bladder neck elevation is a factor leading to recurrent stress incontinence after surgery. Overcorrection at vaginal or retropubic surgery with subsequent bladder outlet obstruction causing long-term micturition disorders can be avoided. Demonstration of the bladder neck during filling cystometry improves detection of detrusor and urethral instability and helps to exclude tonometric artefacts. All these sonographic observations are easier to review from video records than from still pictures. Since demonstration of the urethra does not necessarily require catheterization, the method itself can be performed without simultaneous urodynamic measurements, resulting in an even less invasive procedure.

Introitus sonography is an advantageous technique for establishing the presence of an anatomic defect in the urethrovesical region, especially in cases with stress urinary incontinence. It aids in the selection of patients suitable for surgical correction and their follow-up after a properly performed surgery.

Transperineal ultrasound with video on prolapse

Daniela Ulrich

The linear or curved-array-probe is used in perineal sonography with low frequency and a large angle of reflection. It provides a panoramic view of the pelvis. But fine anatomic structures and three planes in 2D technique are not feasible. (Picture 1)



Picture 1

The concept of pelvic floor sonography

Jacek Kociszewski

Pelvic floor sonography is a new imaging ultrasound technique in reconstructive surgery of pelvic organ prolapse and incontinence, which allows specific and targeted therapies. In addition, it represents a first line approach for the handling of complications.

In Europe ultrasound diagnostic is wide spread and has become one of the most essential diagnostic methods in urogynecology. Perineal and Introitus sonography are two standardized methods, which have been available for years and are already firmly established. The difference between both methods is the choice of transducer and the options where positioning the various probes. Both sonographic procedures are standardized and deliver reproducible results. They were developed for the morphological analysis of the urethra-bladder region within the framework of advanced diagnosis for urinary incontinence. However, every urogynecological examination must include the separate analysis of all compartments including both incontinence and the possible existence of a prolapse in order to confirm a diagnosis suspected clinically. The standard perineal and standard introitus sonography are used only to assess the level 3 compartment according to DeLancey.

As we know from our daily routine, morphological changes of one compartment can positively or negatively influence the function of another. Kinking of the urethra, a large cystocele or rectoenterocele can, in the presence of prolapse complaints, lead to a voiding disorder, OAB or to an overflow incontinence and occult stress urinary incontinence.

In order to better understand the pathoanatomical changes of the whole pelvis, and to plan the optimal treatment approach, the individual compartments of the pelvis must be objectively assessed with an imaging method. PFS represents such a method, whereby the introitus/vaginal/endoanal and abdominal sonography both in 2D and 3D technique can be combined in one investigative procedure. PFS enables a real-time, static and dynamic imaging of all pelvic compartments at three levels: sagittal, frontal and axial. The vaginal scanner can enlarge the introitus sonography by subsequent penetrating the vagina and following, by tilting, rotating and movement of the probe. It allows thus a new dimension of diagnostic possibilities. Furthermore, you can document the findings for possible forensic questions. Moreover, the PF sonography offers the ideal conditions to monitor the position and function of implants like meshes (Picture 2) or tension free vaginal slings.



Picture 2

Sonographic evaluation of suburethral tapes

Sebastian Kolben

Different parameters can be used to evaluate a tape:

In the sagittal plane, the position of the tape in relation to the length of the urethra (in rest) is ideally at the point between the lower and middle third of the urethra for a retropubic tape and medial below the urethra for a transobturator tape. A high position of the sling - when the middle of the sling, in an inactive phase, lies in the upper half of the urethra - leads to de novo urge-symptoms, residual urine or even more incontinence because the tape can open the apical urethra. A low position of the tape leads to possible failure of the tape for not reaching the high-pressure zone.

The distance of the tape to the urethra is ideally between three and five millimeters. If the tape is too narrow, the patient cannot empty the bladder properly. When the distance between the tape and the urethra is too big, the urethra cannot interact with the tape, especially in hypomobile urethra. It leads to sling failure. (Picture 3)



Picture 3

The tape should be smoothly stretched and parallel to the urethra. In rest, the tape should not show a horseshoe shaped bending. In the active phase a bending indicates a usage of the elastic reserve of the implant. This would confirm a good tape functionality. However, a horseshoe shaped bending at rest is a sign for tension and shows in certain circumstances the reason for urination problems and OAB symptoms. (Picture 4)



Picture 4

In the frontal or axial plane, you can visualize the symmetry of the band: there should be no lateral contact or compression of the urethra.

In the instant post-operative situation, a hematoma or a swelling could be responsible for voiding problems. If the tape nevertheless is in an optimal shape and position you know you are safe and can work with conservative therapy options.

We consider it particularly important to evaluate the tape in the first post-operative days because it is possible to completely or partially correct a tape between the first and seventh post-operative day. In most cases it is even possible to preserve the tape. Addressing a failed position of the tape at a later stage is difficult and commonly leads to its removal and, after a successful healing period, reinstatement of a new one.

An exception is the repair of a low positioned tape with failure, the so called secondary „Tethered tape“. Shape changes of the tape by „touching“ it with the vaginal probe and without movement during Valsalva manoeuvre is a typical pathognomonic ultrasound indication for “tethered tape“. If the tape has been accidentally been fixed with a vaginal suture it is easy to correct the suture. Adherence of the tape to the vagina over time may be responsible for a recurrent incontinence. A vaginal adhesiolysis with or without adaption of the tape can improve the function of a vaginal sling and make continence possible.