

PELVIPERINEOLOGY

A multidisciplinary pelvic floor journal

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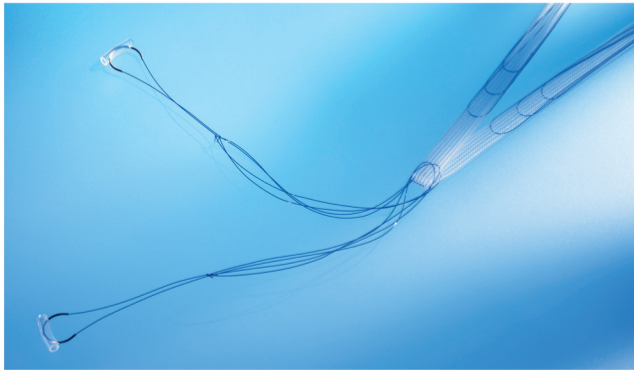
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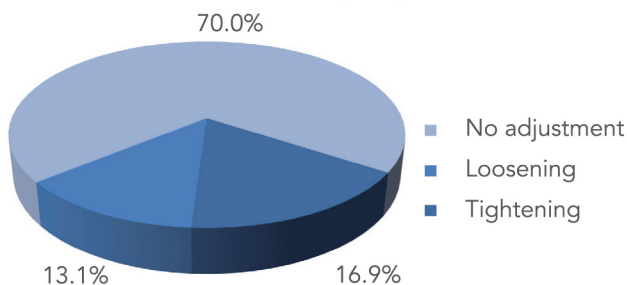
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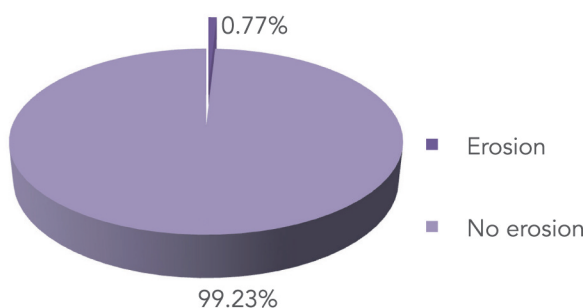


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Freehand acquisition of 3D transperineal pelvic floor volume does not yield accurate measurements

GHAZALEH ROSTAMI NIA, DENA WHITE, LIESCHEN QUIROZ, SEYED ABBAS SHOBEIRI

Oklahoma University Health Sciences Center - Department Of Obstetrics And Gynecology - Section of Female Pelvic Medicine and Reconstructive Surgery/ Urogynecology

Abstract: *Objective:* Abstract: Objectives: Assess the accuracy of freehand 3D Transperineal ultrasound (TPUS) compared to 3D endovaginal ultrasound (EVUS) for obtaining pelvic floor measurements. *Methods:* We compared 30 freehand 3D transperineal ultrasounds and 360 degrees endovaginal ultrasounds of patients referred to our clinic with different urogynecologic symptoms during January-June 2011. The minimal levator hiatus (MLH) height (AP), width (RL), and area were obtained by 3D transperineal and endovaginal ultrasound. *Results:* A total of 60 3D volumes (30 for each modality) were reviewed. The mean age of women in our study group was 52.36 years (SD \pm 15.86), median parity 2 (range 0-5). The median stage of prolapse was 1 (range 0-3). The mean weight was 166.16 pounds (SD \pm 59.07). The mean MLH height, width and area in TPUS measurements were 60.72 mm (SD \pm 9.30), 54.17 mm (SD \pm 11.10), and 26.16 cm² (SD \pm 7.72) respectively. The mean MLH height, width and area in EVUS measurements were 51.54 mm (SD \pm 6.36), 37.41 mm (SD \pm 5.86), and 15.08 cm² (SD \pm 3.67) respectively. Bland Altman analyses of each measurement demonstrated that the two modalities do not consistently provide similar measurements. *Conclusions:* Our study demonstrated that freehand acquisition of 3D transperineal volumes does not provide accurate measurements when compared to 3D endovaginal ultrasonography.

Key words: Transperineal Ultrasound; Endovaginal Ultrasound; Minimal Levator Hiatus; Pelvic Floor; Levator Ani Muscle.

INTRODUCTION

Growing awareness of pelvic floor disorders over the last two decades has led to development and introduction into clinical practice of new imaging techniques; with increasing importance of ultrasonography. Endoanal, endovaginal, and transperineal approaches, using both 2-dimensional and 3-dimensional (3D) imaging, have been used for evaluation of the anatomy of the pelvic floor. Endoanal ultrasonography is recognized as the gold standard for evaluation of the anal sphincter complex.¹ 3D Endovaginal ultrasonography (EVUS) has gained popularity in the evaluation of patients with pelvic floor disorders since it provides valuable anatomic information about the levator ani muscles, anterior and posterior compartments, and minimal levator hiatus.²⁻⁷ Many Urogynecology and Colorectal centers that utilize 3D EVUS and 3D EAUS (BK ultrasound, Peabody, MA, USA), also perform a freehand acquisition of a 3D transperineal volume as a quick overview because the system does not provide an automatic transperineal transducer as with GE (Waukesha, WI, USA) or the other manufacturers (Figure 1). The problem with standardization of image acquisition technique is long recognized and worthy of attention since we need a common language to interpret the results.^{8,9} It is not known whether freehand acquisition will provide equivalent measurements of static images of pelvic floor anatomy, compared to 3D EVUS. In this study we aimed to assess the accuracy of freehand 3D transperineal ultrasound (TPUS) compared to 3D EVUS measurements which have been shown to be repeatable with good inter and intraobserver reliability.⁷

METHODS

Our study had IRB approval at our institution and informed consents were signed by patients. Freehand 3D TPUS and 3D EVUS volumes obtained from 30 patients who were referred to our Urogynecology clinic with various pelvic floor complaints between January–June 2011 were reviewed. Our inclusion criteria were completed charts and good quality of ultrasound volumes. “Good quality” 3D TPUS and 3D EVUS were defined as the ability to visualize the pubic bone and the levator plate in the sagittal view. We screened ultrasound volumes from 200

patients and we chose the first 30 patients that had best 3D volume quality for both ultrasound modalities. 30 3D TPUS and 3D EVUS volumes from the same patients were available for comparison.

3D Transperineal Ultrasonography (TPUS)

All 3D TPUS examinations were performed with the patient placed in the dorsal lithotomy position, with hips flexed and abducted, and a convex transducer positioned on the perineum between the mons pubis and the anal margin (perineal approach). We used the BK 3D convex 8802 frequency 4.3-6 MHZ probe, which has a focal range of 6-114 mm. To obtain 3D images, the probe was manually moved to sweep the pelvic floor structures in a constant speed from right to left in 30 seconds (Figure 1A), which is consistent with the standardized method described by the manufacturer and for which the software was designed. All volumes were obtained at rest. The 2D transperineal approach allowed visualization of the bladder neck and the mobility of the urethra and anorectum. During the examination, the patient was asked to perform a Valsalva maneuver and contract her pelvic floor muscles to facilitate dynamic imaging of the anatomical structures.²

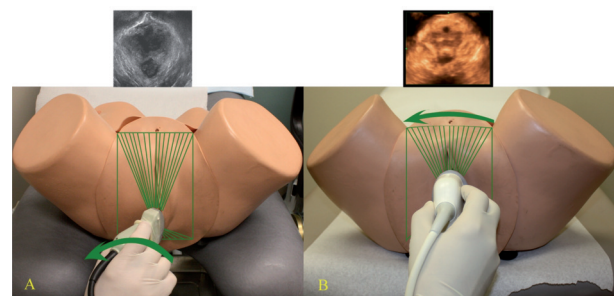


Figure 1A. - Freehand 3D transperineal ultrasound shows freehand movement of probe. The hand sweeps from patient's left to right at a constant speed to obtain a 3D volume.

Figure 1B. - TPUS shows automatic movement of probe. Neither the hand, nor the transducer move, the 3D volume is obtained by internal rotation of the transducer crystals.

3D Endovaginal Ultrasound (EVUS)

3D EVUS was performed on the same patient in the same position after completion of 3D TPUS. A high multi-frequency (9-16 MHz), 360 degrees rotational mechanical probe (type 2050, B-K Medical) was used for all 3D EVUS examinations. The transducer was inserted into the vagina in a neutral position and excessive pressure on surrounding structures was avoided to prevent distorting the anatomy. 300 axial images obtained every 0.2 mm along a 6 cm course were compiled to create a 3D volume.

Measurement protocols

Minimal levator hiatus (MLH), width (MLH RL), height (MLH AP), and area were measured in all 3D TPUS and 3D EVUS volumes in the same manner. To obtain the measurements, the 3D TPUS and 3D EVUS volumes were rotated to position them in an anatomically correct orientation as if the patient was lying down with the mid-sagittal view facing the reader. In order to find the minimal levator hiatus, we located the shortest line between the pubic symphysis and the levator plate (Figures 2, 3). The anterior-posterior (AP) line of the minimal levator hiatus was drawn. The axial plane was rotated posteriorly and was advanced cephalad parallel to the AP line (Figure 4). The mid-sagittal plane was expanded to make the whole volume visible (Figure 5). Minimal levator measurements (height, width, and area) were obtained in this plane, the “minimal levator hiatus plane” (Figure 6). LR was measured at the widest area of the minimal levator hiatus.

Statistical Analyses

SAS v9.2 (SAS Institute, Cary, NC) was used for all statistical analyses. Summary statistics were calculated for the patient population. Bland Altman analyses were used to measure agreement between the two ultrasound modalities. A range of agreement was defined as mean bias ± 2 SD.

RESULTS

30 TPUS and 3D EVUS volumes from the same 30 patients were reviewed. The mean age of women in our study

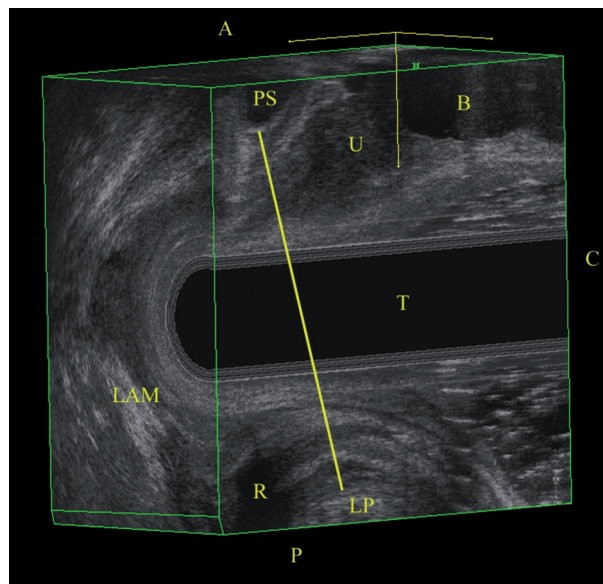


Figure 3. - Shortest line between pubic symphysis and levator plate in mid sagittal view by 3D EVUS; A: anterior, B: bladder, C: cephalad, LAM: levator ani muscle, LP: levator plate, P: posterior, PS: pubic symphysis, R: rectum, T: transducer, U: urethra.

group was 52.36 (± 15.86 SD), median parity 2 (range 0, 5). The median stage of prolapse was 1 (range 0, 3). The mean BMI was 28.77 kg/m² (SD ± 8.56). The chief complaints included mesh erosion (20%), prolapse (23%), fecal incontinence (20%), pelvic pain (13%), urinary incontinence (6%), and other urogynecologic symptoms (16.6%).

The mean MLH height, width and area in TPUS measurements were 60.72 mm (± 9.30 SD), 54.17 mm (± 11.10 SD), and 26.16 cm² (± 7.72 SD) respectively. The mean MLH height, width and area in 3D EVUS measurements were 51.54 mm (± 6.36 SD), 37.41 mm (± 5.86 SD), 15.08 cm² (± 3.67 SD) respectively. Bland Altman analyses (Figures 7, 8) indicated that the 95% level of agreement between the two techniques. This level of disagreement was clinically important and indicated that the two ultrasound

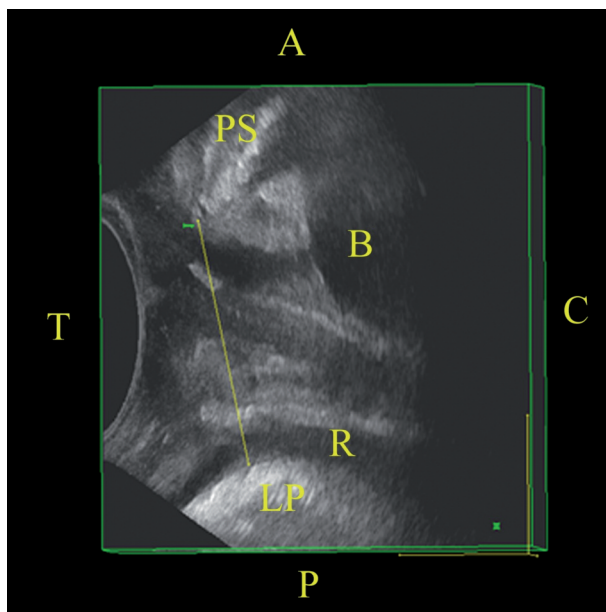


Figure 2. - Shortest line between pubic symphysis and levator plate in mid sagittal view by 3D TPUS; A: anterior, B: bladder, C: cephalad, LP: levator plate, P: posterior, PS: pubic symphysis, R: rectum, T: transducer.

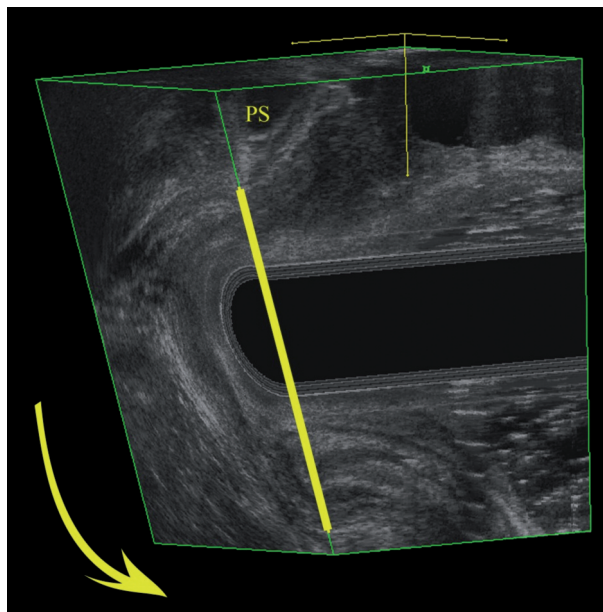


Figure 4. - The axial plane was rotated posteriorly and was advanced cephalad parallel to the shortest line between pubic symphysis and levator plate. PS: pubic symphysis.

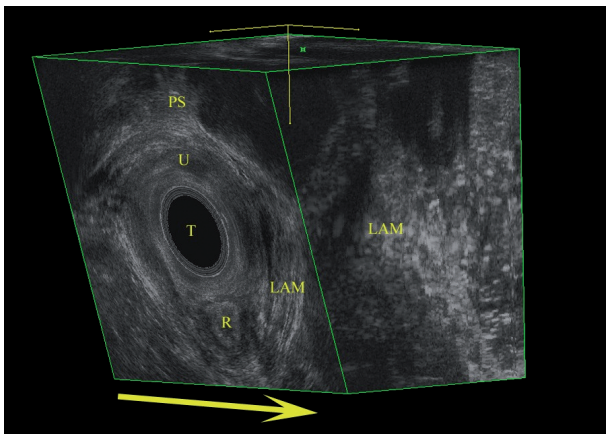


Figure 5. - The mid-sagittal plane was expanded to make the whole volume visible. LAM: levator ani muscle, PS: pubic symphysis, R: rectum, T: transducer, U: urethra.

techniques do not consistently provide similar measurements.

DISCUSSION

Using a strict measurement protocol, our study demonstrated that freehand acquisition of 3D transperineal images does not provide data that are comparable to those obtained from 3D EVUS imaging. This demonstrated the limited clinical use of 3D freehand transperineal measurements. Additionally, although not the focus of this study, 3D EVUS could demonstrate each levator ani subdivision, but 3D TPUS showed LAM as a single bulk.

A study showed that levator hiatus biometry in magnetic resonance imaging (MRI) of the pelvic floor correlates with severity of pelvic organ prolapse.¹⁰ Other studies have shown that the dimensions of the levator hiatus are associated with progress in labor^{11,12} and with pelvic organ prolapse¹³ and may be an independent risk factor for prolapse.¹⁴ The closest clinical equivalent, the genital hiatus, has been shown to be associated with prolapse and prolapse recurrence.^{15,16} Hiatus biometry by 3D/4D TPUS multi-slice imaging has been determined in single plane images obtained at the plane of minimal hiatus dimensions,¹⁷ a method that has been shown to be valid and repeatable by a number of different groups of investigators.¹⁸⁻²¹ Dietz had shown that TPUS multi slice imaging is a reliable method to evaluate female pelvic floor.²²⁻²⁵ Levator ani muscle avul-

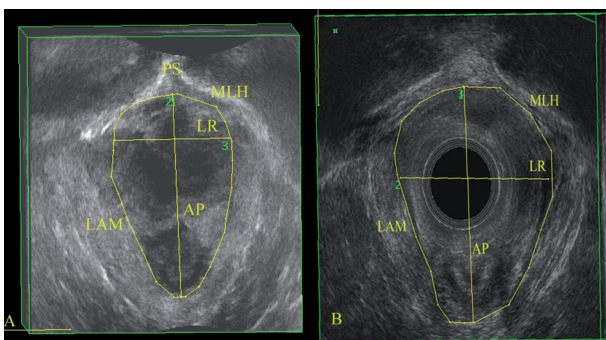


Figure 6A: Minimal levator hiatus biometry in 3D TPUS. AP: anterior posterior, LAM: levator ani muscle, LR: left right, MLH: minimal levator hiatus, PS: pubic symphysis.

Figure 6B: Minimal levator hiatus biometry in 3D EVUS. AP: anterior posterior, LAM: levator ani muscle, LR: left right, MLH: minimal levator hiatus.

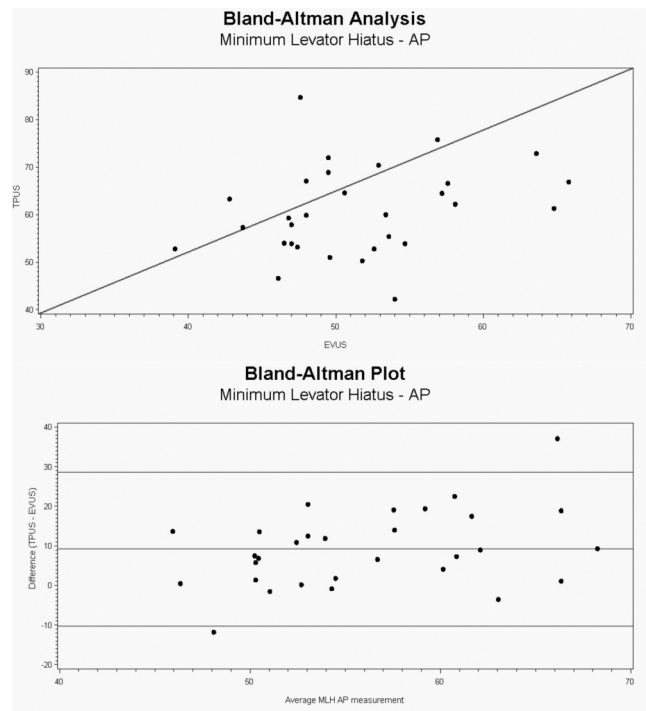


Figure 7. - Minimum Levator Hiatus - AP Bland-Altman Analysis 7a- Bland-Altman Plot 7b.

sion can be detected reliably by TPUS multi slice imaging and physical examination.²⁶ Figure 9 shows a model for levator ani muscle avulsion that was described by Dietz et al. based on TPUS multi slice imaging.

Our study showed this different modality of TPUS, free hand acquisition, cannot be used reliably for pelvic floor biometry.

Our study has particular strengths and limitations. 3D EVUS is being rapidly adapted into research and clinical practice. Van Delft et al. showed a strong correlation be-

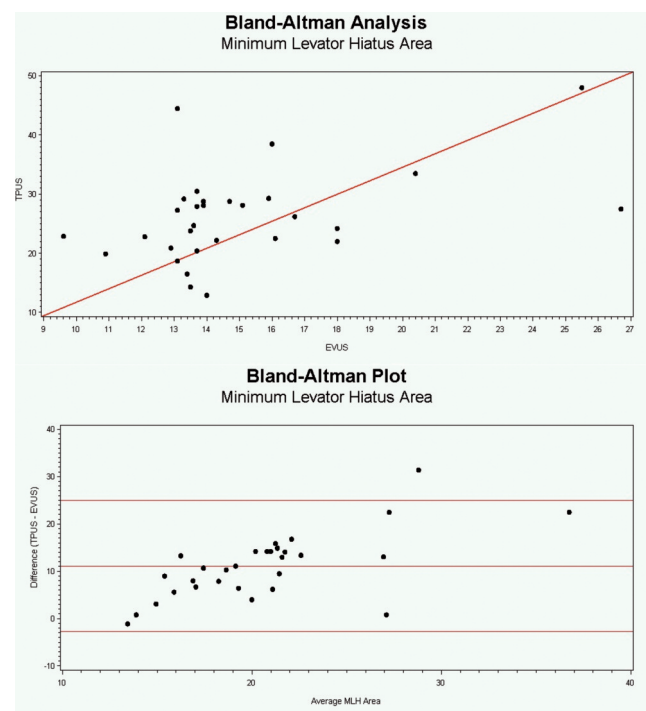


Figure 8. - Minimum Levator Hiatus Area Bland-Altman Analysis 8a- Bland-Altman Plot 8b

tween 3D/4D TPUS multi-slice hiatus biometry and 3D EVUS hiatus biometry (abstract 317, 2012 IUGA meeting, Van Delft et al., Comparison of 3D endovaginal and 3D transperineal ultrasonography measurements of the levator ani biometry at rest). Our own data derived from 29 patients showed good correlation between 3D EVUS and MRI.²⁷ Therefore, 3D EVUS is a valid standard to compare 3D freehand TPUS. The weakness of this study is that the number of the patients is rather small. However, we do not believe this significantly affected the results of our study.

In summary, the current study indicated that hiatus biometry in the accepted axial plane of minimal levator hiatus with freehand acquisition of 3D TPUS could not provide accurate measurements.

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Correspondence to:

Seyed Abbas Shobeiri, M.D
Associate Professor and Section Chief Director of pelvic Floor Imaging
Email: Abbas-Shobeiri@ouhsc.edu

Multidisciplinary Uro-Gyne-Procto Editorial Comment

To improve the integration among the three segments of the pelvic floor, some of the articles published in **Pelviperroneology** are commented on by **Urologists, Gynecologists, Proctologists/Colo Rectal Surgeons or other Specialists** with their critical opinion and a teaching purpose. Differences, similarities and possible relationships between the data presented and what is known in the three or more fields of competence are stressed, or the absence of any analogy is indicated. The discussion is not a peer review, it concerns concepts, ideas, theories, not the methodology of the presentation.

Imaging... While reading the article written by a gynaecologic research group with specific expertise in pelvic floor ultrasonography, a radiologist might be prompted to take into some of the following consideration: (a) few anatomic districts of the body as the pelvic floor are exposed to such a wild uncontrolled "horse-riding" by various physicians who are backed by a so deep difference in preparation and commitment; (b) a common terminology, although highly desirable, is still far from being reached in perineology. In particular, the term minimal levator hiatus (MLH), i.e. the shortest line between the pubic symphysis and the levator plate that most gynaecologist are in love with, is an established parameter known in the radiologic literature since 1991 as the H line which is more consistently drawn from the inferior aspect of the pubic symphysis to the posterior wall of the rectum at the level of the anorectal junction. Also, when just defining the ability to visualize the pubic bone and the levator plate as proof of good quality images at sonography, the anterior border of the puborectalis muscle should not be misinterpreted as the levator plate. Conceptually, this lack of accuracy, might invalidate the result of heavy work activity. Probably, unlike the radiologists who are trained with a severe imaging data management and discipline, a major concern for gynaecologists seems to come only from whether or not TPUS and TVUS are interchangeable tools in pelvic floor sonography. However, it should be realized that the starting and ending point of any measurement is always under the examiner decision and is freehand acquisition. As such, although computed assisted, just after a 30 seconds interval, two subsequent measurements of the same parameter by the same observer, hardly if ever will produce the same value. Consequently, rather than lack of interchangeability between TPUS and EVUS (as demonstrated at the Bland-Altman analysis by this paper), the inherent weakness of any instrumental device deserves consideration.

VITTORIO PILONI

Radiologist/Imaging Specialist - vittorio.piloni@libero.it

Pelvic floor... Ultrasound has become an increasingly frequent adjunct investigation in female pelvic floor dysfunction as stated in 2010 in a joint report of IUGA and ICS, being performed with perineal, introital, transvaginal, transabdominal, transanal modality and 2,3,4D technique. It's potential role in urogynecology includes major morphological abnormalities such as levator defects and excessive distensibility of the puborectalis muscle and levator hiatus (ballooning). The 2013 International Consultation on Incontinence Guidelines state that pelvic organ dysfunction includes multiple conditions such as prolapse, urinary and anal incontinence, defecatory disorders and sexual dysfunction, and based on this concept integrated multicompartamental Pelvic Floor Imaging is described from a global and multicompartamental perspective. "The value of this approach in routine assessment of pelvic floor dysfunction is yet to be evaluated". Considering the levels of evidence and the recommendation of published studies there is no doubt that US imaging role will further expand in the future. Urologists, gynaecologists and colorectal surgeons should be able to perform ultrasound of the whole pelvic floor, since pelvic floor disorders are not isolated in nature, but often involve urological, gynaecological and colorectal issues and the artificial division of the pelvic floor in anterior, middle and posterior compartments, should be replaced by a transverse vision of a mechanical apparatus acting as a unit consisting of muscles under neural control, held together by connective tissues arranged in a 3D arrangement. Together, the structure formed of these three types of tissue influence pelvic organ support and function. Our ability to understand pelvic floor disorders treatment failures and prevention strategy must therefore arise from the understanding of these three tissue elements and their structural and functional interactions. Ultrasonography may play the role of identifying all pelvic floor dysfunctions providing an adequate information for a management that considers the consequences of therapy on adjacent organs and avoids sequential surgeries.

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GIULIO A. SANTORO

Pelvic Floor Unit Treviso Hospital, Italy - giulioasantoro@yahoo.com

Procto... The pelvis has almost become a metaphysical entity: apart from common cognition! Knowledge about the pelvis through very accurate diagnostic tools has increased considerably over the past 20 years and this development is largely due to the progress of diagnostic ultrasound. Specific probes and advanced software enable to view anatomical planes, and many different parameters and morphofunctional data. However despite these developments, this has not led to a proportional growth in the therapeutic strategy in dealing with the posterior pelvic compartment.

The role of endoanal ultrasonography on diagnosis and treatment of abscess and fistula in ano is not in doubt and also the function of transrectal ultrasonography in rectal cancer staging is a routine medical practice. On the other hand, in functional disorders of the posterior pelvis this technique seems less useful: in cases of fecal incontinence due to obstetric trauma, endoanal ultrasonography correctly identifies all sphincter defects at the time of surgery, but it does not correlate with anal sphincter pressure, continence score or outcome of a sphincter repair.¹

In cases of functional disorders of the posterior pelvis what are the cornerstone medical diagnostic tests that can be used to reach a therapeutic decision in these cases? What assists us in decision making? Many diagnostic tests that aim to understand more are often only speculative and self-referential. Evidence based medicine eventually seems to be nothing more than an inadvertent application of the theory of computational complexity: the best algorithm for solving a problem with the minimum necessary resources, that is, for the posterior pelvic compartment, the history and physical examination, sometimes the defecography and little else...

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FEDERICO CAVALLARI

Surgical Department, Mirano Hospital, Venice, Italy
federico.cavallari@ulss13mirano.ven.it

Urogyne... Pelvic floor medicine is a fast growing field over the past decades. With this field physician lack substantial objective measurements, especially when after the urodynamic tests, previously believed to be essential, lost much of its value. Given that ultrasound provides not only a static accurate demonstration of the pelvic floor but enables also dynamic real time and 3D pictures, this very important diagnostic tool quickly gained an important role with pelvic organ prolapse evaluation. Much was published regarding the accuracy of pointing out avulsion problems, as well as many other specific features related to the pelvic floor integrity disruption. Ultrasound scan for pelvic floor evaluation might be done trans-abdominally, trans-perineally or trans-vaginally. Physicians are frequently committed to one of these three methods, as if they were all equally effective and accurate. Thus, this pioneer comparison of the ultrasonic imaging modules is important for future better understanding the value of these tests with the evaluation of the damaged pelvic floor. This will definitely lead towards more efficient use of this important diagnostic tool and will definitely improve the intelligent and data based therapeutic approach to patients.

MENAHM NEUMAN

Urogynecology, Western Galilee Hosp., Nahariya, Israel
mneuman@netvision.net.il

Total pelvic floor repair using a polypropylene mesh. Personal modification

TOMASZ KOŚCIŃSKI, JACEK SZMEJA, TOMASZ BANASIEWICZ

Department of General Surgery, University of Medical Sciences, Poznan, Poland

Abstract: The authors present their personal modification of surgical repair for a complex pelvic floor pathology. In a 58 year old woman rectal prolapse, genital organs prolapse, descending perineum, rectocele and enterocele together with left colon diverticulitis were diagnosed. Subsequent steps of the surgery were: left colectomy, hysterectomy and reconstruction of pelvic fascio-muscular structures using a polypropylene mesh. An abdomino-perineal approach was used to suture the mesh to the perineal body and to the muscles of pelvic floor. Its upper part was fixed to the presacral fascia at S1/S2 level. The rectum and the vaginal stump were anchored to this scaffold. The anatomical and functional 12-month results were excellent.

Key words: Descending perineum; Enterocele; Genital organs prolapse; Pelvic floor repair; Rectal prolapse.

INTRODUCTION

Damage to the fascio-muscular structures and innervation of the pelvic floor is responsible for rectal prolapse and intussusception, genital prolapse, impaired function of anal sphincters, troublesome defecation, urinary incontinence and descending perineum. The anatomical defects in resistant tissues can sometimes be considerable in size. A new hope for successful reconstruction of complex pelvic floor pathologies has risen with the use of prosthetic materials. Tension-free methods of implantation are believed to increase patient's satisfaction, reduce side effects and minimize recurrence rate.^{1,2}

The authors present a technique of modified perineocolporectopexy using a polypropylene mesh to treat a complex pelvic floor pathology.

THE CASE

A multiparous 58 years old woman was diagnosed with rectal prolapse, prolapse of the uterus and vagina, dehiscence and weakening of the pelvic floor, rectocele and enterocele, and advanced diverticular disease of the left colon. (Figure 1). She was dependent on high doses of laxatives. She also had to help herself to evacuate the stools using her fingers. The patient was a chain cigarettes smoker and reported to have a "drinking" problem some years ago. The symptoms of rectal prolapse had lasted at least eight years before she was sent to a proctologist because of protracted rectal bleeding and soreness.

Preoperative evaluation consisted of thorough proctologic examination, defecography and pelvic MRI. Anorectal manometry and rectal endosonography were also performed.

THE SURGICAL TECHNIQUE

Preoperative osmotic bowel cleansing (Fortrans) was used, as well as prophylactic perioperative 3rd generation cephalosporin cover. The patient was operated on in lithotomy position which allowed for abdomino-perineal approach to the perineum, pelvic floor and abdominal cavity.

Laparotomy was performed through median incision. Because of disturbed colonic transit time and advanced diverticulitis of descending and sigmoid colon, left hemicolectomy with transanal stapled anastomosis (EEA 31 stapler) was performed. Then the procedure continued with the hysterectomy. In the next step, pelvic floor peritoneum was opened wide. The mesorectum was bilaterally dissect-

ed within the parietal pelvic fascia, opening the presacral space. The rectovaginal space was exposed down to the perineal body. The defects in fascio-muscular structures that resulted in formation of a giant enterocele and rectocele were identified.

During the vaginal stage of the procedure after infiltrating the mucosa with 0,9% NaCl adrenaline solution (1:200 000) an curved incision was made in the vaginal vestibula. The lower part of the rectovaginal space was opened, laterally to the medial borders of puborectalis muscles. The size of the defect in Denonvilliers' fascia was identified. The structures of perineal body were unveiled.

The prosthetic material (polypropylene mesh) was used for tension-free reconstruction of pelvic fascio-muscular structures. After the mesh was tailored to the size of the defect it was placed into the pelvic floor from "above". Next the lower border of the graft was stitched to the perineal body, the ischio-coccygeal fascia and the levators ani, using Prolene 3-0 sutures (Figure 2). The upper border was fixed to the presacral fascia and periosteum at S1/S2 level after lifting the perineum and setting it in the intermediate position. Lateral margins of the graft were sutured to pelvic parietal fascia above ureters level (Figure 3). Thus the mesh patched the defect in the rectovaginal fascia which caused the enterocele and rectocele. The prolapsing organs were anchored to this scaffolding, while the rectum was stitched through the lateral parts of the mesorectum. The posterior wall of the vaginal stump was fixed to the middle part of the mesh (Figures 4, 5).

The implanted material was separated from the peritoneal cavity by high peritoneal sutured closure. A Redon drain was left in the presacral space for 24 hours. The sur-



Figure 1. – Complex rectal and genital prolapse.

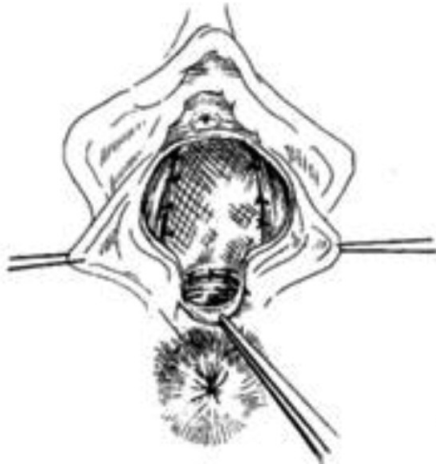


Figure 2. - Transvaginal suturing of the mesh to the perineal body and anal levators.

gery concluded with tight stitching and vaginal setonage. The operation time was 150 min. The blood loss has been minimal.

This surgical procedure can be seen in a video enclosed in the paper.

DISCUSSION

A high failure rate is observed in patients where important supportive pelvic structures were markedly thinned or atrophic, thus their reconstruction was temporary if not impossible at all.³⁻⁵ Introduction of prosthetic materials into pelvic floor repair surgery brings forth a new quality. Weak natural tissue may be replaced, and large anatomical defects are filled with properly implanted meshes resulting in a tension-free effect. Prosthesis can also be used as a frame to which the prolapsing pelvic organs can be attached.

The authors present a modified method of perineocolporectopexy using a polypropylene mesh. The assumption was that the key of a successful surgical result would be achieved through a good access to the pelvic floor structures in order to reveal all the defects and enable implantation of the mesh to valuable anatomical parts. This was the reason of the abdomino-perineal approach which allowed to obtain an effective suspension of the pelvic floor preventing further perineal descent and anchoring the prolapsing rectum and vagina.



Figure 3. - Lateral mesh fixation to the parietal pelvic fascia.

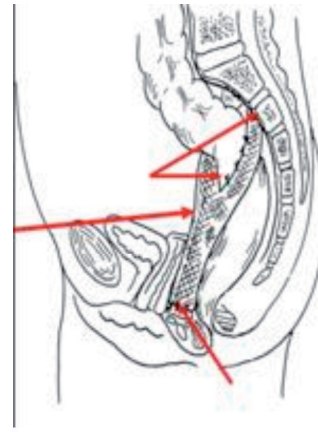


Figure 4. - Grafted mesh. Arrows indicate the fixation points: perineal body, vaginal sutures, presacral fascia, rectal sutures.

CONCLUSIONS

The tolerance of implanted mesh has been good. There was no evidence of local sepsis neither mesh erosion. The anatomical and functional effects were excellent at 12 month follow-up.

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**This surgical procedure can be seen in a video.
Link to <<http://bit.ly/1ackJt3>>**

Correspondence to:

Tomasz Kościński - 49 Przybyszewski street
Poznań 60-355 - Poland
E-mail: tomaszkoscinski.proktolog@op.pl

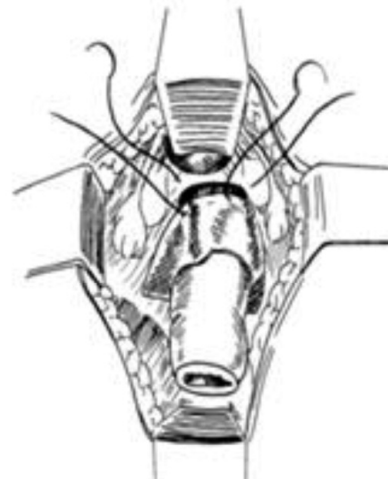


Figure 5. - Anchoring of vaginal stump to the mesh.

Radiofrequency resurfacing and revision of deepithelialized labia minora labiaplasty: review of literature and case study

RED ALINSOD

Urogynecology Director, The Women's Center and The Laguna Laser Center, South Coast, CA

Abstract: The growing demand for Aesthetic Vulvo-vaginal Surgery (AVS), particularly elective and therapeutic labia minora plasty (labia minora reduction) procedures, has increased the risk of failed labiaplasties when performed by inexperienced or poorly trained surgeons. Inadequate labia minora reduction surgery may result in medical and functional complications as well as aesthetically unattractive results. Complications of a botched labiaplasty include bleeding, infection, delayed wound healing, iatrogenic asymmetry, and under or overcorrection. This case report illustrates the use of an innovative radiosurgical technique to repair poor anatomical outcomes of an unsuccessful de-epithelialized labia minora plasty. Revision surgery was achieved using a radiofrequency device that allows incision, micro-smooth cutting, and resurfacing of the vulva-vaginal region, including the labia minora and clitoral hood. Radiofrequency was found to be an effective tool for ironing rough surfaces, smoothing uneven edges, excising hypertrophic labial tissue, and sealing small blood vessels in a labia minora plasty revision surgery.

Key words: Labia minora plasty; Radiofrequency; Aesthetic vulvo-vaginal surgery (AVS); Female genital cosmetic surgery (FGCS); Clitoral hood reduction.

INTRODUCTION

Enlarged or irregular labia minora associated with chronic irritation, other physical discomfort, or an unsightly aesthetic appearance is a growing complaint of women seeking surgical treatment from gynecologic surgeons or cosmetic surgeons.¹ Labia minora (labia) plasty is the term for several female cosmetic genital surgical techniques to reduce the size and in some cases to alter the shape of hypertrophic, asymmetric, or protruding labia minora for aesthetic or functional purposes.^{1,2} Standard techniques for the reduction and reshaping of the labia minora include curved linear excision or simple amputation,^{3,4} central wedge resection,⁵ de-epithelialization,⁶ W-shaped labial resection (zigzag technique),⁷⁻⁸ and laser labiaplasty in which a laser is used in place of a scalpel.¹ More recently, radiofrequency labiaplasty has been found to be beneficial due to its precision and safety in the clitoral area.⁹ In a small case series, posterior wedge resection was found to be an effective technique for aesthetic labiaplasty.¹⁰ Deepithelialized labiaplasty recently has gained popularity because of its purported safety combined with its ability to preserve the natural free edges and neurovascular supply of the labia minora.¹

A combination of labia minora plasty techniques, including 5-flap Z-plasty, reportedly can produce optimal surgical outcomes for labia minora reduction, depending upon the patient's individual needs.¹ Labia minora plasty procedures are minimally invasive surgeries that do not typically lead to significant surgery-related complications.³ However, there is a risk for serious adverse effects resulting from labia minora reduction procedures if a surgeon is not adequately trained and experienced in Aesthetic Vulvo-vaginal Surgery (AVS). Complications of labiaplasty such as bleeding, infection, iatrogenic asymmetry, poor wound healing, and either under or overcorrection may require medical intervention, revision surgery, or both.¹

In this case report we describe an innovative surgical technique involving the use of monopolar high frequency radiofrequency (RF) energy for revision of labia minora labiaplasty. The patient was a 32 year-old Caucasian gravida 3, Para 2 female who had undergone a labia minora labiaplasty under general anesthesia in a plastic surgeon's office surgery center before consulting our office. The surgeon claimed to have previously performed vaginal cosmet-

ic procedures, but provided no credentials or photographic documentation of expertise in labiaplasty.

Approximately two weeks after her surgery, the patient noticed holes in what appeared to be "de-epithelialized" areas of the labia. Seeking a "Barbie Appearance" to correct an unsatisfactory surgery, the patient requested a consultation one month after her operation and then sent our office photos of the postoperative results. The "Barbie Look" is a colloquial term for external genitalia characterized by either no or only minimal labia minora tissue that extend beyond the labia majora. The vertical vaginal orifice appears simply as a fine line. The patient was advised to postpone an appointment with our office until two months after surgery to allow maximum time for normal wound healing. When no improvement occurred, she visited our office one month after initially contacting us. Her operative report suggested that the plastic surgeon had performed a de-epithelialization labiaplasty in which strips of skin were removed from both sides of the labia minora. An inverted U clitoral hood reduction was also performed with the labia minora labiaplasty (Figure 1).



Figure 1. – After de-epithelialization labiaplasty. Following botched de-epithelialization labiaplasty the minora reveal rough elevations, uneven edges, and large flaps of skin connecting minora and majora.



Figure 2. – Pre-op revision. Front view pre-op revision shows protrusion of minora beyond majora, with the clitoral hood topped by a hardened painful scar. Multiple holes are present.

CASE REPORT

Our pelvic exam revealed that the patient's minora was connected to the majora via unattractive flaps of labial tissue with strands of skin. A painful firm scar was observed on top of the clitoral hood. The labia showed rough, bumpy and irregular areas, uneven edges, and an asymmetric pattern that was more pronounced in the postoperative physical exam than in the pre-operative photos (Figure 2). The blood supply had been compromised, thus preventing full healing at the labial edges. Since the labia minora is usually thin, removal of strips of skin on the medial or lateral side can leave an extremely narrow strip of tissue with vasculature that subsequently easily becomes impaired. This defect can result in holes appearing in the de-epithelialized segments.⁹ Additionally, clitoral hood reductions performed on the anterior surface of the clitoral hood can form thickened and painful scars. A scar may appear unsightly as a pale but visible and palpable firm strand traversing the surface of the clitoral hood.

The patient requested a revision surgery to achieve a Barbie Look and signed the appropriate consent form. The Surgitron® Dual RF™ S5 with Pelleve™ equipped with a handpiece (Radiowave technology, Ellman International, Oceanside, NY, USA) was used to perform sutureless RF labial resurfacing and revision in our in-office surgical suite. The patient was administered a topical and local anesthetic but no I.V. In lieu of conventional scalpel-based ablation, RF was utilized initially for excisional surgery to excise labial tissue that had detached from the vulva. The labial surface and edges were then resurfaced with RF to smooth and refine the tissue. A “feathering” technique was used in which multiple passes were made with the device until the desired smoothness and tissue shrinkage was achieved.⁹ Injured vasculature in labial tissue were coagulated with the Surgitron to seal small blood vessels. Finally, the thickened tender scar resulting from the clitoral hood reduction was resurfaced with RF (Figure 3). The patient achieved a full recovery within 8 weeks postoperative at which time she was able to have normal sexual relations (Figure 4). She expressed complete satisfaction with the results of the revision labiaplasty and remained satisfied at 3-year follow up.

COMMENT

The RF applications described in this case report include excisional labiaplasty techniques and the RF Pelleve procedure to correct the poor clinical outcomes of the patient's previous de-epithelialized labiaplasty. RF permitted maxi-



Figure 3. – Immediately after resurfacing revision. Immediately post-op revision shows that excess labial tissue has been trimmed from minora, edges evened, and clitoral hood prominence reduced with radiofrequency surgical technique of “flathering”.



Figure 4. – Post Op 3 Years. Resculptured labia minora at Post Op 3 years remain fully healed and aesthetically attractive with no hypertrophy, asymmetry, holes or rough surfaces.

imum smoothing of the edges of each labium minora to improve their aesthetic appearance while also decreasing labial bulkiness by shrinking the bumpy areas. Compared to lower frequency electrosurgery instruments, monopolar RF treatment is associated with decreased tissue resistance and maximum control in precision cutting as well as tissue tightening to smooth wrinkled skin.⁹ This technique is appropriate for corrective labiaplasty cases requiring delicate and meticulous repair of labial tissue and vasculature.

The versatility of radiosurgery with its detachable handpiece hair wire tips allows it to function in a multimodal capacity as an electrosection instrument for incision, micro-smooth cutting, resurfacing, and vascular repair. The individual variability of small blood vessels in the labia minora poses a challenge for restoration of function to damaged vasculature. However, the Surgitron enables precise microsurgical manipulation required to seal off open small blood vessels with minimal lateral thermal damage of 20-40 microns.⁹ By stimulating coagulation, the attachable ball electrode tips of the device promote soft tissue shrinkage and skin tightening. Monopolar RF surgery has been associated with less thermal destruction, thereby reducing burning or charring during techniques to excise or smooth vulvar skin.⁹

CONCLUSION

Revision of de-epithelialized labia minora labiaplasty utilizing RF is beneficial for the reversal or at least mitigation of poor postoperative results due to suboptimal healing in prior surgery. RF labiaplasty is a promising cutting-edge surgical technique for initial labiaplasty as well as for revi-

sion procedures of the female external genitalia.¹¹ The efficiency and effectiveness of radiosurgery in treating all of the adverse outcomes of the patient's previous "botched procedure" suggest that this device may be highly advantageous for revision labiaplasty requiring incision, resection, resurfacing, skin tightening, and/or small blood vessel repair. Future case series to further investigate the safety and efficacy of RF for revision surgery of failed de-epithelialized labia minora labiaplasty are warranted.

NOTES

Statement of Informed Consent.

A signed statement of informed consent was obtained from the patient to publish medical information pertinent to the case study as well as the photographs relating to her procedure.

Ethical approval: Not required.

Funding: None.

Conflict of Interest Statement.

Red Alinsod, M.D. has previously received financial support from Ellman International, Inc. for an assessment of other clinical research on the use of radiofrequency in Aesthetic Vulvo-vaginal Surgery.

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Correspondence to:

Email: red@urogyn.org

Multidisciplinary Uro-Gyne-Procto Editorial Comment

To improve the integration among the three segments of the pelvic floor, some of the articles published in **Pelvipерineology** are commented on by **Urologists, Gynecologists, Proctologists/Colo Rectal Surgeons** or **other Specialists** with their critical opinion and a teaching purpose. Differences, similarities and possible relationships between the data presented and what is known in the three or more fields of competence are stressed, or the absence of any analogy is indicated. The discussion is not a peer review, it concerns concepts, ideas, theories, not the methodology of the presentation.

Procto... Doctor Alinsod is a Urogynecologist and his paper describes a surgical approach to aesthetic problems affecting the vulvo-vaginal area of some women who are inadequately treated by inexperienced or poorly trained surgeons. For many reasons, mostly cultural, the number of these procedures apparently is growing all over the world with needs that often seem to be quite different or even contradictory conforming the different cultures. Aesthetic problems of the perineal region obviously may involve also the anal and perianal area, and this applies to both sexes. Men and women may require plastic or aesthetic surgery at the anal level either for a purely aesthetic reasons or for a functional problem as well, or both. The condition can be congenital, iatrogenic, or the result of some diseases, or finally it can derive from a normal evolution due to aging.

An ectropion of the rectal mucosa is sometimes seen after operations for rectal atresia or imperforated anus or an inadequate hemorrhoidectomy. In these cases the patient may also complain a more or less severe fecal incontinence. The Saraffof's operation is an interesting but poorly known procedure for the correction of the anal mucosal ectropion. Operations for anal fistula sometimes leave disfiguring scars, as well as severe perineal trauma or suppurative hydrosadeni-

tis, all these eventually requiring plastic surgery with flaps or other procedures. Flaps are also indicated in severe anal strictures. Skin tags of various size are observed in most adults and they are usually asymptomatic, so they do not need to be removed. They may be the consequence of a healed anal fissure or of a reabsorbed perianal hematoma as frequently seen after the vaginal delivery. Some women, and less often some men, however are bothered by the skin tags either for local hygiene reasons or for cosmetic reasons during their sexual activity. Skin tags are easily removed under local anesthesia with a relatively painful recovery. The operations aiming to improve both the appearance and mostly the function of the anal area are not easy, and good results are not the rule, so they must be performed by experienced colorectal surgeons. Skin tags removal is safe and easily done with diathermy or excision and a reabsorbable suture, leaving skin bridges to avoid a complete circular scar. The patient though has to be warned that the recurrence is possible. Histology of the removed tissue is always mandatory.

GIUSEPPE DODI

Colorectal Surgeon, University of Padova, Italy
giuseppe.dodi@unipd.it

Aesthetics... Common interesting indications involving the intervention of plastic surgeons and/or dermatologists in the anal region are represented by skin hyperpigmentation and hair removal, both involved in achieving the so called “anal whitening”.

For anal skin spots removal the first mandatory step consists in the dermatoscopic examination. Along with a careful history, dermoscopy can contribute to distinguish an hyperpigmentation due to epidermal accumulation of melanin (e.g. postinflammatory, frictional, etc), from melanocytes accumulations (nevi of different types) in the dermo-epidermal compartments. Whereas the latter requires a surgical excision in order to perform a proper histological examination, the former could be conveniently removed by the use of a Q-switched laser with a wavelenght of 532 nm. This device emits pulses characterized by a very high power level and a very short emission time (nanoseconds). The specific target of this laser is represented by cells containing high concentration of melanin.

With a single treatment, these cells could be selectively destroyed, leaving a very superficial crust which spontaneously detaches in 7-10 days. A specific learning curve is necessary to capitalize on the selectivity of the Q-switched laser, thus avoiding possible side effects such as skin burns.

Definitive results for anal hair removal can be obtained by the use of two different devices: the Intense Pulsed Light and the long-pulse 1064 nm Neodimio-Yag laser. It is advisable to use the former in lighter skinned and the latter in darker skinned patients. The target of these pulses is represented by melanin contained into the hair follicle. Each treatment allows the removal of the 20% of the hair and must be performed at least 40 days after the previous session.

LUCA SILIPRANDI

Aesthetic Plastic Surgeon, Padova, Italy
l.siliprandi@clinicacittagiardino.it

Efficacy of brief hypnosis as a pain relief method in episiotomy repair

SHOLE VATANPARAST¹, SHAHNAZ SHEKARFOROUSH²

¹Research Center, Shahid Arefian Hosital, Midwifery Department

²Islamic Azad University, Arsanjan Branch, Arsanjan, Nursing and Midwifery Department

Abstract: *Background:* Hypnosis has a longstanding tradition to induce analgesia and sedation in surgery. *Aim of the study:* The purpose of this study was to compare the effectiveness of hypnosis with local anesthetics during episiotomy repair. The clinical trial was designed as a prospective and randomised controlled study. *Patients and Methods:* Thirty primiparous women admitted for vaginal delivery were randomly categorized into two groups: hypnosis and local anesthesia groups. *Results:* The number of women who requested additional anesthesia during repair procedure, pain intensity, participant satisfaction and wound healing were evaluated using validated scales. The subjects who underwent hypnosis requested less anesthesia (8/15 women; 53%) than the local anesthesia group (14/15 women; 93%; $P = 0.014$). The mean pain intensity, one hour after the end of perineal repair, in hypnosis and local anesthesia groups was 3.0 ± 1.13 and 6.07 ± 2.34 respectively ($P < 0.001$). However, there were no differences in pain intensity and wound healing 24 hours after episiotomy repair. Participant satisfaction with the pain-relief method was insignificantly more in the hypnosis group (86 versus 66%, $P = 0.3$). *Conclusions:* Brief hypnosis as used in this study can be effective for pain relief and can be applied instead of local anesthesia during perineal repair.

Key words: Anesthetic; Episiotomy; Hypnosis; Pain; Suturing.

INTRODUCTION

Hypnotherapy, the clinical use of suggestions during hypnosis, in pregnancy and delivery has been used for more than a century, and is one of the most useful applications of hypnosis. The responsiveness of women to hypnosis increases in pregnancy.¹ It was reported a case where hypnosis was used as the only anaesthetic method during Caesarean section with hysterectomy.² Efficacy of hypnosis for the relief of acute pain and anxiety during medical procedures have been evaluated in randomized clinical trials.^{3,4} Hypnosis during abortion decreased participant requests for additional pain relief.⁵ A recent comprehensive meta-analysis demonstrated benefits of hypnosis on different surgically relevant outcomes.⁶ Although pain relief with hypnosis has been recognized previously, few anaesthetists have applied the technique in surgical settings.⁷ So further researches are needed in different clinical settings and populations to confirm the usefulness of hypnosis.

Episiotomy is the most common procedure in obstetric. Midwives usually perform the repair of lacerations and episiotomies.⁸ The perineal suturing caused considerable pain.⁹ A recent trial reported that 50% of the participants experienced pain during perineal repair.¹⁰ There are scarce researches on effective pain relief methods during perineal repair.^{8,11} Local anaesthetics are the usual pain-relief method for most postpartum surgical repairs. However, the injection of the anesthetic agent itself induces pain and tissue edema.¹² Therefore there is a need to investigate the effectiveness and acceptability of other pain-relief methods for perineal injuries repair following delivery. This clinical trial aimed to compare the effectiveness of hypnosis with local anesthetics during episiotomy suturing.

MATERIALS AND METHODS

Study design

The clinical trial was designed as a prospective and randomised controlled study. The trial was conducted from January 2012 to September 2012 at Arefian Hospital, Urmia, Iran. The clinical research ethics board at Arefian Hospital approved the protocol, and all participants provid-

ed verbal and written informed consent. The study outline was reviewed with participants before signing the consent forms. For ethical and practical considerations, the participants and the research midwife were not blinded to the assignment. Hypnotic intervention is not easy to assign blindly. Blinding hypnosis studies are unlikely to take an approval through an ethical committee assessment.¹

A total of 30 women with median episiotomy (3-4 cm) were assigned randomly to either the hypnosis or local anesthesia group by a computer generated random numbers table. Additional pain relief could be supplied at any time during the episiotomy repair on request from women. The use of 10% lidocaine spray was the first choice for both treatment groups.

Interventions

Treatment with either of the two pain-relief methods was conducted by only a hypnotherapist midwife during the study period. As the routine practice in this hospital, all subjects were injected 5 ml lidocaine solution 1% before performing median episiotomy. After delivery, in local anesthesia group, 5 ml lidocaine solution 1% was applied directly along the borders of the wound 5 minutes before suturing. The total volume of lidocaine used in this group included the initial dose was 10 ml.

In hypnosis group, the midwife with advanced training in using hypnosis for obstetric pain relief asked the woman to enter a hypnotic state by hearing. Standardized hypnotic intervention (SHI) protocol and written script have been published elsewhere.¹³ Once the state of mental relaxation and selective attention had been induced, the hypnotherapist designed direct suggestions to decrease pain intensity and anxiety during the suturing and asked the woman to go deeper into hypnosis. The woman was also reminded that she would be able to request anesthesia to increase her comfort at any time during the procedure. The patient received the suggestions of waking and eye opening at the end of the procedure. The episiotomy suturing has been described in detail elsewhere.¹⁴ As part of the routine suturing, a continuous suture for vaginal mucosa and interrupted sutures for perineal muscles were applied (size 0, chromic catgut thread). The skin was sutured using subcuticular technique (size 00, chromic catgut thread).

Eligibility and recruitment

All healthy primiparous women with spontaneous vaginal delivery after 37 weeks of gestation were eligible. Exclusion criteria were instrument delivery by forceps or ventouse, perineal lacerations, postpartum hemorrhage > 1000 ml or severe mental illness.

Outcome measures

The primary outcomes were the number of women who requested additional anesthesia during repair procedure and self-assessments of pain intensity at 1 and 24 hours after delivery. Secondary outcomes were satisfaction with intervention and wound healing assessed at 24 hours postpartum.

Data collection

A 10-mm Visual Analogue Scale (VAS) was used for evaluation of perineal pain intensity (0-10; 0=no pain; 10=worst pain imaginable).¹⁵ The number of lidocaine sprays administered was recorded. Wound healing was assessed by the research midwife who completed the repair at 24 hours postpartum in the hospital. Evaluation of wound healing was conducted by determining if the wound was gaping more than 0.5 cm as well as by systematic assessment of Redness, Edema, Ecchymosis, Discharge and Approximation (the REEDA scale).¹⁶

Data analyses

The data were analyzed using SPSS. Independent t tests were used for analyses of continuous data with normal distribution. Mean values were reported with SD. The chi-square test was used for analyses of categorical variables. The Fisher's exact test was used if expected frequencies were less than five. P values < 0.05 were considered statistically significant.

RESULTS

There were no significant differences between the groups for age, weight, birth weight or length of suturing (Table 1).

No side-effects were reported in either intervention. There were statistically significant differences between the two groups in the request for additional anesthesia during repair (93% in local anesthesia versus 53.3% in hypnosis groups, $p < 0.05$). The mean pain intensity in the first hour postpartum in hypnosis and local anesthesia groups was 3.0 ± 1.13 and 6.07 ± 2.34 respectively ($P < 0.001$). However, it was insignificant at 24 hours after delivery: 4.33 ± 1.23 versus 5.13 ± 1.12 , respectively ($P = 0.07$). Patient satisfaction with the pain relief method was insignificantly more in hypnosis group (Table 2). No difference was seen in wound healing at 24 hours postpartum between the groups. The median REEDA score was 3 in both groups.

DISCUSSION

Decreasing postpartum pain related to perineal laceration repair is important. The present study demonstrated that brief hypnosis as used in this trial for pain relief during epi-

TABLE 2. – Comparison between the local anesthesia and hypnosis groups.

	Local Anesthesia(%)	Hypnosis (%)	P Value
Requested additional anesthesia	14/15 (93)	8/15 (53)	0.014
Pain intensity in the first hour postpartum*	6.07 ± 2.34	3 ± 1.13	< 0.001
Pain intensity at 24 hours postpartum*	5.13 ± 1.1	4.33 ± 1.2	0.07
Satisfaction with intervention	10/15 (66.7)	13/15 (86.7)	0.39

siotomy repair was as effective as local anesthesia and even more in some variables.

In this study a midwife with advanced training in using hypnosis effectively asked the untrained mothers to enter a hypnotic state for the first time in delivery suit. It was previously showed that "hypnosis untrained women may be effective from hearing a medical student read a standardized hypnosis script for the first time in labour".¹⁷

It is clear that women without regional anesthesia experience high levels of pain during the perineal suturing.⁹ So, it needs to use a pain relief method during suturing. Perineal injection with 10 ml (100mg) of lidocaine is recommended for episiotomy.¹⁸ Lidocaine has been used in concentration of 1% in most studies.¹⁹ Hypnosis, alone or in combination with other anesthetic methods, may offer advantages over routine analgesia alone. Hypnosis reduces analgesia requirements in labour.¹ In this study, hypnosis compared with the use of 10 ml lidocaine 1% in the trial decreased the requests for additional anesthesia together with maintaining lower levels of pain during procedure.

Wound healing at 24 hours after delivery was similar in both groups. More patients were satisfied with hypnosis as the pain-relief method, however, it was statistically insignificant. Maybe, it would be due to the small size of this study. Further study should expand this study in the form of a larger controlled study.

The double-blind controlled study is the gold standard for assessment of new methods in medical science.²⁰ However, blinding of the patients and the researchers was not possible in this study due to ethical and practical considerations.

CONCLUSION

Results from this study show that perineal suturing under brief hypnosis can be performed without additional local anesthesia in most women. In regard to high prevalence of postpartum perineal tears or episiotomies, the hypnosis can be effective in decreasing costs and improving suturing pain complaints for most women.

ACKNOWLEDGMENT

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CONFLICT OF INTERESTS

There are no conflicts of interest.

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TABLE 1. – Baseline characteristics of the study population .

Stage	Local Anesthesia	Hypnosis
Age	25.3 ± 4.04	25.07 ± 4.4
Weight (kg)	73.2 ± 9.1	71.9 ± 11.7
Birth weight (g)	3264 ± 452	3240 ± 347
Length of suturing (min)	30.2 ± 6.2	29.8 ± 5.5

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Correspondence to:

Shole Vatanparast, Apadana Avenue, Urmia,
Postal code: 516847146 - Fax: +984413860770
Email: sh.shekar@yahoo.com

Multidisciplinary Uro-Gyne-Procto Editorial Comment

To improve the integration among the three segments of the pelvic floor, some of the articles published in **Pelvipерineology** are commented on by **Urologists, Gynecologists, Proctologists/Colo Rectal Surgeons or other Specialists** with their critical opinion and a teaching purpose. Differences, similarities and possible relationships between the data presented and what is known in the three or more fields of competence are stressed, or the absence of any analogy is indicated. The discussion is not a peer review, it concerns concepts, ideas, theories, not the methodology of the presentation.

Pain Therapy... Many clinical studies and investigations show that hypnosis may produce in surgical patients positive effects on emotional distress, pain, medication consumption, physiological parameters and recovery.¹ Vatanparast and Shekarforoush paper indicates that local anesthesia with 1% lidocaine (5 ml) before episiotomy followed by a suture is not really effective if administered as a sole analgesic method. As a matter of fact, near all patients needed a further analgesic/ anesthetic dose to obtain a complete pain relief. Hypnosis decreases the probability of a new analgesic request by means of distraction mechanisms which cause mainly reduction in frontal lobes activity. Anticipation of pain may in itself induce changes in brain nociceptive networks and hypnotic suggestions may modulate pain-related cortical activity by focusing or diverting attention.² Anticipation of pain (virtual) is able to induce a real pain of about 40% of the pain felt under direct nociceptive application.

Results similar to those seen under hypnosis may be obtained if a low dose diazepam or another benzodiazepine are administered just after the 3rd stage of labor before the suture. It is well known that anxiolytics are very effective in addition to local anaesthetics to improve general comfort and reduce increased fear to feel pain. Also, these drugs are not expensive and easily available.

The hypnotic help offered to the patients in this study may have favourably influenced some of the women in their belief of having had a privileged and special attention. If hypnosis in-

creased analgesia in a particular context, this eventually demonstrates the pivotal role played by different forms of emotional state sensible to distraction and/or to the influence of a skilled and authoritative trained physician. However, a number of patients less submissive to be manipulated might be unresponsive to hypnotic suggestions and their behaviour can be unsatisfactory, in this case, a current pharmacological treatment remaining the only possibility.

As an alternative, if a lateral episiotomy is scheduled, a perineal pudendal block at Alcock's canal in the same side together with local tissues infiltration could be very useful, being done at least 5 minutes before the surgical incision. It would be interesting to complete this study on the effects of hypnosis in obstetrical patients adding a control group treated with 10 ml anaesthetic solution instead of 5 ml, either by simple vaginal-perineal infiltration or in combination with a pudendal block, as described above. In this case a minor role of hypnosis should be expected.

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EZIO VINCENTI
Anaesthesiology and Pain Therapy, Surgical Dept, Dolo, Venice, Italy
evincenti@libero.it

Testing the logical consistency of the Integral Theory System in a non-selected group of original articles from the November 2012 International Urogynecology Journal

BERNARD LIEDL¹, FLORIAN WAGENLEHNER²

¹MD PhD Abteilung für Urogenitale Chirurgie, Beckenbodenzentrum München, Germany

²MD PhD Clinic of Urology, Pediatric Urology and Andrology, Justus-Liebig-University, Rudolf-Buchheim Str. 7, D-35385 Giessen, Germany

Abstract: Aim: To test the concepts and predictions of Integral Theory System (ITS), that pelvic prolapse and symptoms are caused by laxity in vagina / suspensory ligaments. **Methods:** A Popper’s deductive method was applied. The data from published papers in the November 2012 IUJ was tested against concepts and predictions of the ITS. If these concepts and predictions could not explain that data, the ITS was considered invalid. Only descriptive papers were excluded. **Results:** Of 13 papers analysed, 12 were deemed logically consistent with ITS. Overactive Bladder (OAB) and low urethral pressure papers were attributed to loose ligament weakening of musculoelastic mechanisms, diabetic urge symptoms to greater ligament damage by macrosomia; pregnancy effects on hiatal measurements and symptoms by relaxin on collagen crossbonding; symptom improvement with vit D with positive effect on collagen metabolism and ligament strength. The ITS could not explain longer-term improvement of urge symptoms by posterior tibial nerve stimulation. **Conclusion:** There was strong logical consistency between ITS and 12/13 IUJ November 2012 papers.

Key words: Integral Theory System; Urinary Incontinence; Nocturia; Pelvic Organ Prolapse; Chronic Pelvic Pain; Collagen; Relaxin.

INTRODUCTION

The Integral Theory System “ITS” is a holistic, self-contained anatomical system for diagnosis and management of pelvic organ prolapse (POP) and symptoms. It based on the Integral Theory¹ which in essence states that “*pelvic floor symptoms and prolapse, are mainly caused by laxity in the vagina or its supporting ligaments, a result of altered collagen/elastin*” (Figure 1). Management is based solely on repairing the connective tissue damage in these structures. “Repair the structure and you will repair the function”. The relationship between the various prolapses, symptoms and damaged connective tissue structures in 3 zones of the vagina is summarized in figure 1. Overactive bladder and detrusor overactivity are considered to be secondary manifestations of a normal but prematurely activated micturition reflex,² in turn, caused by the same laxities.

THE DEDUCTIVE METHOD OF KARL POPPER

According to Karl Popper, the most eminent philosopher of science of the 20th century, the key test for validity of any theory or system is that it must be able to deductively explain results from all experiments in the field in a logically consistent way. Deduction proceeds from the general to the particular.³ For example, with reference to figure 1, a patient with urinary stress incontinence (USI) will have lax pubourethral ligaments (PUL). However, figure 1 indicates that urge incontinence may also be caused by PUL laxity, cystocele or a uterine prolapse. Furthermore, the ITS predicts that reinforcement of PUL with a midurethral sling may cure both stress and urge symptoms, if the urge is caused by PUL. Again with reference to figure 1, if after say a TVT, urge persists, the ITS predicts it may be corrected by repair of a cystocele or a uterine prolapse.

Fundamental to Popper’s criteria, a theory can never be finally proven. It can only be taken to another stage of proof. However, it can be disapproved by one validated example. If the theory states that all swans are white and one sees a black swan, then the theory is immediately invalidated.

Our aim was to apply this acid test, Popper’s deductive method, to the Integral System.

METHODS

The concepts and predictions of the ITS were tested against all the papers published in the November 2012 issue of the International Urogynecology Journal (IUJ),. To avoid bias, there was no prior examination of that issues’ contents.

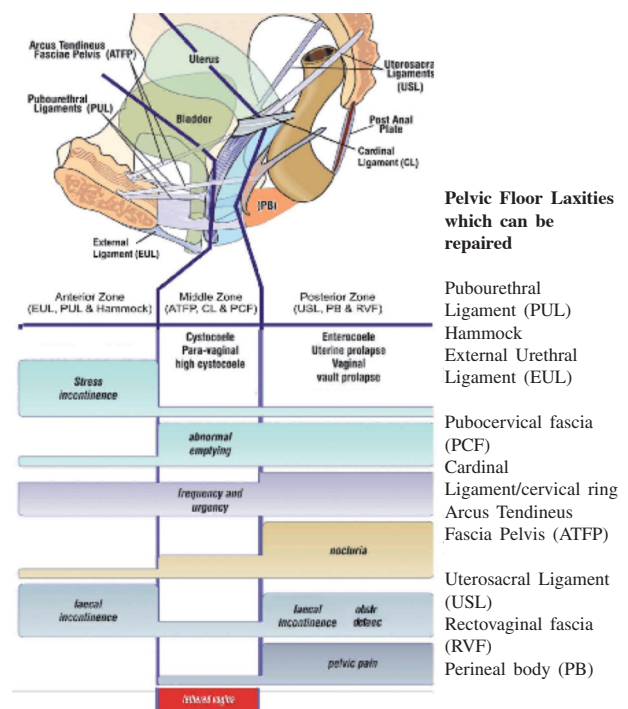


Figure 1. – The diagnostic algorithm uses symptoms to predict zone of damage. Where symptoms such as urgency occur across more than one zone, symptom grouping is used to make the diagnosis. The supporting ligaments/structures naturally divide the vagina into 3 zones: **Anterior:** External meatus to bladder neck, **Middle:** Bladder neck to cervix, **Posterior:** Cervix to perineal body. The height of the bar indicates probability of the symptom originating from damaged structures in that zone. Note that the uterus is supported partly by cardinal ligament (middle zone) and uterosacral ligament (posterior zone).

Inclusion criteria. We non-selectively analysed, without exception, all the papers in the November 2012 volume of IUJ to test whether the Integral System's statements and predictions were logically consistent with their data. To save space, except for key articles, all references in the text to the Integral Theory System (ITS) will refer to chapters and pages in the textbook "The Female Pelvic Floor", 3rd Ed. 2010, PEP Petros, Springer, Heidelberg⁴ which gives a full account of the ITS (www.integraltheory.org).

Exclusion criteria. Only descriptive papers. These are listed at the end of the paper.

How Popper's method was applied. The key message of the IUJ papers was summarized and compared, mainly with the ITS concepts as summarized in figure 1 and published in the 3rd edition of the «Female Pelvic Floor», Petros PEP Springer Heidelberg, but also specific original papers.

ANALYSIS OF NOVEMBER 2012 PAPERS

The numerical order of the 13 papers tested differs to the presentation in IUJ November 2012. The 13 papers are quoted fully at the beginning of each analysis and seriatim at the end of the references section.

Study No 1: Diamond P, Hassonah S, Alarab M, Lovatsis D, Drutz HP. The prevalence of detrusor overactivity amongst patients with symptoms of overactive bladder: a retrospective cohort study. Int Urogynecol J (2012) 23:1577-1580.

The aim of the authors was to determine what proportion of patients presenting for urogynecologic assessment with symptoms of OAB have demonstrable DO. Of 160 patients, 93 had symptoms of frequency, nocturia and urgency (FNU); excluded from the study were 50 patients with prolapse at or beyond the hymen, and 25 with elevated *post-void residual* (PVR>100 ml).

Preliminary analysis. With reference to fig1, the FNU symptoms from the Diamond study were most likely caused by laxity in the posterior zone (uterosacral ligaments) and the elevated PVR from a cystocele or uterosacral ligament laxity.

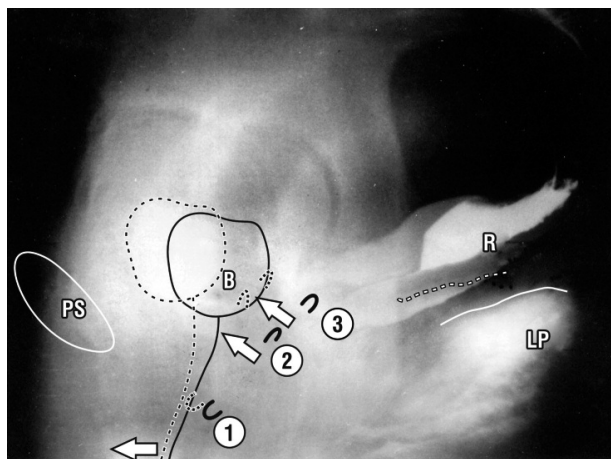


Figure 2. – Squeezing xray superimposed on resting. Rest = unbroken lines; Squeeze = broken lines. Vascular clips at midurethra "1". Bladder neck "2" and bladder base "3". Radio-opaque dye in Foley balloon, vagina, rectum and levator plate. The muscle movements during 'squeezing' are upwards and forwards. Note how levator plate (LP) and rectum (R) are lifted upwards and forwards also. The only muscle which can do this is puborectalis, which lies below LP and behind R. B = Foley balloon. Note the difference with the movements in figure 3. Because 'squeezing', the basic Kegel exercise is not the natural mechanism, it must be learnt.

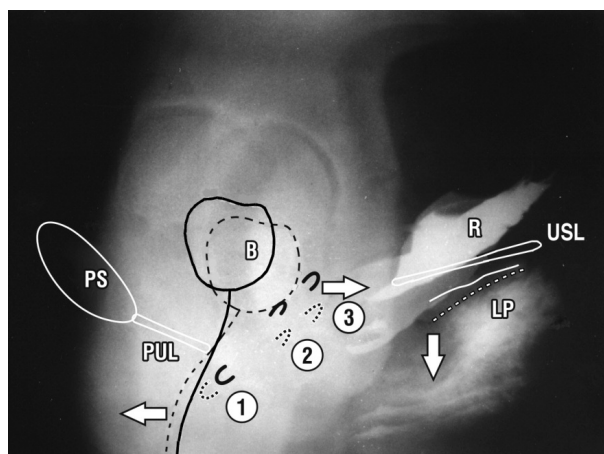


Figure 3. – Same patient and labelling as figure 2. Straining x-ray superimposed on resting. Reflex muscle movements during coughing and straining. Note how the directional movements, forwards (mid urethra '1'), backwards (bladder neck '2' and bladder base '3') all pull against PUL (pubourethral ligaments) and how the downward movements appear to be activated by downward angulation of levator plate, which pulls against (USL) uterosacral ligaments.

Rest = unbroken lines; Strain = broken lines

Only 11 patients had DO. Diamond et al. concluded that it was mandatory to perform an assessment for urogenital atrophy, pelvic organ prolapse, and incomplete bladder emptying before initiating an anticholinergic medication, as these were common causes of OAB symptoms, frequency, urgency and nocturia. They quoted another study,⁵ where 74.6% of patients had prolapse associated with OAB symptoms and yet another where treatment of prolapse with either pessary or surgery resulted in a significant improvement in OAB symptoms.⁶

Analysis. The data from Diamond and the other studies^{5,6} are consistent with the Integral System's statements as summarized in the algorithm, figure 1: prolapse, urgency (OAB), nocturia and abnormal emptying are mainly caused by prolapse, or uterosacral ligament laxity. The Boer et al reference,⁶ as quoted "where treatment of prolapse with either pessary or surgery resulted in a significant improvement in OAB symptoms", is an almost exact paraphrase of the Integral System's prediction, "Repair the structure and you will repair the function", in this case, addressing USL laxity with pessary or surgery⁶ would also cure the OAB symptoms.

The ITS concept is that DO, urgency and nocturia are all differing expressions of a prematurely activated micturition reflex (Ch2 pp 60,61, Ch6 pp 234-267).⁴ Urodynamically controlled data from 1997⁷ indicate that Diamond et al. could have cured >80% of their patients with both prolapse and OAB symptoms, urge, frequency, nocturia, with a simple, overnight stay, posterior sling.

Study No 2: Fitz FF, Resende AP, Stupp L et al. Biofeedback for the treatment of female pelvic floor muscle dysfunction: a systematic review and meta-analysis. Int Urogynecol J (2012) 23:1495-1516.

This systematic review was beset with huge methodological issues. Nevertheless it was able to suggest that Pelvic Floor Muscle training (PFMT) with Biofeedback (BF) is not more effective than other conservative treatments for female PFM dysfunction.

Analysis: Only stress or mixed incontinence symptoms were addressed. The pelvic floor exercises (PFE) as described were based on Kegel exercises, "squeezing", a vol-

untary muscle contraction which pulls the bladder base, vagina and anorectum upwards and forwards (Ch2 pp33-38)⁴. As a learnt movement, there is no reason why biofeedback which assists timing but not quantum of contraction should enhance results. “Squeezing” (Figure 2) is a voluntary movement which needs to be learnt. It pulls all the organs forwards and upwards. It is quite different to the reflex three-directional movements which occur during coughing and straining (Figure 3): forward movement of the distal urethra and vagina and backwards/downwards movement of bladder base and proximal vagina around a competent pubourethral ligament, (Ch2 pp33-38)⁴. According to ITS, a more physiological method for PFE is based on a squatting regime, as this reinforces all three-directional movements, and therefore the ligaments against which they contract, (Ch5 pp219-225)⁴. Pad test based results indicate up to 60% improvement in 60% of patients with symptoms of USI nocturia, urgency, emptying and pelvic pain (Ch5 pp219-225)⁴.

Study No 3: Editorial. Abdel-Fattah M, Rizk DE. Diabetes mellitus and female urinary incontinence: a time for change. Int Urogynecol J (2012) 23:1481-1482.

There is a 20% increase in odds for urge, mainly urge incontinence, not associated with urinary stress incontinence (USI). Gestational diabetes may lead to macrosomia, prolonged second stage of labor, and the increased risk of instrumental delivery on the pelvic floor.

Analysis: The ITS explains the urgency in terms of a greater odds of damage to the uterosacral ligaments by the macrosomia than a normal sized fetus. Even in the normal patients the diameter of the fetal head is 9.4cm flexed (11.2 cm deflexed) has to traverse a pelvic inlet of only 12-13 cm. Though there is significant loosening of collagen bonds with Relaxin hormone, a macrosomic fetus will inevitable stretch all the suspensory ligaments and perineal body (Figure 1) more than a smaller fetus, (Ch2 pp48-58). Laxity in the middle and posterior groups of ligaments, may cause urgency not associated with USI. With reference to figure 1, the ITS predicts that the authors would also find a greater incidence of cystocele and uterine prolapse, the latter associated with nocturia, frequency, emptying, pelvic pain alone.

Study No 4: Zhang YX, Xu HN, Xia ZJ and Wu B. Analysis of clinical interventional strategy for women with urinary incontinence complicated with diabetes mellitus. Int Urogynecol J (2012) 23:1572-73.

The authors compared diabetic with non-diabetic patients and demonstrated a lower cure rate with the diabetic group. They hypothesized neurological damage or damage to the muscles.

Analysis: The comments on neurological damage are not inconsistent with the ITS which stipulates normal efferent and afferent nerve channels to activate organs and muscles. However, we add comments made by Abdel-Fattah and Rizk on the additional distensory damaging effects of macrosomia on the pelvic connective tissues (CT) (Ch2 pp48-58)⁴, but not muscle. Whether it is muscle damage or CT damage causing symptoms was directly tested in a blinded study on 50 patients the vast majority of whom had histologically proven myopathy. 89% were cured immediately with a midurethral sling,⁸ indicating that connective tissue damage, not muscle damage was the key element in the causation of USI.

Study No 5: Shek KL, Kruger J, Dietz HP. The effect of pregnancy on hiatal dimensions and urethral mobility: an observational study. Int Urogynecol J (2012) 23:1561-1567.

Comparison of 3rd trimester data of the pregnant cohort with that of the non-pregnant nullipara revealed a 27% and 41% increase in hiatal area at rest and on Valsalva and an increase in segmental urethral mobility by 64% to 91% in late pregnancy. Similar results were found in patients undergoing Caesarian Section (CS).

Analysis: Shek and Francis’s¹⁰ observations are consistent with the explanations of the ITS as regards the effects of relaxin on collagen which weakens the inter and intramolecular bonds, thereby causing prolapse and incontinence symptoms in pregnancy (Ch2 p44-46)⁴. Rechberger,⁹ observed that collagen loses 95% of its strength just before delivery. This depolymerization of collagen would loosen the collagens bonds between organs and hiatus, and cause laxity in the pubourethral ligament (Ch2 p55)⁴, (Figure 4), allowing distension of the hiatus, rotation of bladder base and USI. The pressure of the fetus on the hiatal structures and vagina in an obstructed labour would extend the collagen structures further, explaining the authors’ statement that these changes are irreversible in patients undergoing CS. Winifred Francis reported onset of bladder symptoms during pregnancy in 1960.¹⁰ This is consistent with depolymerization of collagen by Relaxin production during pregnancy, which increases vastly at 3 months when the placenta takes over productions from the corpus luteum from 3 months onwards (Ch2 44-46)⁴.

Study No 6: Kapoor DS, Housami F, Swithinbank L, Drake M. Maximum urethral closure pressure in women: normative data and evaluation as a diagnostic test. Int Urogynecol J (2012) 23:1613-1618.

The authors demonstrated that women with USI and mixed urinary incontinence (MUI) have lower maximum urethral closure pressure (MUCP) than women with detrusor overactivity incontinence (DOI) and continent women in each decade of life. MUCP decreases with age. However, MUCP failed to meet the criteria for a diagnostic test for incontinence.

Analysis: With reference to figure 1, urge and DOI may occur in all 3 zones, not just the anterior zone. Therefore there will be many patients with DOI who do not have low MUCP and USI. Continence and urethral pressure were shown to be unrelated in a 1997 prospective surgical study.⁷ The cure rate for ISD patients was equivalent to those with normal urethral pressures with the midurethral sling opera-

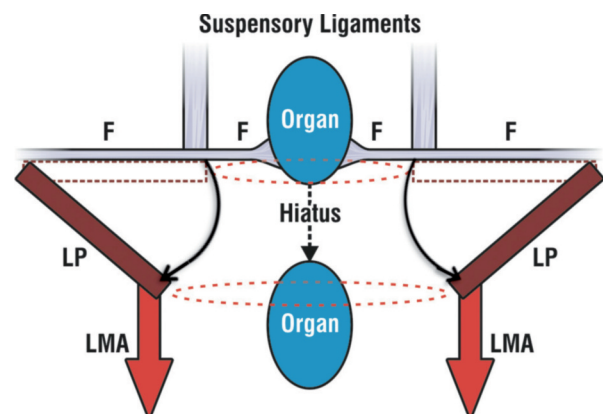


Figure 4. – Schematic coronal view, straining. During straining, the levator plate LP is angulated downwards by the Longitudinal Muscle Ani (LMA) vector, opening out the levator hiatus. If the suspensory ligaments and attached fascia (F) are weakened by Relaxin hormone, the organs are more likely to prolapse through the widened hiatus. As the elastin and collagen weaken beyond a critical mass, the prolapsed position becomes permanent as stated by Shek et al.

tion. Furthermore, cure of USI was effected even though there was no increase in MUCP post-operatively.⁷ The ITS specifies a musculoelastic mechanism for urethral closure with distal and proximal components, both of which rely on an intact pubourethral ligament (PUL) (Ch2 pp 30-38)⁴. Connective tissue weakens with age. According to Gordon's Law,¹¹ laxity in PUL effectively lengthens the three-directional closure muscles, diminishing the urethral closure forces (Ch2 p50)⁴. The elements contributing to urethral pressure are detailed in figure 5 and Ch2 pp59-60. The important biomechanical concept for continence is that narrowing of "a" increases pressure only to the 2nd power (pressure = Force/Area), whereas it increases the intra-urethral resistance to the 4th power according to Poiseuille's Law (5th power for non-laminar flow) (Ch6 pp 227-238)⁴. MUCP is a static measure. Continence is dynamic. Fast-twitch contraction of the three-directional muscle forces instantaneously narrows the urethra, vastly increasing the intra-urethral resistance. This explains how patients with persistent low MUCP (<20cm H2O) post-operatively were cured with a midurethral sling.⁷ On this basis, increased urethral resistance, not pressure, is the essential factor in continence control.

Study No 7: Brazell HD, Claydon CS, Li J, Moore C, Dereska N, Hudson S, Swift S. Does neuromuscular blockade affect the assessment of pelvic organ prolapse? Int Urogynecol J (2012) 23:1599-1603.

Neuromuscular blockade leads to significantly greater increases in POP-Q examination measurements compared with the office measurements, and this increase is most pronounced apically.

Analysis: The ITS is consistent with the explanation of the authors, "The difference noted in patients with general endotracheal anesthesia (GETA) could be explained by neuromuscular blockade causing an artificial relaxation of the levator ani (LA) muscles, which leads to a higher stage of prolapse in the OR." The vagina is densely attached to the rectum which is pulled backwards and downwards by levator plate, even in resting mode (by slow twitch muscle contraction), (Ch2 pp 33-34)⁴ and as seen in figures 3 and 6. LA relaxation would allow the apex to prolapse downwards.

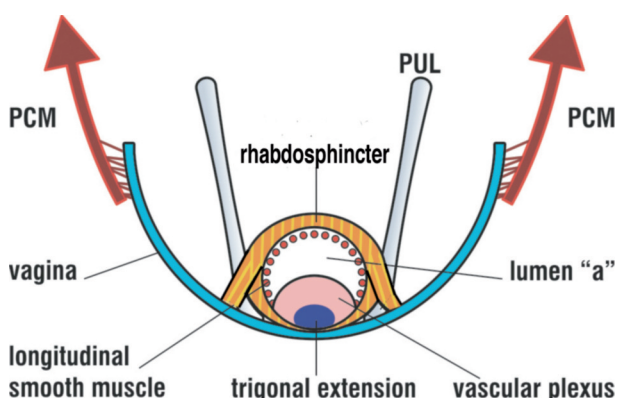


Figure 5. – The components of urethral closure. Perspective: coronal section of vagina at midurethra. The trigonal extension and vascular plexus are known as the "Cresta Urethralis"; arrows = vector closure forces (fast and slow twitch) from contraction of the anterior pubococcygeus muscle (PCM) which stretches the vagina upwards to close the urethral lumen 'a'. Contraction of the rhabdosphincter over the "Cresta Urethralis" provides a water-tight mucosal seal, and is recorded as a pressure rise on effort. Not shown is the contribution to urethral narrowing by the backward/downward vectors LP and LMA (Figure 3).

Study No 8: Parker-Autry CY, Burgio KL, Richter HE. Vitamin D status: a review with implications for the pelvic floor. Int Urogynecol J (2012) 23:1517-1526.

The authors of this Review present evidence to support their hypothesis that vitamin D may cause muscle weakness and lead to incontinence.

Analysis: The ITS makes no reference to vitamin D. From the ITS perspective, it is the loose collagenous insertion of muscle which weakens muscle contractile force, not damaged muscle per se.⁸ It is known that decreased body collagen may be a primary factor in not only connective tissue weakness, but osteoporosis, which is related to vitamin D deficiency. The ITS may be logically consistent with the article, as collagen deficiency would cause lax muscle insertion points, and according to Gordon's Law,¹¹ muscle weakness.

Study No 9: Daan MP, Schweitzer KJ, van der Vaart CH. Associations between subjective overactive bladder symptoms and objective parameters on bladder diary and filling cystometry. Int Urogynecol J (2012) 23:1619-1624.

Of all four OAB symptoms the frequency symptom showed the strongest association with daytime urinary frequency, nocturia with nocturnal frequency, and urgency incontinence with incontinence episodes as measured in the bladder diary. The frequency and nocturia symptoms showed almost equal and strong associations with bladder volumes as measured in the bladder diary and by filling cystometry. The key symptom of the OAB syndrome, urgency, was either not at all or only poorly associated with objective parameters from the bladder diary and filling cystometry.

Analysis: The data are consistent with the ITS view of OAB symptoms: they are the cortical perception of a prematurely activated micturition reflex.² The stretch receptors at bladder base are supported by a vagina adequately tensioned by three-directional muscle forces; these muscle forces are weakened if the ligaments against which they contract are loose.¹¹ The lax vagina can no longer support the stretch receptors which fire off at a lower bladder volume, and so the patient empties her bladder more frequently during the day, "frequency" and during the night, "nocturia", (Ch2 pp 42-44; 50-51;61-63; Ch6 234-245)⁴. In contrast, urgency is considered dependent on the varying sensitivity of the stretch receptors, not bladder volume per se.

Study No 10. Chin HY, Lin KC, Wang CJ, Chiang CH, Kuo HC. Paraurethral striated muscular structures and pelvic floor muscles contribute to resting urethral closure pressure in rats. Int Urogynecol J (2012) 23:1631-1636.

The authors injected the striated muscles alongside the urethra with botulinum toxin in an animal model. Their results showed that the paraurethral striated muscular structures contribute to urethral closure pressure in rats. These structures appeared to connect the pelvic floor muscles with urethral striated muscles to maintain adequate urethral closure pressure at rest. Contraction of the paraurethral striated muscles and pelvic floor muscles contributes about 70-80% of MUCP at rest.

Analysis: Assuming relevance to the human, the ITS states that the antero-medial part of m.pubococcygeus (PCM) contracts forwards against PUL to close the distal urethra (Ch2 pp32-35); (Figures 3 and 7 of this paper). The lateral parts of PCM which join behind the rectum to insert into the coccyx as "levator plate" pulls the bladder base downwards and backwards to "kink" the proximal urethra (Figure 3 and 7). These muscles are principally of the slow-

twitch variety and in stretching the urethra, they narrow it to close the space below the rhabdosphincter at the midurethra. As $\text{Pressure} = \text{Force}/\text{area}$, if PCM contraction weakens, the space enlarges and pressure falls.

Study No 11. Levin PK, Wu JM, Kawasaki A, Weidner AC, Cindy L. Amundsen. The efficacy of posterior tibial nerve stimulation for the treatment of overactive bladder in women: a systematic review. Int Urogynecol J (2012) 23:1591-1597.

The Review was beset with methodological studies. Three smaller observational studies meeting “good quality” criteria all reported statistically significant improvement in OAB symptoms, but with moderate success rates of 54-70%.

Analysis: The ITS explanation for surgical and non-surgical improvement/cure for OAB symptoms is based on strengthening the suspensory ligaments against which three-directional closure forces act. These in turn stretch the vaginal membrane to support the bladder base stretch receptors, which in turn prevents afferent impulses reaching the cortex as OAB symptoms.

The ITS makes no comments on neuromodulation or posterior tibial nerve stimulation (PTNS) or how these methods may or may not work. In fact, given its anatomical basis, the ITS would predict no symptom improvement for urge symptoms much beyond the immediate stimulation period. Based on Popper’s deductive criteria, the ITS predictions are inconsistent and therefore at least partly invalidated.

Study No 12. Capes T, Stanford EJ, Romanzi L, Foma Y, Moshier E. Comparison of two classification systems for vesicovaginal fistula. Int Urogynecol J (2012) 23:1679-1685.

The authors compared two classification systems, the Waaldijk and Goh systems which seek to predict success or failure of fistula repair. The Goh classification system was able to predict both successful closure and subsequent continence; patients with type 1 fistulae, sizes b and i, being more likely to have successful closure and continence after treatment.

Analysis: The ITS would predict that the Goh classification “ii”- Moderate or severe fibrosis (around fistula and/or vagina) and/or reduced vaginal length and /or bladder capacity would have a greater incidence of incontinence due to the “tethered vagina syndrome” (Ch2,p61; Ch4 179-187).⁴ The tethered vagina syndrome was first described in 1990.¹ It is a “motor-type” incontinence characterized by severe scarring or tissue deficit in the bladder neck area of vagina which “tethers” the three-directional forces responsible for distal and proximal urethral closure. The more powerful posterior vectors (Figure 3), forcibly overcome the forward vector to “pull open” the bladder neck. This gives rise to the classical symptom of this condition, sudden massive loss of urine immediately on getting out of bed in the morning. Often there is no significant USI or urgency. On ultrasound, there may be little movement downwards when the patient strains. Cure of this condition consists of augmentation of the bladder neck area of the vagina with some type of skin graft, for example “skin-on Martius graft” to restore the independent three-directional organ movements seen in figure 3.

Study No 13. RamanahR, Berger MB, Parratte BM, DeLancey JOL. Anatomy and histology of apical support: a literature review concerning cardinal and uterosacral ligaments. Int Urogynecol J (2012) 23:1483-1494.

In this Review, the authors quote Blaisdell¹² who described uterosacral fibers attached to the fascia covering the

levator ani, coccygeus, and obturator muscles and presacral fascia, Campbell¹³ who observed that fibers of the USL and CL were consistently intermingled at the cervical portion, with fibers that extended anteriorly above the internal os and posteriorly onto the proximal third of the vagina, and Butler-Manuel et al.¹⁴ who found that sympathetic nerve fibers along with sensory/nociceptive nerves were relatively more abundant than parasympathetic fibers in the deep USL.

Analysis: Blaisdell study confirms why the proximal vagina and uterus are pulled backwards and downwards by the posterior vector forces LP/LMA, an essential part of the ITS explanation for active striated muscle closure (continence) and opening of the urethra (micturition), (Ch2 pp 30-41),⁴ and anus (pp 64-75), and figures 6, 7, 8. Campbell’s description of cardinal ligament fibres extending over the anterior cervix and proximal 1/3 of vagina reinforce the description of the pathogenesis of high cystocele by birth-related rupture of these structures, (Ch4 p162-167).⁴ Butler-Manuel et al.’s description of sensory/nociceptive nerves in the USL are consistent with the claims that low abdominal/pelvic pain/vulvodynia may be a referred pain from lax USLs, (Ch2 pp 108-110, Ch4 pp 195-202).⁴

CONCLUSIONS

We found a strong logical consistency between the data from 12/13 of the IUJ November 2012 papers and the Integral System. The Integral System is an anatomical framework based on diagnosis and management of lax ligaments/connective tissue as the principal cause for pelvic organ prolapse and bladder, anorectal and some pain symptoms.

DESCRIPTIVE STUDIES IUJ Nov 2012 NOT AMENABLE TO ANALYSIS

F. W. Lone, R. Thakar, A. H. Sultan, A. Stankiewicz. Accuracy of assessing Pelvic Organ Prolapse Quantification points using dynamic 2D transperineal ultrasound in women with pelvic organ prolapse. Int Urogynecol J (2012) 23:1555-1560.

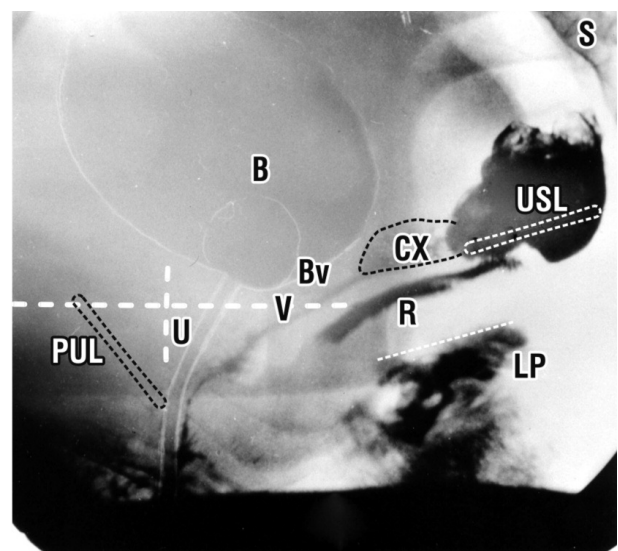


Figure 6. – Sitting lateral x-ray (resting, closed). Even at rest, slow twitch fibres of the posterior vectors (arrows, in figure 7), gently stretch the proximal urethra backwards/downwards. U = urethra; V = vagina; B = bladder; Bv = fascial attachment of bladder base to vagina; CX = cervix; LP = levator plate.

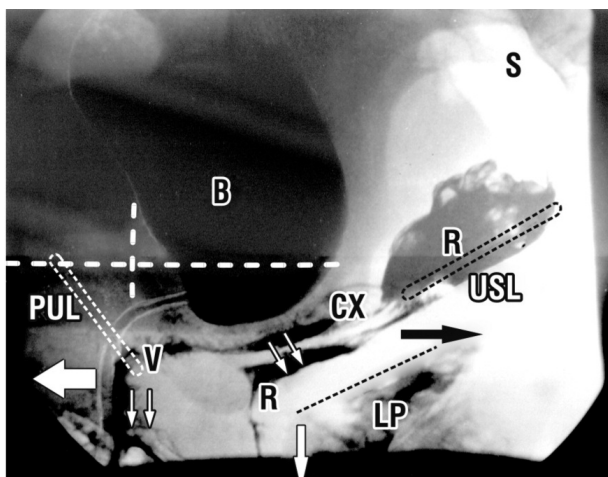


Figure 7. – Same patient and labelling as in figure 6. Urethral closure during effort (coughing or straining). Compared to figure 6, the forward muscle force (arrow) stretches the distal vagina (V) forwards against the pubourethral ligament (PUL) to close the distal urethra, ‘distal urethral closure mechanism’ (Ch2);⁴ the backwards and downwards muscle forces (arrows), stretch and angulate the upper vagina and urethra around PUL to ‘kink’ the proximal urethra, ‘bladder neck closure mechanism’ (Ch2).⁴ Exactly in position “R”, is the forward contraction of m. puborectalis. This stabilizes the anorectum for the posterior vectors (arrows), to stretch the rectum around “R” to form the anorectal angle and to effect anorectal closure.

Man-Jung Hung, Yi-Ting Chen, Pao-Sheng Shen, Shih-Tien Hsu, Gin-Den Chen, Esther Shih-Chu Ho. Risk factors that affect the treatment of interstitial cystitis using intravesical therapy with a dimethyl sulfoxide cocktail. *Int Urogynecol J* (2012) 23:1533-1539.

MME Lakeman, FM Zijta, J Peringa, AJ Nederveen, J Stoker, JPWR Roovers. Dynamic magnetic resonance imaging to quantify pelvic organ prolapse: reliability of assessment and correlation with clinical findings and pelvic floor symptoms. *Int Urogynecol J* (2012) 23:1547-1554.

L Cardozo, T Hall, J Ryan, CE Bitoun, I Kausar, A Darekar, A Wagg. Safety and efficacy of flexible-dose fesoterodine in British subjects with overactive bladder: insights into factors associated with dose escalation. *Int Urogynecol J* (2012) 23:1581-1590.

S Ginath, AD Garely, JS Luchs, A Shahryarinejad, CK Olivera, S Zhou, CJ Ascher-Walsh, A Condrea, ML Brodman, MD Vardy. Magnetic resonance imaging of abdominal versus vaginal prolapse surgery with mesh. *Int Urogynecol J* (2012) 23:1569-1576.

D Shveiky, AI Sokol, RE Gutman, BI Kudish, CB Iglesias. Patient goal attainment in vaginal prolapse repair with and without mesh. *Int Urogynecol J* (2012) 23:1541-1546.

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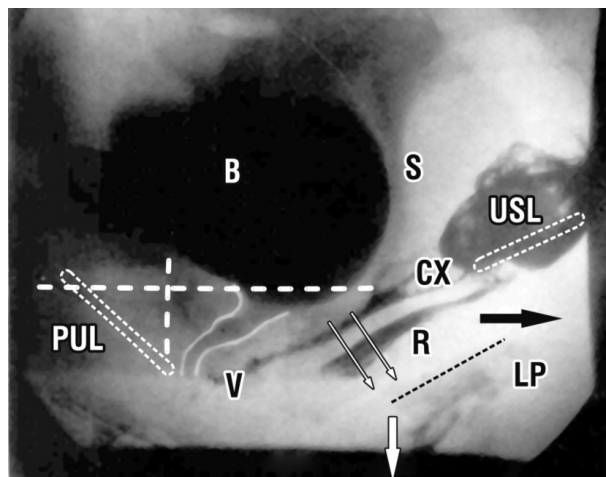


Figure 8. – Urethral opening during micturition. Same patient and labelling as in figure 6. Relaxation of m. pubococcygeus (forward arrow, figure 7) allows the posterior vectors (arrows) to stretch back the vagina and posterior urethral wall.

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22. Study No 8 Parker-Autry CY, Burgio KL, Richter HE. Vitamin D status: a review with implications for the pelvic floor *Int Urogynecol J* 2012; 23:1517-1526.
23. Study No 9 Daan NMP, Schweitzer KJ, van der Vaart CH. Associations between subjective overactive bladder symptoms and objective parameters on bladder diary and filling cystometry *Int Urogynecol J* 2012; 23:1619-1624.
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Correspondence to:

Bernard Liedl
MD PhD Abteilung für Urogenitale Chirurgie,
Beckenbodenzentrum München, Germany
Email: Bernhard.Liedl<bernhard.liedl@t-online.de>

Outcomes of surgical treatment of perianal warts in HIV-positive and HIV-negative patients are similar in terms of recurrence rate and course of recovery

KOŁODZIEJCZAK MALGORZATA¹, SWIECKI PAWEŁ², FIRLAG-BURKACKA EWA², HORBAN ANDRZEJ³, WILCZYŃSKA ALEKSANDRA¹

¹ Solec Hospital, Warsaw, General Surgery, Colorectal Surgery Ward

² Hospital of Infectious Diseases, Warsaw, AIDS Diagnosis and Therapy Centre

³ Medical University of Warsaw, Faculty of Medicine

Abstract: Aim of the study: to compare outcomes of surgical treatment of perianal warts in HIV+ vs. HIV- patients. Patients and Method: The study is a retrospective analysis of all surgical treatments of perianal warts performed in the Colorectal Surgery Ward of Warsaw Solec Hospital between 2004 and 2011 including 24 HIV+ and 57 HIV- patients. Groups were compared in terms of number of re-treatments and time period of hospitalisation as indicators of healing and recovery course. Statistical analysis included chi-square tests for non-parametric variables and median value and range for parametric variables. Results: Within HIV+ group there were 13 (54.17%) patients meeting AIDS criteria. Median CD4 count at the time of surgery was 373. In total there were 13 cases of re-treatment due to recurrences, 5 in HIV+ group and 8 in control group. The average length of hospitalization was 4.66 days (4.17 in HIV+, and 4.82 in control group). Number of cases with longer than average hospitalization was 9 in HIV+ group, and 16 in control group. No statistically significant differences between groups have been demonstrated. Conclusion: In patients with HIV/AIDS the recurrence rate as well as post-operative course and healing was similar as in HIV-negative patients.

Key words: Perianal Warts; HIV; AIDS.

INTRODUCTION

Perianal warts (Condylomata acuminata) result from infection with human papilloma virus (HPV). More than 60 subtypes of HPV have been identified with types 6 and 11 most commonly associated with the benign, exophytic condylomata of the anogenital region. Types 16 and 18 have been associated with more aggressive lesions that can transform into anal intraepithelial neoplasia (AIN) or invasive cancers.¹ Since primary mode of transmission of anogenital HPV is sexual intercourse, genital and perianal warts are one of the most prevalent STDs in HIV+ patients. In the Polish Observational Cohort of HIV patients (POLCA), this prevalence ranged from 5.48% in women to 13.72% in men. Big variations were seen between groups of risky behaviours, with the highest prevalence (44.66%) observed in homo- and bisexual men.² Nadal et al. assessed that perianal warts are the most frequent proctologic condition among patients infected with HIV.³ Warts are easily recognized and range in size from millimetres (Figure 1) to a large Buschke-Löwenstein (Figure 2) type lesions and only in 6% of cases warts are confined to the skin of perianal

area. The majority of patients have also warts extending in the anal canal.⁴

Treatment of warts is difficult because of high recurrence rate of the disease. Warts can be treated by conservative methods or by more invasive surgical methods (Figures 3, 4). The currently used treatments include destructive therapy, immunotherapy and excisional therapy.⁵⁻⁸ Administration of these methods greatly depends on the location of lesions. Application of some treatments commonly used in treatment of externally located warts is contraindicated in lesions located in anal canal. Destructive treatments should be used only for lesions located on the skin, and must not be used for lesions located on the mucosa of the anal canal because of potential for causing necrosis, burn or congelation. Treatment of external warts without concomitant treatment of internal lesions leads to treatment failure. Studies of effectiveness and safety of surgical treatments in patients with HIV/AIDS before the Highly Active Antiretroviral Therapy (HAART) era were giving variable and sometimes conflicting results.⁹⁻¹⁶ On the other hand, there are few outcome studies of surgical treatment between HIV/AIDS pa-



Figure 1. – Perianal warts and warts in the anal canal



Figure 2. – Buschke-Löwenstein tumour.



Figure 3. – Surgical excision with simultaneous electrocoagulation.

tients on effective HAART as compared to HIV-negative patients.^{17,18}

AIM OF STUDY

1. To compare the recurrence rate in immunocompromised patients vs. immunocompetent controls
2. To compare the length of healing and post-operative course in immunocompromised patients vs. immunocompetent controls.

PATIENTS AND METHODS

The study presents a retrospective analysis of all cases of surgical treatment of perianal warts performed in the General Surgery - Colorectal Surgery Ward of Solec Hospital in Warsaw between 2004 and 2011. The analysed population included 24 HIV-positive patients and 57 HIV-negative controls. In all patients the standard surgical technique was used and HIV-positive patients were treated in accordance with international guidelines (EACS). Both groups were compared in terms of number of re-treatments and the length of hospitalization. Length of hospitalization was chosen as indicator of healing and recovery course. Additionally, analysis included demographic parameters (for both groups) and immunological parameters, antiretroviral treatment and stage of HIV infection according to the Centers for Disease Control (CDC) classification (for HIV+ group). Statistical analysis of differences between groups included chi-square tests for non-parametric variables and median value and range for parametric variables. For length of hospitalization average and number of cases exceeding average was analyzed.

RESULTS

Study included 69 men and 12 women with median age at time of surgery of 31 years (31.5 [21-66] in HIV- and 30 [23-45] in HIV+ patients). There were 24 HIV+ patients and 57 HIV- patients. Within HIV+ group there were 13 (54.17%) patients meeting the CDC criteria for diagnosis of AIDS. Median CD4 count at the time of surgery was 373 (199 - 873) cells/mm³. Eighteen (78.26%) patients were treated with HAART. In total there were 13 cases of re-treatment due to recurrences. In the HIV+ group there were 5 cases (20.83%), and 8 (14.03%) cases in control group. This difference was not statistically significant ($p=0.4467$). The average length of hospitalization in the total population was 4.66 days (4.17 in the HIV+, and 4.82 in their control

group). The number of cases with longer than average hospitalization was 9 (38.50%) in HIV+ group, and 16 (28.07%) in the control group. This difference also was not statistically significant ($p=0.3340$)

DISCUSSION

Surgical therapy has the advantage over the conservative methods of usually eliminating warts at a single visit. Warts can be removed by scalpel or scissors excision and electrocoagulation. In case of electrocoagulation the visible warts can be physically destroyed, but care must be taken to control the depth of coagulation to prevent scarring. Because most warts are exophytic, this can be accomplished with a resulting wound that extends only into the upper dermis. When surgical removal is done properly in most cases suturing is not necessary. In case of disseminated, carpet-like lesions in the anal canal it is absolutely necessary to perform excision in several steps, leaving bridges of mucous membrane to preserve the proper function of the anus. Too broad removal of mucous tissue in anal canal may lead to constricting scars and signs of sensory faecal incontinence.

Surgical therapy is most beneficial for patients who have a large number or area of warts. Also, surgical excision is a treatment of choice for warts localized in the anal canal. Indications for surgical treatment of warts in HIV+ patients are the same as in seronegative patients, and treatment is well tolerated. Numerous researchers agree that indications for surgical treatment and post-operative course in asymptomatic HIV+ patients are similar to HIV- patients, but the healing period and frequency of complications may increase with HIV progression.^{19,20} Therefore, despite potentially good results of surgery, immunocompromised patients could possibly require prolonged stay in hospital because of more complications or delayed healing. In our analysis such association has not been observed and length of hospitalization mainly depended on magnitude of lesions and extensiveness of surgical procedure. On the other hand immunodeficiency could lead to increased recurrence rate as observed in other chronic infections. Studies suggest that in HIV+ patients recurrence rate is high, even up to 50% within 6 months of surgery,²¹ but in analyzed group of patients included in this analysis there have been no statistically significant differences in re-operation rate between HIV+ and HIV- patients. However, in patients diagnosed with HIV/AIDS it is advisable to perform elective surgical procedures at relatively high CD4 count. In our group all HIV+ patients were referred to surgical treatment by a specialist in HIV/AIDS



Figure 4. – Status after excision.

treatment. Most patients were treated with HAART and all but one had relatively high CD4 count at the time of surgery. Therefore, to facilitate successful treatment outcomes a good co-operation between HIV/AIDS treating centre and surgical/proctologic ward is recommended.

CONCLUSIONS

1. Excision of perianal warts in well-managed HIV/AIDS patients with a relatively high CD4 count has similar rate of recurrences requiring re-treatment as in HIV-negative patients.
2. Post-operative course and healing in potentially immunocompromised patients was similar to those in immunocompetent patients and required similar length of hospitalisation.
3. If HIV-positive patients are properly prepared to the surgery in terms of CD4 count and viral load, surgical treatment is safe.

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Correspondence to:

Pawel Swiecki - Wolska 37 - Warszawa 01-201 - Poland
Email: drkolodziejczak@o2.pl

Multidisciplinary Uro-Gyne-Procto Editorial Comment

To improve the integration among the three segments of the pelvic floor, some of the articles published in **Pelvipерineology** are commented on by **Urologists, Gynecologists, Proctologists/Colo Rectal Surgeons or other Specialists** with their critical opinion and a teaching purpose. Differences, similarities and possible relationships between the data presented and what is known in the three or more fields of competence are stressed, or the absence of any analogy is indicated. The discussion is not a peer review, it concerns concepts, ideas, theories, not the methodology of the presentation.

Andro... In this study, the authors demonstrated that recurrence of perianal HPV related warts is similar in HIV infected and in non HIV infected patients. Beside this important information, the manuscript rises some translational cues: a) Patients complaining urethral pain frequently have HPV infection detected by swabs at this site, even in absence of external genital warts. As for the anal infection, these patients could have presence of warts hidden in the internal part of uretra. More studies are needed to diagnose and treat this particular condition; b) In our andrological setting we frequently test positive for HPV 6, 11, 16 and/or 18 histotypes both male and female partners from infertile couples. Because the viral clearance is mandatory for their fertility and because in most cases the virus is longlasting despite medical counseling aimed to heal the infection earlier, anal site could represent in these patients a significant reservoir for HPV persistence even in absence of clinical signs; c) HIV infection represents an indication for assisted reproductive techniques in couples seeking fertility. Because HPV genital infection is highly incident in HIV infected patients and reduces fertility outcome, all HIV infected patients should be screened for HPV and anal warts before assisted reproduction; d) Recently, we demonstrated that HPV DNA can be found in blood mononuclear cells obtained from infertile patients with HPV sperm infection. Because this finding could represent a risk factor for cancer in sites far from HPV genital localization, it would be of interest to look for circulating HPV cells in subjects with anal warts and in particular in those with active bleeding or even immunocompromised; e) As warts locatet in other genital sites, also anal warts have high percentage of recurrence after treatment. In the light of the recent literature showing that HPV quadrivalent vaccination of already infected patients is effective in the reduction of both formation and recurrence of HPV related lesions, HPV vaccination could be proposed aimed to reduce anal warts recurrence in affected patients and in their sexual partners.

ANDREA GAROLLA

PhD, Department of Medicine, Unit for Human Reproduction Pathology, Chair of Endocrinology, Chief Prof. Carlo Foresta, Hospital-University of Padova, Via G. Modena 9 - 35128 Padova, Italy andrea.garolla@unipd.it

Gyneco... The paper by Kołodziejczak et al. focuses a topic of great interest in gynecological practice. A relationship between Human Papilloma Virus (HPV) cervical infection and cervical cancer - the second most commonly occurring cancer in women worldwide - is well documented. Strategies to prevent it have been effectively implemented as at present cervical cancer is mainly reported (>85% of cases) in developing countries. George Papanicolaou addressed this topic in 1942 and his cytologic test (Papanicolaou smear test) represents the key stone of cervical cancer prevention¹. Its capability of monitoring the

high risk cervical transformation zone (T-zone: a border between the squamous epithelium of the ectocervix and the columnar epithelium of the endocervix where stem cells support the continuous turnover of both cell types) has been adopted in screening programs and still represents the basis to drive the clinical management through more invasive diagnostic steps.

Human Papilloma Viruses are the most common sexually transmitted agents. Approximately 12 high-risk subtypes are etiologically linked to cervical cancer and its immediate premalignant precursors; among them types 16 and 18 account for 70% of cervical cancer cases, reaching 90% when considering also 31, 33, 35, 45, 52, and 58 HPV types. On the other hand HPV 6 and 11 account for 90% of genital warts found in males and females.

The awareness of the role of special types of HPV infections in promoting cervical cancerogenesis prompted technology to identify the presence of papilloma viruses within the context of the transformation zone. This is now available and HPV genotyping for HPV16/ HPV18 has been recommended for triage in clinical practice. Nevertheless one should consider the economic burden of including HPV genotyping in clinical surveillance for cervical diseases. Moreover its role in screening programs is under debate.

The immunologic aspect of such viral infection has also been explored and specific vaccines have been developed. A quadrivalent vaccine (types 6, 11, 16, 18) has first been developed followed by a more oncological targeted bivalent vaccine (types 16 and 18). Vaccines are indicated in females between 9 and 26 years of age and their introduction in Public Health Programs has been debated. Anyway in clinical practice one should consider that even in vaccinated women the cytologic Papanicolaou test can't be avoided.

Concerning perineal warts the quadrivalent vaccine is of choice and this aspect has to be considered while looking for risk-benefits.

Kołodziejczak et al. report a case series of 81 patients (69 males) surgically treated for perianal warts from 2004 and 2011. This highlights the importance of behavioral aspects, including the adoption of barrier methods at intercourses. Most of interest for gynecologists, the authors underline that most frequently warts extend in the anal canal and only in 6% of cases they are limited to the skin of perianal area. This represents a reservoir area to be carefully examined in women complaining of symptoms suggestive for genital condylomatosis.

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MARCO SOLIGO

Clinica Ostetrico-Ginecologica Ospedale Buzzi, Università di Milano, Italy marco.soligo@fastwebnet.it

As announced in the Editorial by Bruce Farnsworth (*Pelviperrineology* 2011; 30:5) this is the eight of a series of articles highlighting the different sections of the book "Pelvic Floor Disorders, Imaging and a Multidisciplinary Approach to Management" edited by G.A. Santoro, P. Wiczorek, C. Bartram, Springer Ed., 2010.

Fistula

GIULIO A. SANTORO¹, ANDRZEJ P. WIECZOREK², MAGDALENA M. WOŹNIAK²,
ALEKSANDRA STANKIEWICZ²

¹ Pelvic Floor Unit, 1^o Department of Surgery, Regional Hospital, Treviso, Italy

² Department of Pediatric Radiology, University of Lublin, Poland

The eighth section of the book "Pelvic floor disorders - Imaging and Multidisciplinary Approach to Management" is focused on "Fistula".

In the "Introduction", Rechberger presents the causative factors, diagnosis, the classification systems of fistula and their treatment. The prevalence of fistula differs worldwide - in undeveloped countries fistula is mostly the results of poor obstetric care, while in developed countries the leading cause of a urogenital fistula (UGF) is a history of pelvic surgery (including cesarean section) or radiotherapy due to pelvic malignancy. Various classification systems were proposed and nearly all of them were based on descriptions of two factors, namely the size and anatomic location of the defect. However, the most precise classification system for vesicovaginal and rectovaginal fistulae was introduced into clinical practice by Goh in 2004. In this system fistula location, the size of the fistula, and also local factors that could compromise clinical outcome are taken into consideration.

In the first chapter "Urogenital fistulae", D. Pushkar, G. Kasyan and N. Sumerova describe causative factors of the Vesicovaginal fistula (VVF) and urethrovaginal fistulas, their diagnosis and management. Vascular damage of bladder tissue caused by radiotherapy leads to atrophy or necrosis of the bladder epithelium, which causes ulceration, or the formation of fissures. The majority of fistulae become apparent 1.5–2 years after termination of radiotherapy, however, some may appear many years after treatment. The majority of urethrovaginal fistulae in adults are a result of iatrogenic injuries. Various techniques of surgical repair of UGF, including flap techniques are precisely described. The principles of VVF surgical repair might be summarized in three points: (1) excision of all scar tissues; (2) splitting of the vaginal and bladder layers; and (3) closure of the fistula without overlapping of the suture lines. Direct primary anatomical repair may be advised for the patient with urethrovaginal fistula with minimal anatomical disruption.

The second chapter is entitled "Rectovaginal fistulae". A.M. Abulafi and A.H. Sultan present the definition of rectovaginal fistula (RVF), which is an abnormal communication between the rectum and vagina, its diagnosis and management. RVF is a very rare condition, accounting less than 5% of ano-rectal fistulae. The most common cause of RVF is obstetric trauma, which represents between 50% and 90% of RVF presenting clinically, and occurs in 0.1% of all vaginal deliveries. Other causes are: Crohn's disease, trauma to the rectum, perineum, or vagina and tumors infiltrating and eroding the nearby organs leading to the fistula formation. RVF could be classified as: anovaginal and rectovaginal, that is divided into two types, a low (located between the lower third of the rectum and the lower half of the vagina) and a high fistula (between the middle or upper

third of the rectum and the posterior vaginal fornix. Another RVF classification is based on their cause and it is as follows:

- type I - RVF with or without anal sphincter disruption
- type II - RVF due to inflammatory bowel disease
- type III - RVF due to radiation injury
- type IV - RVF due to postoperative injury.

Clinical assessment starts by taking a careful history, noting the severity of symptoms, previous operations on the ano-rectum and vagina, mode of vaginal delivery, the degree of continence to both urine and stools, and taking account of any associated co-morbidities that could influence management. Clinical examination includes careful inspection of the perineum and perianal area. The anus should be examined to determine the status of anal sphincter function by checking the resting and squeeze pressures. The authors strongly advocate the routine use of endoanal ultrasound (EAUS) in order to delineate the fistula and to identify any associated anal sphincter defects that would influence management. The authors describe precisely the methods of treatments of RVF. Conservative treatment is initially recommended if there are significant associated co-morbidities. Moreover, the authors describe in details the surgical operations, which are grouped into three main categories, depending on the approach: local (rectal route, vaginal route and perineal route), abdominal approach and tissue interposition. The choice of treatment depends largely on the experience of the surgeon and, the etiology and location of the fistula, and status of the anal sphincter and ano-rectum.

In the third chapter of this section entitled "Anorectal fistulae", G.A. Santoro et al. describe the management of anorectal abscesses and fistulae. Their pathogenesis is attributed to an infection of the anal glands, usually located in the subepithelial position, the intersphincteric space, or the external sphincter, with ducts that enter at the base of the anal crypts of Morgagni at the dentate line level. Five presentations of anorectal abscess have been described: perianal, submucosal, intersphincteric, ischioanal, and supralelevator abscess and the main tracts of the fistula in relation to the sphincters, which are divided into: intersphincteric, trans-sphincteric, suprasphincteric, and extrasphincteric tract. Preoperative identification of all loculate purulent areas and definition of the anatomy of the primary fistulous tract, secondary extensions, and internal opening plays an important role in adequately planning the operative approach in order to ensure complete drainage of abscesses, to prevent early recurrence after surgical treatment, and to minimize iatrogenic damage of sphincters and the risk of minor or major degrees of incontinence.

Useful information can be obtained by clinical assessment including digital examination. Fistulography has a

very limited role in the assessment of cryptogenic anorectal sepsis and it is little used in clinical practice, however it can be helpful in a chronic fistula with an external opening distant from the anus offering only indirect and not very reliable information on the involvement of anal sphincters. EAUS has been demonstrated to be a very helpful diagnostic tool in accurately assessing all fistula or abscess characteristics. It can be easily repeated while following patients with perianal sepsis to choose the optimal timing and modality of surgical treatment, to evaluate the integrity of or damage to sphincters after operation, and to identify recurrence of fistula. It also gives information about the state of the anal sphincters, which is valuable in performing successful fistula surgery. The authors report that EAUS after injecting 3% hydrogen peroxide (HPUS) through the external opening of the fistula appears to be particularly useful in diagnosing the extrasphincteric fistulae. This technique allows identification of tracts whose presence has not been definitively established, or distinction of an active fistulous tract from postsurgical or post-trauma scar tissue. Moreover, the application of MRI in the assessment of recurrent sepsis not visualized on EAUS is described. The authors suggest that the most appropriate management of anorectal sepsis is to eradicate the tract and drain the sepsis. However, success is influenced by the etiology of the fistula, the course of the tract, and the initial sphincter status.

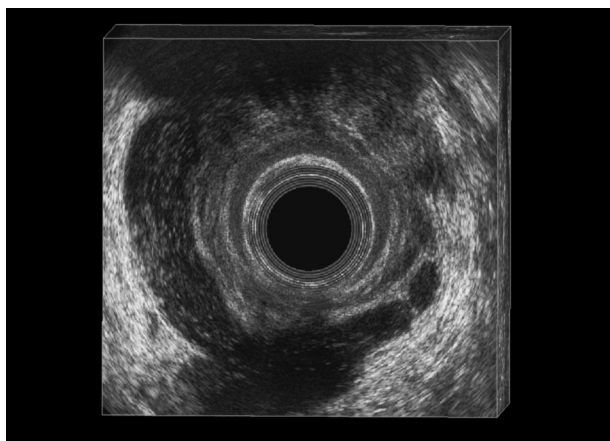


Figure 1. – Endoanal ultrasound. Horseshoe supralelevator abscess.

Multiple surgical techniques, which are currently in use, including fistulotomy and fistulectomy, various types of flaps, instillation of fibrin sealant or stem cells, and plug positioning are described in details.

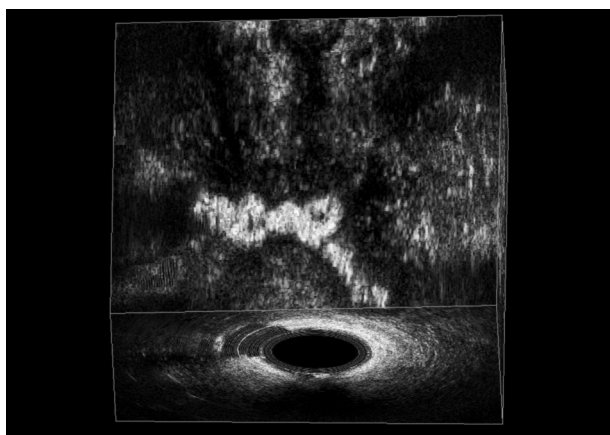


Figure 2. – Endoanal ultrasound. Transsphincteric fistula after peroxide injection.



Figure 3. – Fistula plug.

In his commentary, M. Cervigni highlights the importance of the correct timing of a repair and that the decision is simplified by determining of the overall nutritional health of the patient, and the health of the local tissue. A knowledgeable, rational, and current diagnostic approach combined with meticulous surgical technique, could minimize failure and provide relief for the disabling symptoms of these complex patients.

In their commentary, T. Nguyen and F. Frizelle remind that preliminary examination and investigation of the patient with a UGF is important and suggests four essential aspects, which need to be considered when approaching treatment of a UGF: timing of the operation; use of oestrogens/antibiotics; type of operative approach; use of free or pedicled flaps. The authors highlight that in order to optimize the outcome of the RVF repair, there is a need for a multidisciplinary approach by a colorectal and gynecological team. EAUS or MRI and anal manometry are helpful in the workup of the patients with fistula, to quantify the strength of the anal musculature and to document sphincter defects that may require repair. Moreover, these authors present a newly introduced procedure to treat perianal fistulae- the anal ligation of the intersphincteric fistula tract (LIFT), which has impressive and promising results coming out of a handful of institutions. The LIFT procedure involves dissection in the anal intersphincteric plane via the perineal approach to skeletonize the fistulous tract. The tract at this level is then suture ligated. The intervening tract between the ties is eventually excised and the wound closed.

Correspondence to:

G. A. SANTORO
Chirurgia Generale 1
Ospedale regionale Cà Foncello
31100 Treviso Italia
gasantoro@ulss.tv.it

As announced in the Editorial by Bruce Farnsworth (*Pelviperrineology* 2011; 30:5) this is the ninth and last of a series of articles highlighting the different sections of the book "Pelvic Floor Disorders, Imaging and a Multidisciplinary Approach to Management" edited by G.A. Santoro, P. Wiczorek, C. Bartram, Springer Ed., 2010.

Failure or recurrence after surgical treatments

GIULIO A. SANTORO¹, ANDRZEJ P. WIECZOREK², MAGDALENA M. WOŹNIAK²,
ALEKSANDRA STANKIEWICZ²

¹ Pelvic Floor Unit, 1^o Department of Surgery, Regional Hospital, Treviso, Italy

² Department of Pediatric Radiology, University of Lublin, Poland

The last section of the book "Pelvic floor disorders - Imaging and Multidisciplinary Approach to Management" is focused on "Failure or Recurrence After Surgical Treatments".

In the "Introduction" T. Rechberger and A.P. Wiczorek present epidemiological studies, reporting that the percentage of failures after primary classical repair of pelvic organ prolapse (POP) markedly exceeds 30%. Moreover, even new methods of reconstructive surgery, such as synthetic grafts used vaginally, are not free of the complications although provide higher cure rates than traditional vaginal repairs. Commonly known risk factors responsible for surgical failure after primary repair of POP include: improper patient selection, incorrect surgical technique and inappropriate selection of surgical materials, accompanied by lack of experience in pelvic reconstructive surgery, persistence after surgery of risk factors for POP occurrence (obesity, constipation, chronic cough), congenital defects in extracellular matrix components that influence the function of fascias and ligaments, diminished levator ani contraction strength and a widened genital hiatus >5 cm. Selection of suitable patients is definitely the best way to avoid unnecessary complications. Vaginal meshes should not be used in all patients who present with prolapse. In older women with bad general health conditions, some traditional techniques such as colpocleisis are still valuable. Thus, meshes should be used selectively in patients who will benefit from their use and where the benefits outweigh the potential risks. The authors describe some of the most common complications such as: micturition, dyspareunia, leakage. Moreover, surgical tips to minimize the probability of tape or mesh exposure are reported. In summary, proper patient selection, local estrogen treatment before operation in patients with severe urogenital atrophy, appropriate surgical technique, antiseptic rules and antibiotic prophylaxis, more frequent use of imaging modalities, are the keys to success.

The "first chapter" of this section describes in details the "Imaging and Management of Complications of Urogynecologic Surgery". The author presents results of his study on a large prospective series on the incidence of urinary tract injury, utilizing universal cystoscopy. It was found that total urinary tract injury rate was 4.8%. Injuries occurred in 7.6% of total vaginal hysterectomies, 4.0% of total abdominal hysterectomies, and 2.0% of laparoscopic hysterectomies (P = 0.156). Concurrent prolapse surgery was associated with an increased risk of urinary tract injury (14.6% vs. 4.0%; P = 0.01). Not all urinary tract injuries were detected intraoperatively. Procedures such as Burch and Marshall-Marchetti-Krantz urethropexy carry the inherent risk of ureteral, bladder, and urethral injuries. The bladder injuries identified at the time of surgery need to be man-

aged by primary closure. The author suggests a suprameatal urethrolysis approach, as this technique has resulted in 90% resolution of the voiding dysfunction and no occult urinary incontinence. Less common risks of retropubic procedures are represented by pain, osteitis pubis, and osteomyelitis, and apical vaginal support failure (pudendal neuropathy, apical prolapse after vaginally implanted graft material, extrusion of abdominally implanted polypropylene mesh, extrusion of vaginally implanted graft material, and vaginal stenosis). Another complications after POP surgery is recurrence of the prolapse and bladder erosions with a creation of a vesicovaginal fistula. When these complications occur, they result in tremendous suffering on the patient's part, with necessity of removing the mesh. Bladder erosions require removal by laparotomy and cystotomy, or a combined cystoscopic/laparoscopic approach. Perineorrhaphy repair may result in stenosis of vaginal introitus. Repair requires reapproximation of the superficial transverse perinei, bulbospongiosus, puboperinealis, puboanalis, and rectovaginal septum for the best functional results.

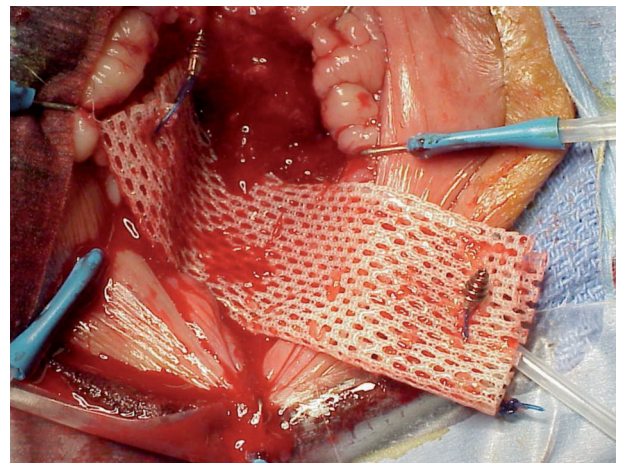


Figure – The silicone sling with the bone anchors attached as it is being removed through the vaginal extrusion site.

In the "invited commentary", W. Davila has emphasized the expanding role of imaging in identifying mesh contraction and its promising data in identifying those patients who require removal of a segment of the graft and those requiring removal of the entire graft for relief of pain symptoms. Since mesh contraction may be due to over-tensioning of the mesh during implantation, it is likely that imaging techniques could be valuable in guiding surgeons to achieve appropriate tensioning of mesh, avoiding over-

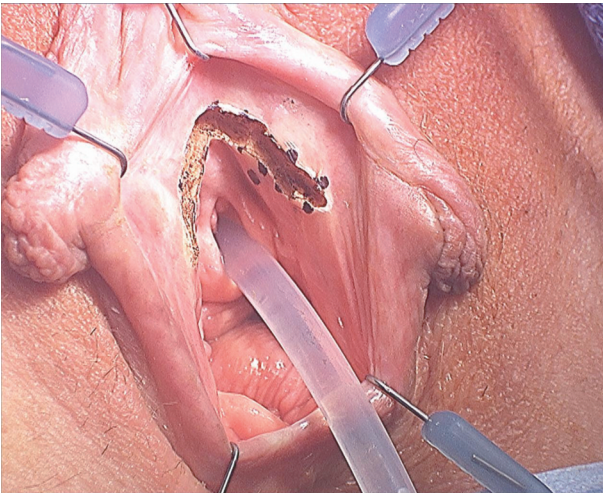


Figure – Suprameatal urethrolysis.

sioning. Imaging techniques will have greater applications in the evaluation of pelvic anatomy and identification of mesh complications related to pelvic surgery, and in the prevention of complications relative to mesh use.

In “the second chapter” entitled “Investigation and Management of Complications after Coloproctological Surgery” T.W. Eglinton and F.A. Frizelle review the incidence and management of complications after colorectal surgery. The authors describe specific infection-related complications such as wound infection, intra-abdominal abscess, and anastomotic leak, which is the most significant and feared, with the potential for considerable morbidity and mortality. The management of anastomotic leak varies and may range from a conservative approach with antibiotics to laparotomy, drainage, and takedown of the anastomosis with stoma formation. Iatrogenic ureteral injuries occur in 0.3–1% of primary colorectal pelvic surgery, and may be up to ten times higher in recurrent pelvic surgery. Stoma retraction is due either to a poorly placed stoma or to tension. This complication is usually avoidable with careful surgical technique and preoperative planning. Fecal incontinence after sphincter-saving surgery for rectal cancer is relatively common and troublesome, but its occurrence can be decreased with careful patient selection, appropriate use of adjuvant therapy, and operative approaches. Incontinence rate is ranging from 1% to 63%.

In the “invited commentary”, F. La Torre outlines that complications following colorectal and proctological surgery are various and related to the indication, to the choice of treatment, and to the general clinical condition. In all cases of anastomotic strictures that are no longer than 5–7 cm, and without local malignancy, the first choice must be endoscopic dilatation. The creation of a perfect stoma is

fundamental to avoid stoma complications. It should be started with a correct and long vascular preparation, with a stump that is more than adequate, following by a regular closure and fixation of the intestine to the abdominal wall. Thus, the majority of ischemia and necrosis responsible for retraction and early re-operation, as well as hernia and prolapse could be avoided.

In their “invited commentary”, I. Sudol-Szopinska and M. Kolodziejczyk have shared their experience on complications after coloproctological surgeries. Anal sphincters may be damaged during a careless hemorrhoidectomy, through cutting of the internal anal sphincter during a fissurectomy, and while operating on an anal fistula. The result of sphincter damage is incontinence. EAUS is the method of choice for classifying incontinent patients into those with normal anal sphincters or damaged ones. EAUS is used to evaluate the extent of the sphincter damage, which is necessary for planning surgery. After a successful operation of a fistula, scarring of the external anal sphincter and the puborectalis muscle are commonly observed, as it is a defect in the continuity of the internal anal sphincter, associated with its partial resection in the course of removing the fistula. The authors report that the most common reason for the early recurrence of an abscess is too small incision and inadequate drainage. The most frequent cause of fistula recurrence are errors in operative technique, such as not identifying the internal opening, leaving part of the main track and its branches, too tight suturing of the wound, inadequate drainage, or formation of a new inflammatory channel. The majority of recurrences occur within 1 year of the operation, and according to various authors this pertains to 0–26% of cases. EAUS is the first choice imaging modality for diagnosing complications after operations of anal fistulae and abscesses. Another complication is the stenosis of the anal canal. Most often it occurs after hemorrhoidectomy, fissurectomy, or after low anterior resection of the rectum. Some errors in the surgical technique, such as not preserving some healthy anoderm bridges in the anal canal, or too tight suturing of the wound, could be causative factors. Another complication is anal canal deformation, which might occur after an open internal sphincterotomy and requires surgical treatment. It has cosmetic and functional consequences. A significant deformity, such as a key-hole deformation, makes cleaning of the area difficult; patients report fecal soiling and pruritus or burning of the perianal skin.

Correspondence to:

G. A. SANTORO
Chirurgia Generale 1
Ospedale regionale Cà Foncello
31100 Treviso Italia
gasantoro@ulss.tv.it

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- Diagnostics in pelvic floor dysfunction, ultrasound workshop
- Controversy about use of alloplastic materials at the pelvic floor
- Pathophysiology of vaginal prolapse, principles of surgical repair
- How to apply the Integral System for cure of difficult clinical problems
- New and old surgical techniques for pelvic floor reconstruction
- Site specific defect repair
- Cure of pelvic floor dysfunction by pelvic floor surgery: updated evidence
- Neuromodulation in pelvic floor dysfunctions
- Drugs including Botox to treat vesical and anorectal dysfunctions
- Current results of clinical studies using alloplastic materials at the pelvic floor
- Slings and artificial sphincter in male and female
- Anorectal function and dysfunctions, role of surgical techniques
- Aesthetic Gynecology
- Vaginal reconstruction

Organisation and registration

Dr. med. Bernhard Liedl - President of ISPP (International Society of Pelviperineology)

Chefarzt Zentrum für Urogenitalchirurgie Beckenbodenzentrum München
Denninger Strasse 44, D-81679 München - E-mail: liedl@bbzmuenchen.de

Office: **Ms Laura Mir-Heidari**

E-mail: MirHeidari@chkmb.de - Phone: +49-89-92794-1522 - Fax: +49-89-92794-1523

Program committee ISPP

Richard Reid (Gynecology):

richard_reid@dbgyn.com

Peter Petros (Gynecology):

pp@kvinno.com

Bruce Farnsworth (Gynecology):

drbruce505@gmail.com

Bernhard Liedl (Urology):

liedl@bbzmuenchen.de

Vincent Tse (Urology):

vwmtse@gmail.com

Darren Gold (Coloproctology):

dandjgold@gmail.com

Giuseppe Dodi (Coloproctology):

giuseppe.dodi@unipd.it

Submission

Please send interesting contributions (with abstract) to the committee via
MirHeidari@chkmb.de (Office Dr. med. Bernhard Liedl)



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