

PELVIPERINEOLOGY

A multidisciplinary pelvic floor journal

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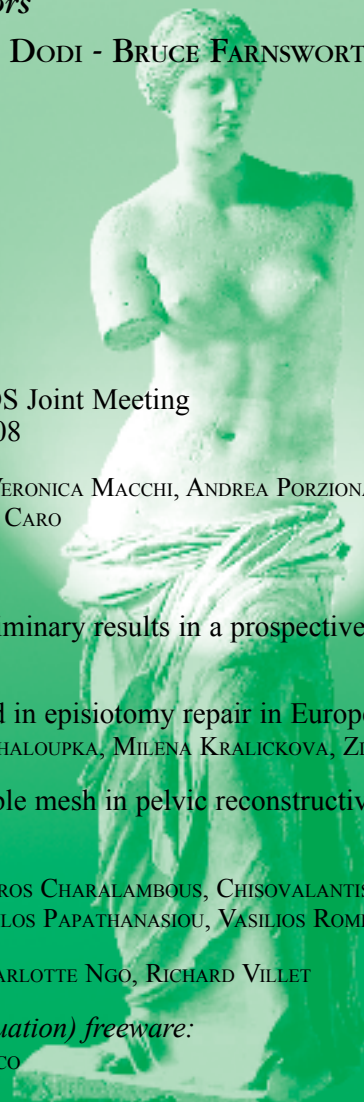
*Official Journal of Australian Association of Vaginal and Incontinence Surgeons,
Integrated Pelvis Group, Società Interdisciplinare del Pavimento Pelvico
Perhimpunan Disfungsi Dasar Panggul Wanita Indonesia*

Editors

GHISLAIN DEVROEDE - GIUSEPPE DODI - BRUCE FARNSWORTH

CONTENTS

- 3 *Editorial*. Pelvic Floor Imaging
- 4 International Pelviperineology Congress AAVIS-IPFDS Joint Meeting
Padua, Venice, Italy - September 30th - October 4th 2008
- 7 Histotopographic study of the pubovaginalis muscle VERONICA MACCHI, ANDREA PORZIONATO, ENRICO VIGATO,
CARLA STECCO, ANTONIO PAOLI, ANNA PARENTI, RAFFAELE DE CARO
- 10 Pelvic Floor Digest
- 12 Posterior intravaginal slingplasty: Feasibility and preliminary results in a prospective observational study
of 108 cases PETER VON THEOBALD, EMMANUEL LABBÉ
- 17 Material and type of suturing of perineal muscles used in episiotomy repair in Europe
VLADIMIR KALIS, JIRI STEPAN JR., ZDENEK NOVOTNY, PAVEL CHALOUKKA, MILENA KRALICKOVA, ZDENEK ROKYTA
- 22 A preliminary report on the use of a partially absorbable mesh in pelvic reconstructive surgery
ACHIM NIESEL, OLIVER GRAMALLA, AXEL ROHNE
- 26 A simple technique for intravesical tape removal STAVROS CHARALAMBOUS, CHISOVALANTIS TOUNTZIARIS,
CHARALAMBOS KARAPANAGIOTIDIS, CHARALAMBOS THAMNOPOULOS PAPATHANASIOU, VASILIOS ROMBIS
- 28 Unusual vulvar cystic mass - suspected metastasis CHARLOTTE NGO, RICHARD VILLET
- 29 *Perineology... The T.A.P.E. (Three Axes Perineal Evaluation) freeware:
a good tool to introduce you to Perineology* JACQUES BECO



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Editorial Office: LUCA AMADIO, ENRICO BELLUCO, PIERLUIGI LUCIO, LUISA MARCATO, MAURIZIO SPELLA

c/o Clinica Chirurgica 2 University of Padova, 35128, Padova, Italy

e-mail: editor@pelviperineology.org

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PELVIC FLOOR IMAGING

Recent milestones in surgical techniques and the development of new operative materials and implants for use in coloproctology and urogynaecology, together with advances in molecular diagnostics and laboratory testing have revolutionized the management of patients with pelvic floor disorders. The assessment of urogynaecological and coloproctological operations, the surgical techniques themselves and the outcomes of these treatments are areas of great interest in the literature. Significant variations in the results of surgery have been reported and this may be because the initial choice of surgical procedure and the assessment of outcomes are based on a traditional clinical assessment. History and physical examination can be subjective and vary greatly between different specialties and even individual surgeons. Such assessments may be unreliable despite recent efforts to standardize clinical history and examination using the Pelvic Organ Prolapse quantification system (POPQ) and standardized questionnaires. New imaging technology offers an opportunity to improve our follow up of patients and so obtain a better estimation of the true incidence of unsuccessful operations and postoperative complications.

In recent years there has been dramatic improvement in imaging techniques of the pelvic floor. Modalities such as magnetic resonance imaging, high-resolution endoanal, endorectal and endovaginal three-dimensional ultrasonography and dynamic and 3/4D transperineal ultrasound provide superior depiction of the pelvic anatomy and also help in understanding pathologic and functional changes that occur in pelvic floor disorders. Despite these improvements pelvic floor abnormalities, which are very common in women and are a great social problem, are still not always diagnosed. The causes of urinary and fecal incontinence and pelvic organ prolapse are not fully understood and there are still many questions unanswered in pelvic physiology and pathophysiology. The use of diagnostic imaging in both preoperative assessment and post-operative monitoring of the effects of surgical treatment offers great potential. Better availability of diagnostic imaging encourages its wider clinical usage and many clinicians now believe that in modern surgical practice a proper pre-operative imaging assessment should be performed.

The increased interest in imaging by all the specialties associated with pelvic floor medicine has prompted us to create a Section on "Pelvic Floor Imaging" in future issues of Pelviperineology. All the topics concerning new developments in existing technologies along with the new technologies in pelvic floor imaging will be covered. We will start with the description of normal anatomy and physiology, describe the examinations performed as part of a preoperative assessment and outline techniques needed to monitor surgical outcomes and the effects of treatment. We are sure that this will be of great interest to many of our readers. We look forward to receiving your contributions and hope that anyone who is dealing with imaging of the pelvis will share their experiences and join with us in this project.

GIULIO ANIELLO SANTORO

Head, Pelvic Floor Unit, Section of Anal Physiology
and Ultrasound, Treviso, Italy
giulioasantoro@yahoo.com

PAWEL WIECZOREK

Department of Radiology,
University of Lublin, Lublin, Poland
wieczornyp@interia.pl

PELVIPERINEOLOGY**A multidisciplinary pelvic floor journal**

Pelviperineology is published quarterly. It is distributed to clinicians around the world by various pelvic floor societies. In many areas it is provided to the members of the society thanks to sponsorship by the advertisers in this journal.

SUBSCRIPTIONS: If you are unable to receive the journal through your local pelvic floor society or you wish to be guaranteed delivery of the journal Pelviperineology then subscription to this journal is available by becoming an International Member of AAVIS. The cost of membership is € 75,00 and this includes airmail delivery of Pelviperineology. If you wish to join AAVIS visit our website at www.aavis.org and download a membership application.

The aim of Pelviperineology is to promote an inter-disciplinary approach to the management of pelvic problems and to facilitate medical education in this area. Thanks to the support of our advertisers the journal Pelviperineology is available free of charge on the internet at www.pelviperineology.org The Pelvic Floor Digest is also an important part of this strategy. The PFD can be viewed in full at www.pelvicfloordigest.org while selected excerpts are printed each month in Pelviperineology.



AAVIS

Australian Association of Vaginal
Incontinence Surgeons



IPFDS

International Pelvic Floor Dysfunction
Society

10th AAVIS Annual Scientific Meeting
International Pelviperineology Congress
AAVIS-IPFDS Joint Meeting

Padua, Venice, Italy - September 30th - October 4th 2008

INVITATION

The Organising Committee and the Executives of the Australian Association of Vaginal and Incontinence Surgeons as well as the International Collaboration of the Pelvic Floor and the International Pelvic Floor Dysfunction Society invite you to attend an International Pelviperineology Congress to be held at Padua and Venice between September 30th and October 4th 2008. Pelviperineology is a word that signifies a new beginning for doctors working together to advance the cause of pelvic medicine. Many clinicians aspire to a multidisciplinary approach to the management of pelvic problems and the first step in widening the horizons of each of us is to communicate with our peers and colleagues from other specialties. That is the aim of this conference.

The organising committee has tried to ensure that all opinions are represented by the speakers invited to come to Padua and Venice. The program is ambitious and delegates will recognise many names that they have seen in the medical literature over the years. In addition to the main program there will be a number of industry symposia and specialised workshops, each catering to a special interest. Submitted videos will be shown on a continuous loop during the meeting and each video will be repeated so that delegates will have the opportunity to see a video at another time if it conflicts with another part of the program that they did not want to miss.

This meeting is designed to inform and entertain. The program explores all the controversies that are relevant to the current practice of pelvic medicine and in most cases the principal players in these areas are here to speak to the issues in progress.

We hope you enjoy the various activities and meetings in Padua and Venice and get the opportunity to experience the sights and sounds of Venice while you are attending the meeting. As well as the social events that make up the official program our conference organisers Defoe have also arranged a series of excursions and activities to fill in the times when you want to explore Venice and the surrounding area.

I look forward to meeting you in Italy.

Bruce Farnsworth

Conference Organising Committee



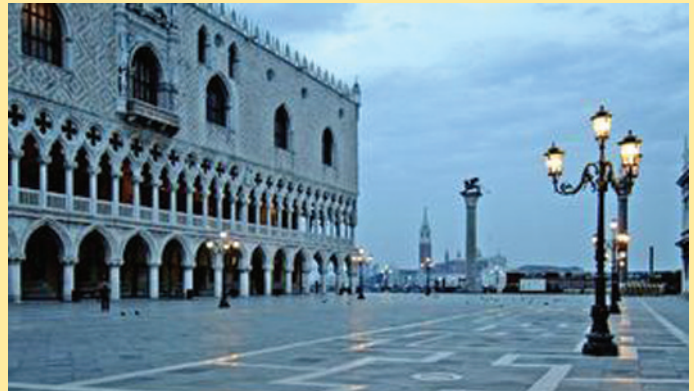
ORGANIZING SECRETARIAT



Defoe Congressi
Via Verdi, 37
29100 Piacenza (Italia)

Phone: +39-0523-338391 - Fax: +39-0523-304695

E-mail: info@defoe.it - Website: www.defoe.it



PRECONFERENCE WORKSHOPS

Padua, University Hospital

30th September - 2nd October 2008 Padua

TUESDAY SEPTEMBER 30

- 9.00 **Anatomy Workshop - Posterior Compartment**
Anatomy Department University of Padua
Raffaele De Caro, Veronica Macchi,
Andrea Porzionato, Carla Stecco
- 11.00-13.00 - **Ethics Workshop** - Bernie Brenner
- 9.00 -17.00 **Concurrent Session - Live Surgery**
Live surgery will be organised for the full day at the University of Padua. Full details will be available prior to the conference.
Chairmen: Walter Artibani, Giuseppe Dodi, Pietro Salvatore Litta.
- 1300-1400 - **Lunch**
- 14.00-15.30 - **Integral Theory / TFS Workshop**
Peter Petros, Klaus Goeschen, Ian Hocking, Andrei Muller
Funogea, Tomasz Rechberger, Burghard Abendstein
- 14.00- 5.30 - **Symposium**
- 15.30-16.00 - **Afternoon Tea**
- 16.00-18.00 - **Podium Presentations**

WEDNESDAY OCTOBER 1

- 9.00-12.00 - **Symposium - Joint Meeting Italian Colorectal Society Current Approach to Faecal Incontinence**
Anorectal function - the relevant anatomy - Peter Petros
Pathophysiology of faecal incontinence - Michael Swash
Diagnosis of anorectal dysfunction - Giulio Santoro
Sacroneuromodulation in faecal incontinence - Ezio Ganio
Management of faecal incontinence - Donato Altomare
New innovations in management of faecal incontinence Max Haverfield
Durasphere in faecal incontinence - Brian Draganic
The AMI anal band - Ulrich Baumgardener
The AMS artificial sphincter - Gianandrea Binda
Posterior compartment treatment with anal incontinence Thomas Skricka
- 900-1200 - **Male Pelvic Dysfunctin Symposium**
Overview of male incontinence - Jesus Romero
Assessment of male urinary incontinence - Vincent Tse
Development of the ADVANCE sling - Peter Rehder
The Advance-male sling: first results in different degrees stress Leopold Durner
The Advance-male sling: results of a multi-centre study Christian Gozzi
ProACT device update - Ervin Kocjancic
Flow Secure device for male incontinence Fernando Garcia Montes
A new device for male incontinence - Wilhelm Bauer
The Remeex device in male incontinence - Salvatore Siracusano

12.00-14.00 - **Lunch**

1400 - 1530 - **Focal Defect Vaginal Repair Workshop**
Richard Reid, Carl Zimmerman, Lew Lander

- 14.00-15.30 - **Concurrent Session - Joint Meeting with SIUD & AIUG Current Approach to Management of Urinary Incontinence**
Adult consequences of paediatric urological problems Mario De Gennaro
The scientific basis of the overactive bladder - Marcus Drake
RCT repair ± TVT for severe prolapse and occult stress incontinence - Anna Rosamilia
Incontinence and urinary tract infections - Florian Wagenlehner
Is there any place for colposuspension? - Eckhard Petri
The role of urodynamics before and after treatment of prolapse - Francesco Pesce
How to choose the right sling - Diego Riva
The changing role of urodynamics in urinary incontinence Daniele Grassi

1530-1600 - **Afternoon Tea**

- 1600-1800 - **Complications of Pelvic Surgery with Prosthesis**
Voiding dysfunction after pelvic floor surgical repair Mauro Cervigni
Voiding evaluation after vaginal surgery - Oscar Contreras Ortiz
Surgical footprint - the role of the vaginal surgeon Andri Nieuwoudt
Neurological risks of pelvic floor vaginal surgery Jean Pierre Spinosa
Complications of biological meshes - Richard Reid
Incontinence after mesh - Carlos Medina
Alloplastic slings, are they really the solution? - Eckhart Petri
Sexual dysfunction after mesh surgery - Brigitte Fatton
Alternatives to Mesh in Prolapse Surgery - Rodolfo Milani

18.30 **Dinner Meeting**

Mesh User Forum and Expert Round Table

Spend the evening with our expert panel which will include some of the pioneers of surgery with prostheses: Giulio Nicita, Michel Cosson, Rodolfo Milani, Mauro Cervigni, Michele Meschia, Richard Reid, Peter Petros, Menachem Neuman, Andri Nieuwoudt, Oscar Contreras Ortiz, Eckhard Petri, Alain Pigne, and others as we discuss the controversies of pelvic surgery with prostheses.

AAVIS-IPFDS Video Festival

... the Other Venice Film Festival

Do you have a video you would like to present at the AAVIS-IPFDS Joint Meeting at Venice in October? Videos will be shown on a continuous loop over 2 days during the meeting so you can make sure you catch a video at some time during the meeting.

This section of the meeting will be directed by Andri Nieuwoudt from the Netherlands.

All videos need to be sent to Andri Nieuwoudt prior to the meeting. Videos will only be accepted from doctors who have registered to attend the meeting.

Contact: A. Nieuwoudt for further information:

E-mail: nieuwoudt@gmail.com



MAIN CONGRESS

Westin Excelsior, Venice Lido

2nd - 4th October 2008, Venice Lido

THURSDAY OCTOBER 2

MORNING PROGRAM

8.00 **Registration Desk Opens Westin Excelsior Hotel**

10.00 **IPFDS Symposium - Pelvic Pain Syndrome**

The painful bladder - Mauro Cervigni

Vulvodynia - Adolf Lukanovic

Proctalgia - Thomas Skricka

Practical clinical approach to pelvic pain - Francesco Pesce

Controversies in the treatment of IC - Anna Rosamilia

Trigger points and biofeedback in managing pelvic pain

Marek Jantos

Pelvic pain after mesh implantation - Brigitte Fatton

13.00 - 14.00 - **Lunch**

14.00 - 15.30 - **IPFDS Symposium - Holistic Concepts of Pelvic Floor Dysfunction - From Delivery to Dysfunction**

Pelvic floor rehabilitation - Alain Pigne

Pelvic floor and functional bowel disorders - Enrico Corazziari

Anal incontinence - Filippo La Torre

Complex pelvic problems - a multidisciplinary perspective

Marco Soligo

WHO initiatives in central Asia - are we learning from the past

Richard Porter

16.00-18.00 - **Podium Presentations - Surgical Technique**

Paravaginal repair with Gynemesh - 5 year results

Vedprakash Singh

Prolift update - Michel Cosson

Colpo-uterine suspension with tension free sling at low elasticity: technique and result at four years of follow up

Alessandro D' Afiero

UST(Urethral Surrounding Tape), new technique for stress incontinence - Johan Lahodny

Techniques for avoiding incontinence after prolapse surgery

Roberto Baccichet

TFS - three year results - Peter Petos

TVT or Monarc for ISD - Anna Rosamilia

Austrian randomized control trial of TVT vs TVT-O

Ayman Tammaa

Brazilian experience with the IVS - Marcia Salvador de Geo

Evolution of the Perigee - Alain Pigne

9.00-18.00 - **Showtime - All Day Continuous Videofest**

Convenor: Dr Andrei Nieuwoudt

18.30 **Welcome Cocktail Party - Westin Hotel Venice Lido**

FRIDAY OCTOBER 3

7.00 **Breakfast Symposium**

SESSION 1

8.30-10.00 **Incontinence Update**

Pathophysiology: current knowledge - Giuliano Zanni

Biological slings - the latest data - Biagio Adile

TVT secure - what's the story? - Menahem Neuman

ISD update - Ervin Kocjancic

Options after sling failure - Carlos Medina

Drug treatment for stress urinary incontinence - Lucas Schreiner

Coital incontinence - Stefano Salvatore

Slings for Incontinence - what does the data say

Michele Meschia

10.00-10.30 **Morning Tea and Trade Display**

SESSION 2

10.30-1200 **Prolapse Update**

Pathological studies with alloplastic materials - Bernd Klosterhalfen

Elitrocele and vaginal vault prolapse - Stavros Athanasiou

New developments with Avaulta - Mauro Cervigni

Partially absorbable mesh - a new beginning - Dirk Waterman

The octopus principle in prolapse surgery: results

Emmanuel Delorme

Vaginal/paravaginal repair - is it worth the effort? - Richard Reid

MRI identification of focal vaginal support defects - Vittorio Piloni

Uterine preservation after Apogee and Perigee - Roberto Baccichet

12.00-14.00 - **Lunch**

SESSION 3

1400 **AAVIS Keynote Speaker** - Jacques Beco

How can we win the war against pudendal neuropathy?

14.30-15.00 - **Afternoon Tea and Trade Displays**

SESSION 4

15.00-16.00 - **Interdisciplinary Training Sessions**

Understanding The POPQ System - Jeff Tarr

Urodynamics Update - Francesco Pesce

Please doctor, don't forget my pudendal nerves - Jacques Beco

16.00-17.00

Cystoscopy for gynaecologists - Vincent Tse

Understanding the integral theory - Bernhard Liedl

Practical colorectal assessment - Darren Gold

9.00-17.00 - **Showtime - All Day Continuous Videofest**

17.00-18.00 - **Industry Symposium**

19.00 **Conference Gala Dinner - Westin Hotel, Venice Lido**

SATURDAY OCTOBER 4

7.00-8.00 - **Breakfast Symposium - Fistulas and Flaps**

Complicated urinary fistulas - Bernhard Liedl

Anorectal fistulas and biological prostheses - Roland Scherer

Martius graft flaps in tethered vagina syndrome - Klaus Goeschen

Imaging in fistulas - Giulio Santoro

Anorectal fistulas Overview - Gian Andrea Binda

Anal fistula - anatomy and pathology correlation - Darren Gold

SESSION 5

8.30-10.00 - **Controversies in Obstructive Defaecation**

Anorectal anatomy - Antonio Longo

Current application of perineal sonography in obstructed defecation - Vittorio Piloni

The future of the STARR Procedure - Angelo Stuto

Complications of the STARR procedure - Paul Antoine Lehur

Functional consequences of STARR - Gabriele Bazzocchi

UK Experience - Karen Nugent

STARR Procedure for external rectal prolapse - Roland Scherer

A gynaecologist's view of obstructive defaecation

Burghard Abendstein

10.00-10.30 - **Morning Tea and Trade Display**

SESSION 6

10.30-11.00 - **IPFDS Keynote Seaker** - Eckhard Petri

Experience with more than 400 surgical repairs after alloplastic slings and meshes

SESSION 7

1100-1300 - **Future Innovations in Pelvic Surgery**

Adjustable slings for incontinence - Jesus Romero

The future of prostheses in prolapse surgery - Michel Cosson

Rectal mucosal descent - the tip of the iceberg - Darren Gold

Cadaveric fascia - is it the answer? - Michele Parodi

Transobturator sling for faecal incontinence - Peter Rosenblatt

Informed consent and new technologies - Bernie Brenner

13.00-13.30 - **AAVIS Joint Meetig with IPFDS - ICOPF**

14.00-16.00 - **Family Lunch and Venice Sightseeing Cruise**

Histotopographic study of the pubovaginalis muscle

VERONICA MACCHI (*) - ANDREA PORZIONATO (*) - ENRICO VIGATO (*) - CARLA STECCO (*)
ANTONIO PAOLI (*) - ANNA PARENTI (**) - GIUSEPPE DODI (***) - RAFFAELE DE CARO (*)

(*) Section of Anatomy, Department of Human Anatomy and Physiology, University of Padova, Italy

(**) Section of Pathologic Anatomy, Department of Oncological and Surgical Sciences, University of Padova, Italy

(***) Section of Surgery, Department of Oncological and Surgical Sciences, University of Padova, Italy

Abstract: The pubovaginalis muscle (PVM) is one of the described components of the pubococcygeus muscle. The aim of the study was to investigate its topography and histological characteristics. After in situ formalin fixation, the pelvic viscera were removed from 16 female cadavers (range of age: 54-72 years). Serial macrosections of the pelvic viscera and pelvic floor complex, cut in horizontal (8 cases) and coronal (8 cases) planes, underwent histological and immunohistochemical study. PVM was identified in 13/16 (81%) specimens. In both coronal and transverse sections it appears as a layer of muscular tissue at the passage of the inferior and middle thirds of the vagina, along the lateral vaginal walls. In coronal sections, it appeared as a fan-shaped layer of muscular tissue, arising from the pubococcygeus muscle, running with an oblique course towards the lateral vaginal walls. The mean (\pm SD) thickness of the PVM was 1.8 (\pm 1.25) mm. In the transverse sections, a bundle of muscle fibres with oblique course splits from the medial margin of the pubococcygeus muscle towards the lateral walls of the vagina, mingling with the outer longitudinal fibers of the muscular layer of the vagina. Immunohistochemical stainings showed that it consisted predominantly of striated muscle fibers. The PVM could represent anatomical evidence of a functional connection between the vagina and the muscular system of the pelvic floor.

Key words: Female pelvis; Dissection; Levator ani muscle.

INTRODUCTION

The levator ani muscle is considered the most important supportive system of the pelvic floor and has been divided into many portions, according to their attachments or physiological functions. Standing et al.¹ subdivide the levator ani muscle into the ischiococcygeus, iliococcygeus and pubococcygeus portions. The pubococcygeus muscle is often subdivided into separate parts according to the pelvic viscera to which they relate, i.e. pubourethralis and puborectalis in the male, pubovaginalis (PVM) and puborectalis in the female. At the level of the vagina and the rectum, the muscle bundles of the pubococcygeus muscle are continuous with those controlateral, forming a sling (pubovaginalis and puborectalis). From the functional point of view, Hanzal et al.² and Ashton-Miller and De Lancey³ describe three regions of the levator ani muscle: the iliococcygeal portion (that is flat and relatively horizontal and spans the potential gap from one pelvic sidewalls to the other), the pubovisceral muscle (the portion of the levator ani that arises from the pubic bone on either side attaching to the walls of the pelvic organs and the perineal body), and the puborectal muscle. The pubovisceral muscle consists of three subdivisions: the puboperineus, the PVM and the puboanalis. Shafik⁴⁻⁵ suggests that the levator ani muscle consists essentially of the pubococcygeus, the iliococcygeus being rudimentary in humans; the puborectalis muscle does not belong to the levator ani muscle, having different origin, innervation and function (the former being a constrictor, the latter a dilator of the intrahiatal organs).

Kearney et al.⁶ found sixteen terms used for the different portions of the levator ani muscle, differences that may be in consequence of the preponderance of studies conducted on male subjects. The difference of opinions concerning the anatomy of the levator ani⁷ reflects also on the description and terminology of the PVM. Lawson⁸ called the muscular fibers that join the vaginal wall to the pubic bone as the 'pubovaginalis/pubourethralis', whereas the same structure has been called as the 'pubococcygeus' by Curtis et al.⁹ and Roberts et al.,¹⁰ 'puborectalis' by Courtney,¹¹ 'pelvic fibers of anterior layer' by Ayoub¹² and 'superficial perineal layer of anterior fibers' by Bustami.¹³ Furthermore, Smith¹⁴ states that these muscular fibers arising from the pubis just run adjacent but do not insert into the wall of the vagina. The

"Terminologia Anatomica"¹⁵ mentions the PVM, referring to those bundles of the pubococcygeus which surround the vagina, intermingling with the controlateral ones.

The microscopic anatomy of the PVM is poorly described. DeLancey and Starr¹⁶ studied the histology of the connection of the vagina with the medial portion of the levator ani muscles, in the region of the proximal urethra. Thus, the term 'pubovaginalis' has also been used for the 'pubourethralis' muscle, defined as the portion of the levator ani muscle that is attached to the urethral supports. A damage of this part of the levator ani muscle might affect urethral support.⁶

The aim of the present study was to investigate the histological structure, the characteristics and topography of the PVM in order to evaluate its role in static and dynamic of the pelvic floor.

MATERIALS AND METHODS

Sampling of pelvic viscera

Specimens were obtained from 16 female cadavers (age range: 54-72 years), with anamnesis negative for pelvic pathology. All the subjects were postmenopausal. The pelvic viscera and pelvic floor were sampled according to a protocol previously described.¹⁷⁻¹⁹

Histology

Twelve specimens were fixed in 10% formalin for 15 days and then 5-mm thick slices were cut in the transverse (8 cases) plane. Four thick transverse slices of the vagina were sampled. Two slices, one cranial and one caudal, were collected at the level of the middle third of the vagina, and two slices, one cranial and one caudal, were sampled at the level of the inferior third of the vagina (levels II and III respectively, according to DeLancey.²⁰ Moreover 8 cases were cut on coronal plane. The slices were embedded in paraffin and then cut into 10- μ m thick sections, which were stained with hematoxylin and eosin (H.E.), azan-Mallory and Weigert's Van Gieson stain for elastic fibres. In the histological sections, the course and characteristics of the PVM were analysed. Topographical relationships with the vagina, rectum, and aponeurotic structures of the perineum were also evaluated. Morphometric evaluation was carried out with the help of image analysis software (Qwin Leica Imaging System,

Cambridge, UK). Immunohistochemistry used monoclonal anti-human alpha-smooth muscle actin (mouse IgG2a, kappa, Dako-Smooth muscle actin 1A4, Code No. M151, 1:50 solution in phosphate-buffered saline) and monoclonal anti-rabbit sarcomeric actin (mouse IgM, kappa, Dako-Sarcomeric actin, Alpha-Sr-1, Code No. M874, 1:50 solution in PBS) (Dako A/S, Glostrup, Denmark).²¹⁻²³ The distribution of smooth and/or striated muscle fibers within the PVM was evaluated in the immunostained sections.

RESULTS

In coronal sections, stained with H.E. and a-M., the PVM was identifiable in 7/8 specimens (87.5%). It appeared as a fan-shaped layer of muscular tissue, located at the passage between the inferior (cranial level III) and middle third (caudal level II) of the vagina. Muscles fibres arise from the pubococcygeus muscle, run with an oblique course towards the lateral vaginal walls, where they mingle with the outer longitudinal fibers of the muscular layer of the vagina. From their origin the muscle fibres are progressively separated by loose connective tissue, forming a fan, with the apex corresponding to their origin from the pubococcygeus muscle and the base corresponding to the lateral walls of the vagina. At the level of the junction of the muscles fibres of the PVM and muscular layer of the vagina the mean thickness of the PVM is 1.8 ± 1.25 mm.

In the transverse sections, the PVM was identifiable in 6/8 specimens (75%). When the pubococcygeus muscle runs lateral to the vagina, a bundle of muscle fibres with oblique course splits from the medial margin of the pubococcygeus muscle towards the lateral walls of the vagina, mingling with the outer longitudinal fibers of the muscular layer of the vagina (Fig. 1). The mean thickness of the bundle of muscular fibres is 872 ± 56 micron. Other muscle fibers run towards the posterior vaginal wall, mingling with the longitudinal fibres of the vagina at the level of the lateral thirds of posterior vaginal wall. In 3/8 cases (37.5%) some muscle fibers were recognizable along the midline, between the posterior vaginal wall and the rectovaginal septum.

Immunohistochemical staining showed that the PVM consisted predominantly of striated muscle fibers. At the level of the midline, between the posterior vaginal wall and the rectovaginal septum, sparsely smooth muscle fibers were

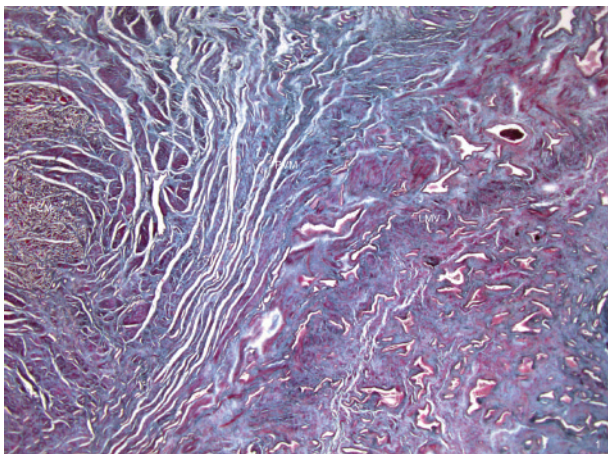


Fig. 1. – Magnification of a transverse section of a female pelvic block showing the pubococcygeus muscle (PCM) and the lateral wall of the vagina. A bundle of muscle fibres of the pubovaginal muscle (PVM) run towards the outer longitudinal fibers of the muscular layer of the vagina (LMV). Note the longitudinal and transverse course of the muscular fibres of the PCM (azan Mallory staining, original magnification X 1.25).

recognisable. At the boundary between the PVM and the vagina, obliquely running muscle fibres were recognizable, connecting the PVM with the outer longitudinal muscular layer of the vagina.

DISCUSSION

The levator ani muscle plays a critical role in supporting the pelvic organs.²⁴⁻²⁶ Standring et al.¹ subdivide the levator ani muscle into the ischiococcygeus, iliococcygeus and pubococcygeus portions. The pubococcygeus muscle is often subdivided into separate parts according to the pelvic viscera to which they relate, i.e. pubourethralis and puborectalis in the male, pubovaginalis and puborectalis in the female. At the level of the vagina, the muscle bundles of the pubococcygeus muscle, are continuous with those contralateral, forming a sling (pubovaginalis and puborectalis).^{1, 15} Testut and Jacob²⁷ reported that at this level a dense and compact connective tissue is interposed between the vagina and the levator ani muscle, that links each other. Cruveilhier²⁸ described that small fibres of the levator ani muscle penetrate into the vaginal wall. More recently, Guo and Dawei²⁹ in their radiological study of the pelvic floor, describe the PVM, located 3 mm below the puborectalis plane, indicating it in the axial section of MR imaging – PDW turbo SE sequences – in the component of the pubococcygeus muscle in proximity of the vagina. Our findings show that in the transverse sections the PVM is a dependence of the pubococcygeus muscle, from which splits at the level of the vagina. The muscle fibers show an oblique course and connect to the longitudinal fibres of the outer muscular layer of the vagina by oblique decussating fascicule at the level of the lateral vaginal walls and the lateral thirds of the posterior vaginal wall. So rather than a sling, the PVM is closely connected to the vagina, closing it on the lateral and posterior aspects.

As regards muscle characteristics, the PVM origins from the striated muscular fibres of the levator ani muscle. DeLancey and Starr¹⁶ describe the presence of smooth muscle, collagen and elastic fibers of the vaginal wall and paraurethral tissues that directly interdigitate with the muscle fibers of the most medial portion of the levator ani. Our study shows that the PVM consists predominantly of striated muscle fibers, mainly located at the level the lateral vaginal walls and the lateral thirds of the posterior vaginal wall; these muscle fibers origin directly from the striated levator ani muscle. On the other hand, sparse smooth muscle fibers have been recognizable, located at the level of the midline, between the posterior vaginal wall and the rectovaginal septum. These fibres could ascribed to the component of smooth muscle fibers recognizable at the level of the rectovaginal septum, that is located in an oblique coronal plane, close to the posterior vaginal wall, and is formed of a network of collagen, elastic fibres, smooth muscle cells with nerve fibres, emerging from the autonomic inferior hypogastric plexus, and variable numbers of small vessels.³⁰⁻³¹ We must also be considered that the age group in all the studied cadavers were 54-72 years old. Thus, the histological structure, the characteristics and topography of the PVM in younger women, especially nulliparous, may be different.

From the functional point of view the PVM plays a role in the static and dynamic of the pelvic floor. In rectocele, failure of support of the rectum and perineum by the puborectalis and pubovaginalis muscles contributes to the prolapse by allowing descent of the posterior perineum during straining.¹ With particular reference to the role on the vagina, the contraction of PVM approaches the posterior vaginal wall to the anterior one²⁷ and elevates the vagina in the region of the mid-urethra.¹⁵ Shafik^{4, 32} attributed to the contraction of

the levator ani the modification of the shape of the vagina, transformed from a cone into a flat shape. It becomes elevated and laterally retracted, and pulling on the hiatal ligament which is attached to the vagina at the lateral fornices. These are pulled up and opened, resulting in elongation, narrowing and partial straightening of the vaginal tube, as well as elongation of the uterus.³³ Our study shows that the fibres of the PVM are recognisable on the passage between the inferior and middle thirds of the vagina, mingling with the longitudinal fibres of the muscular layer of the vagina. It could be hypothesized that the fibres of the PVM represent an intermediate course of bridging muscle bundles going reciprocally from the striated pubococcygeous muscle to the smooth fibres of the longitudinal layer of the vagina and viceversa. Thus, the PVM could represent anatomical evidence of a functional connection between the vagina and the muscular system of the pelvic floor.

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Correspondence to:

Prof. RAFFAELE DE CARO, MD
Department of Human Anatomy and Physiology,
Section of Anatomy
Via A. Gabelli, 65 - 35121 Padova, Italy
Tel +39 049 8272327 - Fax +39 049 8272328
E-mail: rdecaro@unipd.it

This section presents a small sample of the *Pelvic Floor Digest*, an online publication (www.pelvicfloordigest.org) that reproduces titles and abstracts from over 200 journals. The goal is to increase interest in all the compartments of the pelvic floor and to develop an interdisciplinary culture in the reader.

1 – THE PELVIC FLOOR

Patients' pelvic goals change after initial urogynecologic consultation. Lowenstein L, Kenton K, Pierce K, Fitzgerald MP, Mueller ER, Brubaker L. *Am J Obstet Gynecol.* 2007;197:640. The objective of the study was to determine the effect of initial urogynecologic consultation on the number and type of patient goals. The number of patients' postconsultation goals was higher than the number of preconsultation goals. Women were less likely to report "symptom" and "information-seeking" goals, but more likely to report treatment goals after consultation. It is important to reassess goals following initial consultation.

Levator avulsion and grading of pelvic floor muscle strength. Dietz HP, Shek C. *Int Urogynecol J Pelvic Floor Dysfunct.* 2007 Nov 13; epub. In a retrospective study with 3D/4D translabial ultrasound and digital assessment on 1,112 women, levator avulsion was diagnosed whenever the examiner was unable to palpate the insertion of the pubovisceral muscle on the inferior pubic ramus and/or whenever a discontinuity between bone and muscle was detected on ultrasound. Avulsion defects were found in 23%, associated with a highly significant reduction in the overall Oxford grading. Avulsion of the puborectalis muscle seems to have a marked effect on pelvic floor muscle strength, which may help in diagnosing trauma.

Effect of biofeedback training on paradoxical pelvic floor movement in children with dysfunctional voiding. de Jong TP, Klijn AJ, Vijverberg MA et al. *Urology.* 2007;70:790. Pelvic floor dysfunction occurs frequently in children with dysfunctional voiding and can be cured by dedicated physical therapy. The clinical importance of this phenomenon is not yet clear.

2 – FUNCTIONAL ANATOMY

The contribution of the levator ani nerve and the pudendal nerve to the innervation of the levator ani muscles; a study in human fetuses. Wallner C, van Wissen J, Maas Cpet al. *Eur Urol.* 2007 Nov 20; epub. The levator ani muscle (LAM) often has a dual somatic innervation with the levator ani nerve as its constant and main neuronal supply. Fetal pelvises were studied individually and 3D reconstructions were prepared. The levator ani nerve innervated the LAM in every pelvis, whereas a contribution of the pudendal nerve to the innervation of the LAM could be demonstrated in only 10 pelvic halves (56%). No sex differences were observed.

Anatomic relationships of the tension-free vaginal mesh trocars. Chen CC, Gustilo-Ashby AM, Jelovsek JE, Paraiso MF. *Am J Obstet Gynecol.* 2007;197:666. The bladder (mean distance 0.7 cm, range, 0.4-1.1) and medial branch of the obturator vessel (0.8 cm, range 0.6-1.0) may be at risk of injury during the passage of the anterior trocars, whereas the rectum (0.8 cm range 0.6-1.0) and inferior rectal vessels were at 0.9 cm (range 0.7-1.1), may be at risk during the passage of the posterior trocar (study in 8 frozen cadavers).

Anatomic variations of the pelvic floor nerves adjacent to the sacrospinous ligament: a female cadaver study. Lazarou G, Grigorescu BA, Olson TR et al. *Int Urogynecol J Pelvic Floor Dysfunct.* 2007 Nov 24; epub. The pudendal nerve (PN) was found to pass medial to the ischial spine (IS) and posterior to the sacrospinous ligament (SSL) at a mean distance of 0.6 cm in 80% of 15 female cadavers. In 40% of cadavers, an inferior rectal nerve (IRN) variant pierced the SSL at a distance of 1.9 cm medial to the IS. The levator ani nerve (LAN), coursed over the superior surface of the SSL-coccygeus muscle complex at a mean distance of 2.5 cm medial to the IS. Anatomic variations were found which challenge the classic description. A nerve-free zone is situated in the medial third of the SSL.

3 – DIAGNOSTICS

Analysis of a computer based simulator as an educational tool for cystoscopy: subjective and objective results. Gettman MT, Le CQ, Rangel LJ, Slezak JM. *J Urol.* 2007 Nov 12; epub. Resident education in cystoscopy has traditionally relied on clinical instruction. However, simulators are now available outside the clinical setting. We evaluated a simulator (UroMentor, Symbionix, Lod, Israel) for flexible and rigid cystoscopy with 30 novice and 27 expert cystoscopists on a computer based cystoscopic simulator. Objectively, expert and novice performance of cystoscopic tasks can be distinguished. Subjective assessments suggest ongoing refinement of the simulator as a learning tool for cystoscopic skills training.

4 – PROLAPSES

Transperineal rectocele repair with polyglycolic acid mesh: a case series. Leventoglu S, Menten BB, Akin M, et al. *Dis Colon Rectum.* 2007 Nov 30; epub. In 83 females with predominant, symptomatic rectocele a transperineal rectocele repair was done using polyglycolic acid (Soft PGA Felt(R)) mesh. Preoperatively, 39 patients had Stage II and 44 patients had Stage III rectocele with a mean total symptom score 9.87 ± 1.93 , reduced to 1.62 ± 0.59 at six-month follow-up postoperatively and anatomic cure in 89.2 percent. Hemorrhage (3.6 percent) and wound infection (4.8 percent) were the surgical complications observed.

Uterosacral ligament suspension sutures: anatomic relationships in unembalmed female cadavers. Wieslander CK, Roshanravan SM, Wai CY, et al. *Am J Obstet Gynecol.* 2007;197:672. The of uterosacral ligament suspension (USLS) sutures can directly injure the ureters, rectum, and neurovascular structures in the pelvic walls. Their anatomic relationships were examined in 15 unembalmed female cadavers. The mean distance of the proximal sutures to the ureters and rectal lumen was 14 (0-33) and 10 mm (0-33), of the distal ones to the ureters 14 (4-33) and to the rectal lumen 13 mm (3-23). Right sutures were at the level of S1 in 37.5%, S2 in 37.5%, and S3 in 25% of specimens, left sutures at S1 in 50%, S2 in 29.2%, and S3 in 20.8%. Of 48 sutures passed, 1 entrapped the S3 nerve, and in 4.1% of specimens the pelvic sidewall vessels were perforated.

Does supracervical hysterectomy provide more support to the vaginal apex than total abdominal hysterectomy? Rahn DD, Marker AC, Corton MM et al. *Am J Obstet Gynecol.* 2007;197:650. In unembalmed cadavers, it appears that total abdominal hysterectomy and supracervical hysterectomy provide equal resistance to forces applied to the vaginal apex.

Bladder symptoms 1 year after abdominal sacrocolpopexy with and without Burch colposuspension in women without preoperative stress incontinence symptoms. Burgio KL, Nygaard IE, Richter HE, Brubaker L et al. *Am J Obstet Gynecol.* 2007;197:647. One year after abdominal sacrocolpopexy (ASC), irritative, obstructive, and stress urinary incontinence (SUI) symptoms were assessed in 305 women using Urogenital Distress Inventory subscales. A composite "stress endpoint" combined SUI symptoms, positive stress test, and retreatment. ASC reduced bothersome irritative and obstructive symptoms and prophylactic Burch reduced stress and urge incontinence.

Bowel symptoms in women 1 year after sacrocolpopexy. Bradley CS, Nygaard IE, Brown MB et al. *Am J Obstet Gynecol.* 2007;197:642. Most bowel symptoms improve in women with moderate to severe pelvic organ prolapse after sacrocolpopexy. In a randomized trial of sacrocolpopexy with or without Burch colposuspension in stress continent women with stages II-IV prolapse, in addition subjects underwent

posterior vaginal or perineal procedures (PR) at each surgeon's discretion. The preoperative and 1 year postoperative Colorectal-anal Distress Inventory (CRADI) scores were compared within and between groups using Wilcoxon signed-rank and rank-sum tests, respectively. The sacrocolpopexy + PR group (n = 87) had more baseline obstructive colorectal symptoms than the sacrocolpopexy alone group (n = 211). CRADI total, obstructive, and pain/irritation scores significantly improved in both groups.

Stapled haemorrhoidopexy versus Ferguson haemorrhoidectomy: a prospective study with 2-year postoperative follow-up. *Sabancı U, Ogun I, Candemir G. J Int Med Res. 2007;35:917.* Patients with grade III or IV haemorrhoids underwent stapled haemorrhoidopexy (50) or Ferguson haemorrhoidectomy (50) between 2000 and 2003. Six patients (12.0%) receiving stapled haemorrhoidopexy experienced complications (bleeding, haematoma, anal fissure) and recurrence in 2.0%. Of those undergoing Ferguson haemorrhoidectomy urinary retention was seen in three patients (6.0%) We conclude that Ferguson haemorrhoidectomy was safer than stapled haemorrhoidopexy for bleeding complications, but stapled haemorrhoidopexy was superior to the Ferguson technique in terms of postoperative pain, duration of hospital stay and time to return to normal activities.

Proctalgia in a patient with staples retained in the puborectalis muscle after STARR operation. *De Nardi P, Bottini C, Faticanti Scucchi L et al. Tech Coloproctol. 2007 Nov 30; epub.* Stapled transanal rectal resection is a surgical technique for the treatment of intussusception and rectocele causing obstructed defecation. The case of a patient complaining of persistent pain, tenesmus and fecal urgency after STARR is described. The patient also had an external rectal prolapse requiring an Altemeier rectosigmoid resection; during the operation several staples were removed that had stuck to the puborectalis muscle with some degree of muscle inflammation at histology.

Total rectal lumen obliteration after stapled haemorrhoidopexy: a cautionary tale. *Brown S, Baraza W, Shorthouse A. Tech Coloproctol. 2007 Nov 30; epub.* The obliteration of the rectal lumen during stapled haemorrhoidopexy in a patient with marked mucosal prolapse was recognised immediately and continuity was restored by performing a limited Delorme's procedure.

Transanal haemorrhoidal dearterialisation: nonexcisional surgery for the treatment of haemorrhoidal disease. *Dal Monte PP, Tagariello C, Giordano P et al. Tech Coloproctol. 2007 Dec 3; epub.* Transanal haemorrhoidal dearterialisation (THD) is a nonexcisional surgical technique for the treatment of piles, consisting in the ligation of the distal branches of the superior rectal artery, resulting in a reduction of blood flow and decongestion of the haemorrhoidal plexus. From 2000 to 2006 THD was performed in 330 patients (180 men; mean age, 52.4 years), including 138 second, 162 third and 30 fourth-degree haemorrhoids. There were 23 postoperative complications (bleeding, thrombosis, rectal haematoma, anal fissure, dysuria, haematuria, needle rupture). The mean postoperative pain score was 1.32 on a VAS. 219 patients were followed for a mean of 46 months (range, 22-79). The operation completely resolved the symptoms in 92.5% of the patients with bleeding and in 92% with prolapse.

Modified Longo's stapled hemorrhoidopexy with additional traction sutures for the treatment of residual prolapsed piles. *Chen CW, Kang JC, Wu CC et al. Int J Colorectal Dis. 2007 Nov 20; epub.* Residual prolapsed piles is a problem after the stapled hemorrhoidopexy, especially in large third- or fourth-degree hemorrhoids. We have developed a method using additional traction sutures, and this contributed to reduce the residual internal hemorrhoids, but a randomized trial and long-term follow-up are needed to determine possible surgical and functional outcome.

5 – RETENTIONS

Sacral neuromodulation for urinary retention after pelvic plexus injury. *Garg T, Machi G, Guralnick ML, O'Connor RC. Urology. 2007;70:811.* Injury to the pelvic plexus with resultant urinary retention is a known complication of colectomy. A case of urinary retention after colectomy successfully treated with the insertion of a pelvic neuromodulator is described.

Mortality in men admitted to hospital with acute urinary retention: database analysis. *Armitage JN, Sibanda N, Cathcart PJ. BMJ. 2007;335:1199.* Mortality in men admitted to hospital with acute urinary retention is high and increases strongly with age and comorbidity. In 100 067 men with spontaneous acute urinary retention, the one year mortality was 4.1% in men aged 45-54 and 32.8% in those aged 85 and over. In 75 979 men with precipitated acute urinary retention, mortality was 9.5% and 45.4%, respectively. Patients might benefit from multidisciplinary care to identify and treat comorbid conditions.

A novel surgical approach to slow-transit constipation: report of two cases. *Pinedo G, Leon F, Molina ME, Dis Colon Rectum. 2007 Nov 21; epub.* A laparoscopic colonic bypass with an ileorectal anastomosis to the rectosigmoid junction, leaving the colon in situ, was offered and accepted by the two patients who had reject because of morbidity the surgical procedure of choice of total abdominal colectomy. After a 4 and 2 months of close follow-up they have one to four bowel movements per day with mild abdominal distension and pain.

Risk factors for chronic constipation and a possible role of analgesics. *Chang JY, Locke GR, Schleck CD et al. eurogastroenterol Motil. 2007;19:905.* Constipation has an estimated prevalence of 15% in the general population. A study to identify potentially novel risk factors for chronic constipation was done with a valid self-report questionnaire. People reporting symptoms of IBS were excluded. Among 523 subjects chronic constipation was reported by 18% of the respondents. No association was detected for age, gender, body mass index, marital status, smoking, alcohol, coffee, education level, food allergy, exposure to pets, stress, emotional support, or water supply, but with use of acetaminophen, aspirin and non-steroidal anti-inflammatory drugs. The explanation of these associations requires further investigation.

Constipation as cause of acute abdominal pain in children. *Loening-Baucke V, Swidsinski A. J Pediatr. 2007;151:666.* Objective: Nine percent of the 962 children that had a visit for acute abdominal pain, with significantly more girls (12%) than boys (5%), acute and chronic constipation were the most frequent causes of the pain, occurring in 48% of subjects. A surgical cause was present in 2% of subjects.

What is the best treatment for chronic constipation in the elderly? *Kalish VB, Loven B, Sehgal M. J Fam Pract. 2007;56:1050.* There is no one best evidence-based treatment for chronic constipation in the elderly. While the most common first-line treatments are dietary fiber and exercise, the evidence is insufficient to support this approach in the geriatric population: dietary fiber, herbal supplements, biofeedback, lubricants, polyethylene glycol. A newer agent, lubiprostone (Amitiza), appears to be effective.

Outcomes of surgical management of total colonic aganglionosis. *Choe EK, Moon SB, Kim HY et al. World J Surg. 2007 Nov 9; epub.* Total colonic aganglionosis is difficult to diagnose; but once it is diagnosed correctly and treated by corrective surgery, outcomes seem promising. Martin's operation brought about a good outcome and enabled patients to have acceptable bowel habits. The prognosis is highly dependent on the extent of aganglionosis.

Constipation in pregnancy: prevalence, symptoms, and risk factors. *Bradley CS, Kennedy CM, Turcea AM et al. Obstet Gynecol. 2007;110:1351.* Constipation measured using the Rome II criteria (presence of at least two of the following symptoms for at least one quarter of defecations: straining, lumpy or hard stools, sensation of incomplete evacuation, sensation of anorectal obstruction, manual maneuvers to facilitate defecation, and fewer than three defecations per week) affects up to one fourth of women throughout pregnancy and at 3 months postpartum with a prevalence rates of 24%. Iron supplements and past constipation treatment are associated with constipation during pregnancy.

The PFD continues on page 20

Posterior intravaginal slingplasty: Feasibility and preliminary results in a prospective observational study of 108 cases

PETER VON THEOBALD - EMMANUEL LABBÉ

Department of Gynecology and Obstetrics, University Hospital of Caen, France

Abstract: The Posterior Intravaginal Slingplasty has been evaluated in a continuous prospective series of 108 patients with an average follow up time of 19 months. Peri-operative and post-operative complications were recorded as well as an anatomical and functional assessment. The morbidity of the Posterior IVS procedure appears comparable if not lower than that of spinofixation in terms of dyspareunia and buttock pain. The technical feasibility is excellent. Insertion of the Posterior IVS tape is far easier to achieve than with the spinofixation technique, and it is quicker to perform than sacrocolpopexy. Follow-up of our patients at long term will reveal whether Posterior IVS will also offer the same advantages of durability or long term cure as shown by abdominal prosthetic repairs.

Key words: Genital prolapse; Mesh repair; Polypropylene; Posterior Intravaginal Sling.

INTRODUCTION

Adequate treatment of genital prolapse requires a defect specific approach. Repair of upper compartment prolapse (vaginal vault, hysterocoele, enterocoele) can involve abdominal or laparoscopic techniques such as sacrocolpopexy¹⁻¹⁰ the Kapedji type operation,^{11, 12} combined abdominal/vaginal techniques^{7, 12, 13} or techniques using the vaginal route, such as spinofixation¹⁴⁻¹⁷ or MacCall type culdoplasty.¹⁸ Peter Petros¹⁹ described a new technique using a sling of polypropylene mesh for suspension of upper compartment organs which have prolapsed, called "Posterior Intra Vaginal Slingplasty" (PIVS), and for which a more detailed name would be "infracoccygeal translevatorial colpopexy".

The main aim of this study is the assessment of the feasibility, the morbidity and the anatomical results obtained with the Posterior Intra Vaginal Slingplasty (PIVS) technique for the treatment of severe uterine or vaginal vault prolapse by reporting the outcomes of a continuous series of 108 cases with an average follow-up of 19 months. The secondary aim is to use the same criteria to assess the treatment of any associated cystocoele and rectocoele by interposition of a prosthesis (Surgipro* Mesh - Tyco Healthcare, USA).

MATERIALS AND METHODS

A series of 108 consecutive patients, with a mean age of 60 years (range 36 and 82), who presented with genital prolapse giving rise to symptoms, were included between August 2001 and July 2003. To be eligible for inclusion, the prolapse had to include descent of upper compartment organs (vaginal vault, hysterocoele or enterocoele) with a point C > 0 cm according to the POP-Q classification.²⁰ Cystocoele and/or rectocoele, if associated, were given specific treatment.

In every patient, the clinical examination during consultation was re-assessed under anaesthesia. The first assessment served to include the patients, and the second was the basis for the final decision of treatment. All patients underwent PIVS; and in addition, those with an associated cystocoele or a rectocoele were treated with placement of a polypropylene mesh in the vesico-vaginal or recto-vaginal space respectfully. Hysterectomy was not performed to treat prolapse. Rather, hysterectomy was only performed for medical indications such as meno- or metrorrhagia with a polymyomatous uterus, symptomatic uterine hyperplasia or cervical dystrophy. In a case of isolated hypertrophic lengthening of the cervix, trachelectomy was carried out. When stress urinary incontinence was diagnosed at clinical examination

with full bladder or when the closing pressure was less than 25 cm water, a sub-urethral tape was inserted using the Anterior Intravaginal slingplasty (IVS) technique via a separate vaginal incision beneath the mid urethra.

This is a prospective, observational study. All patients were seen 6 weeks post operation, again after 6 months, and then every year by the surgeon or another gynaecologist in the department.

The main study criteria were patient morbidity (peri-operatively and immediately post-operatively, as well as long term morbidity), and also the anatomical and functional results at short term with respect to the PIVS.

The secondary study criteria were patient morbidity (peri-operatively, immediately post-operatively as well as long term), together with the anatomical and functional results at short term with respect to the insertion of vesico-vaginal and recto-vaginal interposition prostheses.

In order to improve the morbidity study, three sub-groups were created: the first group included all patients who had had a hysterectomy (Group 1), the second group were the patients who had undergone a PIVS with or without a recto-vaginal prosthesis and/or a sub-urethral sling (Group 2) and the third group consisted of patients who underwent treatment for cystocoele by means of a vesico-vaginal interposition prosthesis (Group 3). (PIVS for vault prolapse also) The Krikal-Wallis test was used for statistical analysis of the duration of hospital stay and Pearson's chi-square test (exact p-value with SPSS Exact Tests module) for loss of haemoglobin.

Surgical technique

When vaginal hysterectomy is required, it is performed initially in the standard fashion. Treatment of cystocoele (if any) follows next with a sagittal anterior colpotomy. If a retropubic sub-urethral sling needs to be inserted for treatment of urinary stress incontinence, the colpotomy incision stops 4 centimetres from the urethral meatus and the tape is inserted via a separate incision. Vesico-vaginal and vesico-uterine dissection should be wide enough to reach the pelvic fascia laterally. Perforation is required each side of the bladder neck, opening a tunnel towards the Cave of Retzius.

The multifilament polypropylene material (Surgipro® Mesh TYCO Healthcare, USA) used for the vesico-vaginal anterior interposition prosthesis measures 4 centimetres in width, and 6 to 8 centimetres in length, and has two anterior tapered extensions or strips. It is cut from a 15 by 8 centimetre portion of mesh from which the posterior prosthesis can also be cut in order to be economical. It should cover the entire width of the bladder and reach the base of the vagina. The two anterior strips of the prosthesis are slipped through

the perforations in the pelvic fascia and laid flat against the posterior surface of the pubis using the forefinger and a dissection forceps with no grasping function. Adhesion to the pubis is sufficient to ensure reliable and sturdy anterior anchorage. The other end of the anterior prosthesis is fixed to the uterine isthmus using two stitches of resorbable suture. When there is no uterus, this end is fixed to the vaginal vault. A check is made that there are no sharp edges and that it is not placed under tension. Anterior colporrhaphy using rapid resorption suture material to close the entire thickness of the vagina (both mucosa and fascia) is carried out without colectomy. Insertion of the PIVS mesh, and treatment of any existing rectocele requires standard sagittal posterior colpotomy, without incising the perineum in order to keep pain to a minimum. The top of the incision reaches the neck of the uterus or the vaginal vault when there has been a hysterectomy. The recto-vaginal plane and enterocele pouch are dissected. The two para-rectal fossa are opened using the finger and blunt-tipped scissors. The landmarks on each side are the ischial spine, the sacrospinous ligament and the levator ani muscles (iliococcygeal fasciculus). Upwards, the uterine isthmus and its junction with the utero-sacral ligaments are visible. This classic dissection is carried out without any retractors. A 5 millimetre incision is made 3 centimetres lateral and inferior to the anal margin on each side. The IVS Tunneller® (Tyco Healthcare, USA) is inserted via this buttock incision in the ischio-rectal fossa, separated from the rectum by the levator ani muscles and the surgeon's finger which is inserted via the para-rectal fossa. This finger is used to keep a check on movement of the tunneller through the muscle layers. The blunt tip of the tunneller is maneuvered to a position where it is in contact with the sacrospinous ligament, and 2 centimetres medial to the ischial spine. The muscle is then perforated at this level by the blunt tip that comes into contact with the surgeon's finger. Thus covered and protected from any contact with the rectum, the blunt tip of the tunneller is taken out of the colpotomy area. The polypropylene tape is taken through the tunneller using the plastic stylette, and then the tunneller is removed. The tape is fixed to the utero-sacral ligaments, the uterine isthmus and the vaginal vault using two resorbable sutures. If there is a rectocele, a polypropylene recto-vaginal interposition prosthesis (Surgipro®, TYCO Healthcare, USA) measuring 8 centimetres long and 4 centimetres wide is used. Like the anterior prosthesis, its corners are rounded. The aim is to cover and reinforce the recto-vaginal septum in order to correct the rectocele. To the top it is fixed to the PIVS tape by two stitches of resorbable suture, and at the bottom, its point of fixation is to the central fibrous core of the perineum on each side of the anus, again using two stitches of resorbable suture. The prosthesis must lie flat against the rectum, with no large creases. It is pulled up into the sacral concavity at the same time as the vaginal vault or uterus, together with the vesico-vaginal prosthesis which acts integrally with the uterine isthmus or vaginal vault when the system is placed under tension. No colectomy is used here either. The posterior colpotomy is closed with rapid resorption suture prior to pulling on the two external ends of the PIVS mesh. A vaginal pack is inserted into the vagina for 24 hours in order to ensure that the vaginal walls are properly in contact with the prostheses and the dissection planes. A bladder catheter is inserted for the same period of time.²¹

RESULTS

The PIVS operation was performed as planned in all 108 cases. Thirty three patients had a past history of hysterectomy or surgery for prolapse of the upper or posterior

compartment (27 hysterectomies and 19 rectocele repairs). From a functional point of view, all the patients had previously complained of a dragging sensation in the pelvis and the uncomfortable presence of a protruding mass. Twenty seven patients had also complained of stress urinary incontinence, 10 of stubborn constipation that worsened concomitant with the prolapse, 2 of anal pain at defecation and one of anal incontinence. All the prolapses included descent of upper compartment organs (vaginal vault, hysterocele, enterocele) with a point C > 0 cm according to the POP-Q classification.²⁰ Associated with this was a cystocele (point Ba > 0 cm) in 73 cases, and a rectocele (point Bp > 0 cm) in 87 cases. Nineteen hysterectomies, 22 amputations of the cervix and 49 urinary incontinence repairs using a sub-urethral sling (Anterior IVS) were carried out as detailed in the previous section.

Group 1 comprised 19 patients who underwent hysterectomy during the same anaesthesia, whatever the other associated procedures (PIVS in every case, and sometimes correction of cystocele or rectocele). Group 2 comprised 31 patients with installation of PIVS and in some cases recto-vaginal prosthesis and/or a sub-urethral sling for stress incontinence (excluding any other procedure). Group 3 included 58 patients in whom a vesico-vaginal interposition prosthesis was installed (associated with any other procedure except hysterectomy).

The intra-operative complications (9 cases) were essentially bladder injuries (7 cases), either during dissection of the cystocele (4 cases), or during passage of the sub-urethral sling insertion device (3 cases). One low rectal injury occurred during dissection of the rectocele, and one case of bleeding from the Cave of Retzius during treatment of urinary incontinence was controlled by simple pressure (using a vaginal pack on the full bladder), for which the subsequent history was uncomplicated apart from anaemia at 9.5 g/dl. The post-operative complications consisted of anaemia (loss of more than 2 g/dl of haemoglobin) in 7 cases (6.5%), with a trend that did not reach significant level ($p = 0.14$) between the hysterectomy group 1 (3 cases or 15.8%) and the cystocele (2 cases or 3.4%) and PIVS (2 cases or 6.4%) groups. Two cases of haematoma of the Cave of Retzius were observed, which had no further consequences for the patients. With respect to the cystocele repair 2 vaginal erosions occurred at 2 and 18 months, that were resolved by simple excision of the exposed mesh under local anaesthesia. For the treatment of the upper and posterior compartments there were 2 infections of the prosthetic material which had to be completely removed, with one case occurring with a haematoma of the para-rectal fossa (on day 15) and the other on a vaginal erosion at 5 months. Finally, there were 6 cases of simple post-operative urinary infection and 5 cases of isolated fever, which resolved without complications in every case. The average hospital stay was 4.8 days (ranging from 2 to 10 days). No immediate re-operation was necessary. Note that the stays were significantly longer ($p < 0.001$) for Group 1 (hysterectomy) (5.4 days) and Group 3 (cystocele) (4.9 days) compared with Group 2 (Posterior IVS) (4.1 days). The mean follow-up of the patients who were seen again was 19 months (ranging from 9 to 31 months). Six patients were lost to follow-up. They had had no intra-operative complication and their characteristics (age, past history, type of operation) were similar to those of the total cohort.

From an anatomical perspective, the presence of a prolapse at the first post-operative consultation at 6 weeks was considered as a failure, whilst if the same was found later, this was considered as a recurrence. With regard to correction of the upper and posterior compartments (assessment of

PIVS in 102 patients), there was one failure in the patient whose prosthesis was removed on day 15. There were 2 recurrences at 6 months, i.e. hysterocoele and cystocoele, one of which occurred in the patient who had an infection on the prosthesis at 5 months with, once again, complete removal of the mesh. With regard to repair of the anterior compartment (73 patients), there were 6 failures and 2 recurrences at 6 months.

From a functional point of view (in 102 patients) and with regard to PIVS and the posterior prosthesis, the results included 3 cases of moderate de novo constipation, 1 case of dyspareunia that resolved after section of one of the 2 PIVS side strips and also one case of urinary incontinence that previously was masked. However, in the 10 patients who presented with pre-operative dyschesia, 5 no longer have any symptoms and one has experienced considerable improvement. Concerning the anterior compartment, there were 8 cases of transient voiding obstruction, 6 cases of urinary incontinence that were unmasked, and 1 failure of the urinary incontinence treatment.

DISCUSSION

There were few intra-operative complications encountered with this technique (9 cases, 8.5%). None of these can be specifically attributed to the installation of the PIVS, since they all occurred during dissection of the level 2 or level 3 defect and not during the dissection for level 1 (PIVS) attachment. When examined in detail, of the 4 bladder injuries that occurred during dissection of the cystocoele (including one in a patient with a past history of hysterectomy), suturing was uncomplicated in every case and in only one case the proximity of the bladder trigone required double J catheters to be inserted as a precaution. The subsequent history for these 4 patients was uncomplicated. The only case of rectal injury occurred during rectal dissection immediately above the anus; a simple suture closure was inserted together with myorrhaphy of the levator ani muscles and perineorrhaphy. It was possible to implant the PIVS normally, as it lay some distance away from the rectal suture. The subsequent history was uncomplicated, with a follow-up of 12 months. Immediate post-operative complications consisted essentially of anaemia that was encountered three times more often when hysterectomy took place. Other authors, such as Hefni,²² argue as we do, that the uterus should be preserved in order to reduce morbidity. The 3 cases of vaginal erosion (2.7%) opposite the prosthesis material (twice with a vesico-vaginal prosthesis, once with a recto-vaginal prosthesis) are consistent with the results found in the literature, and which vary considerably between 0 and 40% (Tab. 1). However there are few series and the number of cases is low or concern repair of a cystocoele alone. Many different types of mesh have been used by the vaginal, abdominal or combined approach without any clear relationship appearing between the type of prosthesis, the route of approach and the rate of erosion. It should be noted that regardless of the approach for inserting the prostheses, those for which there is no erosion and those which have a very high rate of erosion are the shortest series, and thus those with the least experience. This latter factor, namely technique or experience therefore appears to be the determining factor. Our good results encourage us to continue with the same materials and the same longitudinal incisions. The same prosthetic material made of multifilament polypropylene (Surgipro[®] Mesh, Tyco Healthcare, USA) has been used in our department since 1993 for laparoscopic promontofixation (5) and laparoscopic colposuspension using tapes³⁶ in over 400 patients with an erosion rate of less than 2%. In addition, it should be highlighted that

if it is necessary to remove a multifilament prosthesis, this is achieved far more easily than for a monofilament prosthesis that tends to "unravel" and presents an important risk of leaving filaments behind that will prolong the infection. However, as was perfectly expressed by Michel Cosson:³⁷ "the ideal prosthesis does not exist yet".

No erosion occurred on the PIVS mesh. The 2 cases of infection of the prosthesis were in patients who had undergone several operations. In one case, the infection was secondary to a vaginal erosion that occurred on the recto-vaginal prosthesis at 5 months and required removal of the PIVS tape together with the posterior mesh prosthesis, but the cystocoele repair was not involved. Myorrhaphy of the levator ani muscles was carried out and the subsequent history was uncomplicated. The vault prolapse nevertheless recurred. In this case, the patient was obese and had a past history of a Richter spinofixation and myorrhaphy. In the other case the infection occurred on day 15 following a post-operative haematoma in a patient treated by PIVS alone, and this patient had a past history of promontofixation then hysterectomy and Richter spinofixation, with rejection of the polypropylene suture material after the latter operation. A new PIVS was installed 6 months later and the subsequent history was uncomplicated, with a follow-up of 12 months.

The rate of post-operative complications appears to us to be linked with the technique. A number of steps are mandatory to avoid infection. For example, meticulous asepsis must be observed, the anus must be covered with a transparent adhesive drape at the beginning of the operation, the prosthesis inner packages must be opened at the very last moment prior to insertion of the tape, and gloves must be changed every time the prosthetic material is handled. In order to avoid erosion, the prosthesis must be placed deep down between the viscera and the fascia, and not between the fascia and the mucosa. Placement of the prosthesis must be done without tension and without any anchoring stitch transfixing the mucosa. Excision of the vaginal mucosa must also be avoided, or at least there should be no excessive colpectomy. Indeed, just as observed after abdominal sacrocolpopexy, once the organ hernia has been reduced the vagina retracts rapidly in a few days, and if there is no tension it is able to recover adequate thickness to cover the prosthesis and avoid erosion.

With regard to the anatomical results following the PIVS procedure, only one case was disappointing (because it occurred without removal of the PIVS): this was the recurrence after 6 months of a hysterocoele associated with cystocoele. The patient in question weighed 140 kg and suffered from bronchitis and constipation. Re-operation was possible without problems, with the installation of an anterior transobturator prosthesis associated with spinofixation and retensioning of the PIVS. The subsequent history was uncomplicated, with a follow-up of 18 months.

The technique used in our series differs from that described by Peter Petros¹⁹ and Bruce Farnsworth³⁸ and the differences concern the sagittal incision perpendicular to the long side of the prostheses; the complete dissection of the pararectal fossae; the anchorage point for the PIVS which in our series is located very high up beneath the sacro-sciatic ligament; the use of meshes to repair the associated cystocoele and rectocoele; and the absence of colpectomy. These differences explain why there is no rectal injury in our series, and no erosion on the PIVS tape that occurred in 5.3% of cases in the Petros series. The other complications and the anatomical and functional results are very similar.

With respect to the functional results obtained with the PIVS procedure, only 3 cases of de novo constipation were observed. Therefore, this technique does not present the

TABLE 1. – Erosion rate according to technique and mesh. (SCP = sacrocolpopexy).

Author	Procedure	Mesh	Patients	Follow-up (months)	Erosion rate
Fox SD (1)	SCP	?	39	14	0 %
Gadonneix P (2)	SCP	?	46	?	0 %
Leron E (3)	SCP	Teflon	13	16	0 %
Brizzolara S (4)	SCP	Prolene	124	35	0.8 %
Von Theobald P (5)	SCP	Surgipro	100	53	2 %
Lindeque BG (6)	SCP	PTFE	262	16	3.8 %
Visco AG (7)	SCP	?	243	?	4.1 %
Sullivan ES (8)	SCP	Marlex	205	?	5 %
Marinkovic SP (9)	SCP	PTFE	12	39	16.6 %
Kohli N (10)	SCP	Mersilene PTFE	57	20	12 %
Average			1101		3.9 %
Visco AG (7)	combined	Mersilene PTFE	30	?	26.6 %
Montironi PL (14)	combined	Polypropylene	35	14.6	2.8 %
Average			65		16.2 %
Sergent F (23)	vaginal	Surgipro Parietex	26	12	0 %
Canepa G (24)	vaginal	Marlex	16	20	0 %
Migliari R (25)	vaginal	Mixed fiber ?	15	23.4	0 %
Migliari R (26)	vaginal	Polypropylene	12	20.5	0 %
Nicita G (27)	vaginal	?	44	13.9	0 %
Shah DK (28)	vaginal	?	29	25	0 %
Flood CG (29)	vaginal	Marlex	142	38.4	2.1 %
Our series	vaginal	Surgipro	108	19	2.7 %
Borrell Palanca A (30)	vaginal	Polypropylene	31	23.5	3.2 %
Adhoute F (31)	vaginal	Prolene	52	27	3.8 %
Bader G (32)	vaginal	Gynemesh	40	16.4	7.5 %
De Tayrac R (33)	vaginal	Gynemesh	48	18	8.3 %
Dwyer PL (34)	vaginal	Atrium	47	29	17 %
Julian TM (35)	vaginal	Marlex	12	24	25 %
Average			562		4.6 %

classic disadvantages of promontofixation: 9 to 14 % de novo constipation.^{1, 5} On the contrary, greater than one out of two cases of pre-operative dyschesia were improved or cured thanks to the repositioning of the rectum within the sacral concavity, as proven by post-operative defecography. The same effect on supra levator rectocoeles and rectal intussusception was demonstrated with the bilateral spinofixation technique.^{17, 18, 24}

No pain in the area covered by the pudendal nerve was observed, unlike spinofixation in which pain in the buttocks is likely to occur in 6.1 to 19.2% of cases.³⁹⁻⁴² The only case of post-operative dyspareunia is explained by excessive tension and seemed to be caused by one of the PIVS side strips secondary to fibrosis. The pain disappeared after the tape was divided. In the spinofixation series the rate of dyspareunia varied between 2.3 % and 9 %.¹⁵⁻¹⁷

With regard to the vesico-vaginal prosthesis, there were 6 failures and two recurrences out of 73 patients. Our failure rate is poor at 11% and we consider this too high. The failures involve lateral detachment of the anterior vaginal wall and we have concluded that this technique does not seem to adequately correct “lateral defects”.³⁹ Subsequent to this assessment, we have decided to modify the anterior prosthesis and add a lateral anchorage point to the arcus tendineus via a transobturator route.

CONCLUSIONS

This is a prospective observational study of a continuous series of 108 cases with an average 19 months follow-up. PIVS appears to be a feasible technique involving a low rate of morbidity and satisfactory results at 19 months. Randomised comparative studies against sacrospinous fixation including questionnaires of quality of life and sexuality are under way.

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Editor's Note: The authors wish to inform the reader that a paper analysing this data has previously been published in the French language journal *Gynecologie, Obstetrique et Fertilité*.⁴³ The paper presented in *Pelvipiperineology* has been rewritten for publication in the English language. The editors of *Pelvipiperineology* encourage authors who have published work in their native language to consider submission to *Pelvipiperineology* in English.

Correspondence to:
PETER von THEOBALD M.D.
Department of Gynecology and Obstetrics
University Hospital of Caen
F-14033 CAEN Cedex (France)
e-mail: vontheobald-p@chu-caen.fr
Phone: +33231272533 - Fax: +33231272337

Material and type of suturing of perineal muscles used in episiotomy repair in Europe

VLADIMIR KALIS - JIRI STEPAN Jr. - ZDENEK NOVOTNY - PAVEL CHALOUPKA
MILENA KRALICKOVA - ZDENEK ROKYTA

Department of Obstetrics and Gynecology, University Hospital, Faculty of Medicine, Charles University, Alej Svobody 80, 304 60 Plzen, Czech Republic

Abstract: None of the trials evaluating episiotomy repair clearly focused on perineal muscles. The aim of this study was to describe suture material and styles of suturing perineal muscles in Europe by using an email and postal questionnaire. From 34 European countries, 122 hospitals agreed to participate. Thirteen different types of sutures are currently used. The most common material is polyglactin 910 (70%) followed by polyglycolic acid. Fifty one hospitals (46%) use only short-term and 49 hospitals (44%) use only mid-term absorbable synthetic sutures. In 8 hospitals both types of sutures were used. The most common size of suture is 2-0 USP. Thirty percent of hospitals use continuous and 47% hospitals interrupted sutures for perineal muscle repair. In 23% of the hospitals there is not a uniform policy. The technique of suturing perineal muscles is diverse in Europe. It is unclear whether short-term absorbable synthetic suture should substitute mid-term absorbable synthetic material in the perineal muscle layer.

Key words: Episiotomy; Practice variation; Perineum/Surgery; Episiorrhaphy; Suture technique.

INTRODUCTION

Episiotomy, the incision of the perineum during the last part of the second stage of labour or delivery is still considered a controversial procedure. Long-term complications after episiotomy repair are common. A large proportion of women suffer short-term perineal pain and up to 20% have longer-term problems (e.g. dyspareunia).¹ Other complications involve the removal of suture material, extensive dehiscence and the need for resuturing.²

According to an Italian study, episiotomy is associated with significantly lower values in pelvic floor functional tests, both in digital tests and in vaginal manometry, in comparison with women with intact perineum and first- and second-degree spontaneous perineal lacerations.³ In another prospective trial of 87 patients, the pelvic floor muscle strength, assessed with the aid of vaginal cones, was significantly weaker in the episiotomy subgroup compared to a subgroup with spontaneous laceration.⁴ A German study did not reveal any difference in the pelvic floor muscle strength between groups with restrictive and liberal use of episiotomy.⁵ None of these trials are specific about the type of suturing material used.

Some of the trials evaluating episiotomy and its consequence regarding suturing material, focus on the type of sutures and a technique used for suturing the superficial layers (skin or subcuticular).⁶

If mid-term absorbable polyglycolic acid sutures were used for repairing perineal muscles, a comparison to catgut^{7, 8, 9, 10} or chromic catgut^{11, 12} was usually made.

One trial compared mid-term absorbable polyglycolic acid (Dexon II) with a new monofilament suture glycomer 631 (Biosyn).¹³ There were significantly more problems associated with monofilament material at 8-12 weeks postpartum (suture removal due to discomfort and pain) which might be explained by the longer absorption time of glycomer 631.¹³

In a recent trial, in which only a short-term absorbable polyglactin 910 (Vicryl RAPIDE) is used, a continuous suture is compared to an interrupted technique and a continuous suture is found to be superior.¹⁴

To our knowledge, three trials have compared short- and mid-term synthetic absorbable suturing material.^{15, 16, 17} In these, either only a standard mid-term absorbable polyglactin 910 (Coated Vicryl) or only a short-term absorbable polyglactin 910 (Vicryl RAPIDE) was used for all layers (vaginal mucosa, perineal muscles, subcuticular/skin). All

of them focused on perineal pain and short-term complications of the repair and did not follow the pelvic floor muscle function.

A small Danish randomized control trial (RCT) showed no difference in short- and long-term perineal pain, with a reduction in pain when walking on day 14 in a Vicryl RAPIDE group. Also, no difference was found between groups regarding episiotomy dehiscence.¹⁵

An Ulster study compared the same materials (Coated Vicryl and Vicryl RAPIDE).¹⁶ 78 women were completed after birth with Coated Vicryl and 75 with Vicryl RAPIDE. At six and twelve weeks, a significant difference in the rates of wound problems (infection, gaping, pain, material removed) was found in favor of Vicryl RAPIDE.¹⁶

Kettle et al. performed a very well designed RCT with 1542 women.¹⁷ These were randomized into groups where either a standard mid-term absorbable polyglactin 910 (coated Vicryl) or a short-term absorbable polyglactin 910 (Vicryl RAPIDE) was used. The sutures of the perineal muscles and the skin were either, only interrupted, or only continuous, non-locking. The vaginal mucosa was always sutured continuously. This trial shows a clear benefit of the continuous technique compared to the interrupted. The pain at day 2, 10 and onwards up to 12 months postpartum was significantly lower in the continuous group. Also, all the other followed parameters (suture removal, uncomfotability, tightness, wound gaping, satisfaction with the repair and a return to normality within 3 months) were in favor of the continuous technique.¹⁷

Comparing the standard mid-term absorbable and short-term absorbable polyglactin 910, in the parameter which differed most (suture removal), if sutures needed to be removed only visible transcutaneous sutures were removed from the continuous group. So the rate for suture removal, which was significantly lower for those who had received short-term absorbable polyglactin 910, is related to vaginal mucosa or skin and not to the sutures of perineal muscles.¹⁷

Pain at day 10 was not significantly different; however, some secondary pain measures (pain walking) were significant.¹⁷ The reduction in pain is achieved by inserting the skin sutures into the subcutaneous tissue and so avoiding nerve endings in the skin surface.¹⁸ So the difference at day 10 might be explained by a different rate of absorption between Vicryl RAPIDE and Coated Vicryl and irritating nerve endings in the skin (and not in the muscles) by the remaining Coated Vicryl sutures. Vicryl RAPIDE is

absorbed in 42 days and its tensile strength is none (0 lb from original 10 lb) after two weeks. The suture begins to fall off in just 7 to 10 days. So this is ideal material if no wound tension after 7-10 days is acceptable. Coated Vicryl is absorbed in 56-70 days and its tensile strength is at 75% (10 lb from original 14 lb) after two weeks.¹⁹

No study has been clearly focused on the layer of perineal muscles. No study has as yet explored the advantage of new sutures with antibacterial properties for suturing the perineal muscles.

DeLancey and Hurd show that urogenital hiatus is sealed by the vaginal walls, endopelvic fascia, and urethra. Once the urogenital hiatus has opened up, the vaginal wall and cervix lie unsupported. The constant vector of abdominal pressure on the fascia can cause its failure. It is ultimately the perineal body that is the mechanism for preventing prolapse beyond the urogenital hiatus.²⁰

The layers traversed during uncomplicated mediolateral episiotomy are: epithelium, bulb of vestibule, Bartholin's gland (occasionally), bulbospongiosus, superficial transverse perinei, perineal membrane, urethrovaginal sphincter and transversus vaginae.²¹ Puborectalis muscle is rarely ever involved in this incision and so not afflicted by this procedure. When repairing an episiotomy, the suture of perineal muscles seems to be the crucial step for an obstetrician or midwife in preventing a decrease in the pelvic floor muscle strength.

The aim of this survey was to map the current situation in Europe and to describe common types of material and styles of suturing perineal muscles after episiotomy in European hospitals.

MATERIALS AND METHODS

In the year 2006, an email or postage questionnaire study was sent to different European hospitals. The question related to this project was as follows:

Which type of material and methods of suturing are used in your hospital for perineal muscles?

Hospitals of 27 EU countries, of 3 countries which had initiated entrance talks to the EU, plus Iceland, Israel, Norway and Switzerland, were asked to answer a mediolateral episiotomy questionnaire.

RESULTS

A total of 122 hospitals in 34 European countries participated in this project and sent back their answers. Sixty eight hospitals are situated in the original 15 EU countries, 44 hospitals are from countries which entered the EU later or are involved in entrance talks, and 10 hospitals are located in the four remaining countries: Iceland, Israel, Norway and Switzerland.

Type of suturing material

A total of 110 hospitals reported that one type of suture material is used for perineal muscle repair while 12 hospitals answered that they use alternatively two types of sutures. None of the hospitals uses more than two different sutures in their standard approach.

Altogether 13 different types of sutures are currently in use across Europe. These are shown in table 1.

The most common suture type is a polyglactin 910 suture (Coated Vicryl, Vicryl RAPIDE or Vicryl PLUS Antibacterial), that is used in 96 hospitals (more than 70%). Polyglactin 910 is followed by polyglycolic acid (Safil, Safil Quick, Dexon II), used by 16 hospitals (12%) and traditional gut sutures (catgut, chromic catgut) are used in 13 hospitals (10%). Non-absorbable suture was reported by only one

TABLE 1. – *Material for suturing of perineal muscles.*

Material	Mention	
	(N)	(%)
1 Catgut	8	6
2 Chromic catgut	5	3.5
3 Dexon II	5	3.5
4 Safil	7	5
5 Safil Quick	4	3
6 Coated Vicryl	40	29.5
7 Vicryl RAPIDE	55	41
8 Vicryl PLUS Antibacterial	1	1
9 Monocryl	1	1
10 Chirlac rapid braided	2	1.5
11 Assucryl synthetic	1	1
12 Polysorb	1	1
13 Ethilon	1	1
14 Not exactly specified absorbable material	3	2
Total	134	100

NB.: The total number amounts to 134 (12 hospitals use two materials alternatively).

institution that also uses some other absorbable material. Catgut and/or chromic catgut are used as the only suture in 11 hospitals (9%).

Considering short- and mid-term absorbable synthetic sutures, we found that short-term absorbable sutures (Safil Quick, Vicryl RAPIDE, Chirlac rapid braided) are used by 61 hospitals (50%). Mid-term absorbable sutures (Dexon II, Safil, Coated Vicryl, Vicryl PLUS Antibacterial, Assucryl synthetic, Polysorb) are used for suturing the perineal muscles in 55 hospitals (46%). Monocryl, whose absorption time is somewhere between short- and mid-term is used by one hospital. Only one hospital reported using a new absorbable synthetic suture with Triclosan (Vicryl PLUS Antibacterial), that has antibacterial properties.

Fifty one hospitals (46%) use only short-term absorbable synthetic sutures and 49 (44%) use only mid-term absorbable sutures for perineal muscle repair. In 8 hospitals (8%) both types of sutures were used and 3 hospitals (2%) were not specific about their absorbable material.

Size of the suturing material

As for sizes of the sutures, we received 96 answers of which 3 hospitals referred to two alternative sizes. In 26 remaining responses (8 using catgut only) the hospitals did not give details regarding the size of sutures used for perineal muscle repair.

Among the hospitals which use only one type of material and only one size, the most frequent response was 2-0 Vicryl RAPIDE - 32 cases, followed by 0 and 2-0 Coated Vicryl, both reported by 13 institutions. All details are shown in table 2.

Method of suturing of perineal muscles

In the catgut group 5 hospitals did not answer. From the remaining 6 hospitals, only one hospital uses both techniques (continuous or interrupted), and a remaining 5 hospitals suture perineal muscles with interrupted stitches only.

From 111 hospitals which use an absorbable synthetic material for suturing the muscles, 89 hospitals answered in full with 27 (30%) hospitals use continuous sutures, and 42 (47%) hospitals interrupted sutures. Twenty (23%) hospi-

TABLE 2. – Sizes for sutures of perineal muscles.

Size (USP)	short-term absorbable sutures		mid-term absorbable sutures	
	(N)	(%)	(N)	(%)
0	11	22	19	42
2-0	38	74	21	47
3-0	2	4	5	11
Total	51	100	45	100

NB.: Only answers for absorbable synthetic material shown.

tals do not have a uniform policy and leave the method of suturing to the discretion of the individual doctors (or midwives).

DISCUSSION

The choice of the suture depends on: properties of suture material, absorption rate, handling characteristics and knotting properties, size of suture, and the type of needle.

Nearly a half of all European hospitals cooperating in this project use a mid-term synthetic absorbable suture for the suturing of perineal muscles. The other question put to participants in this questionnaire was analyzed in another article.²² In order to keep the question simple, there was not an additional request, if the same mid-term absorbable synthetic suture is used for all layers or for perineal muscles only. The majority of hospitals use interrupted sutures to approximate perineal muscles; the latter possibility is not excluded.

It was also noted that a new synthetic material with antibacterial properties (Vicryl PLUS Antibacterial) is currently used by one institution.

According to the meta-analysis, mid-term absorbable synthetic material for perineal repair is associated with less short-term pain compared to traditional gut sutures but with increased rates of removal. Further research with alternative suture materials is needed.² This disadvantage is reduced with short-term synthetic material and with a subcuticular continuous non-locking technique of episiotomy repair.¹⁷ However, the information regarding suturing material of perineal muscles is not extensive.

There is a recommendation that a short-term synthetic absorbable suture (Vicryl RAPIDE) is a preferential material for all three layers in an episiotomy repair and so episiotomy can be sutured in a loose continuous non-locking technique with only two knots (at the beginning and at the end).²³

However, according to Ethicon Sutures Homepage, a short-term absorbable suture (Vicryl RAPIDE) is suggested for superficial closure of mucosa or skin closure for patients not returning for another check-up.¹⁹ A mid-term absorbable suture (Coated Vicryl) should be used for general tissue and muscle approximation.¹⁹ A new mid-term absorbable suture (Vicryl PLUS Antibacterial) has the same indication as Coated Vicryl and should be used when extra caution is desired (i.e. potentially high risk surgical sites).¹⁹ More information is needed to find the potential benefit of Tri-closan in perineal repair.

On the other hand the Aesculap web page recommends a short-term absorbable suture (Safil Quick) for an episiotomy repair in Gynaecology and Obstetrics without further specification.²⁴

In the review of the management of obstetric sphincter injury, great care should be exercised in reconstructing the perineal muscles to provide support to the sphincter repair. Muscles of the perineal body should be reconstructed with Vicryl 2-0 sutures.²⁵

It might happen that a short-term absorbable synthetic suture does not necessarily hold the approximated torn muscles for a sufficient time. However this assumption is not based on any evidence.

There is a consensus that a short-term absorbable synthetic suture is the best choice for vaginal mucosa and perineal skin. The suturing the mucosa and perineal skin with a short-term absorbable synthetic suture and perineal muscles with a mid-term absorbable synthetic suture would bring additional expenditures for any institutional budget. The production of a prefabricated episiotomy set, where both sutures would be available, could reduce this increase in costs. An episiotomy set already exists in several hospitals. Also, in this era of reducing adjacent episiotomies, this additional expenditure would not be so dramatic compared to the financial implications of anal sphincter repair.

Currently, the type of material, its size and the technique of suture is not a controversial topic regarding vaginal mucosa and perineal skin. However, the style of suturing of perineal muscles has not yet been fully explored. This European survey serves to document this ambiguity. Further well designed RCTs are required to focus on the real role of the perineal muscles after vaginal birth and the best method of their repair. These RCTs must also comprise the exact depiction of cutting of episiotomy and all details with regards to the repair.

This survey shows that there is much diversity in the technique of suturing of perineal muscles across Europe. It is not clear enough if short-term absorbable synthetic suture should substitute mid-term absorbable synthetic material in this layer, as it did for vaginal mucosa and perineal skin.

On the basis of information obtained from 122 European hospitals, the authors of this survey would like to cooperate in a multicentric trial to obtain more information.

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Correspondence to:

VLADIMIR KALIS
 Department of Obstetrics and Gynecology, University Hospital,
 Faculty of Medicine, Charles University
 Alej Svobody 80, 304 60 Plzen, Czech Republic
 Tel: +420 377 105 212 (work), +420 777 067 699 (mobile)
 Fax: +420 377 105 290
 E-mail: kalisv@fnplzen.cz

Pelvic Floor Digest

continued from page 11

6 – INCONTINENCES

The impact of fecal (FI) and urinary incontinence (UI) on quality of life 6 months after childbirth. *Handa VL, Zyczynski HM, Burgio KL et al. Am J Obstet Gynecol. 2007;197:636.* With validated questionnaires 759 primiparous women were assessed for FI and UI six months postpartum, measuring QOL with SF-12 summary scores, health utility index score (a measure of self-rated overall health), and the modified Manchester Health Questionnaire. Women with FI and those with UI had worse scores than women without incontinences or flatal incontinence only. FI and UI together have a greater impact than either condition alone.

The impact of tension-free vaginal tape on overactive bladder symptoms in women with stress urinary incontinence: significance of detrusor overactivity. *Choe JH, Choo MS, Lee KS. J Urol. 2007 Nov 12; epub.* Evaluating the results of the TVT in 549 women (2003 to 2004) it is concluded that the tension-free vaginal tape procedure can be performed in women with stress urinary incontinence and overactive bladder including urge incontinence even if the patient has detrusor overactivity on urodynamic study. However, patients should be fully advised of the possibility of persistent overactive bladder symptoms and treatment for those symptoms after tension-free vaginal tape should be o

Myoblast and fibroblast therapy for post-prostatectomy urinary incontinence: 1-year followup of 63 patients. *Mitterberger M, Marksteiner R, Margreiter E et al. J Urol. 2007 Nov 12; epub.* Transurethral ultrasound guided injections of autologous fibroblasts and myoblasts obtained from skeletal muscle biopsies were done in 63 patients with stress urinary incontinence after radical prostatectomy were treated with. One year after implantation 41 patients were continent, 17 showed improvement and 5 failed. Thickness and contractility of the rhabdosphincter were significantly improved postoperatively.

Behavioral comorbidity differs in subtypes of enuresis and urinary incontinence. *Zink S, Freitag CM, Gontard AV. J Urol. 2007 Nov 13; epub.* Different subtypes of enuresis and urinary incontinence demonstrate differences in behavioral problems and psychiatric comorbidity. The highest rates of psychiatric comorbidity were found in the group of children with voiding postponement and the lowest were in children with monosymptomatic nocturnal enuresis. Screening for comorbid psychiatric disorders in children with enuresis and urinary incontinence is highly recommended, and further investigations in large groups of children are necessary.

Evaluation and outcome measures in the treatment of female urinary stress incontinence: International Urogynecological Association (IUGA) guidelines for research and clinical practice. *Ghoniem G, Stanford E, Kenton K et al. Int Urogynecol J Pelvic Floor Dysfunct. 2008;19:5.*

The age distribution, rates, and types of surgery for stress urinary incontinence (SUI) in the USA. *Shah AD, Kohli N, Rajan SS, Hoyte L. Int Urogynecol J Pelvic Floor Dysfunct. 2008;19:89.* The distribution of SUI surgery across age groups in the USA in 2003 was studied: 129,778 women underwent 165,776 surgical procedures. Of these women, 12.2, 53.0, 30.4, and 4.5% belonged to reproductive, perimenopausal, postmenopausal, and elderly age groups, respectively. Surgical rates (per 10,000 women) were 4, 17, 19, and 9 in these age groups, respectively. Complications occurred most frequently in reproductive age women. Women at all stages of reproductive life may seek surgical treatment for SUI, but the greatest percentage of surgical procedures occurred in perimenopausal women.

Clinical and urodynamic outcomes of pubovaginal sling procedure with autologous rectus fascia for stress urinary incontinence. *Mitsui T, Tanaka H, Moriya K et al. Int J Urol. 2007;14:1076.* Pubovaginal sling surgery with autologous rectus fascia was done in 29 consecutive women with SUI. Overall SUI was cured in 23 patients and improved in 3 patients. Three patients who developed persistent urinary retention or severe voiding difficulty after surgery underwent urethrololysis. Of 17 patients who had urgency before the pubovaginal sling, urgency was cured postoperatively in seven, while de novo urgency appeared in one patient. Postvoid residual urine volume (PVR) >100 mL and Qmax <=20 mL/s before surgery are risk factors for postoperative voiding difficulty.

Mixed urinary incontinence: continuing to confound? *Hockey J. Curr Opin Obstet Gynecol. 2007;19:521.* Mixed incontinence is a complex clinical problem for urogynaecologists and generalists alike, as research for new treatments tend to focus on single-symptom groups. Those with mixed symptoms form a diverse group, which is difficult to study precisely. Recent studies, however, have aimed to classify the subgroups into predominant types to determine the response to treatment with greater accuracy.

Transobturator tapes for stress urinary incontinence: results of the Austrian registry. *Tamussino K, Hanzal E, Kolle D et al. Am J Obstet Gynecol. 2007;197:634.* Data on a total of 2543 operations with 11 different tape systems were collected. Intraoperative complications were noted for 120 procedures (4.7%): increased bleeding, vaginal, bladder and urethral perforations. Reoperations attributable to the tape procedure were reported for 57 patients (24 tapes cut or loosened for voiding dysfunction, 11 vaginal erosions, 7 abscesses with erosions). Significant postoperative pain was reported for 12 patients (0.5%).

National audit of continence care for older people: management of urinary incontinence. *Wagg A, Potter J, Peel P et al. Age Ageing. 2007 Nov 21; epub.* A national audit was conducted across England, Wales and Northern Ireland. The results indicate that assessment and care by professionals directly looking after the older person were often lacking. There is an urgent need to re-establish the fundamentals of continence care into the practice of medical and nursing staff and action needs to be taken with regard to the establishment of truly integrated, quality services in this neglected area of practice.

The inside-out trans-obturator sling: a novel surgical technique for the treatment of male urinary incontinence. *de Leval J, Waltregny D. Eur Urol. 2007 Nov 20; epub.* A new polypropylene sling procedure for treating stress urinary incontinence (SUI) after radical prostatectomy (RP) is pulled for compressing the bulbar urethra upward and tied to each other across the midline. Patients with detrusor overactivity are excluded. At 6 months 45% patients were cured and 40% improved (1pad/d), so this procedure appears to be safe and efficient at short term. Further studies are warranted to determine long-term outcome.

Long-term follow-up of a transvaginal Burch urethropexy for stress urinary incontinence. *Rardin CR, Sung VW, Hampton BS et al. Am J Obstet Gynecol. 2007;197:656.* A vaginal Burch urethropexy for urodynamic stress urinary incontinence with urethral hypermobility was performed in 66 women using a suture carrier device. Concurrent prolapse repairs were performed as indicated. Mean follow-up time was 20.9 +/- 18.9 months. Objective failure was observed in 16 patients (24.2%). Subjective failure was reported by 21.2% of patients, with 50% and 28.8% reporting success and improvement, respectively. Six patients (9%) experienced febrile illness, 4 (6%) intraoperative hemorrhage, 1 pelvic abscess, 12 (18.2%) suture erosion; half required surgical revision or excision. It is concluded that vaginal Burch urethropexy is well tolerated but is associated with poor long-term success and high suture erosion rates.

Complication rates of tension-free midurethral slings in the treatment of female stress urinary incontinence: a systematic review and meta-analysis of randomized controlled trials comparing tension-free midurethral tapes to other surgical procedures. *Novara G, Galfano A, Boscolo-Berto R, Secco S, Cavalleri S, Ficarra V, Artibani W. Eur Urol. 2007 Nov 8; epub.* To evaluate the complication rates of tension-free midurethral slings compared with other surgical treatments for stress urinary incontinence a systematic review of the literature using MEDLINE, EMBASE, and Web of Science identified 33 randomized controlled trials reporting data on complication rates. Tension-free slings were followed by lower risk of reoperation compared with Burch colposuspension, whereas pubovaginal sling and tension-free midurethral slings had similar complication rates. With regards to different tension-free tapes, voiding LUTS and reoperations were more common after SPARC, whereas bladder perforations, pelvic haematoma, and storage LUTS were less common after transobturator tapes. The quality of many evaluated studies was limited.

Botulinum toxin A (Botox(R)) intradetrusor injections in adults with neurogenic detrusor overactivity/neurogenic overactive bladder (NDO/NOAB): a systematic literature review. *Karsenty G, Denys P, Amarenco G et al. Eur Urol. 2007 Oct 16; epub.* A total of 18 articles evaluating the efficacy or safety of Botox in patients resistant to antimuscarinic therapy, with or without clean intermittent self-catheterisation (CIC), were selected. Most of the studies reported a significant improvement in clinical (approximately 40-80% of patients became completely dry between CICs) as well as urodynamic (in most studies mean maximum detrusor pressure was reduced to <=40cm H(2)O) variables and in the patients' quality of life, without major adverse events. However, more adequately powered, well-designed, randomised, controlled studies evaluating the optimal dose, number and location of injections, impact on antimuscarinic regimen and CIC use, duration of effect, and when to perform repeat injections are warranted.

Urinary incontinence at orgasm: relation to detrusor overactivity and treatment efficacy. *Serati M, Salvatore S, Uccella S, Cromi A, Khullar V, Cardozo L, Bolis P. Eur Urol. 2007 Nov 20; epub.* This is the first study showing an inferior efficacy of antimuscarinic treatment in women with DO complaining of incontinence at orgasm or at penetration.

Intermediate-term outcome of the simplified laparoscopic antegrade continence enema procedure: less is better. *Nanigian DK, Kurzrock EA. J Urol. 2007 Nov 13; epub.* The Malone antegrade continence enema procedure revolutionized the surgical management of fecal incontinence. Laparoscopic antegrade continence enema is an effective means of treating intractable fecal incontinence and constipation. Our technique of using in situ appendix without cecoplication requires minimal mobilization and manipulation of the blood supply. Secondary ischemia, adhesions and scar formation are reduced, alleviating the most common complication, stomal stenosis. Our results show that cecoplication is not necessary to maintain stomal continence.

A patient-centered approach to developing a comprehensive symptom and quality of life assessment of anal incontinence. *Cotterill N, Norton C, Avery KN et al. Dis Colon Rectum. 2007 Nov 15; epub.* To identify question items required for a comprehensive symptom and quality of life assessment for individuals with anal incontinence is rather difficult. A consensus is reached that assessment should include the type, frequency and severity of incontinence, whether passive or associated with urgency, ability to delay and discriminate stool type, and "normal" bowel pattern with five key issues: unpredictability, toilet location, coping strategies, embarrassment, and social activity restriction. The currently available questionnaires do not capture comprehensive information on the issues identified as important by patient

Surgical strategies for faecal incontinence - a decision analysis between dynamic graciloplasty, artificial bowel sphincter and end stoma. *Tan EK, Vaizey C, Cornish J et al. Colorectal Dis. 2007 Nov 12; epub.* Artificial bowel sphincter (ABS) and dynamic graciloplasty (DG) and a permanent end stoma (ES) are surgical options for faecal incontinence (FI). All three procedures are cost-effective: ABS is the most cost-effective after 10 years, ES is most cost-effective over 5 years, DG maybe considered as an alternative in specialist centres.

The ProTect device in the treatment of severe fecal incontinence: preliminary results of a multicenter trial. *Giamundo P, Altomare D, De Nardi P et al. Tech Coloproctol. 2007 Dec 3; epub.* ProTect consists of a pliable, silicone catheter with an inflatable balloon that seals the rectum at the anorectal junction, acting like an anal plug. The proximal part of the catheter incorporates two contacts that monitor the rectum for the presence of feces. The patient is alerted to an imminent bowel movement and, hence, a potential fecal accident, through a beeper. In 11 subjects an overall significant improvement in the quality of life and a significant reduction in incontinence scores were demon

Correlation between anal sphincter defects and anal incontinence following obstetric sphincter tears: assessment using scoring systems for sonographic classification of defects. *Norderval S, Markskog A, Rossaak K, Vonen B. Ultrasound Obstet Gynecol. 2007 Dec 5; epub.* There is a positive correlation between the extent of sphincter defects and the degree of anal incontinence following primary repair of obstetric sphincter tears. Our findings highlight the importance of adequate reconstruction of the anal sphincters during primary repair.

A preliminary report on the use of a partially absorbable mesh in pelvic reconstructive surgery

ACHIM NIESEL (*) - OLIVER GRAMALLA (***) - AXEL ROHNE (*)

(*) Klinik Preetz, Department for Obstetrics and Gynecology, 24211 Preetz, Germany,

(***) SERAG-WIESSNER KG, Zum Kugelfang 8-12, 95119 Naila, Germany

Abstract: The physical characteristics of a synthetic implant used in pelvic reconstructive surgery are thought to play an important role in the causation of erosion and other complications of mesh implantation. This is in addition to the significant role of surgical technique and a patient's own risk factors. In this report the physical characteristics of non reabsorbable and partially reabsorbable meshes are examined and compared including weight, breaking strength, flexural rigidity and pore size. A preliminary study is reported where thirty patients underwent prolapse surgery with bilateral sacrotuberal fixation of the vault and mesh implants in the anterior and/or posterior vaginal wall using a partially reabsorbable mesh. Mean follow-up at 1 year demonstrated an erosion rate of 4-4.5% with a recurrence rate only in the anterior compartment of 12%.

Key words: Pelvic reconstructive surgery; Mesh erosion; Partially absorbable mesh.

INTRODUCTION

Conventional procedures for reconstructive vaginal surgery are burdened with recurrence rates of up to 30%.^{1,2} Many of these operations can result in a poor anatomical result and loss of the physiological vaginal axis. This may lead to secondary pelvic defects and functional pelvic problems. Since the introduction of mesh in pelvic organ prolapse (POP) surgery good anatomical restoration appears to be associated with lower recurrence rates and good functional outcome. Polypropylene tapes have proven to have good biocompatibility in vaginal tissues,³ but there are complications such as mesh erosion and extrusion.

In 2005 the International Urogynaecology Association (IUGA) Grafts Roundtable proposed a classification of simple and complex healing abnormalities⁴ which differentiates between them based on the timing of presentation relative to implantation, site of the lesion relative to suture line, the presence of inflammatory tissue and whether there are any affected viscera. Clinical experience has shown that most cases of erosion or extrusion are simple healing abnormalities. The density of graft material and other physical characteristics like pore size may play a significant role in tissue acceptance of mesh. Partially absorbable meshes have the advantage of weight reduction after resorption of a component of the graft. The aim of this retrospective study was to demonstrate the efficacy and safety of a partially absorbable polypropylene / polyglycolacid / ε-caprolacton mesh in pelvic reconstructive surgery especially in regard to the incidence of mesh erosion. We also describe the physical characteristics of this graft material in comparison to non absorbable meshes that are currently available.

MATERIALS AND METHODS

Between September 2006 and February 2007, a series of 30 consecutive patients underwent surgery for vaginal prolapse. The International Continence Society (ICS) Pelvic Organ Prolapse Quantification (POP-Q) staging system was used to assess the severity of pelvic organ prolapse.⁵ All patients reported in this study were assessed as POPQ Stage 3 or Stage 4. Tension-free placement of a partially absorbable mesh beneath the bladder or between the vagina and rectum was performed using a vaginal approach. The anterior transobturator mesh (ATOM) repair was performed in 25 of the 30 patients, while 22 underwent posterior graft implantation and all 30 underwent bilateral sacrotuberal fixation. In 13 cases a concomitant hysterectomy was done for

uterine prolapse POPQ Stage 2 or 3. Seventeen patients had a post-hysterectomy prolapse and 6 had suffered a recurrence following a traditional colporrhaphy. Mean age of patients was 68.5 yrs (range 53-80) with mean parity of 2.3 (range 1-8). After an interval of 2 weeks and again at a mean follow-up at 1 year (range 10-14 months) the patients were reassessed.

The surgical procedure involved a transvaginal placement of a mesh in areas of vesicovaginal and rectovaginal dissection according to the description of Fischer.⁶ In the posterior compartment a posterior vertical midline incision enabled the vagina to be dissected from the underlying tissues and the rectum separated from the vagina. The pararectal fossa was opened on each side. On each side 2 to 3 non resorbable sutures were fixed at the sacrotuberal ligament. The posterior mesh (SeraGYN® PFI, SERAG-WIESSNER, Germany) was cut to measure 6-8 cm in width and 10-15 cm in length. The upper part of the graft was attached to the vault and the sacrotuberal ligaments with the prefixed non resorbable sutures. The lateral edges of the mesh were fixed to the levator ani muscle and the lower edge to the perineum without tension. In this way a new rectovaginal septum with vault suspension by bilateral sacrotuberal fixation was performed.

When performing an anterior prolapse mesh procedure the bladder was dissected free from the vagina following an anterior vertical midline incision. The paravesical fossa was opened on each side. Bilateral transobturator passage of the trapezoid, four-armed mesh (Seratom® A PA, SERAG-WIESSNER, Germany) through the arcus tendineus fasciae pelvis was performed using the anterior transobturator mesh (ATOM) technique. The upper edge of the implant was attached to the sacrotuberal ligaments using sacrotuberal prefixed non resorbable sutures. A new vesicovaginal septum was thus created with bilateral sacrotuberal vault suspension.

The partially absorbable mesh consists of polypropylene (PP), polyglycolacid (PGA) and ε-caprolacton (PCL) as components of a monofilament thread. Six filaments of PP are coated with a co-polymer of PGA and PCL (Fig. 1). The distance between the PP-filaments is > 10 µm.

After 120 days PGA and PCL are absorbed and the multi-filament character of the six PP-fibres appears (Fig. 2).

The physical characteristics of the partially absorbable mesh are compared with three other frequently used grafts:

- Prolift®, GYNECARE, Johnson & Johnson, New Jersey, USA;

TABLE 1. – Comparison of physical characteristics of different meshes in pelvic reconstructive surgery.

Producer	Gynecare	AMS	Bard	SERAG-WIESSNER	
Product	Prolift®	Apogee® / Perigee®	Avaulta®	Seratom® A	Seratom® A PA (after resorption)
Material	Polypropylene	Polypropylene	Polypropylene + Collagen	Polypropylene	Polypropylene + Polyglycolacid+ ε-Caprolacton
Body structure	Edges are welded; Identical structure of body and arms; Arms and body are all of a piece; Arms unstable under tension (roll in)	Edges are cut; structure of body and arms are not identical Arms are sewed or rivet to the body; Arms are enfolded and unstable under tension (roll in)	Edges are cut; Identical structure of body and arms; Arms and body are all of a piece; middle part covered with collagen; Arms unstable under tension (roll in)	Edges are tongued; Identical structure of body and arms; Arms and body are all of a piece; the arms remain stable under tension	Like Seratom A;
Weight (g)	1.3 (anterior) 0.7 (posterior)	1.5 Perigee® (ant.) 1.0 Apogee® (post.)	0.8 (anterior)	0.5 usable for anterior and posterior repair	0.6 (0.3) usable for anterior and posterior repair
Weight in g/m ²	45	55	100	30	45 (15)
Thickness arm, thickness gauge mm	0.4	0.7	0.5	0.5	0.5
body, thickness gauge mm	0.4	0.5	0.4	0.4	0.4
Size of pores (large pores)					
Area of pores (mm ²)	7	6	1	11	11
Width of pores mm	3	3	2	3	3
Height of pores (mm)	3	3	1	5	5
Relation of pores in the mesh (body) %	60	50	50	80	70
Relation of pores in the mesh (arm) %		40			
Flexural rigidity axial (mg)	4	5	43	16	7 (2)
transverse (mg)	6	5	49	32	14 (3)
Breaking strength axial (arm) (N)	60	80	70	90	80

- Apogee®, Perigee®, AMERICAN MEDICAL SYSTEMS, Minnesota, USA;

- Avaulta anterior BioSynthetic mesh®, BARD, Covington, UK.

The subjects are:

- weight in g/m² and per item in g, measured with a precision balance (Mettler Toledo XP 204), accurate to 0.1 mg.

- breaking strength of the mesh arms in Newton (N), Universal Test Machine (Tira), information accurate to 0.01 Newton, test speed 500 mm/min, testing length 100 mm.

- flexural rigidity in mg, measured with Bending Resistance Tester (Gurley Precision Instruments) in both the longitudinal and transverse axis.

- area, width and height of a pore in mm, measuring the sizes of 5 pores with stereo microscope Stemi SV 11 (Zeiss) and calculating the mean, information accurate to 0.01 mm.

- pore content: relation of area of pores to area of the mesh in % after marking an area of 10 x 10 mm, stereo microscope Stemi SV 11 (Zeiss).

- thickness, according to destination of diameters of surgical used threads, thickness measuring gauge (Frank, type 16304, accurate to 0.001mm, test surface 0,8 cm², system test pressure 1,27 N/ cm²).

RESULTS

The prosthetic materials studied differ with regard to shape and physical characteristics (Tab. 1). Polypropylene and macro porosity as a basic structure are common to all of the implants. Avaulta® is additionally coated with a resorbable portion of collagen and Seratom® A PA is coated with polyglycolacid and ε-caprolacton. The Seratom® A PA mesh has the lowest weight after absorption of the resorbable part, while there is no information regarding the weight of Avaulta® after absorption of the collagen coating.

The thickness of each mesh varies between 0.4 and 0.7 mm. The width of the pores does not differ, but there is a wide range in regard to area and height. The areas of the pores make up 50 to 80 % of the total graft area. There is a wide variation in flexural rigidity of the different meshes ranging between 4 (lowest value after absorption: 2 mg) to 43 mg in the longitudinal axis and 5mg (after absorption: 3 mg) to 49 mg in transverse axis. In regard to the partially absorbable mesh itself the flexural rigidity is reduced for 71% (axial axis) - 79% (transverse axis) after absorption. Breaking strength demonstrates less variability between 60 and 90 N over all meshes.

We reviewed our patients 2-3 weeks after surgery. No relapse, mesh erosions or any other complications were observed. At follow up 10- 14 months after surgery anterior

compartment recurrence occurred in 3 patients (12 %) with POP-Q = Stage 2. There was no relapse in the middle or posterior compartment (POP-Q: Stage 0 or 1) (Tab. 2).

Vaginal erosion of the mesh as a simple healing abnormality affected one patient (4 %) after cystocele and one (4.5 %) after rectocele repair. The vaginal erosion measured <0.5 cm² in area and was treated by partial excision of the mesh as well as local application of estrogen.

There were no bladder or urethral erosions and no vaginal or pelvic infections.

The mean postoperative length of the vagina was 9.5 cm. Functional problems of dyspareunia and de-novo urge occurred in one patient in each case. De-novo stress incontinence was observed in 4 patients. Cystitis and temporary urine retention were seen in 2 cases.

TABLE 2. – Results of mesh supported prolapse surgery with a partially absorbable graft (Follow-up 10-14 months).

Compartment	anterior (n = 25) Seratom® A PA	Medium (Vault) (n = 30)	posterior (n = 22) Seragyn® PFI
relapse ≥ POPQ II° (%)	12%	0%	0%
mesh-erosion (%)	4% (n = 1)	0%	4,5% (n = 1)

DISCUSSION

A number of parameters affect the ability of a synthetic mesh to act as the perfect graft. These include: kind of material (e.g. polypropylene, polyester), textile construction (mass per unit area), configuration of the thread (monofilament, multifilament, fleece), pore size, elasticity, and the amount of ingrowth of connective tissue. Physical characteristics may play a significant role in respect to the biocompatibility of prosthetic materials in human tissue.

Partially absorbable meshes such as SeraGYN® PFI or Seratom® A PA are likely to have four advantages:

- weight reduction;
- monofilament surface during critical postoperative phase with less risk of inflammation;
- masking the hydrophobic surface of polypropylene. For this reason better acceptance in the tissue is expected;
- more softness, like multifilament grafts.

Previously available composite meshes such as Vypro II® (Ethicon, USA) were made of two separate threads of PP and polyglycolacid and did not meet the criteria of an ideal mesh for induration and shrinkage.⁷ The SeraGYN® PFI or Seratom® A PA partially absorbable graft consists of a single thread made up of a coating of polyglycolacid / ε-caprolacton and a core of six PP-filaments. The primary monofilament mesh has the advantage of avoiding early rejection or inflammation then it converts to a hexafilament graft with reduced rigidity after reabsorption of the cover. As the distance between the filaments is > 10 µm, the migration of leucocytes and macrophages, that may counter invading bacteria, is not hindered in contrast to conventional multifilament and microporous meshes (Amid II-IV classification).⁸

Seratom® A PA weighs 15 g/m² and contains the lowest proportion of foreign material in comparison with other grafts in this trial (Fig. 3). Despite the reduced weight no deficits were found in our in-vitro testing of stability and flexibility. In relation to flexural rigidity the partially absorbable graft demonstrates at least twofold less stiffness than

the non resorbable prosthetic materials. In respect to breaking strength the partially absorbable mesh is as firm as the other grafts.

It is apparent that physical properties of the prosthetic material contribute to the incidence of complications in pelvic floor reconstruction. There has been a lot of effort undertaken within the last few years to produce lightweight biocompatible grafts. Mesh erosions are not only caused by problems with surgical technique and patient's own risk factors but also by the kind of implant (Tab. 3). Julian,¹⁴ in a randomised controlled trial found an erosion rate of 25% with a Marlex PP mesh but in most trials it is quoted at 8-12%.⁹ Our experiences with the partially absorbable mesh show a considerably reduced erosion rate of 4-4.5% after a mean follow-up of 1 year (range 10-14 months). The erosions happened in the anterior as well as in the posterior vaginal wall in a very circumscribed area. The problem was resolved by simple excision of the small area of unincorporated mesh. No major visceral complications were seen.

The mesh proved as a safe and effective graft in pelvic floor reconstruction even in advanced vaginal prolapse (POP-Q Stage 3-4). This study is limited in that it is a retrospective survey in a small population without any quality of life questionnaire.

Efficient and objective trials are mandatory to fully evaluate the place for partially absorbable meshes. The Pareto-(partially resorbable transobturatoric) mesh study began in April 2007 as a prospective randomised multicenter study with the study center at the Gynecological Clinic, University of Freiburg, Germany. A non resorbable 6 armed PP-mesh prosthesis for reconstruction of cystocele and vault prolapse is compared with a partially absorbable graft of the same size. The primary question that has to be answered is if the erosion rate can be reduced by the use of the partially absorbable mesh. Other factors that are thought to affect the erosion rate will also be examined. These include collagen content, extracellular matrix proteins, degree of proliferation of vaginal epithelium and bacterial colonization. The surgical technique is standardized and follow-up is planned after 3 months, one and three years. First results for publication are expected at the end of 2008.

TABLE 3. – Factors in aetiology of mesh erosion

- As a consequence of operation
(simultaneous hysterectomy, inverse T- incision?,⁹ excessive excision of vaginal skin, extent of colpotomy,⁹ supra-fascial dissection,^{10,12} lack of experience,¹¹ taut suture of vaginal skin, excessive tension of mesh¹³)
- Patient risk factors
(poorly controlled diabetes mellitus, tobacco use,¹³ vaginal prolapse, POPQ ≤ 2,¹² repeat procedures, medication of cortisone, vaginal estrogen status, prior history of pelvic irradiation,¹³ age ≤ 70 years^{11,12})
- As a consequence of mesh characteristics
(graft according to Amid classification II-IV,⁸ large amount of foreign material)

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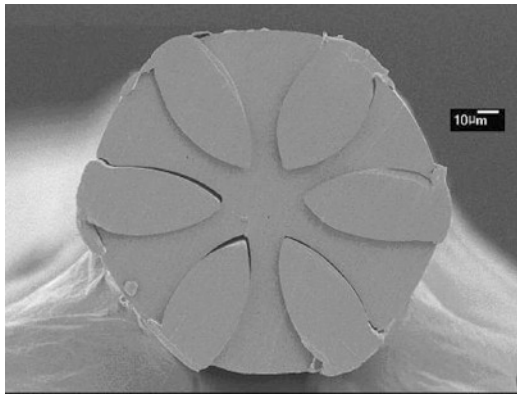


Fig. 1. – Cross section of partially absorbable Seramesh PA® and Seragyn® PFI thread with six filaments of PP and a coat of polyglycolacid and ε-caprolacton (scanning electron microscope). The distance between the PP- filaments is > 10 µm.

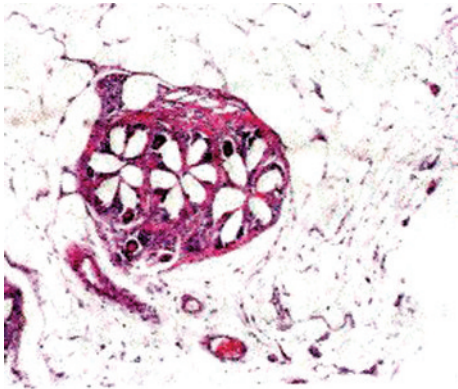


Fig. 2. – Histologic section of Seramesh PA® and Seragyn® PFI thread 120 days after implantation in rat tissue. The hexafilament profile of PP persists after absorption of the co- polymer of PGA and PCL.

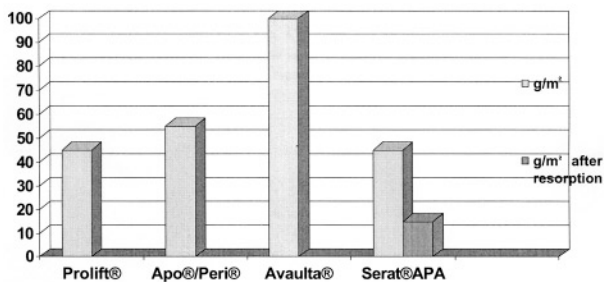


Fig. 3. – Weight of different meshes in g/m².

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Interests Declared:

- The authors state that there are no grants, pecuniary interests or financial support in relation to this study.
- The author OG is a textile engineer. As an employee at SERAG- WIESSNER KG. He declares his pecuniary and commercial interests.

Correspondence to:

Dr. ACHIM NIESEL
 Klinik Preetz, Department for Obstetrics and Gynecology,
 Am Krankenhaus 5, 24211 Preetz, Germany,
 Tel. 04342 801200, Fax. 04342 801258
 Email: a.niesel@klinik-preetz.de

Pelvic Floor Digest

continued from page 21

National trends and costs of surgical treatment for female fecal incontinence. *Sung VW, Rogers ML, Myers DL et al. Am J Obstet Gynecol. 2007;197:652.* This study describes national trends, hospital charges, and costs of inpatient surgical treatment for female fecal incontinence in the United States. From 1998 to 2003 21,547 women underwent inpatient surgery for fecal incontinence. This number has remained stable, with 3423 procedures in 1998 and 3509 procedures in 2003. The overall risk of complications was 15.4% and the risk of death was 0.02%. Total charges increased from \$34 million in 1998 to \$57.5 million in 2003, a significant economic impact on the health care system.

Prevalence and risk factors of fecal incontinence (FI) in women undergoing stress incontinence (IU) surgery. *Markland AD, Kraus SR, Richter HE. Am J Obstet Gynecol. 2007;197:662.* Women enrolled in a stress UI surgical trial have high rates of FI. Potential risk factors for (at least) monthly fecal incontinence (FI) in women presenting for stress urinary incontinence (UI) surgery are decreased anal sphincter contraction, perimenopausal status, prior incontinence surgery/treatment, and increased UI bother.

The PFD continues on page 27

A simple technique for intravesical tape removal

STAVROS CHARALAMBOUS - CHISOVALANTIS TOUNTZIARIS
CHARALAMBOS KARAPANAGIOTIDIS - CHARALAMBOS THAMNOPOULOS PAPATHANASIOU
VASILIOS ROMBIS

Department of Urology, "Hippokratio" General Hospital of Thessaloniki - Thessaloniki, Greece

Abstract: The tension-free vaginal tape (TVT) procedure has become the most frequently performed surgical technique for the treatment of stress urinary incontinence with cure rates reported at greater than 85%.¹⁻³ Nevertheless, these excellent results are associated with specific complications such as bladder perforation^{2,4} and vaginal, urethral and bladder erosion.⁵⁻⁸ Any undetected perforation or gradual erosion of the bladder wall may lead to a delayed recognition of an intravesical mesh. Herein, we describe a novel technique concerning mesh removal which requires minor instrumentation and results in the effective resection of intravesical tape.

Key words: Intravesical; Sling; Stress urinary incontinence; Tension-free vaginal tape.

CASE REPORT

A 63-year-old woman presented with recurrent urinary tract infections and dysuria, six months following a TVT procedure performed elsewhere. A physical examination revealed no abnormalities. A cystoscopy was performed and an intravesical mesh was identified entering just behind the right ureteral orifice and exiting from the right side of the bladder dome. The patient was then prepared for mesh removal. A 26 Fr resectoscope was introduced into the bladder and subsequently reached the tape. The mesh was resected in the same way as a deep resection of a bladder tumor, with the loop in constant contact with the bladder wall (Fig. 1). Primarily, an incision was made at the exit point of the bladder dome following adequate filling of the bladder, in order for the tape to be stretched. The same procedure was repeated at the point of tape entrance adjacent to the trigone, and the resectoscope subsequently withdrawn. A 26 Fr cystoscope was introduced into the bladder and the free piece of tape was grasped and removed intact via the sheath of the cystoscope (Fig. 2). The patient had an uneventful recovery. A follow-up cystoscopy, performed one month postoperatively, showed no evidence of a mesh or

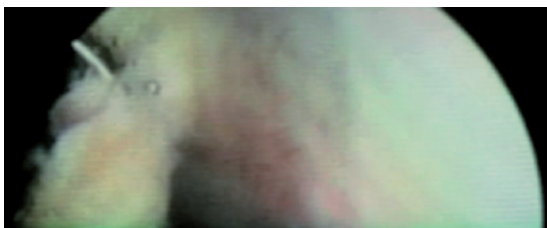


Fig. 1. – Resection of intravesical mesh during a cystoscopy using a resectoscope.



Fig. 2. – The free piece of mesh (3 cm) has been removed from inside the bladder by a grasper.

other abnormality. Follow-up data, one year post surgery, showed no signs of SUI recurrence.

DISCUSSION

Bladder perforation during insertion of TVT is a common operative complication with rates varying from 5 to 19%.²⁻⁴ However, if the condition is recognized intra-operatively, repositioning of the passer and drainage of the bladder for 24-48 h are the sole methods required for resolution of the problem. Therefore, a cystoscopy using a 70° angle is necessary to carefully inspect the entire surface of the bladder. In addition, full vesical distention is necessary, as folds of the bladder mucosa may conceal the tape. In addition, submucosal placement of the tape must not go unrecognised.

However, an intravesical mesh may be detected during a late cystoscopy in a patient experiencing recurrent urinary tract infections or hematuria following a TVT procedure. This complication, occurring and remaining unidentified at the time of surgery or developing by gradual penetration of the bladder wall, represents an operative challenge. Several approaches to this problem have been proposed. Volkmer et al.⁸ proposed an open suprapubic approach with cystotomy for tape removal. Jorion described a method using a laparoscopic grasper via a suprapubic trocar using a transurethral nephroscope for inserting a laparoscopic scissors to cut the tape.⁹ Baracat et al.¹⁰ performed the excision in a similar fashion. Kielb and Clemens described a technique, which uses a laparoscopic scissors via a suprapubic trocar and a cystoscope to visualize and grasp the tape.¹¹ In an attempt to reduce the invasiveness and morbidity associated with the procedure, Giri et al.¹² in addition to Hodroff et al.¹³ reported and described cases treated with transurethral holmium laser excision.

Our technique uses a resectoscope and a cystoscope, common transurethral instrumentation, which are easily accessible in all urological departments. We believe the described technique in the present study should represent the initial approach for the removal of an intravesical mesh.

CONCLUSIONS

Urologists should exercise caution concerning cases with persisting symptoms resulting from lower urinary tract infection following TVT surgery, due to the possibility of the presence of an intravesical mesh. In such cases, the technique described herein can be easily performed and is less invasive, ensuring low morbidity.

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Correspondence to:

STAVROS N. CHARALAMBOUS MD PhD FEBU
Urological Surgeon
Vice-Director of Urological Department
Hippokratia General Hospital
49 Kostantinoupoleos str
55236, Thessaloniki, Greece
Tel. +3023 10892307 - Fax +2310 30 826666
E-mail: st.charalambous@gmail.com

Pelvic Floor Digest*continued from page 25***7 – PAIN**

Comparative measurement of pelvic floor pain sensitivity in chronic pelvic pain. *Tu FF, Fitzgerald CM, Kuiken T et al. Obstet Gynecol. 2007;110:1244.* Women with pelvic pain conditions exhibit enhanced somatic pain sensitivity at extragenital sites. Whether comparable differences exist for pelvic floor or vaginal pain sensitivity is unknown. Comparing 14 women with chronic pelvic pain to 30 healthy women without this condition and using a prototype vaginal pressure algometer, we recorded continuous ascending pressure and determined each subject's pressure-pain threshold at each of eight paired pelvic floor sites and two adjacent vaginal sites. Thresholds were significantly lower in women with pelvic pain (at iliococcygeus). Pelvic floor and vaginal site pain detection thresholds had moderate-to-strong correlations with each other.

Re-imaging interstitial cystitis. *Hanno PM. Urol Clin North Am. 2008;35:91.* An "antiproliferative factor" has been postulated in the etiologic pathway of the painful bladder syndrome/interstitial cystitis, but without any dramatic breakthroughs in the field. Other looks with regard to epidemiology, etiology, and clinical treatment are being taken.

Chronic prostatitis/chronic pelvic pain syndrome. *Pontari MA. Urol Clin North Am. 2008;35:81.* Prostatitis is not any more referred to inflammation in the prostate, often attributed to an infection, but rather to a chronic pain syndrome for which the presence of inflammation and involvement of the prostate are not always certain. The article discusses this syndrome and the various factors associated with diagnosis and treatment.

Vulvodynia: new thoughts on a devastating condition. *Gunter J. Obstet Gynecol Surv. 2007;62:812.* The article explores 3 factors that may contribute to inconsistent results with therapy; the hypothesis that vulvodynia is a systemic disorder; the idea that failure to address the psychological or emotional aspect or chronic pain may affect outcome; and the concept that chronic vulvar pain, like headache, is not a single condition but is a diverse group of disorders that produce the same symptom.

Vulvodynia: case report and review of literature. *Gumus II, Sarifakioglu E, Uslu H, Turhan NO. Gynecol Obstet Invest. 2007;65:155.* Vulvodynia is a chronic pain syndrome affecting up to 18% of the female population, defined as chronic vulvar burning, stinging, rawness, soreness or pain in the absence of objective clinical or laboratory findings. A case accompanying somatoform disorder and depression is presented.

Painful bladder syndrome/interstitial cystitis and vulvodynia: a clinical correlation. *Peters K, Girdler B, Carrico D et al. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Nov 24; epub.* Vulvodynia affects 25% of women with painful bladder syndrome/interstitial cystitis (PBS/IC). To clinically evaluate the association of PBS/IC and vulvodynia and possible contributing factors, a group of 70 women were divided in 2 subgroups with and without vulvodynia for comparison. Average levator pain levels were significantly greater in those with vulvodynia and there were no differences in number of pelvic surgeries, sexually transmitted infections, vaginitis or abuse history.

Serum paraoxonase-1 activity in women with endometriosis and its relationship with the stage of the disease. *Verit FF, Erel O, Celik N. Hum Reprod. 2007 Nov 13; epub.* Oxidative stress may play a role in the pathophysiology of endometriosis. Serum paraoxonase-1 (PON-1) is a high-density lipoprotein (HDL) associated enzyme that prevents oxidative modification of low-density lipoprotein (LDL). The serum PON-1 activity in women with endometriosis was significantly lower compared to controls and a negative correlation was found with the stage of the disease.

8 – FISTULAE

Limited anterior cystotomy: a useful alternative to the vaginal approach for vesicovaginal fistula repair. *Hellenthal NJ, Nanigian DK, Ambert L, Stone AR. Urology. 2007;70:797.* Most vesicovaginal fistulas are corrected using a transvaginal approach. A novel abdominal approach is described, using a small anterior cystotomy and omental pedicle interposition.

The PFD continues on page 30

Unusual vulvar cystic mass - suspected metastasis

CHARLOTTE NGO - RICHARD VILLET

Groupe Hospitalier Diaconesses Croix Saint Simon, Paris, France

CASE REPORT

This 73 year old caucasian woman with a previous history of breast and colon adenocarcinomas was complaining about a growing vulvar mass, with hypoaesthesia of the glans clitoridis. Examination found a tender vulvar mass located deeply in the anterior part of the left labium majora, above the urethral meatus, close to the clitoris and pubic symphysis.

There was no local inflammation. MRI showed a 3cm independent cystic mass with a thick wall between the pubic symphysis and the urethra. Surgical excision was done with a longitudinal incision between the hymen and the labium minor. The mass was freed medially from the clitoris and posteriorly from the pubic bone aponeuroses, through bulbospongi-

osus, ischiocavernosus muscles and nervus dorsalis clitoridis. Histopathology confirmed an inflammatory benign mucinous cyst, partially calcified, compatible with a Mullerian duct cyst or Gartner duct cyst. Two months after surgery the patient had recovered normal anatomy and function.

Correspondence to:

Dr. RICHARD VILLET
Groupe Hospitalier Diaconesses Croix Saint Simon
18 rue du Sergent Bauchat
75012 Paris, France
E-mail: rvillet@hopital-dcss.org

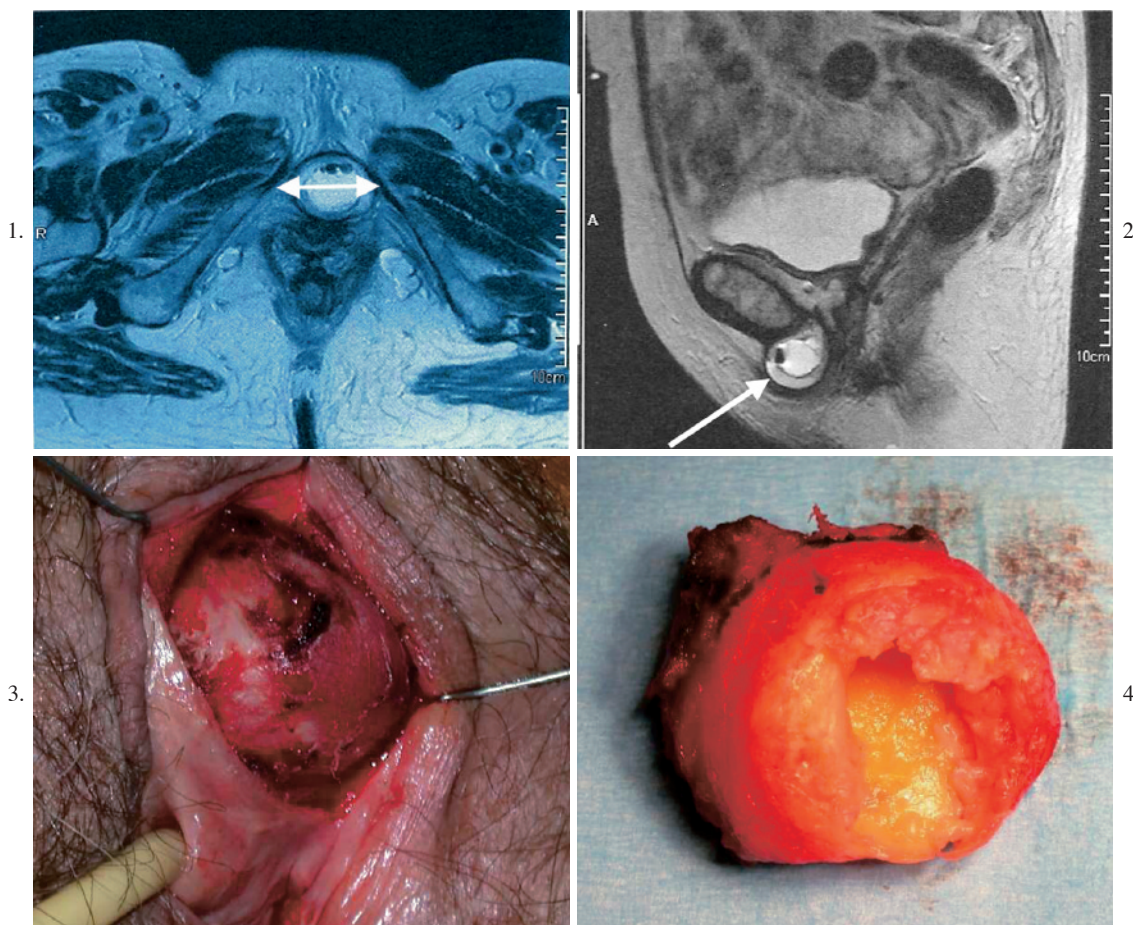


Fig. 1. – MRI transverse view; Fig. 2. – MRI Lateral view; Fig. 3. – Periurethral mass - intraoperative view; Fig. 4. – Pathological specimen of excised mass.

The T.A.P.E. (Three Axes Perineal Evaluation) freeware: a good tool to introduce you to Perineology

Jacques Beco, Liege University, Belgium

In the past each specialist of the perineum, the gynecologist, the urologist and the colo-proctologist, has to deal with two main symptoms: one which reflects a failure to maintain the door closed (incontinence) and one which is linked to a difficulty to open the way (obstruction). In this old approach the only problem of the specialist is to treat "his incontinence" without creating "his obstruction" and reverse.

For example, the urologist working only on "his axis" has to treat urinary incontinence without creating dysuria or to treat dysuria without inducing urinary incontinence. The gynecologist has to treat genital prolapse (vaginal incontinence to solid) without inducing dyspareunia or to treat dyspareunia without creating prolapse. The coloproctologist is facing the same problem on his "axis" with anal incontinence and dyschesia. This "mono axis" approach has explained many severe iatrogenic dysfunctions unknown by the surgeons who weren't aware of the side effects they have created on the other axes. The Burch's colposuspension is a very good example of this drama.¹

One of the main issues in Perineology is to obtain a complete history of the patient including the three axes (gynecological, urological and colo-proctological). Because each of these axes has two ends, one "incontinence" and one "obstruction", it is possible to draw a radar diagram including these six main symptoms (dyspareunia, prolapse, dysuria, urinary incontinence, dyschesia, anal incontinence). We called this diagram "T.A.P.E." for "Three Axes Perineal Evaluation".²

In its first version each of the six symptoms was evaluated according to a three level ordinal scale: 0 = no problem, 1 = mild problem, 2 = severe problem. If the patient was completely normal, the shape of the TAPE was hexagonal (Fig. 1).³⁻⁵

This version was already interesting because if you have this diagram in your mind it is impossible to treat a patient without taking care of all her symptoms. The first weakness of this approach was the rough evaluation of the symptoms which has not been validated and was not recognized by the peers. The second one was the difficulty to draw this diagram and to use it in the practice. The third one was the lack of evaluation of perineodynia (painful perineum) which can be the main symptom in this area.

The T.A.P.E. freeware was created to correct all these weakness. It has been realized in collaboration with Mr Fabian Terf and financed by the sponsors of the Groupement Européen de Périnéologie (GEP).

With this freeware, the TAPE can be draw immediately by just entering the data. You can choose the validated questionnaire you want for each symptom. If there is no questionnaire available for one symptom, our three levels scale can still be used. By this way you can obtain quickly a three axes, easily comprehensible and validated evaluation of your patient. A visual analog scale has been added for the evaluation of pain (Fig. 2).

It is possible to print each evaluation of the patient separately or the complete file with all the evaluations to follow the effects of the different treatments during the time.

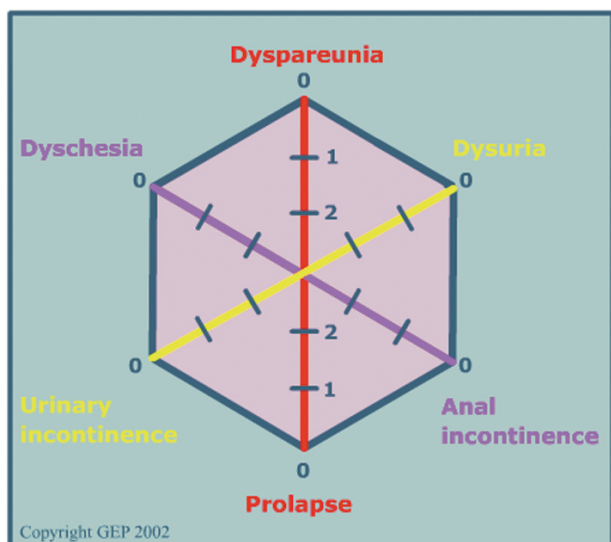


Fig. 1. – First version of the TAPE.

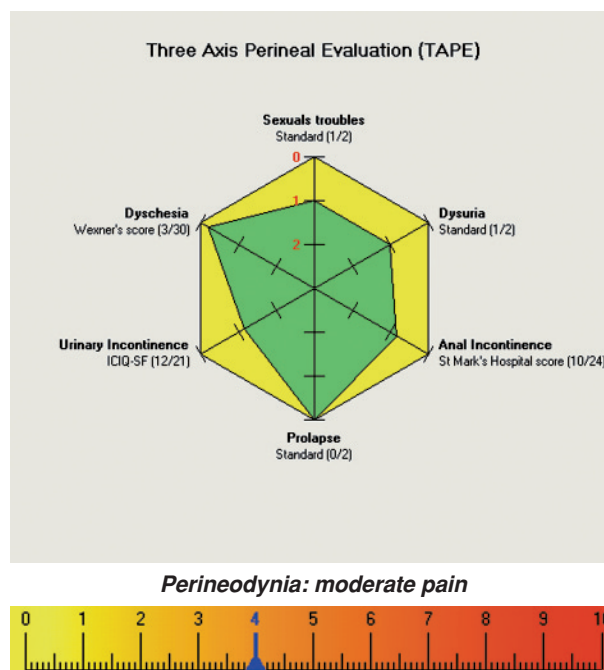


Fig. 2. – New version of the TAPE.

All the data can be exported to an excel file for statistics. The file with the image of the diagram is also available to be used in a presentation or a publication.

This freeware can be downloaded after simple registration (to be informed of the software updates) by using this link: <http://www.binarybs.com/tape.php?lg=en>. To use this software you need to have Windows installed on your computer or a Windows emulator for Mac. Please note that this software will operate on a Mac computer only if you have a windows emulator.

Of course the evaluation obtained with a TAPE is not as complete as the one obtained by a Short-IPGH system⁶ but it is a first relevant step to become a real perineologist by analyzing the effect of your treatments on the main symptoms of the three perineal compartments. It is just the beginning of the story...

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CONTACT DETAILS:

Contact the GEP via the website at www.perineology.com
Dr Jacques Beco E-mail: jacques.beco@skynet.be

Pelvic Floor Digest

continued from page 27

Initial experience on efficacy in closure of cryptoglandular and Crohn's transsphincteric fistulas by the use of the anal fistula plug. Schwandner O, Stadler F, Dietl O et al. *Int J Colorectal Dis.* 2007 Nov 22; *epub.* The success rate for the Cook Surgisis(R) AFPtrade mark anal fistula plug for the closure of complex anorectal fistulas both in cryptoglandular and Crohn's associated fistulas was 61% (12 of 18 patients). Further analysis is needed to explain the definite role of this innovative technique in comparison to traditional surgical techniques.

The role of transperineal ultrasonography in the assessment of the internal opening of cryptogenic anal fistula. Kleinubing H Jr, Janini JF, Campos AC et al. *Tech Coloproctol.* 2007 Dec 3; *epub.* Transperineal ultrasonography and hydrogen-peroxide injection are superior to physical examination in the identification of internal openings in anal fistulas.

9 – BEHAVIOUR, PSYCHOLOGY, SEXOLOGY

Abuse in women and men with and without functional gastrointestinal disorders (FGID). Alander T, Heimer G, Svardstudd K, Agreus L. *Dig Dis Sci.* 2007 Nov 30; *epub.* Women with FGID had a higher risk of having a history of some kind of abuse. Women with a history of abuse and FGID had reduced health-related quality of life. Thus previous abuse must be considered by the physician for diagnosis and treatment of the FGID.

The effects of bilateral caudal epidural S2-4 neuromodulation on female sexual function. Zabihi N, Mourtzinos A, Maher MG et al. *Int Urogynecol J Pelvic Floor Dysfunct.* 2007 Nov 30; *epub.* Stimulation of S2-4 by bilateral caudal epidural neuromodulation in this small group of women with voiding dysfunction, retention, and/or pelvic pain resulted in self-reported improvements in sexual function.

Female sexual dysfunction: what's new? Mayer ME, Bauer RM, Schorsch I et al. *Curr Opin Obstet Gynecol.* 2007;19:536. Future research may provide new diagnostic, treatment algorithms (pharmacological and nonpharmacological) suitable for use in daily clinical practice to approach the different categories of female sexual dysfunction symptoms.

Sexual function following anal sphincteroplasty for fecal incontinence. Pauls RN, Silva WA, Rooney CM et al. *Am J Obstet Gynecol.* 2007;197:618. Sexual activity and function was similar following anal sphincteroplasty, compared with controls, despite symptoms of fecal incontinence. Fecal incontinence of solid stool and depression related to fecal incontinence were correlated with poorer sexual H

Sexual function after vaginal surgery for pelvic organ prolapse and urinary incontinence. Pauls RN, Silva WA, Rooney CM et al. *Am J Obstet Gynecol.* 2007;197:622. The most bothersome barrier to sexual activity before repair is vaginal bulging, postoperatively vaginal pain. Sexual function is unchanged following vaginal reconstructive surgery (49 cases) despite anatomic and functional improvements; lack of benefit may be attributable to postoperative dyspareunia.

Sexual function before and after sacrocolpopexy for pelvic organ prolapse. Handa VL, Zyczynski HM, Brubaker L et al. *Am J Obstet Gynecol.* 2007;197:629. Most women (224 cases) reported improvements in pelvic floor symptoms that previously interfered with sexual function. The addition of Burch colposuspension did not adversely influence sexual function.

10 – MISCELLANEOUS

Anal intraepithelial neoplasia and other neoplastic precursor lesions of the anal canal and perianal region. Shepherd NA. *Gastroenterol Clin North Am.* 2007;36:969. Anal intraepithelial neoplasia is closely linked to human papillomavirus infection and is particularly common in homosexuals and in immunosuppressed patients. High grades of anal intraepithelial neoplasia may remain static for long periods of time in immunocompetent patients, but those with HIV/AIDS show early and rapid malignant transformation. In general most anal pre-neoplastic conditions are best diagnosed by biopsy and treated by surgical excision, although local recurrence is a problem.

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Dr B Farnsworth, PO Box 1094, Wahroonga 2076 Australia e-mail: drbruce505@yahoo.com.au

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Each of the following sections must start on a new page: 1) Title, Summary and Key Words, 2) Introduction, 3) Materials and Methods, 4) Results, 5) Discussion, 6) References, 7) Tables, 8) Legends.

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Discussion: Emphasize only the new and most important aspects of the study and their conclusions.

Acknowledgments: Mention only those that give a substantial contribution.

References: References in the text must be numbered in the order of citation. References in text, tables and legends must be identified with Arabic numerals in superscript. The style of references and abbreviated titles of journals must follow that of Index Medicus or one of the examples illustrated below:

1) Article from a Journal (Index Medicus):

a) *Standard:*

MacRae HM, McLeod RS. Comparison of haemorrhoid treatment modalities: a metaanalysis. *Dis Colon Rectum* 1995; 38: 687-94.

Court FG, Whiston RJ, Wemyss-Holden SA, Dennison AR, Madern GJ. Bioartificial liver support devices: historical perspectives. *ANZ J Surg* 2003; 73: 793-501.

or:

Court FG, Whiston RJ, Wemyss-Holden SA, et al. Bioartificial liver support devices: historical perspectives. *ANZ J Surg* 2003; 73: 793-501.

b) *Committees and Groups of Authors*

The Standard Task Force, American Society of Colon and Rectal Surgeons: Practice parameters for the treatment of haemorrhoids. *Dis Colon Rectum* 1993; 36: 1118-20.

c) *Cited paper:*

Treitz W. Ueber einem neuen Muskel am Duodenum des Menschen, uber elastische Sehnen, und einige andere anatomische Verhaeltnisse. *Viertel Jahrschrift Prar. Heilkunde (Prager)* 1853; 1: 113-114 (cited by Thomson WH. The nature of haemorrhoids. *Br J Surg* 1975; 62: 542-52. and by: Loder PB, Kamm MA, Nicholls RJ, et al. Haemorrhoids: pathology, pathophysiology and aetiology. *Br J Surg* 1994; 81: 946-54).

2) Chapter from a book:

Milson JW. Haemorrhoidal disease. In: Beck DE, Wexner S, eds. *Fundamentals of Anorectal Surgery*. 1st ed. New York: McGraw-Hill 1992; 192-214.

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