Vol. 26
N. 4
December 2007

Rivista Italiana di Colon-Proctologia
Founded in 1982

PELVIPERINEOLOGY

A multidisciplinary pelvic floor journal

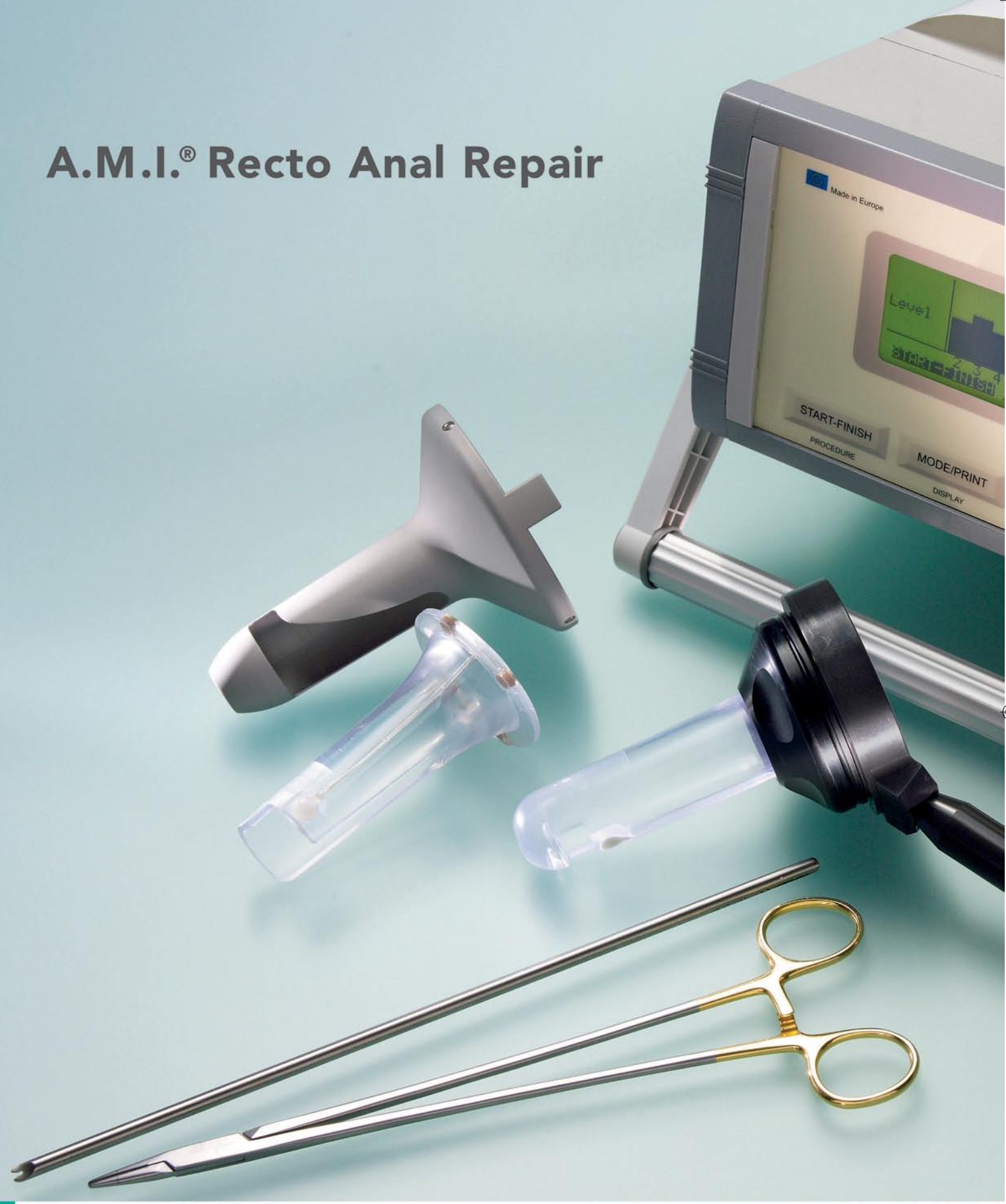
www.pelviperineology.org

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

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
Quarterly journal of scientific information registered at the Tribunale di Padova, Italy n. 741 dated 23-10-1982
Editorial Director: GIUSEPPE DODI
Printer "La Garangola" Via E. Dalla Costa, 6 - 35129 Padova - e-mail: info@garangola.it

Australian Production Minnis Communications 4/16 Maple Grove, Toorak, Vic 3142, Australia, e-mail: minnis@minniscomms.com.au

A.M.I.® Recto Anal Repair



For pain-free treatment of prolapsing haemorrhoids

- Artery ligation and lifting of protruding mucosa in one session
- Easy to handle and highly effective
- Minimally invasive with no general anaesthesia required

A.M.I.®
Agency for Medical Innovations

A.M.I.® Agency for Medical Innovations . Im Letten 1 . 6800 Feldkirch . Austria . **t** +43 5522 90505-0 . **f** 90505-4006 . **e** info@ami.at . **www.ami.at**

Editorial

FUTURE DIRECTIONS

This edition of Pelviperineology is the final edition of Volume 26 and is the last issue of our first year in English. We have seen a steady growth in interest in the journal with 4 international societies currently negotiating to collaborate with Pelviperineology and produce the journal in their region. Pelviperineology is printed in the same format around the world and in some countries is accompanied by a local language edition or a newsletter.

One of the societies that we will be working closely with in the future is the International Pelvic Floor Dysfunction Society. The IPFDS is an organization whose aims and agenda are very similar to AAVIS. Unfortunately the IPFDS has been forced to cancel the planned meeting in Moscow this April due to logistic reasons and rather than allow the society to have no meeting this year AAVIS has issued an invitation to the IPFDS to join us in our 10th Annual Scientific Meeting at Padua and Venice in 2008. The combined AAVIS-IPFDS meeting looks like being an excellent combination of the old world and the new. Already a number of workshops and symposia have been planned and now a number of new speakers and topics have been brought into the program.

The Congress in Venice will be preceded by workshops and symposia to be held at the University of Padua. These include a cadaver workshop in the anatomy department at Padua where an anatomy school has been located since the 13th century. Carl Zimmerman and Richard Reid will host a workshop on Vaginal Focal Defect Repair. Dr Bernie Brenner will conduct his excellent workshop on Ethics with special emphasis on dealing with commercial pressures in practice and relating with colleagues. Peter Petros will conduct his workshop on the Integral Theory and TFS device. There will be a number of other sessions relating to incontinence, prolapse and new technologies. A special session will be dedicated to the assessment and management of obstructed defecation with a parallel session on voiding difficulty.

This year AAVIS will be trialing a new system of abstract presentation. All abstracts submitted will be accepted and displayed at the meeting and on the internet for one month prior to the meeting. Each registered attendee at the meeting will have the opportunity to vote on the abstracts. The best abstracts will be announced in the final session and published in this journal.

Further information regarding our expanded program will be posted on the AAVIS Website at www.aavis.org *as it becomes available.*

On a sad note the end of 2007 was marked by the death of Professor Ahmed Shafik from Cairo. A doctor of immense stature in Europe and South America where he had a very high profile but less well known in the English speaking world Professor Shafik stood out as a leader in his chosen field. You will find two separate tributes to Professor Shafik within this edition of the journal.

THE EDITORS

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 (75 euro), 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.

ETHICON
Women's Health & Urology

A division of Johnson & Johnson Medical Ltd.

NEW

Gynecare
TVT SECUR* System

Tension-free Support for Incontinence

No bigger than your palm.
No less than a revolution.

A breakthrough in Minimally Invasive SUI Technology

For further information visit "www.jnjgateway.com" or call 1-800-252-194 in Australia, 0039-06-911-94-500 in Italy, or 1-888-GYNECARE in the United States.

introducing 2 of Our Latest Portfolio

Gynecare
PROLIFT*

Pelvic Floor Repair Systems

Evolution in design for pelvic floor restoration

Designed to enhance your surgical technique with an innovative, standardised system

Original article

The clinical role of the gracilis muscle: an example of multidisciplinary collaboration

ENRICO VIGATO (*) - VERONICA MACCHI (**) - CESARE TIENGO (*) - BRUNO AZZENA (*)
ANDREA PORZIONATO (*) - ALDO MORRA (****) - CARLA STECCO (*) - GIUSEPPE DODI (***)
FRANCESCO MAZZOLENI (*) - RAFFAELE DE CARO (**)

(*) Section of Plastic Surgery, Department of Medical and Surgical Sciences, University of Padova, Italy
(**) Section of Anatomy, Department of Human Anatomy and Physiology, University of Padova, Italy
(***) Section of Surgery, Department of Oncological and Surgical Sciences, University of Padova, Italy
(****) Section of Radiology, Euganea Medica Group, Padova

Abstract: The gracilis muscle is widely used in reconstructive surgery as either a pedicled or free flap for soft tissue coverage or as a functioning muscle transfer. Many studies based on cadaveric dissection have focused on the vascular anatomy of the gracilis muscle providing uncertain data about the number, origin and calibre of its vascular pedicles. Computed Tomography (CT) angiographies of 40 patients (35 males and 5 females, mean age: 63 years) have been analyzed bilaterally to perform a detailed anatomical study of the gracilis vascular supply. The main pedicle penetrates the gracilis muscle at a mean distance (± S.D.) of 10 ± 1 cm from the ischiopubic branch. Its calibre shows a mean value of 2.5 ± 0.5 mm, and it is statistically larger when directly originating from the deep femoral artery versus when arising from the artery of the adductors ($p < 0.01$). The muscle belly has a mean length of 30 ± 2.1 cm. A significant correlation between the calibre of the main pedicle and the volume of the gracilis muscle was found ($p < 0.01$). The mean number of the accessory pedicles is 1.8 (range 1-4). Based on the results of our study, a 54 year old woman suffering from a recurrent recto-vaginal fistula underwent CT angiography to plan a proximally pedicled gracilis flap. CT angiography showed that the entrance point into the gracilis muscle was located 10.3 cm distal from the pubis and that the length of the muscle belly was 28 cm. This data was useful for planning the graciloplasty, since that part of the dominant pedicle and the distal myotendineuos junction was long enough for the surgical procedure. Using this information pre-operatively surgeons could minimize the extent of dissection and avoid retrograde mobilization of the dominant pedicle, thus reducing the risk of iatrogenic damage. CT angiography could be a useful pre-operative study for the plastic surgeon when planning a gracilis flap, allowing better patient selection and providing a detailed description of the muscular and vascular structures of the thigh.

Key words: CT angiography; Vascular anatomy; Gracilis; Muscular flap; Rectovaginal fistula.

INTRODUCTION

Gracilis muscle is widely used in reconstructive surgery, either as a pedicled flap or as a free microsurgical flap. Both pedicled and free flaps can be muscular or musculocutaneos (the so- called "composite flaps").[1] As a pedicled flap, gracilis muscle can be used in perineal and vaginal reconstruction, after oncological surgery,[2] in the treatment of recurrent anovaginal and rectovaginal fistulas[3] as well in the coverage of the neurovascular bundle after vascular surgery.[4] As a functioning pedicled flap the gracilis muscle can be transferred for the treatment of anal incontinence. This technique called graciloplasty was described in the 1950's by Pickrell [5] and was revolutionized in the late 1980's by the introduction of chronic muscle electrostimulation.[6] The gracilis microsurgical free flap is commonly used in the reconstruction of upper and lower limbs, in breast reconstruction [7] and, as a free functioning flap, to restore forearm function or in dynamic reconstruction of facial paralysis.[8]

The reason why this muscle has been favored by reconstructive surgeons is that it has reliable vascular and neurological pedicles and the minimal donor-site morbidity. This muscle can also be easily harvested and its multi-fascicular innervation allows safe muscular debulking preserving contractility.[9] In the literature the neurovascular anatomy of the muscle has been investigated in relation to its use as both a muscular flap and as a myocutaneous flap, but there is no general agreement about the anatomical characteristics of its main and accessory pedicles, especially considering their origin and calibre. The aim of the present study is to evaluate the anatomical vascular features of the gracilis muscle using Computed tomography (CT) angiography in order to assess its suitability in reparative surgery of rectovaginal fistula.

MATERIALS AND METHODS

Anatomoradiological study

Analysis of the characteristics of the gracilis muscle and of its vascular pedicle was performed using CT angiography in 50 patients (40 Male, 10 Female), randomly retrieved from the archive at the diagnostic centre "Euganea Medica" (Albignasego, Padova). The patients had undergone CT examination for atherosclerotic pathology. The CT images were obtained using a 16-slice multidetector CT scanner (Lightspeed 16; General Electric medical System; Milwaukee, WI, USA) with the following parameters: thickness 2.5 mm, speed 27.5, kV 120, mA 300. The analysis and post-processing of the CT scans have been realized on workstation Terarecon 3.6.2.3 Acquarius. Ten patients were excluded from the study due to excessive modification of the vascular anatomy. CT angiographies of both inferior limbs of the remaining 40 patients were carefully analyzed, focusing on the arteries directed towards the gracilis muscle.

The following morphological parameters have been recorded: 1. length of the muscle (L), measured between its pubic and tibial attachments, 2. length of the muscle belly, measured between its proximal and distal myo-tendineous junctions 3. anteroposterior and laterolateral diameters (AP and LL) of the muscle belly, measured at the entrance point of the main vascular pedicle. An estimated volume of the muscle has also been calculated (L x AP X LL). All the measurements have been performed on both inferior limbs (80) in order to make a comparison between the sides. Moreover, the following characteristics of the main vascular pedicle have been recorded: origin, course, calibre, presence of proximal accessory pedicles, distance between the entrance point into the muscle and the pubis. The origin of the main vascular pedicle has been classified as 1. from the deep femoral artery; 2. from the artery for the adductor muscles; 3. from the medial circumflex artery of the femur. The calibre of the vessels has been measured at the entrance point into the muscle. Furthermore, the following characteristics of the accessory pedicles have been recorded: number, origin, course, calibre, and distance from the pubis of their entrance point into the muscle. The accessory pedicles easily recognizable on CT-scans and clearly directed towards the gracilis muscle have been considered.

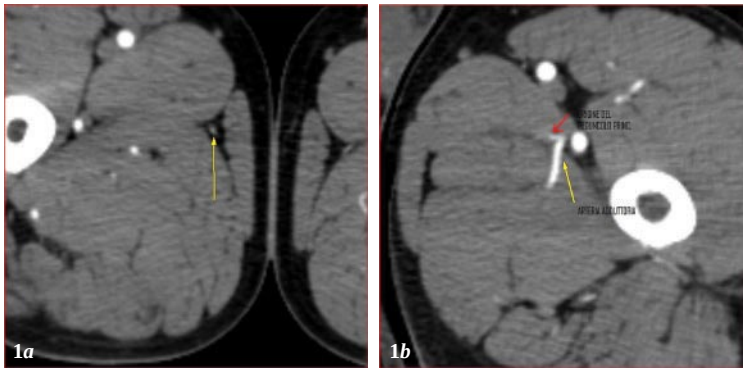


Fig. 1. – *a)* Transverse image of CT angiography at the level of the point of entry of the main pedicle into the gracilis muscle (yellow arrow). *b)* Transverse image of CT angiography showing the origin of the dominant pedicle for gracilis muscle from the artery for the adductors.

The results for each parameter are expressed in mean values (± SD) and range of value. In order to reveal correlation between the volume of the muscle and the calibre of its main vascular pedicle, and between the calibre of the main pedicle and the artery from which it originated, statistical analysis was performed by the one-way ANOVA test. $P<0.05$ was considered to be statistically significant. Statistical calculations were carried out by Prism 3.0.3 (GraphPad Software Inc., San Diego, CA, USA).

RESULTS

Gracilis muscle was identified in all the patients. It has a mean length of 41 ± 2.1 cm (37-45). The muscle belly shows a mean length of 30 ± 2.1 cm (27-34). At the entry point of its main vascular pedicle, the muscle has mean AP diameter of 44 ± 1 mm and mean diameter LL of 11 ± 2 mm.

The dominant pedicle originates from the artery for adductors in 46% of cases, in 45% of cases directly from the deep femoral artery and in the remaining cases (9%) from the medial circumflex artery. In 19% of patients the pedicles of left and right gracilis muscles originate from different vessels. The calibre of the main pedicle is quite large (2.5 mm). A correlation between the calibre of the main pedicle and its origin has been found ($p = 0.0056$): when the dominant pedicle is a direct branch of the deep femoral artery, it shows a wider calibre (mean calibre 2.7 mm) than when it is a branch of artery for adductors (mean calibre 2.3 mm).

CT angiography proved to be very reliable in following the course of the main vascular pedicle, from its origin to the deep aspect of the muscle. Independently from its origin, the main pedicle passes between adductor longus and adductor brevis muscles, reaching the deep aspect of the gracilis muscle. The entrance point into gracilis muscle was 10 ± 1.3 cm distal from the pubis. At the point of entrance into the muscle, the pedicle splits in minor branches, generally two, with opposite directions, which enter into the muscle, creating a 'hilum'. The distal branches enter into the muscle 5 cm below the most cranial ones after which the intramuscular course of the arteries is parallel to the muscular bundles. An accessory pedicle proximal to the main one was found just in 8% of cases.

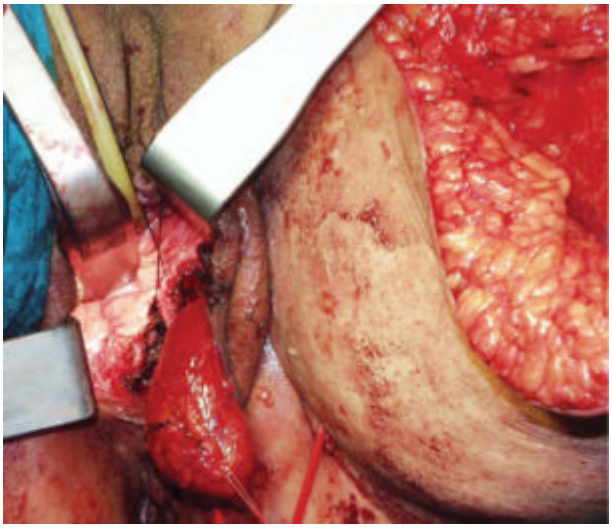


Fig. 2. – Intraoperative view of the repair of the rectovaginal fistula.

At least one accessory pedicle was found in all patients. These pedicles are variable in number (1-4), with a mean of 1.8, and they originate from the superficial femoral artery or from the popliteal artery, and are directed towards the muscle passing between sartorius and adductor longus muscles. The most rostral pedicle has a mean calibre of 2 mm. No correlation has been found between the calibre of the main pedicle and the number of accessory pedicles ($p = 0.64$).

Clinical Application

Basing on the results of our study, a 54 year old woman suffering from a recurrent recto-vaginal fistula underwent CT angiography for planning a proximally pedicled gracilis flap. CT angiography showed that the dominant pedicle entered the muscle 10.3 cm distal from the pubis and that the muscle belly was 28 cm long. A transverse skin incision was made at the perineal body and dissection was performed of the rectovaginal septum to the level of at least 4 cm above the fistula. The anterior wall of the rectum and the posterior wall of the vagina were repaired with a continuous suture. The graciloplasty was performed through an inner longitudinal skin incision starting from the hypothesized point of entry of the main pedicle into the muscle and extending inferiorly on the medial aspect of the thigh. After having identified the main vascular pedicle that was located 10.3 cm below the pubis, the muscle was exposed and isolated until the distal myotendineous junction; the accessory pedicle was ligated, while the dominant one was carefully preserved. Skeletalization of the dominant pedicle was not necessary, as the muscle belly was long enough to easily reach the pelvis. Division of the branch of the obturator nerve supplying the gracilis was performed, in order to prevent muscular contraction, which could compromise the stability of the muscle in its new position. The muscle belly was turned over towards the pelvi-perineal region, passing through a subcutaneous tunnel, and easily filled the space between the vaginal and rectal walls. The muscle was fixed to the anterior wall of the rectum and to the posterior wall of the vagina with interrupted sutures. Antibiotic therapy was administered for 3 days after the surgical procedure. Long term follow-up demonstrated a stable closure of the fistula with no recurrence. Fistula closure was monitored by rectoscopy, air insufflation and periodic gynaecologic examination.

DISCUSSION

The gracilis muscle is one of the most versatile muscles used in reconstructive surgery. The anatomical features of the gracilis muscle and its pedicular arteries have been investigated in several studies performed through anatomical dissections of human cadavers [1, 10, 11] or anatomo-radiological studies on gracilis muscles harvested from cadavers.[9, 10-12] To the best of our knowledge this study is the first anatomo-radiological analysis of the vasculature of the gracilis muscle performed in vivo. We found that the anatomical features of the arteries supplying gracilis muscle can be easily identified using CT angiography. This method is both innovative and accurate as the behaviour and calibre of each vascular pedicle can be minutely determined. As regards the morphology and the size of the muscle, the results of the anatomo-radiological study are comparable to the data in literature. In fact, previous studies reported a mean length of gracilis muscle of 44-46 cm [9, 13] and of the muscle belly of 30 cm [1, 10] whereas in our study the mean values have been 41 cm and 30 cm respectively. On the contrary, the mean value of the LL diameter (1.1 cm) of the muscle has resulted significantly higher than that reported in literature (0.6 cm). This difference could be ascribed to the different trophism of the muscle in vivo and in cadavers.

From our anatomo-radiological study, the origin of the main vascular pedicle of the gracilis muscle is equally subdivided between the artery for adductors(46%) and the deep femoral artery (45%). Earliest studies and anatomical textbooks report the main pedicle as a branch of the circumflex medial artery,[9, 10, 14] whereas other publications pointed at the artery for adductors as the most common origin of the main pedicle.[1, 11] Recently, the hypothesis that these differences could have come from misinterpretation of the term "adductor artery", because many authors refer to the artery for adductors as a "transverse branch of the medial circumflex artery".[15]

In our study vascular calibres have been larger than those measured during cadaver dissections (2.5 mm vs 1.5-2 mm), probably due to the in-vivo method. The main vascular pedicle has a greater calibre when originating directly from the deep femoral artery than when it is a branch of the adductor artery; however, it is intuitive that a direct branch of a main vessel is larger than a branch of a branch artery. In 19% of patients the pedicles of left and right gracilis muscles originated from different vessels. Thus, a surgeon, planning a pedicled or free flap, could choose the left or the right muscle, according to the calibre of the main pedicle and most favourable anatomical situation.

Gracilis muscle flap is an excellent option for the repair of recto-vaginal and ano-vaginal fistulas, which are often resistant to repeated repair procedures. In fact, with a success rate increasing from 60%[16] to 83%,[17-18] this procedure has generally better outcome than those reported for other repair techniques. In particular pedicled gracilis flap is adequate in those cases of irradiated rectovaginal septum, active Crohn's disease, fibrotic perineal body, as well large and recurrent fistulas, where it is essential to separate the organs and interpose healthy tissue with an independent blood supply. In fact, the rectovaginal septum is located in an oblique coronal plane, close to the posterior vaginal wall, and shows a variable numbers of small vessels.[19] In our case CT angiography showed that the entry point into gracilis muscle was located 10.3 cm distal to the pubis and that the length of the muscle belly was 28 cm. These data were useful for planning the graciloplasty, since that part of the muscle belly between the dominant pedicle and the distal myotendineuos junction was long enough for the surgical procedure. In this way surgeons could minimize the dissection and avoid retrograde mobilization of the dominant pedicle, thereby reducing the risk of iatrogenic damage. CT angiography could be a useful preoperative study for the plastic surgeon in planning a gracilis flap, allowing a better selection of the patients and providing a detailed description of the muscular and vascular structures of the thigh.

REFERENCES

1. Coquerel-Beghin D, Milliez P, Lemierre G, Duparc F. The gracilis muscolocutaneous flap: vascular supply of the muscle and skin components. Surg Radiol Anat 2006; 28: 588-595.
2. Dev VR, Gupta A. Plastic and reconstructive surgery approaches in the management of anal cancer. Surg Oncol Clin N Am 2004; 13: 339-353.
3. Fürst A, Schmidbauer C, Swol-Ben J, et al. Gracilis transposition for repair of recurrent anovaginal and rectovaginal fistulas in Crohn's disease. Int J Colorectal Dis 2007 Dec 13.
4. Morash M, Sam A, Kibbe M, et al. Early results with use of gracilis muscle flap coverage of infected groin wounds after vascular surgery. J Vasc Surg 2004; 39: 1277-1283.
5. Pickrell KL, Broadbent TR, Masters FW, Metzger JT. Construction of a rectal sphincter and restoration of anal continence by transplanting the gracilis muscle: a report of four cases in children. Ann Surg. 1952; 135: 853-862.
6. Hallan RI, Williams NS, Hutton MR, et al. Electrically stimulated sartorius neosphincter: canine model of activation and skeletal muscle transformation. Br J Surg 1990; 77: 208-213.
7. Arnez Z, Pogorelec D, Planinsek F, Ahcan U. Breast reconstruction by free transverse gracilis flap. Br J Plast Surg 2004; 57: 20-26.
8. Harii K, Ohmori K, Torii S. Free gracilis muscle transplantation with microvascular anastomoses for the treatment of facial paralysis. Plast Recon Surg 1976; 57: 133.
9. Taylor G, Cichovwitz A, Ang SG, Ashton M. Comparative anatomical study of the gracilis and coracobrachialis muscles: implications for facial reanimation. Plast Recon Surg 2002; 112: 20-30.
10. Giordano PA, Abbes M, Pequignot JP. Gracilis blood supply: anatomical and clinica re-evalutation. Br J Plast Surg 1990; 43: 266-272.
11. Standing et al. Gray's Anatomy. Thirty-eight edition (2005). Churchill Livingstone.
12. Juricic M, Vaysse P, Guitard J, Moscovici J. Anatomic bases for use of a gracilis muscle flap. Surg Radiol Anat 1993; 15: 163-168.
13. Mathes S.J., Nahai F. Classification of the Vascular Anatomy of Muscles: Experimental and Clinical Correlation. Plastic and Reconstructive Surgery 1981; 67: 177.
14. Morris S, Yang D. Gracilis muscle: arterial and neural basis for its subdivision. Ann Plast Surg 1999; 42: 630-633.
15. Hussey AJ, Laing AJ, Regan PJ. An anatomical study of the gracilis muscle and its application in groin wounds. Ann Plast Surg 2007; 59: 404-409.
16. Rius J, Nessim A, Nogueras JJ, Wexner SD. Gracilis transposition in complicated perianal fistula and unhealed perineal wounds in Crohn's disease. Eur J Surg 2000; 166: 218-222.
17. Zmora O, Potenti FM, Wexner SD, et al. Gracilis muscle transposition for iatrogenic rectourethral fistula. Ann Surg 2003; 237: 483-487.
18. Zmora O, Tulchinsky H, Gur E, et al. Gracilis muscle transposition for fistulas between the rectum and urethra or vagina. Dis Colon Rectum. 2006; 49: 1316-1321.
19. Stecco C, Macchi V, Porzionato A, et al. Histotopographic study of the rectovaginal septum. Ital J Anat Embryol 2005; 110: 247-254.

Correspondence to:
Prof. RAFFAELE DE CARO, MD
Section of Anatomy,
Department of Human Anatomy and Physiology
School of Medicine, University of Padova
Via A. Gabelli, 65 - 35127 Padova, Italy
Tel +39 049 8272327 - Fax +39 049 8272328
Email: rdecaro@unipd.it

Case report

Neurilemoma (Schwannoma) of the ischiorectal fossa: a case report and a brief review of the relevant pathology

JOHANN COETZEE (*) - AMANDA DE BEER (**)

(*) Krugersdorp Hospital, Krugersdorp, South Africa
(**) Ampath Pathology Laboratories, Kempton Park, South Africa

INTRODUCTION

A case of a primary neurilemoma of the ischiorectal space is described. The ischiorectal fossa is a pelvic anatomic space, which until recently received scanty attention in medical training programmes. With the advent of new surgical techniques in reconstructive pelvic surgery, for example both the trans-obturator route for sub-urethral slings and the passage of trocars for the posterior placement of mesh supports in posterior prolapse, knowledge of the anatomy and pathology of this space has assumed more importance.

A neurilemoma (also spelled neurilemmoma and also referred to as a Schwannoma) of the ischiorectal fossa is very rare. A Pubmed search using neurilemoma, neurilemmoma, Schwannoma and ischiorectal fossa gave no citations, while an advanced Google scholar search came up with two citations, both in male patients. This is therefore to the best of our knowledge the only female patient currently reported in the literature.

CASE REPORT

The patient, a fifty two year old G1 P2 (a set of twins), was referred by her general practitioner with a presumptive diagnosis of a cystic swelling of the left sided Bartholin's gland. The patient had been aware of the swelling for some three months, but it did not cause pain and there was no bladder or bowel dysfunction. She still had irregular menstrual periods, but had not been sexually active for some time due to a male factor. Clinical examination revealed no abnormalities of the general parameters. There was a large swelling visible and palpable in the area of the left ischiorectal fossa, with delineable margins on vaginal and rectal examination. The rest of the pelvic examination was normal.

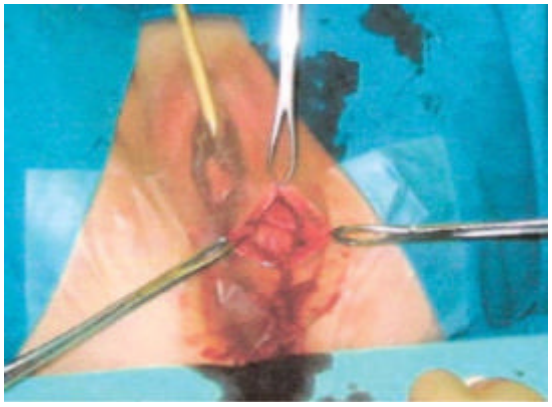


Fig. 1. – Perineal incision to expose tumour.

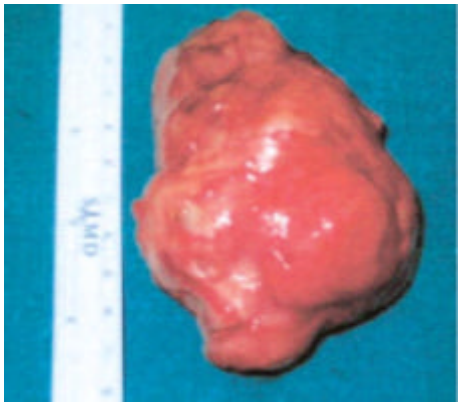


Fig. 2. – Excised Neurilemoma.

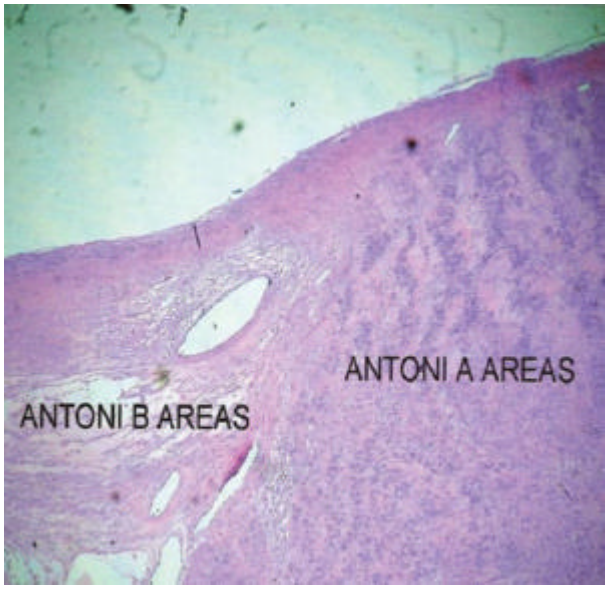


Fig. 3. – Histological section of tumour demonstrating Antoni A and B areas.

Transperineal ultrasound showed that it was not a cystic mass, but a large tumour with a homogenous consistency. The pre-operative diagnosis was that of a lipoma of the ischiorectal fossa.

The tumour was exposed with an incision lateral to the perineum (Fig. 1), and it was easily shelled out with blunt finger dissection. There was a blood vessel pedicle present in the posterior superior position. The mass (Fig. 2) was delivered through the incision and complete haemostasis was obtained in the cavity, which was then obliterated with interrupted sutures. Anatomical structures were sought and care was taken not to place sutures through the rectum or vagina. The post-operative period was uneventful and at the four week follow-up examination the patient had recovered completely.

DISCUSSION

A wide spectrum of disease processes may involve the ischiorectal fossa, including congenital and developmental lesions, inflammatory, traumatic and haemorrhagic conditions; primary tumours and pathologic processes from outside the ischiorectal fossa with secondary involvement.

Clinical examination, transperineal ultrasound, computed tomography and magnetic resonance imaging are all useful in the diagnosis of these conditions.[1]

Neurilemomas, or Schwannomas, derive from the Schwann cells of nerve sheaths, and may occur singly or multiply on any nerve or nerve root. The most common location is in fact the acoustic nerve, making this a frequent intracranial tumour. Neurilemomas are almost always benign, very infrequently malignant and should then be called neurogenic sarcomas. However, even benign lesions may recur after incomplete removal. Neurilemomas generally appear in middle adult life but sometimes are encountered earlier, particularly in association with von Recklinghausen's neurofibromatosis. This hereditary syndrome is characterized by multiple nerve tumours, either neurofibromas or neurilemomas.[2] Histologically two patterns, so called Antoni A and Antoni B are encountered in neurilemomas. The Antoni A pattern comprises interlacing bundles or whorls of elongated spindle cells, and the Antoni B pattern a very loose, disorganized myxoid tissue with abundant ground substance and scattered stellate cells. Both histological patterns were present in the tumour resected from our patient (Fig. 3), and staining for protein S100 was positive.

CONCLUSION

Neurilemoma are mostly resectable curable growths [3] and with careful attention to complete excision and the surrounding anatomy the prognosis will be excellent.

REFERENCES

1. Llauger J, Palmer J, Perez C, et al. The normal and pathologic ischiorectal fossa at CT and MR imaging. RadioGraphics 1998; 18: 61-82.
2. Woodruff JM. Pathology of the major peripheral nerve sheath neoplasms. Monogr Pathol 1996; 38: 129-161.
3. Miller M, Kulaylat MN, Ferrario T, Karakousis CP. Resection of tumors of the ischiorectal fossa. J Am Coll Surg 2003; 196: 328-332.

Correspondence to:
JOHANN COETZEE
Krugersdorp Hospital,
Krugersdorp, South Africa.
Email: johcc@iafrica.com

Pelvic Floor Digest

*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.*

FORUM

"First do no harm" and the emerging story of the vaginal reconstructive mesh implant. *Swift SE. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:983*

Patterns of technical error among surgical malpractice claims: an analysis of strategies to prevent injury to surgical patients. *Regenbogen SE, Greenberg CC, Studdert DM et al. Ann Surg. 2007;246:705.* To identify the most prevalent patterns of technical errors in surgery, surgeon reviewers analyzed 444 randomly sampled surgical malpractice claims. Most errors occur in routine operations with experienced surgeons, under conditions of increased patient complexity or systems failure. Commonly recommended interventions, including restricting high-complexity operations to experienced surgeons, additional training for inexperienced surgeons, and stricter supervision of trainees, are likely to address only a minority of errors. Safety should rather focus on improving decision-making and performance in routine operations for complex patients and circumstances.

Institutional academic industry relationships. *Campbell EG, Weissman JS, Ehringhaus S et al. JAMA. 2007;298:1779.* Relationships between academy and industry may create conflicts of interest. To date there are no empirical data to support the establishment and evaluation of institutional policies and practices related to managing these relationships. A total of 459 department chairs completed a survey, 60% of them having some form of personal relationship with industry, including serving as a consultant (27%), a member of a scientific advisory board (27%), a paid speaker (14%), an officer (7%), a founder (9%), or a member of the board of directors (11%). Institutional academic-industry relationships are then highly prevalent and underscore the need for their active disclosure and management.

1 – THE PELVIC FLOOR

Prevalence and risk factors for pelvic floor symptoms in women in rural El Salvador. *Ozel B, Borchelt AM, Cimino FM, Cremer M. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:1065.* Seventy-one percent of women reported urinary incontinence (UI); 49.3 and 61.1% of women reported urge UI and stress UI, respectively. Forty-one percent of women reported fecal incontinence (FI) of solid or liquid stool. Women with UI were significantly more likely to have had a hysterectomy compared to women without UI. Women with FI had significantly fewer years of education when compared to women without FI.

Gastrointestinal electrical stimulation for treatment of gastrointestinal disorders: gastroparesis, obesity, fecal incontinence, and constipation. *Lin Z, Sarosiek I, McCallum RW.Gastroenterol Clin North Am. 2007;36:713-34.*

2 – FUNCTIONAL ANATOMY

The Integral Theory of continence. *Petros PE, Woodman PJ. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Oct 30; e-pub.* Pros and cons of a unitary view of the pelvic floor.

Effect of micturition on clitoris and cavernosus muscles: an electromyographic study. *Shafik A, Shafik AA, El Sibai O, Shafik IA. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Oct 10; e-pub.* Decreased EMG activity of corpora cavernosa and increased activity of cavernosus muscles during micturition denotes corporal tissue relaxation and cavernosus muscles' contraction. These actions are mediated through the urethro-corporocavernosal reflex and effect a mild degree of clitoral tumescence.

Physiological considerations of the morphologic changes of the testicles during erection and ejaculation: a canine study. *Shafik A, Shafik AA, Shafik IA, El Sibai O. Urol Int. 2007;79:262.* During erection and ejaculation dogs testicles undergo changes in volume, position and temperature. This seems to serve the erectile and ejaculatory functions of the penis.

Physioanatomical relationship of the external anal sphincter to the bulbocavernosus muscle in the female. Shafik A, Shafik IA, el-Sibai O, Shafik AA. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:851. The bulbocavernosus muscle and external anal sphincter anatomically and physiologically constitute a single muscle in males. The study demonstrates a similar pattern in females, and this anatomical structure seems to play dual and yet synchronous roles in fecal control and sexual response.

Vaginal pressure during daily activities before and after vaginal repair. *Mouritsen L, Hulbaek M, Brostrom S, Bogstad J. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:943.* The measurement of vaginal pressure during various daily activities before and after vaginal surgery for pelvic organ prolapse showed that post-operative counselling should concentrate more on treating chronic cough and constipation than restrictions of moderate physical activities.

Vaginal pressure during lifting, floor exercises, jogging, and use of hydraulic exercise machines. *O'Dell KK, Morse AN, Crawford SL, Howard A. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:148.* Comparing exercise and cough pressure with urodynamic equipment it was concluded that vaginal pressure measurement is reproducible in women without prolapse and that exercises produce lower pressure than cough, but individuals varied in pressure exerted.

Evolving Concepts in the Cellular Control of Gastrointestinal Motility: Neurogastroenterology and Enteric Sciences. *Mazzone A, Farrugia G. Gastroenterol Clin North Am. 2007;36:499.* The enteric nervous system is independent, and it is integrated into several other complex systems (interstitial cells of Cajal, immune cells) for an effective coordination of motility, secretion, and blood flow in the gastrointestinal tract. Its complexity is comparable with the central nervous system.

3 – DIAGNOSTICS

Translabial ultrasound assessment of the anal sphincter complex: normal measurements of the internal and external anal sphincters at the proximal, mid-, and distal levels. *Hall RJ, Rogers RG, Saiz L, Qualls C. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:881.* Mean sphincter measurements are given for symptomatic and asymptomatic intact women and are comparable to previously reported endoanal MRI and ultrasound measurements.

Pelvic examination. *Kahwati LC. N Engl J Med. 2007;357:1778.*

The gastrointestinal motility laboratory. *Parkman HP, Orr WC. Gastroenterol Clin North Am. 2007;36:515.* This article addresses important concepts in setting up and running an efficient and practical gastrointestinal motility laboratory, an important area for patient evaluation in gastroenterology and an essential element in any comprehensive digestive disease program.

4 – PROLAPSES

Gene expression in the rectus abdominis muscle of patients with and without pelvic organ prolapse. *Hundley AF, Yuan L, Visco AG. Am J Obstet Gynecol. 2007 Nov 2; epub.* The gene expression in a group of actin and myosin-related proteins of the rectus muscle in 15 patients with pelvic organ prolapse and 13 controls was compared. Only one gene, MYH3, was 3.2 times overexpressed in patients with prolapse, therefore differential messenger ribonucleic acid levels of actin and myosin-related genes in patients with pelvic organ prolapse and controls may be limited to skeletal muscle from the pelvic floor.

Histological features of the rectovaginal septum in elderly women and a proposal for posterior vaginal defect repair. *Nagata I, Murakami G, Suzuki D et al. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:863.* To develop a novel surgical procedure for posterior vaginal defect repair, the rectum-vagina interface tissues obtained from cadavers were examined. The septum, an elastic fiber-rich plate, lines the posterior surface of the vein-rich zone of the vaginal wall, extending between the bilateral paracolpiums and being more evident in the lower half of the interface. Often thin and interrupted, it is not so clearly demonstrated in the upper vagina histologically, therefore augmentation using some implant is considered necessary for treating enterocele and high rectocele.

How accurate is symptomatic and clinical evaluation of prolapse prior to surgical repair? *Fayyad A, Hill S, Gurung V et al. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:1179.* To assess the accuracy of pre-operative evaluation of pelvic organ prolapse 104 patients admitted for prolapse surgery were enrolled in an audit. Examinations in theatre were different from clinic findings in 37% of the cases for degree of prolapse and the prolapse being in a different vaginal compartment. The operation performed was different from the one proposed in the clinic in 21% of the cases. Patients should be counselled about this when listed for surgery.

Is there a difference in patient and physician quality of life evaluation in pelvic organ prolapse? *Srikrishna S, Robinson D, Cardozo L, Gonzalez J. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Oct 16;epub.* Quality of life assessment is important in the evaluation of women with urogenital prolapse, but using the Prolapse Quality of Life questionnaire the outcomes based on the physicians' perspective may not be valid compared to those completed by the patient.

Follow-up after polypropylene mesh repair of anterior and posterior compartments in patients with recurrent prolapse. *Gauruder-Burmester A, Koutouzidou P, Rohne J et al. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:1059.* In a total of 120 patients with recurrent cystocele and/or rectocele or with combined vaginal vault prolapse treated by either posterior (Apogee) or anterior (Perigee) mesh interposition depending on the defect, after 1 year 93% were free of vaginal prolapse, 7% had level 2 defects. Erosions occurred significantly more often in patients treated with the Perigee system.

Conservation of the prolapsed uterus is a valid option: medium term results of a prospective comparative study with the posterior intravaginal slingoplasty operation. *Neuman M, Lavy Y. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:889.* To evaluate the therapeutic significance of hysterectomy when vaginal apical prolapse is reconstructed with posterior intravaginal slingplasty (PIVS), 44 out of 77 underwent concomitant vaginal hysterectomy. The current results support the previously reported efficacy, safety, and simplicity of the PIVS procedure as well as the legitimacy of uterine preservation. Moreover, unstable bladder symptoms were found to be improved after this operation. However, long-term data are required to be able to draw solid conclusions concerning the superiority of the discussed operation.

Is hysterectomy or the use of graft necessary for the reconstructive surgery for uterine prolapse? *Jeon MJ, Jung HJ, Choi HJ et al. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Oct 10; epub.* The use of graft, rather than hysterectomy, might be necessary for the reconstructive surgery for uterine prolapse. This was proven in 168 patients with abdominosacral colpopexy using mesh and hysterectomy (group l); abdominosacral uteropexy with mesh (group II), abdominal uterosacrocardinal colpopexy and hysterectomy (group III). After a 36 months follow-up recurrence in group III was 6.2 times higher than in group I.

Day case laparoscopic rectopexy is feasible, safe, and cost effective for selected patients. *Vijay V, Halbert J, Zissimopoulos A et al. Surg Endosc. 2007 Oct 18;epub. Since 2001,* 28 patients have undergone procedures for rectal prolapse and of 12 laparoscopic rectopexy patients, 5 were selected for day case, which appeared to be is safe, feasible, and acceptable for selected well-motivated patients. Compared with Delorme's procedure and inpatient laparoscopic rectopexy, savings of £1,000 per patient can be achieved because of an average 3-day decrease in bed occupancy.

Laparoscopic rectopexy without resection: a worthwhile treatment for rectal prolapse in patients without prior constipation. *Hsu A, Brand MI, Saclarides TJ. Am Surg. 2007;73:858.* Anterior resection with rectopexy is indicated in rectal prolapse for fear that sigmoid redundancy will cause disabling constipation. After treating 12 patients with rectopexy to the presacral fascia with Nurolon sutures and a 3-75 months follow up, the Authors believe that resection is not necessary in patients without preexisting constipation.

5 – RETENTIONS

Prevalence and associated risk factors of retention of urine after caesarean section. *Chai AH, Wong T, Mak HL. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Oct 12; epub.* Caesarean section poses higher risk of postpartum urinary retention (PUR) than vaginal delivery with a prevalence of 3.38. Lack of progress of labor is a significant associated factor.

[Our experience with the urolume intraurethral prosthesis] *Garcia Penalver C, Parra Escobar JL et al. Arch Esp Urol. 2007;60:731.* Urolume is a stent type, non magnetic, self expanding urethral endoprosthesis indicated to keep the urethral lumen in cases of infravesical obstruction in 17 males, 10 with symptoms of BPH and 7 with bulbar urethral stenosis. This is a safe and simple technique, which may be performed under local anesthesia as outpatient surgery. It has a low complication rate. It significantly improves the flowmetry parameters and symptom questionnaire results. It is a very good option to be taken into consideration in older patients, with chronic urinary retention and high surgical risk or in patients with short bulbar urethral stenosis without previous skin flap urethroplasty.

Constipation: evaluation and treatment of colonic and anorectal motility disorders. *Rao SS. Gastroenterol Clin North Am. 2007;36:687.* The Rome criteria may be a useful guide for a clinical diagnosis of functional constipation that consists of three overlapping subtypes: slow transit constipation, dyssynergic defecation, and irritable bowel syndrome with constipation. An evidence-based approach considers specific drugs such as tegaserod and lubiprostone, and biofeedback for dyssynergia.

Constipation and Irritable Bowel Syndrome in the elderly. *Morley JE. Clin Geriatr Med. 2007;23:823.* Lifestyle changes, osmotic laxatives, and lubiprostone are the approaches of choice for the management of constipation in old age.

Idiopathic slow transit constipation is rare: But delayed passage of meconium is common in the constipation clinic. *Croaker GD, Pearce R, Li J. Pediatr Surg Int. 2007 Oct 31; epub.* There is no evidence for a supposed effect of social class in a population having truly idiopathic slow transit constipation which in itself is rare.

The PFD continues on page 180

Original article

Preliminary retrospective case series study of the outcome of Prolift™ technique in thirty women with pelvic organ prolapse including its effect on stress urinary incontinence

NADER GAD - MAAIKE MOLLER

Department of Obstetrics & Gynaecology, Royal Darwin Hospital, Darwin, Ausralia

Abstract: In this retrospective case series analysis of thirty Prolift procedures the authors describe aspects of the surgical technique as well as outcomes. The latter specifically addresses intraoperative, immediate and medium term post procedure periods with particular analysis of its effect on urodynamic stress incontinence (UDSI). The results of this study showed that the Prolift procedure is safe and very successful in treating women with a severe degree of pelvic organ prolapse. Primary haemorrhage of more than 500 mls in one patient during difficult vaginal hysterectomy was the only significant complication in this study and was not associated with the Prolift procedure in itself. The patient did not require blood transfusion. One of the important findings in this study is the fact that in six (43%) out of 14 women with UDSI the urinary symptoms were cured after the Prolift procedure alone. Indeed out of twenty-two women with symptoms of stress urinary incontinence (SUI), thirteen women (59%) had these symptoms cured by the Prolift procedure alone. This supports the practice of the main author in management of women with combined POP and SUI by offering these women a two stage procedure: first treat the POP by Prolift procedure then few months later perform Tension-free Vaginal Tape- Obturator (TVT-O) or Tension-free Vaginal Tape (TVT) procedure to treat UDSI.

Key words: Pelvic organ prolapse; Pelvic reconstructive surgery; Prolift; TVT-O; Stress urinary incontinence.

HISTORY & EXAMINATION

Pelvic organ prolapse (POP) and associated stress urinary incontinence (SUI) is a major health care problem. It is estimated that 50% of parous women lose pelvic support [1] and an American woman has a 11.1% lifetime risk of undergoing an operation for pelvic floor support.[2] An ageing population is likely to increase the prevelance of POP and DeLancey describes this anticipated increasing health burden as a "hidden epidemic".[3]

Current methods of pelvic reconstructive surgery for treating POP are suboptimal. The Olson study found that 29% of the patients requiring one operation for pelvic floor support will have an organ prolapse recurrence (OPR) sufficiently severe as to require at least one re-operation.[2] Even when the conventional procedure of anterior and posterior repair is supplemented with other procedures such as sacrospinous ligament fixation, transvaginal needle suspension and enterocele repair, the recurrence rate is still high at 20-30%.[4] Shull et al. reported an incidence of 30% cystocele following vaginal vault suspension with half of these noted within the six weeks postoperative period. The same group reported a 24% cystocele recurrence rate after vaginal and paravaginal repair.[5] Paraiso et al. reported their long term follow-up data after sacrospinous ligament fixation of the vaginal vault prolapse: the recurrence rate was 37% for cystocele and 14% for rectocele.[6] The utilisation of the weak native tissues may be the contributing factor in the high recurrence rate. These classical pelvic reconstructive techniques can only restore 50% of the pre-operative tissue strength.[7]

Synthetic material has been used to reconstruct pelvic floor anatomy and restore function and has been shown to reduce the OPR rate.[4] Its effectiveness has however been marred by the occurence of adverse effects such as granuloma formation (GF), vaginal erosion and mesh shrinkage. The increased use of Tension-free Vaginal Tape (TVT) has created evidence that polypropylene mesh is better tolerated and the new Prolift mesh (Ethicon, USA) is now being used in an attempt to treat POP. Preliminary studies give cause for cautious optimism. The TVM Group from France first described the procedure in 687 patients.[8] A subsequent study has looked at the optimal anatomical positioning of the mesh,[9] but there have also been reported cases of serious adverse effects.[10-11]

In this retrospective case series analysis of Prolift procedures we describe specific aspects of the surgical technique that developed during operating on these thirty patients. Intraoperative complications, immediate and medium term post procedure outcomes with particular analysis on its effect on urodynamic stress incontinence (UDSI) are also described. The results shall be compared with those of the retrospective study of the TVM Group reported in 2005 International Meeting of the ICS [8] and the Fatton et al. case series multicentre study.[12]

MATERIALS AND METHODS

This series of thirty cases was carried out by a single operator (main author) at two hospitals in Australia (thirteen public patients at Royal Darwin Hospital and seventeen private patients at Darwin Private Hospital) over a period of nineteen months (December 2005 to June 2007). The patients' notes were analysed retrospectively on a purpose made master sheet.

All women were assessed preoperatively with regard to their symptoms, parity and previous urogynaecological surgical history. The degree of the prolapse was classified using the Baden-Walker halfway staging system.[13] Women were encouraged to use pelvic floor exercises preoperatively and to continue postoperatively. Postmenopausal women were instructed to use vaginal oestrogen preoperatively and to recommence a maintenance dose of one to two nights a week, starting six weeks postoperatively.

Urodynamic assessments (UDA) were performed preoperatively in most patients with urinary symptoms. UDA included uroflowmetry and filling cystometry. When SUI was confirmed on UDA preoperatively women were counselled regarding a two-stage procedure to address both complaints, namely a Prolift procedure to correct the POP, followed by a Tension-free Vaginal Tape Obturator (TVT-O) about three months later. TVT procedure was offered to women with intrinsic sphincter deficiency (ISD). Both the TVT-O and TVT procedures were performed under local anaesthesia and sedation with cough test performed in theatre. Intraoperative complications were classified in terms of bladder, rectum or bowel perforation, blood loss greater than 500 mls, blood transfusion or any other significant adverse event. Immediate postoperative complications were classified according to infection, thromboembolic event, urinary retention, return to theatre, blood transfusion or any other specific complication.

The medium term post operative assessment was performed in most women six weeks after surgery. This included history, with special reference to the effect of the procedure on the preoperative symptoms and physical examination looking at any evidence of complications such as mesh erosion or shrinkage, urinary or rectal fistula formation or recurrence of prolapse. In this study prolapse was considered to recur if there is POP stage 2, 3 or 4 even in absence of symptoms. In addition, any symptomatic patient with POP stage 1 is considered as having a recurrence of her prolapse.

The authors analysed the preoperative urinary symptoms of these women and paid particular attention to the effect of the Prolift procedure on women with preoperative diagnosis of UDSI and on subsequent post operative management of those who were remained symptomatic.

Surgical Technique

All patients are administered intravenous prophylactic antibiotics in the form of 1g Cephazolin and 500 mg metronidazole (these to continue for the first 48 hours, followed by an oral course for three to five days). Full thickness dissection of the vagina from the underlying structures (rectum or bladder) is achieved by generous infiltration of a 40 ml solution of prilocaine 0.25% and adrenaline 1:200,000 in the relevant compartment (anteriorly or posteriorly as per specific procedure). The infiltration needs to be injected into the correct plane of dissection between the full thickness vaginal wall and the underlying structures.

A sharp knife is used to cut the full thickness of the vagina and electro-surgical incisions are avoided in all cases.

The length of vaginal incisions is minimised in all cases. In the anterior Prolift the length of the skin incision usually comprises the middle third of the distance between the level of the urethro-vesical junction (UVJ) and the vaginal vault, or the reflection of the anterior vaginal wall of the cervix in women with an intact uterus. The dissection continues under the full thickness of the vaginal skin distally and proximally to the incision to the limit of the UVJ and the vaginal vault / reflection of the anterior vaginal wall of the cervix respectively. In the posterior Prolift, the length of the incision comprises the middle third of the distance between the level of the hymen and the vaginal vault or the reflection of the posterior vaginal wall of the cervix in women with an intact uterus. The dissection under the intact vaginal skin is continued from the level of the hymen to the vaginal vault or to the reflection of the posterior vaginal wall off the cervix in women with an intact uterus.

Tearing of the vaginal skin or damaging the underlying structures during dissection may be avoided by the local infiltration described above and by sharp dissection in the proper anatomical plane. When blunt dissection is needed a peanut dissector is used gently. In most women the initial opening of the paravesical and pararectal space including exposure of the ischial spines is achieved by sharp dissection using large scissors with push and open technique. During the anterior Prolift procedure it is important to ensure that the distance between the exit points of the superficial and deep Cannula-equipped Guides (CEG) should be at least 6 cm. This can be achieved by the superficial CEG entering the paravesical space within 1cm from the proximal end of the ATFP, and that of the deep CEG entering the space within one centimetre from the ischial spine.

Crumpling of the mesh must also be avoided. At the same time the tension on the mesh must be neither too tight nor loose. This is ensured through the following steps:

Firstly the surgeon avoids crumpling of the mesh. This can be achieved by ensuring that it is spread out by pulling on the free ends of its arms while the inner ends of the canulae are just projecting outside the inner aspect of the side pelvic wall (in the anterior Prolift) or the sacrospinous ligament (in the posterior Prolift procedure). Subsequently any excess tension in the anterior compartment is eased off by exerting pressure with the index finger on the far lateral aspect of each side of the anterior fornix until no tension by the arms of the mesh are felt. Any excess tension in the posterior compartment is eased off by exerting pressure with the index finger on the far lateral aspect of each side of the posterior fornix until no tension by the arms of the mesh are felt. This can be further aided by inserting an index finger per rectum and pressing on the lateral anterior aspect of the rectal mucosa until no tension is felt around the rectum.

In the anterior compartment, anteriorly the mesh is sutured at the midpoint of its proximal edge to the endopelvic fascia that is attached to the undersurface of the vaginal skin using 2/0 PDS after trimming any excess length of mesh. The distal edge of the mesh is sutured in its middle to the vaginal vault or the anterior aspect of the cervix (in women with intact uterus) using 2/0 prolene. In this series none of the patients requiring an anterior Prolift had previously undergone a hysterectomy. This latter subgroup of patients would have required the mesh to be attached to the vaginal vault. In the posterior compartment, after trimming any excess length of the mesh, the lower edge of the mesh is sutured at both its corners to the sides of the perineal body using 2/0 PDS. Two sutures of 2/0 Prolene are used to attach the upper edge of the mesh, one suture to the corresponding remnant of the utero-sacral ligament. In women with intact uterus only one suture of 2/0 Prolene is inserted in the centre of the upper edge of the mesh to the posterior wall of the cervix. When a total Prolift is performed in women who have had a hysterectomy in the past there is no need for any suturing of the mesh to the vaginal vault. In these women the mesh is fed from anterior to posterior compartment through a tunnel, approximately 3 cm wide, created by the sharp dissection using a large pair of scissors with the push and open technique. It is essential to ensure that the mesh does not rotate during its retrieval posteriorly. No excision of vaginal skin is necessary. The vaginal skin is sutured using No. 1 vicryl suture in two continuous layers. The deep layer is a continuous running mattress suture, with particular caution not to involve the mesh material in the suturing. The superficial layer is a continuous running simple suture. Locking sutures are avoided. Hysterectomy should be avoided during Prolift procedures if possible.

If a woman does require or request a hysterectomy during the Prolift repair, the following precautions may be helpful: T-shaped incisions should be avoided. A collar incision is made around the cervix and it extends anteriorly, cutting the full thickness of the vaginal skin, to encompass not more than the lower third of the distance between the cervix and the level of the urethro-vesical junction. This incision should be enough for completing the hysterectomy and the exposure of the paravesical space and ischial spines and is then sutured as a single incision longitudinally. The pedicles of the cardinal-utero-sacral ligaments complex on both sides are tied together, through the anterior compartment, medially in front of the mesh.

RESULTS

Thirteen (43%) of the thirty women were referred by other specialists (either private or public). The age of the women in this study at the time of their surgery ranged from 36 to 79 years. Eighteen women (60%) were in the age group between 51 and 65 years old and only 6 women (20%) were 50 years or younger. The remaining 20% were 66 years or older. The distibution by age is illustrated in Figure 1.

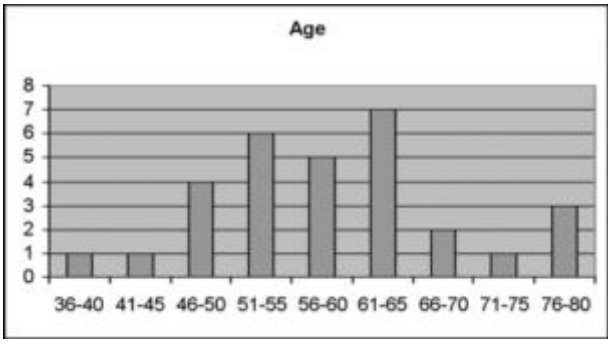


Fig. 1. – Number of patients in each age group.

The range of parity in these women ranged from 1 to 10 deliveries with an average of 3.7 deliveries. All the women had at least one vaginal delivery with the highest parity is 10 vaginal deliveries. Only one woman had 2 caesarean sections in addition to 2 normal vaginal deliveries.

The main author performed six types of Prolift operation according to the individual patient's needs as illustrated in Figure 2.

Seventeen patients (56.7%) previously had a hysterectomy prior to the Prolift procedure. Four women (30.8%) out of the thirteen women with an intact uterus had a hysterectomy performed during the Prolift procedure. This represents 13.3% of the women in the study. It was also noted that 11 women (37%) had undergone previous pelvic floor repair prior to their Prolift procedure with seven of them (23%) having had more than one repair.

Urinary symptoms were the most common presenting symptom (93%) followed by feeling a bulge (77%). Figure 3 illustrates the presenting symptoms of the women in the study.

In this study no one woman had prolapse in only one compartment. Rectocoele was present in 90% and cystocoele in 70% of patients. No one patient was operated upon for whom her worst degree of prolapse out of all compartments was only stage 2 or less as all 30 patients had at least third stage prolapse in one or more compartments. Those who had a 4th stage prolapse in one or more compartment was 19 (63.3%). Enterocoele was present in eight patients (26.7%) and excessive vaginal scarring was present in four patients (13.3%).

Apart from blood loss greater than 500 ml in one patient, there was no significant complication noted in any woman during their surgery, hospital stay or in the follow-up visit. The range of hospital stay was 3 to 5 days with an average stay of 3.9 days. The medium term post operative assessment was performed in most women at six weeks after surgery. Only three patients (10%) were assessed earlier than

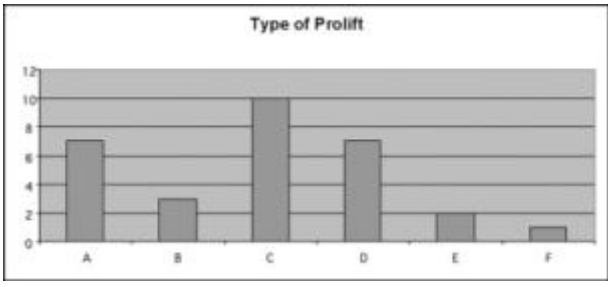


Fig. 2. – Numbers and types of Prolift procedures performed. A= Total Prolift and Uterine Conservation, B = Total Prolift and Hysterectomy, C = Total Prolift for vaginal vault support and anterior and posterior compartment repair, D = Posterior Prolift for vault prolapse and posterior compartment repair, E = Posterior Prolift for posterior compartment repair and uterine conservation, F = Posterior Prolift for posterior compartment repair and hysterectomy.

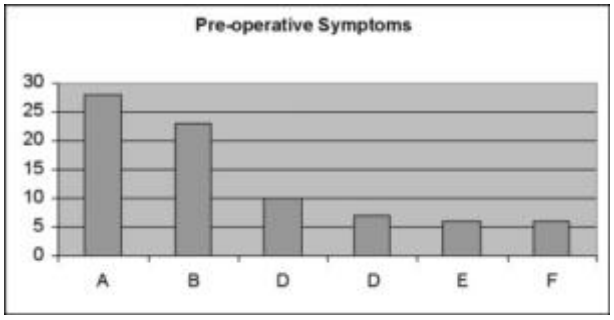


Fig. 3. – The presenting symptoms. A = Urinary symptoms, B = Feeling bulge, C = Bowel symptoms, D = Vaginal bleeding, including discharge, E = Sexual problems, F = Other - pain, embarrassing noise.

six weeks. The mean time of follow-up was 11.3 weeks (range 4-51 weeks). The mean duration between the Prolift procedure and time to audit was 44 weeks (range: 13-92 weeks). Table 1 compares the intraoperative, immediate postoperative and intermediate term postoperative complications in this study with that of Cosson et al. and Fatton et al.

Of the series, twenty-seven (90%) women had some type of urinary symptom prior to their Prolift. Twenty-two (73.3%) women had symptoms of stress incontinence (SI). Sixteen women (53.3%) also had additional urinary symptom(s) such as urgency, retention or feeling of incomplete emptying. Nineteen women (70.4%) of those with pre-operative urinary symptoms and 86.3% of those with stress incontinence had UDA. Of those women who had UDA, fourteen (73.7%) had UDSI and four (21.0%) had no UDSI. Six (43%) out of the 14 women with preoperative diagnosis of UDSI reported no further SI after the Prolift procedure. In fact out of twenty-two women with symptoms of SI, thirteen (59%) women reported no further SI after the Prolift procedure alone. The only patient who had an inconclusive UDSI was noted to have marked improvement of her SI following the Prolift procedure (Tab. 2).

Out of the 14 patients with preoperative diagnosis of UDSI, four (28.5%) had ISD. Two of these women opted to have TVT-O and not TVT to avoid any risk of bowel injury. The other two women had TVT. All seven women who had either TVT or TVT-O following their Prolift procedure reported subjective cure of their urinary symptoms including SUI.

One of the patients who had TVT-O seven months after a total Prolift procedure presented herself about 3 months following the TVT-O complaining of pain inside the vagina. There was no recurrence of her SUI. Clinical examination revealed a tender spot on the right side of the lower anterior vaginal wall where the TVT-O mesh penetrates the obturator foramen; there was no evidence of mesh erosion, granuloma formation or recurrence of the prolapse. The patient was admitted as a day procedure where she was examined under anaesthesia; there was no evidence of mesh erosion. The vaginal skin was incised over the tender spot described above and about 1 cm of the TVT-O mesh was excised up to where it penetrates the obturator foramen. The vaginal skin was then well mobilised before it was sutured. When she was reviewed in the out patient clinic, the patient was asymptomatic with no further pain or recurrence of SUI.

Of the sixteen women who had non SUI urinary symptoms either in isolation (5) or in addition to SUI (11), all had these symptoms cured after the Prolift.

DISCUSSION

The surgical technique was developed by the main author based on the established technique described by the Prolift

TABLE 1. – *Comparison of the complications of this study with that of Cosson et al.[8] and Fatton et al.[12]*

Complications	*Gad*	*Cosson*	*Fatton*
Intraoperative			
• Bladder or rectal injury	0	Vesical 4 (0.58%) Rectal 2 (0.30%)	
• Blood loss greater 500 ml	1 (3.33%) (note 1)	3 (0.44%)	
• Blood transfusion	0		
Immediate postoperative			
• Infection	0	Cellulitis 1 (0.15%)	T > 38.5C 2 (1.8)
		Perineal Abscess 2 (0.29%)	UTI 13 (11.8%)
			Pelvic abscess 0
		Pelvic haematoma 12 (1.75%)	Deep haematoma 2 (1.8%)
• Thromboembolism	0		
• Urinary retention	0 (note 2)		13 (11.8%)
• Return to theatre	0		
• Blood transfusion	0		
Medium term postoperative			
• Granuloma formation	0	46 (6.70%)	3 (2.8%)
• Mesh exposure	0		5 (4.7%)
• Urinary or rectal fistula	0	2 (0.30%)	
• Mesh contraction	0	19 (2.77%)	18 (17%)
• Recurrence	0	36 (5.24%)	5 (4.54%)
• De novo SUI	0	37 (5.39%)	

Note 1: In one patient there was an EBL > 500ml. This woman had a large fibroid uterus with 1st degree uterine prolapse. She requested a hysterectomy at the time of her Prolift due to pressure symptoms caused by the large fibroid uterus. Most of the blood loss occurred during the difficult vaginal hysterectomy part of the procedure and was not associated with the Prolift procedure itself. She did not require blood transfusion. The histology confirmed a large fibroid uterus weighing 481g (150mm x140mm x70mm).

Note 2: There were no cases of urinary retention by conventional definitions. There was one woman who passed 350ml on first void, the nursing staff measured residual urine of 96mls. For no clear indication she re-inserted an indwelling catheter again. On the same day the woman had to leave the hospital to attend to family business with the catheter still in situ. By the time she returned the next morning she had a successful trial after removal of the catheter.

Gynecare manufacturer [13] modified according to his personal experience with the intention of achieving an outcome with minimum complications and reduction of the risk of recurrence. The technique of the Prolift was fully described by Reisenauer et al. and Fatton et al.[9, 12] Reisenauer et al. leave the endopelvic fascia attached to the bladder and the rectovaginal fascia attached to the rectum, a view that is not shared by Fatton et al. who perform full thickness dissection. The latter view is shared by the first author.

The incidence of POP doubles roughly with each decade between the ages of 20-59.[15] Major pelvic reconstructive surgery by Prolift procedure on women in the extremes of age may be controversial. In this study there was only one woman younger than 45 years (36 years). The youngest in the Fatton study is twenty-nine. Increasing longevity has resulted in a higher number of women presenting with symptoms of POP in later years. Increased activity, including sexual activity[14] into older age means that older women should be considered as candidates for Prolift procedure. There were four women aged over 70 (13.3%). The oldest woman in the series (79) had a severely scarred vagina due to four previous pelvic floor repairs. The next oldest woman, aged 78 years, had a longstanding severe procidentia with decubitus ulcers and oedema. Her treatment by the main author has been described elsewhere in this journal.[16] The oldest woman in the Fatton study is 90.

The association between parity and POP is well established. Vaginal delivery is the single most important risk factor for development of pelvic floor dysfunction.[16, 17] There is an eleven-fold increased risk of POP for women who have had more than four normal vaginal deliveries compared with nulliparous women.[15] All thirty women in this study had at least one vaginal delivery in the past.

When a hysterectomy is performed during a Prolift repair, it is associated with a higher risk of mesh exposure and recurrence.[9, 12] In this study there was a much higher proportion of women that had had a previous hysterectomy (56.7% vs 23.3% in Cosson and 28.2% in Fatton). This is consistent with the evidence that women with a previous hysterectomy are at a higher risk of POP compared with those with an intact uterus. The author was able to avoid a simultaneous hysterectomy in a larger proportion of patients (only 13.3% of women had a simultaneous hysterectomy compared with 52.8% in Cosson and 19% in Fatton). Whilst being conscious of the potential complications of having a hysterectomy at time of Prolift, it is inevitable that some women will still need to undergo this additional procedure for clinical reasons or patient request. The main author would therefore like to draw attention to the technique he described above to attempt to reduce complications associated with a hysterectomy performed at the time of Prolift.

As mentioned above, all patients had at least third stage prolapse in one or more compartments. Nineteen women (63.3%) had a 4th stage prolapse in one or more compartment. In Fatton study the degree of prolapse were classified using the classification of Jacquetin which is a modification of Baden-Walker Halfway staging system used in this study.

All patients had a hospital stay between three to five days with average stay of 4 days. In all patients the hospital stay was uneventful.

The number of complications in this study compares very favourably with that of the other two larger studies. There was only one significant intraoperative complication in this study was blood loss > 500ml occured to a patient during a hysterectomy part of her surgery which was unusually difficult due

TABLE 2. – *Effect of Prolift procedure on associated SUI.*

SUI	Yes		No		
before Prolift	22 patients (73%)				8
UDA performed	Yes 19		No 3	No 8	
Result of UDA if performed	UDSI 14	no UDSI 4	Inconclusive UDSI 1		
No SI following prolift	6 (43%)	4 (100%)	0	3 (100%)	8 (100%)
	13 (59%)				
Presence of SUI following Prolift	8 (57%) 5 had TVT-O & 2 had TVT 1 awaiting surgery	0	1 (100%) Marked improvement of SUI	0	0
	9 (41%)				

to the large size of the uterus. The significance of hysterectomy during Prolift has been discussed elsewhere in the discussion.

In three women (10%) the follow up visit was only four weeks postoperatively. Deviations from the routine six week follow-up are usually because of logistical constraints and patient convenience in the geographical area in which the surgeon practices. The absence of re-referral in these cases following their initial post operative review supports the assumption of a longer term successful post operative outcome right up to the time of audit. In this study the majority of women had urinary symptoms as it was the most presenting symptom with 3/4 of patients had symptoms of stress incontinence. One of the important findings in this study is the fact that six (43%) out of fourteen women with preoperative diagnosis of UDSI this was cured after the Prolift alone. Indeed out of twenty-two women with symptoms of SUI, thirteen (59%) women had these cured by the Prolift alone. The authors acknowledge that this is a subjective cure as none of these women had postoperative UDA. The only patient who had an inconclusive UDSI was noted to have marked improvement of SUI following the Prolift procedure and declined any further intervention or investigation. In eight women (57%) with preopertive diagnosis of UDSI, this was not cured by the Prolift alone. Five had a subsequent TVT-O procedure and two out of the four women with diagnosis of ISD had TVT. Both procedures were successful in all cases. The remaining woman is still waiting her procedure. It is of interest that the four women in this study with preoperative diagnosis of ISD remained to have SUI following their Prolift procedure. This represents 50% of the women who remained to have SUI following the Prolift procedure but only 28.5% of the women with preoperative diagnosis of UDSI.

The authors acknowledge that not all the women with urinary symptoms had a pre-operative UDA. Nevertheless, the main author's practice of performing a two-stage procedure starting with the Prolift procedure could result in some of the women opting to delay the UDA until after the Prolift procedure.

The main author separates the treatment of POP and UDSI for the following two reasons. Firstly, the degree of urinary incontinence may improve following POP repair. Secondly, he performs a TVT-O or TVT under sedation and local anaesthesia with a cough test performed in theatre which may contribute to very high success rate and no urinary retention problems in his own patients (unpublished audit data).

All the women who had non SUI urinary symptoms had these cured following Prolift.

CONCLUSIONS

This study shows that the Prolift procedure is a safe and effective option for women with a severe degree of POP. Forty three percent of women with preoperative diagnosis of UDSI were subjectively cured following Prolift. This supports the practice of the main author of performing a two stage procedure: Prolift for prolapse repair followed by a TVT-O or TVT procedure only in the group of women who their UDSI remains after the Prolift procedure. Women with ISD need to be warned that it is unlikely that they would have relief of their SUI following the Prolift procedure.

Both authors acknowledge the limitations of the study, such as the relatively short period of follow-up. Additionally, the small sample size may diminish the significance of the absence of rarer post operative complications. Nevertheless, even in a sample of thirty, the authors believe that the low incidence of all types of complications is significant.

Both authors would welcome a long term randomised controlled study comparing Prolift with a traditional repair with or without sacrospinous ligament fixation, abdominal sacrocolpopexy, or a laparoscopic paravaginal repair, or sacrocolpopexy. They would also be very interested in a randomised controlled trial in women with the diagnosis of POP and UDSI comparing the Prolift and TVT-O or TVT performed at the same time with that of a two-stage procedure.

REFERENCES

1. Beck RP. Pelvic relaxation prolapse. In: Kase NG, Weingold AB. Eds. Principles and practice of clinical gynaecology. New York: John Wiley & Sons 1983; 677-85.
2. Olsen L, Smith VJ, Bergstrom JO, et al. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. Obstet Gynecol 1997; 89: 501-6.
3. DeLancey J. The hidden epidemic of pelvic dysfunction: achievable goals for the improved prevention and treatment. AJOG 2005; 192: 1488-95.
4. Julian TM. The efficacy of Marlex mesh in the repair of severe recurrent vaginal prolapse of the anterior midvaginal wall. AJOG 1996; 175: 1472-5.
5. Shull BL, Bent SJ, Kuehl TJ. Surgical management of prolapse of the anterior segment: an analysis of support defects, operative morbidity and anatomic outcome. AJOG 199; 171: 1429-39.
6. Paraiso MFR, Ballard LA, Walters MD, et al. Pelvic support defects and visceral and sexual function in women treated with sacrospinous suspension and pelvic reconstruction. AJOG 1996; 17: 1423-31.
7. Whiteside JL, Weber AM, Meyn LA, Walters MD. Risk factors for prolapse recurrence after vaginal repair. AJOG 2004; 191: 1533-1538.
8. Cosson M, Caquant F, Collinet P, et al. Prolift mesh (Gynecare) for pelvic organ prolapse surgical treatment using the TVM group: a retrospective study of 687 patients. Communication in the ICS meeting Montreal 31 August 2005.
9. Reisenauer C, Kirschniak A, Drews U, Wallwiener D. Anatomical conditions for pelvic floor reconstruction with polypropylene implant and its application for the treatment of vaginal prolapse. EJOG and Reprod biology 2007; 131: 214-255.
10. Mokrzychi ML, Hampton BS. Pelvic arterial embolization in the setting of acute hemorrhage as a result of the anterior Prolift proecedure. Int Urogynaecol J Pelvic Floor Dysfunction. 2007; 18: 813-815.
11. Ignjatov I, Stosic D. Retrovesical haematoma after anterior Prolift procedure for cystocele correction. Int Urogynecol J Pelvic Floor Dysfunct. 2007; 18: 1495-7.
12. Fatton B, Amblard J, Debodinance P, et al. Transvaginal repair of genital prolapse: preliminary results of a new tension-free vaginal mesh (Prolift(technique) - a case series multicentric study. Int Urogynecol J 2007; 18: 743-752.
13. Gynecare Prolift for Pelvic Organ Prolapse. www.jnjgateway.com
14. Lindau ST, Schumm LP, Laumann EO, et al. A Study of Sexuality and health amongst older adults in the United States. NEJM 2007; 357: 762-74.
15. Siddighi S, Hardesty JS. Urogynecology & Female Pelvic Reconstructive Surgery. McGraw-Hill, New York 2006.
16. Gad N. The use of triple vaginal ring pessaries in procidentia prior to total Prolift procedure. Pelviperineology 2007; 26: 93-94.
17. Mant J, Painter R, Vessey M. Epidemiology of genital prolapse: Observations from the Oxford Family Planning Association study. Br J Obstet Gynaecol 1997; 104: 579-85.
18. Viktrup L, Lose G, Rolff M, Barfoed K. The symptom of stress incontinence caused by pregnancy or delivery in primiparas. Obstet Gynecol 1992; 79: 945-9.

No conflict of interest declared.

Correspondence to:
NADER GAD
Consultant & Senior Lecturer
Royal Darwin Hospital, Darwin, Ausralia
Email: drnadergad@hotmail.com.au

Original article

Role of enterocoele in obstructed defecation syndrome: proposal of a new radiological and surgical classification

CLAUDIO MORANDI - BEATRICE BREVEGLIERI - CLAUDIO MORATTI
LUCA VERGANTI - PIETRO TORRICELLI

Department of Radiology, University of Modena and Reggio Emilia, Italy

Abstract: This study proposes a new classification of enterocoele based on its functional role as a cause of constipation in patients with ODS (obstructed defecation syndrome). We retrospectively evaluated 597 patients (551 F, 46 M) with symptoms of ODS, who had undergone a cinedefecography between November 2001 and November 2005. We classified enterocoele into three groups based on the presence of a radiological pattern of obstructed defecation and the presence of any other functional or anatomical abnormality. An enterocoele was found in 127 females (23%) and 1 male. We recognised prolapse of the small bowel in 103 females and in one male while in 24 females the sigmoid colon descended into the Pouch of Douglas. We found 38 patients (6.9%) with a functional enterocoele, 38 patients (6.9%) with a non obstructive enterocoele and 27 (4.9%) with an obstructive enterocoele. All the 23 patients with sigmoidocoeles were classified as symptomatic non obstructive. In the group with obstructive enterocoele the finding of a radiological pattern of obstructed defecation was higher (26/27) than in the group without an obstructive enterocoele (23/100) ($p < 0.001$). In patients with obstructive enterocoele the occurrence of concurrent anatomical and functional abnormalities was lower ($p < 0.05$) than in patients with other classes of enterocoele. From this study we can infer that obstructive enterocoele impairs rectal evacuation and it can be considered the main cause of obstructed defecation in patients with ODS. This new classification can be useful to determine which cases would be likely to benefit from pelvic surgery.

Key words: Enterocoele; Obstructed defecation syndrome; Cinedefecography; Sigmoidocoele.

INTRODUCTION

Obstructed defecation syndrome (ODS) is clinically defined as a prolonged (more than 6 months) history of difficult rectal evacuation, including excessive straining, feeling of incomplete evacuation or inability to evacuate without digitation. It is usually related to a functional disorder and it occurs most exclusively in females. Many authors [1-4] have reported an incidence of enterocoele from 19% to 35% in patients with ODS. However, the role of enterocoele (defined as prolapse of the small bowel into the rectogenital space) in this syndrome is still controversial.

According to Wexner,[7] the etiological classification of enterocele is: primary when factors such as multiparity, advanced age, general lack of elasticity, obesity, constipation and increased abdominal pressure are present, and secondary when it occurs after gynecological surgical procedures, especially hysterectomy. Another classification of enterocoele proposed by Nichols [8] is based on its origin: 1) congenital (unusual deep Pouch of Douglas), 2) pulsion-mediated (caused by chronic increase of abdominal pressure), 3) by traction (associated with a loss of support of the pelvic floor), 4) iatrogenic (after surgical procedures that change the normally-horizontal vaginal axis to vertical).

In patients with a uterus, the hiatus between the proximal edges of the fascial layers (anteriorly the pubocervical fascia and posteriorly the rectovaginal fascia) is bridged by the cervix and the uterine fundus. One of the most common causes of enterocoele in non-hysterectomized patients is an unusually deep Pouch of Douglas.[5] In hysterectomized patients failure to reattach these layers results in a fascial defect so the peritoneum comes into direct contact with the Pouch of Douglas.[6]

A grading system, proposed by Hale et al., classifies enterocoele as small when the bowel extends 2 to 4 cm below the vaginal apex, moderate when extension reaches 4-6 cm, and large when this distance is greater than 6 cm. Extension up to 2 cm below the vaginal apex is considered to be within the normal range.[9]

The most common symptoms of enterocoele are a dragging sensation in the pelvis and pain in the lower abdomen. Many patients report outlet obstruction [3] and assisted defecation. Some develop faecal incontinence.

Detection of enterocoele is difficult: up to 84% are missed at clinical examination.[11] Its presence and extent can be diagnosed by endo-ultrasonography and by dynamic magnetic resonance imaging,[12-14] otherwise the functional relevance of an enterocele is diagnosed only in the late evacuation phase during cinedefecography.[15, 16] Defecography or evacuation proctography is a dynamic radiologic technique that involves imaging of the elimination of a barium paste enema from the rectum in order to assess changing anatomic relationships of the pelvic floor and associated organs during evacuation. The main indication to perform cinedefecography is constipation and rectal outlet obstruction.[7, 8] The aim of our study is to demonstrate in patients with clinical symptoms of ODS the incidence of enterocoele, the variable relationship between herniated small bowel, peritoneum and rectal ampulla (the enterocoele may sink into the bottom of the cul-de-sac or float within the Pouch of Douglas) and finally to assess the correlation between different groups of enterocoele and ODS.

MATERIALS AND METHODS

We retrospectively evaluated 597 patients (551 women, 46 men) who underwent a cinedefecography from November 2001 to November 2005. All patients had a full physical examination by a surgeon and completed a questionnaire regarding: age, presence of symptoms of obstructed defecation (defecation frequency, use of laxatives, severe and prolonged straining, perineal dragging sensation, feeling of incomplete evacuation, alimentary disorders), incontinence, parity, history of a previous hysterectomy or cystocoele repair or any pelvic surgery for ODS. The indication for cinedefecography was obstructed defecation in 95% and incontinence in 5% of the cases. Females' mean age was 51 years (range 20-79) and males' mean age was 49 years (range 25-79). In the female group twenty-eight patients (5.08%) had a previous operation for obstructed defecation syndrome (Tab. 1); 180 patients (32.67%) had hysterectomy, 35 (6.36%) had a cystocoele repair (Tab. 2). All patients gave written informed consent to the study.

Cinedefecography

Cinedefecography was performed using the standard technique described by Kelvin et al. in 1992.[17] The rectum was emptied by administration of glycerin suppositories or an enema. Approximately one hour before the examination 300

TABLE 1. – *Previous surgical procedures for obstructed defecation syndrome.*

	Total	*Female*	*Male*
STARR (Stapled Transanal Rectal Resection)	17	15	2
Wells' Rectopexy	2	1	1
Delorme's procedure	1	1	–
Orr-Loygue's Rectopexy + Sigmoid Resection	3	3	–
Zacharin'S Rectopexy + Sigmoid Resection	1	1	–
Block Rectocoele Repair	1	1	–
Total Colectomy for slow transit constipation	1	1	–

ml of diluted barium suspension at 60% (Prontobario® 60%-Bracco s.p.a.Milan-Italy) was given orally to opacify the small bowel.[11-18] Patients were asked to empty the bladder. Later the rectum was filled with 200 ml of thick barium sulphate paste at 113% w/v (Prontobario® esofago-Bracco s.p.a-Milan-Italy) injected with a syringe with the patient in the left lateral position on the fluoroscopy table (GE Prestige VH).

Cinedefecography can be divided in three steps: pre-evacuation, evacuation and post-evacuation. Initial radiographs of the pelvis with the patient in the lateral position are taken at rest and with voluntary contraction of the pelvic floor muscles in order to record the pre-evacuation anorectal configuration and pelvic floor position. Then the patient is moved into the upright position and seated on a commode placed on the footrest of an examination table in front of a fluoroscopy unit.[7] While the patient was seated on the commode lateral radiographs were taken during rest and squeezing as a point of reference to locate bone landmarks and to assess the degree of filling of pelvic ileum. A left lateral view of the pelvis was recorded during the evacuation phase (overall the entire fluoroscopic period is limited to 50 seconds).[7] The entire examination was recorded on videotape and each videoclip was analyzed using a computer video capture combined with an image analysis program (Microprint®).

Definitions and radiographic analysis

The following parameters were considered: the anorectal angle (ARA), the pubococcygeal line (PCL), the bi-ischiatic line, the antero-posterior anal canal width, the evacuation time, and the post-evacuation barium trapping. An enterocoele was diagnosed when the barium contrast which filled small bowel loops descended below the pubo-coccygeal line. Sigmoidocoele (Fig. 1, 2) was diagnosed by the presence of gas-filled sigmoid loops in the Pouch of Douglas.[10] Any other concomitant functional and anatomical abnormality was also recorded. A rectal prolapse was defined as a circumferential descent of the entire thickness of the rectal wall above the anal canal (rectal-ampullar prolapse), involving the anal canal (intracanalicular prolapse) or coming out through the anal verge (external full-thickness rectal prolapse).[19]

We diagnosed a rectocoele when the anterior rectal and posterior vaginal wall herniated into the lumen of the vagina; its depth was assessed by the length of the segment drawn from this axis to the maximum anterior convexity point of the rectocoele.[19]

Pelvic floor descent was defined as the drop of the ano-rectal junction during straining more than 3.5 cm from its resting position at the inferior plane of the ischial tuberosities.[20]

Anismus was diagnosed as a persistent or excessive indentation of the puborectalis sling posteriorly on the rectum at or just above the anorectal junction without an appropriate widening of ARA.[20] Obstructed evacuation was defined as the inability to evacuate 2/3 of the sulphate paste within 30 seconds.[21]

Based upon cinedefecography we radiologically distinguished two types of enterocoele: *a functional enterocoele* (Fig. 3), when the small bowel descends to PCL at straining and without compressing the rectal ampulla and *symptomatic enterocoele* when small bowel or sigmoid colon compresses the rectal ampulla and rises with it at the end of straining. Furthermore, we divided the symptomatic enterocoele into *non obstructive* and *obstructive enterocoele*.

Non obstructive (Fig. 4, 5) enterocoele permits rectal evacuation because it occupies the Pouch of Douglas only at the end of evacuation and allows normal function of the rectal ampulla.

Obstructive enterocoele (Fig. 6, 7) descends in the early phase of voiding and compresses the rectal ampulla to prevent passage of stool. We then describe three classes of enterocoele: functional enterocoele, symptomatic non obstructive enterocoele and symptomatic obstructive enterocoele

The three categories of enterocoele were then evaluated for the presence of a radiological pattern of obstructed defecation and any other functional or anatomical abnormalities. Differences between these groups were considered statistically significative for a p value < 0.05. SPSS 12 (SPSS Inc. Chicago, Illinois, USA) software was used for calculation.

RESULTS

An enterocoele was found in 128 patients (21.44%), 127 females (23.05%) and 1 male (2.2%). One hundred and three females (81%) had a prolapse of the small bowel into the rectogenital space (enterocoele), while the remaining 24 (19%) had a sigmoid colon descent into the Pouch of Douglas (sigmoidocoele).

A functional enterocoele was diagnosed in 38 patients (6.9% of all females - mean age 55 years and range 27-79). The patients in this group had a mean number of pregnan-

TABLE 2. – *Patients with different types of enterocoeles.*

	Control group no evidence of enterocoele	*Functional enterocoele*	*Sigmoidocoele*	*Symptomatic non obstructive enterocoele*	*Symptomatic obstructivr enterocoele*
N.	424 (76.95%)	38 (6.9%)	24 (4.35%)	38 (6.9%)	27 (4.9%)
Mean age	51 (range 20-79)	55 (range 27-79)	52 (range 20-77)	57 (range 38-73)	56 (range 25-75)
Number of pregnancies	1.5 (0-6)	1.4 (0-4)	1.7 (0-5)	1.1 (0-2)	1.8 (0-4)
Hysterectomy	123 (29%)	3 (7.89%)	3 (12.5%)	18 (47.37%)	10 (37.04%)
Cystocoele repair	7 (1.65%)	0	2 (8.33%)	3 (7.89%)	0
Hysterectomy + cystocoele repair	11 (2.59%)	0	5 (20.83%)	3 (7.89%)	4 (14.81%)

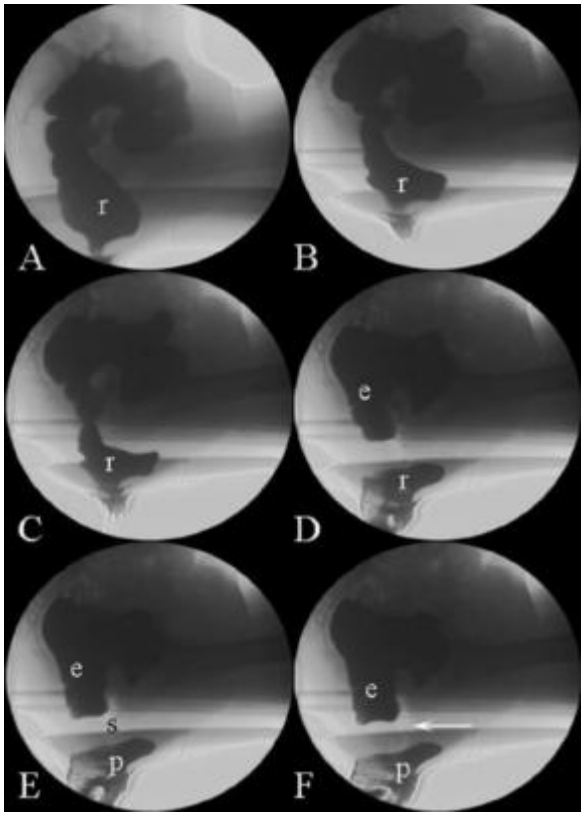


Fig. 1. – A-F: Female, 20 years old, nulliparous, with a history of significant weight-loss. Association of external prolapse (p), perineal descent, *sigmoidocoele* (s in E and arrow in F). Rectum (r) and small bowel loops (e).

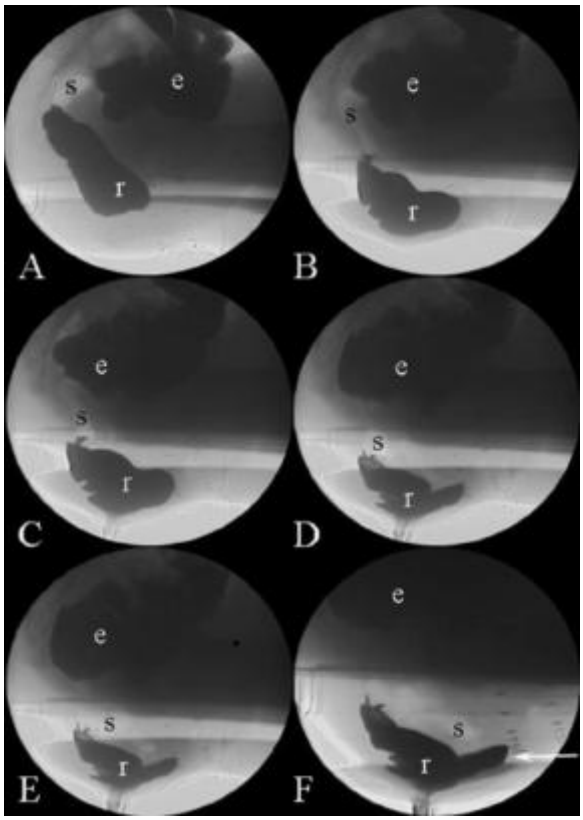


Fig. 2. – A-F: *Sigmoidocoele* (s in E and F). Large anterior rectocoele (arrow in F). Rectum (r) and small bowel loops (e).

cies of 1.4, while 3 (7.89%) had undergone hysterectomy. No patients had undergone a cystocoele repair.

The frequency of obstructed defecation in this group was 37% (14/38) (Fig. 8). Five patients (13.18%) had an isolated enterocoele, while in 33 (86.82%) it was associated with other conditions, as reported in Table 3. Four patients had a combined functional enterocoele with sigmoidocoele.

Perineal descent was present in 10 of 38 patients (26.32%). Thirty-eight patients (6.9% of females with ODS) had a symptomatic non obstructive enterocoele. Their mean age was 57yrs (range 38-73). Hysterectomy had been performed in 47.37% and was associated with cystocoele repair in 3 cases (7.89%). Cystocoele repair alone had been performed in 3 patients (7.89%). ODS was found in 7 patients (18%) (Fig. 8). An isolated enterocoele was noted in 5 patients (13.16%) and associations with other condition are shown in Table 3. Perineal descent was detected in 24 patients (68%).

Symptomatic obstructive enterocoele was found in 27 patients (4.9% of all females - mean age 56 years). Ten of these patients had undergone hysterectomy (37.04%), while 4 patients had undergone cystocoele repair (14.81%). Radiologic obstructed defecation was found in 26 of the patients (96.3%) while 1 patient was incontinent (Fig. 8). Obstructive enterocoele was found as an isolated finding in 13 patients (41.15%), while in the remaining 14 (58.85%) we recognised additional findings (Tab. 3). Pelvic floor descent was present in 4 patients (14.81%). The only male with an enterocoele had an obstructive enterocoele. Sigmoidocoele was found in 24 patients (4.35% of all females - mean age 52 years and range 20 -77 years). The mean number of pregnancies in this group was 1.7. Three patients (12.5%) had undergone a hysterectomy, while 2 patients (8.33%) had undergone a cystocoele repair and 5 patients (20%) had both procedures. Only 2 patients (8%) had obstructed defecation (Fig. 8). Five patients (20.83 %) had an isolated sigmoidocoele, while 19 patients (79.17%) had additional findings on defecography (Tab.3). The most frequent finding was perineal descent(46%). In the group with obstructive enterocoele the frequency of a radiological pattern of obstructed defecation was statistically significant ($p < 0.001$). In patients with obstructive enterocoele the occurrence of concomitant anatomical-functional abnormalities was lower ($p < 0.05$) than in patients with other classes of enterocoele.

DISCUSSION

Obstructed defecation syndrome is a multi-compartment pelvic disorder due to the presence of recto ampullar dysfunction such as rectal prolapse, rectocoele, paradoxic puborectalis muscle contraction, enterocoele and pelvic floor descent.[22, 23] The clinical role of enterocoele is controversial. In many studies it has been considered to be associated with obstructed defecation and constipation.

In 1952 Wallden et al.[24] postulated that the anterior pressure on rectum from an enterocoele may cause a defecation disorder characterized by obstruction. They termed the disorder mechanical rectal obstruction or defecation block.

However, Halligan et al.[25] demonstrated that most of the patients with enterocoele evacuate more rapidly and completely suggesting that enterocoele is not necessarily associated with impaired rectal evacuation indicating that these pouches do not mechanically obstruct defecation; on the contrary, they found a higher incidence of incontinence in patients with enterocoele. The development of transanal resection as a treatment for outlet obstruction [26] has underlined the importance of assessing the presence of an enterocoele. Patients were also asked to empty the bladder before rectal imaging because the presence of a cystocele may prevent the recognition of an enterocoele.[27] Some authors

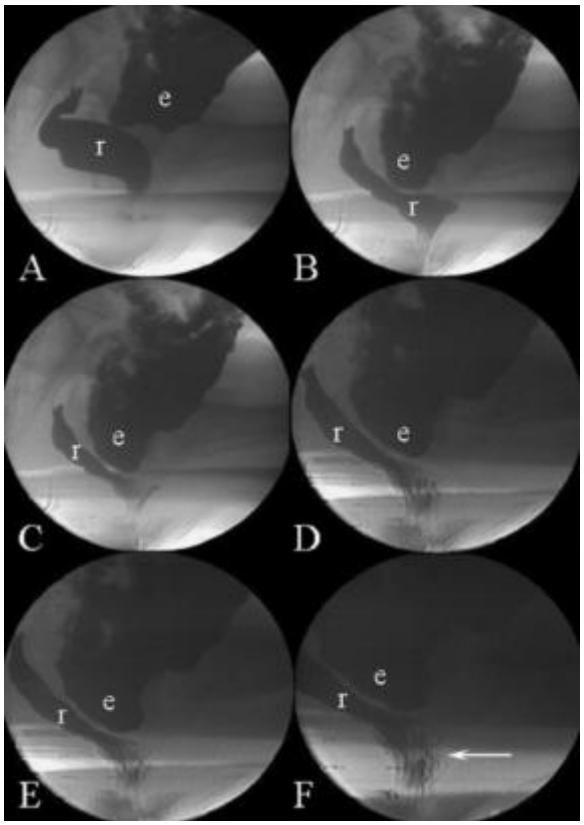


Fig. 3. – A-F: Female, 65 years old, with previous hysterectomy and two deliveries. The *functional enterocoele* (e) reaches the Pouch of Douglas without compressing the rectum (r). The arrow in F shows the intracanalicular prolapse which causes obstructed defecation.

perform a post evacuation image after the proctographic phase to detect an enterocoele. We prefer to document a late evacuation phase during cinedefecography with the patient straining maximally for almost 40 seconds to observe the herniation of intestinal loops in a dynamic setting.

In our study the rate of enterocoele in patients with ODS was 21.44%, while the incidence of sigmoidocoele was 4.35%. These data are comparable to those reported in the literature, where the incidence is reported as 19% to 35%[4] and from 4% to 5.2% respectively.[10-17]

In the group with obstructive enterocoele the number of patients with a radiological pattern of obstructed defecation is higher (26/27 vs 23/100; p< 0.001) than the number of patients without an obstructive enterocoele. The same results can be observed comparing patients with an obstructive enterocoele to those patients who belong to any other class of enterocoele.

Obstructed enterocele is more likely than non obstructive enterocoele to be an isolated pathological condition (41.15% vs 13.16%, p < 0.05). Anatomical and functional abnormalities are less frequent in obstructive enterocoele (58.85% vs 86.84%; p<0.05) than in other classes of enterocoele. This data confirms the hypothesis that an obstructed enterocoele, often isolated, may be the real cause of ODS in these patients. Our conclusions differ from those of Halligan et al.[25] The reason could be that in Halligan's population the majority of patients probably had only functional and non obstructive enterocoeles, as defined by our classification, without having a true obstructive enterocoele. The identification of obstructive enterocoele, which seems to be the main cause of obstructed defecation, is important in determining which patient to refer to pelvic surgery.

TABLE 3. – *Pelvic floor disorders observed with cinedefecography in patients with enterocoele.*

Additional Findings to functional Enterocoele		
Rectal Prolapse	12	31.58%
Pelvic Floor Descent	4	10.53%
Rectocoele	2	5.26%
Rectal Prolapse + Paradoxic Puborectalis Muscle Contraction	5	13.18%
Rectal Prolapse + Rectocoele	4	10.53%
External Prolapse + Perineal Descent	2	5.26%
External Prolapse + Perineal Descent + Sigmoidocoele	3	7.89%
Perineal Descent + Rectocoele + Sigmoidocoele	1	2.63%
Additional Findings to Symptomatic Non Obstructive Enterocoele		
Rectal Prolapse	5	13.16%
Rectocoele	2	5.26%
Perineal Descent	9	23.68%
Perineal Descent + Rectocoele	9	23.68%
Rectal Prolapse + Perineal Descent + Rectocoele	4	10.53%
Perineal Descent + Rectocoele + Paradoxic Puborectalis Muscle Contraction	2	5.26%
Rectal Prolapse + Paradoxic Puborectalis Muscle Contraction + Rectocoele	2	5.26%
Additional Findings to Symptomatic Obstructive Enterocoele		
Paradoxic Puborectalis Muscle Contraction	4	14.81%
Rectal Prolapse	2	7.41%
Perineal Descent	2	7.41%
Rectal Prolapse + Rectocoele	4	14.81%
Perineal Descent + Rectocoele	2	7.41%
Additional Findings to Sigmoidocoele		
Rectal Prolapse	3	12.50%
Rectal Prolapse + Rectocoele	5	20.83%
External Prolapse + Perineal Descent	4	16.67%
Rectal Prolapse + Perineal Descent + Rectocoele	3	12.50%
External Prolapse + Perineal Descent + Enterocoele	2	8.33%
Perineal Descent + Rectocoele + Enterocoele	2	8.33%

The presence of clinical and radiological signs of incontinence [1-19] associated with the diagnosis of enterocoele can be explained by the high incidence of perineal descent (58%) in patients with symptomatic non obstructive enterocoele. This is the most frequent type of enterocoele detected. The same condition is found in patients with sigmoidocoele who have pelvic relaxation that results from weakening of the supporting vaginal tissues and the pelvic diaphragm.[7] This is demonstrated by the increased incidence of perineal descent (46%), the association with a functional enterocoele (16.6%) and by the presence of an external full-thickness rectal prolapse (25%). The association between sigmoidocoele and enterocoele was also observed in 3 of 9 sigmoidocoeles in Fenner's study [28] whereas in our study we found it in 4/24 patients (16.66%). In the group of patients with sigmoidocoele we found a very low incidence of obstructed defecation (2/24: 8.33%). This group has a higher rate of previous hysterectomy and cystocoele repair. However, we found even younger patients (mean age 52 years old) with a past history of gastrointestinal disorders and poor pelvic floor function. These factors probably weakened the muscular fibers of the pelvic floor with subsequent loss of support. 7 It is clear from imag-

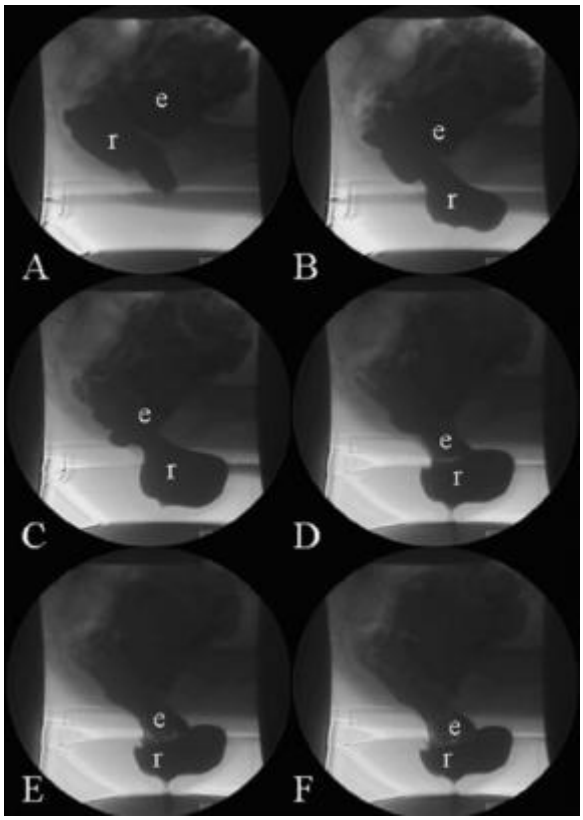


Fig. 4. – A-F: Female, 49 years old. Non relaxing puborectalis syndrome with indentation of the puborectalis muscle on the posterior wall of the ampulla (r) and no significant change in the anorectal angle during defecation. Association of perineal descent, anterior rectocoele with barium trapping and *non obstructive enterocoele* that compresses the ampulla without blocking it in the late phase (D) of defecation.

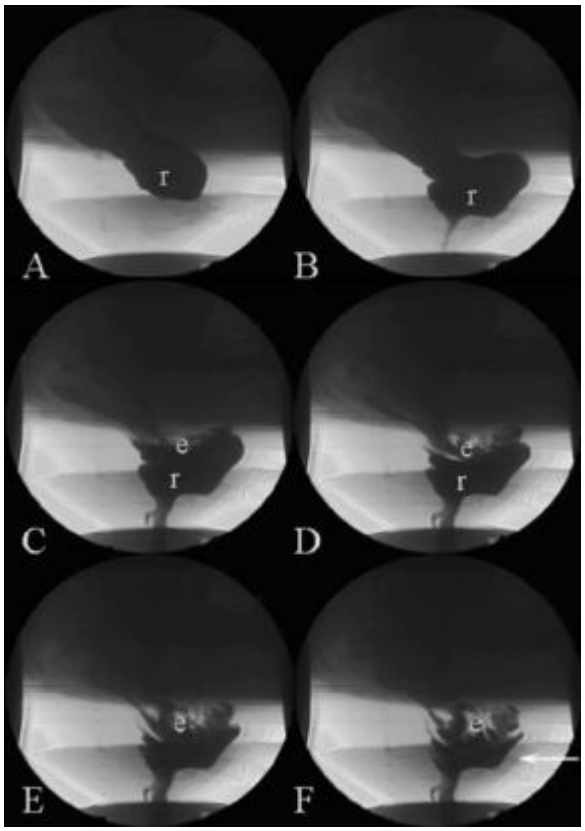


Fig. 5. – A-F: *Non obstructive enterocoele* (e) reaches the Pouch of Douglas compressing the rectum (r) without obstructing the ampulla. Association with perineal descent and anterior rectocoele.

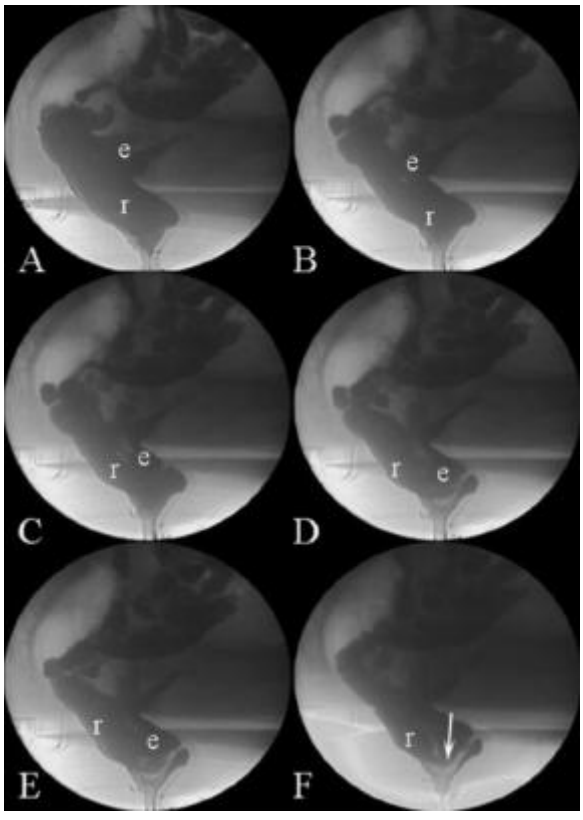


Fig. 6. – A-F: Female, 65 years old. *Obstructive enterocoele* (e) compresses the ampulla (r) in the early phase of voiding (B:C) and, moving towards the anus, blocks rectal emptying (arrow in F). No evidence of associated functional or anatomical disorders.

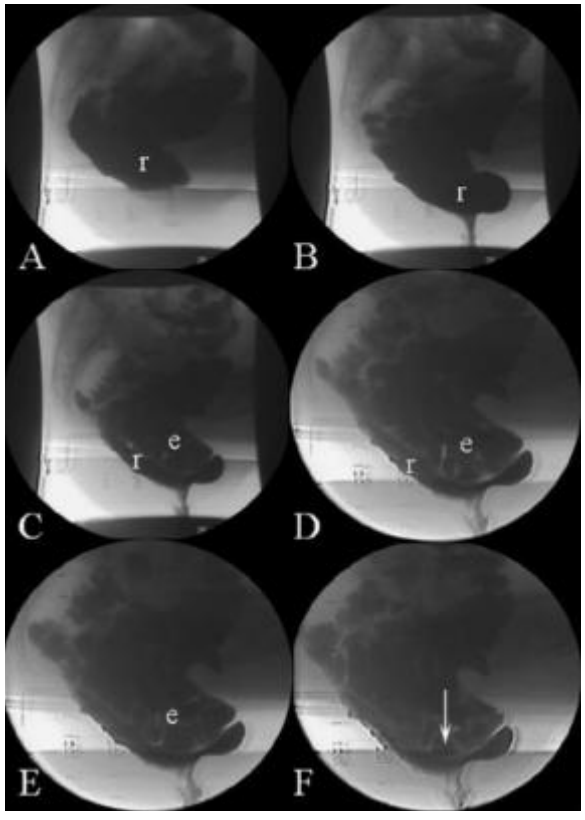


Fig. 7. – A-F: Female, 55 years old with previous hysterectomy and one delivery. The ampulla (r) is completely compressed by the *obstructive enterocoele* (e and arrow in F). No evidence of associated functional or anatomical disorders.

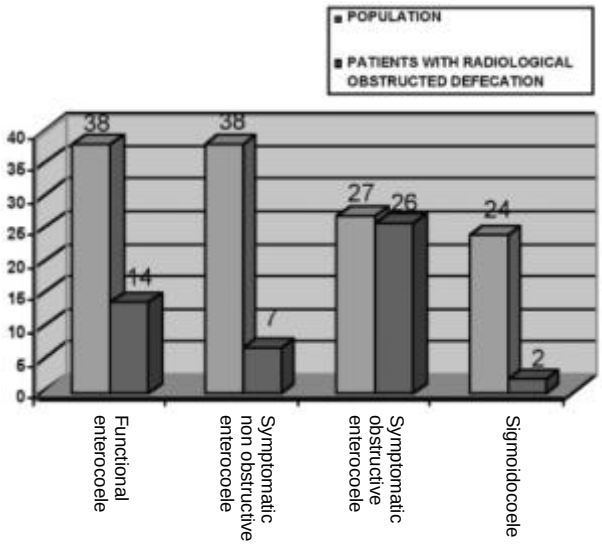


Fig. 8. – Frequency of obstructed defecation in patients with different types of enterocoele.

ing that a sigmoidocoele compresses the rectal ampulla only in the late phase of defecation. In our classification this condition is called "symptomatic non obstructive" enterocoele.

Otherwise, the frequency of hysterectomized patients (i.e. secondary enterocoele) is very high in obstructive and non obstructive enterocoele (respectively 51% and 47%); the frequency of cystocoele repair is similar. These results may suggest a possible role also for hysterectomy and cystocoele repair in the pathogenesis of symptomatic enterocoele (obstructive and not obstructive).

CONCLUSION

We propose a new classification of enterocoele based on its causative role in obstructed defecation in patients with ODS. In fact, we believe that it is possible to identify a functional enterocoele which does not compress the rectal ampulla and a symptomatic one that does compress the rectal ampulla. Enterocoele can be further classified as either an obstructive or non obstructive enterocoele. The first one is often associated with a radiological pattern of obstructed defecation and it's usually present as an isolated condition, probably being the only cause of obstruction in these patients. The second one, which is less associated with obstructive defecation, is usually related to other pathological conditions. Once validated, this classification could define the role of enterocoele in the pathogenesis of the obstructed defecation syndrome and allow the surgeon to design the best procedure and consequently improve the chances of a successful outcome.

REFERENCES

1. Mellgren A, Bremmer S, Johansson C et al. Defecography. Results of investigations in 2816 patients. Dis Colon Rectum 1994; 37: 1133-1141.
2. Bremmer S, Mellgren A, Holmstrom B et al. Peritoneocele and enterocele. Formation and transformation during rectal evacuation as studied by means of defaeco-peritoneography. Acta Radiol 1998; 39: 167-175.
3. Chou Q, Weber AM , Piedmonte MR. Clinical presentation of enterocele. Obstet Gynecol 2000; 96: 599-603.
4. Lapalus MG, Henry L, Barth X et al. Entérocèle: facteurs de risque clinique et associations à d'autres troubles de la statique pelvienne (à partir de 544 défécographies). Gynecol Obstet & Fertil 2004; 32: 595-600.
5. Miklos JR, Kohli N, Lucente V et al. Site-specific fascial defects in the diagnosis and surgical management of enterocele. American Journal of Obstetrics and Gynecology 1998; 179: 1418-1423.
6. Karasick S, Spettell CM. The role of parity and hysterectomy on the development of pelvic floor abnormalities revealed by defecography. AJR Am J Roentegenol 1997; 169: 1555-1558.
7. Jorge JM, Habr-Gama A,Wexner SD et al. Clinical applications and techniques of cinedefecography. Am J Surg 2001; 182: 93-101.
8. Nichols DH, Randall CL. Enterocele. In Vaginal surgery (eds Lippincott Williams & Wilkins), 1989; 313-327 Baltimore.
9. Maglinte DD, Kelvin FM, Hale DS et al. Dynamic cystoproctography: a unifying diagnostic approach to pelvic floor and anorectal dysfunction. AJR Am J Roentgenol 1997; 169: 759-768.
10. Marcio J, Jorge N, Yung-Kang Y et al. Incidence and clinical significance of sigmoidoceles as determined by new classification system. Dis Colon Rectum 1994; 37: 1112-1117.
11. Hock D, Lombard R, Jehaes C, et al. Colpocystodefecography. Dis Colon Rectum 1993; 36: 1015-1021.
12. Schoenenberger AW, Debatin JF, Guldenschuh I et al. Dynamic MR defecography with a superconducting, open-configuration MR system. Radiology 1998; 206: 641-646.
13. Hilfiker PR, Debatin JF, Schwizer W et al. MR defecography: depiction of anorectal anatomy and pathology. J Comput Assist Tomogr 1998; 22: 749-755.
14. Karaus M, Neuhaus P, Wiedenmann TB. Diagnosis of enteroceles by dynamic anorectal endosonography. Dis Colon Rectum 2000; 43: 1683-1688.
15. Mahieu P, Pringot J, Bodard P. Defecography: I. Description of a new procedure and results in normal patients. Gastrointest Radiol 1984; 9: 247-51.
16. Mahieu P, Pringot J, Bodard P. Defecography: II. Contribution to the diagnosis of defecation disorders. Gastrointest Radiol 1984; 9: 253-61.
17. Kelvin FM, Maglinte DD, Hornback JA et al. Pelvic prolapse: assessment with evacuation proctography (defecography). Radiology 1992; 184: 547-551.
18. Stoker J, Halligan S, Bartram CI. Pelvic Floor Imaging. Radiology 200; 218: 621-641.
19. Mellgren A, Johansson C, Dolk A et al. Enterocele demonstrated by defaecography is associated with other pelvic floor disorders. Int J Colorectal Dis 1994; 9: 121-124.
20. Karlbom U, Nilsson S, Påhlman L et al. Defecographic study of rectal evacuation in constipated patients and control subjects. Radiology 1999; 210: 103-108.
21. Halligan S, Malouf A, Bartram CI et al. Predictive value of impaired evacuation at proctography in diagnosing anismus. AJR Am J Roentgenol 2001; 177: 633-636.
22. Jean F, Tanneau Y, Le Blanc-Louvry I et al. Treatment of enterocele by abdominal colporectosacropexy-efficacy on pelvic pressure. Colorectal Dis 2002; 4: 321-325.
23. Grandjean JP, Seket B, Galaup JP et al. Traitement des rectocèles et des élytrocèles par voie abdominale: apport de la laparoscopie. Ann Chir 2004; 129: 87-93.
24. Wallden L. Defecation block in cases of deep rectogenital pouch. Acta Chir Scand 1952; 103: 236-238.
25. Halligan S, Bartram C, Hall C et al. Enterocele revealed by simultaneous evacuation proctography and peritoneography: does "defecation block" exist? AJR Am J Roentgenol 1996; 167: 461-466.
26. Corman ML, Carriero A, Hager T, et al. Consensus conference on the stapled transanal rectal resection (STARR) for disordered defaecation. Colorectal Dis. 2006; 8: 98-101
27. Kelvin FM, Maglinte DD, Hale DS et al. Female Pelvic Organ Prolapse. A Comparison of Triphasic Dynamic MR Imaging and Triphasic Fluoroscopic Cystocolpoproctography. AJR Am J Roentegenol 2000; 174: 81-88.
28. Fenner DE. Diagnosis and assessment of sigmoidoceles. Am J of Obstet and Gynecol 1996; 175: 1438-1441.

Correspondence to:
MORANDI CLAUDIO
Dipartimento Integrato Servizi Diagnostici e per Immagine
Struttura Complessa di Radiologia 1.
Azienda Ospedaliera Universitaria, Policlinico di Modena
Via Del Pozzo, 71 - 41100 Modena
Tel. +39 059 4225266 - Fax. +39 059 4224290
Email: info@defecografia .it

Retrospective review

The impact of birth history on pelvic floor function: a retrospective assessment of 10,125 patients

VITO LEANZA (*) - STEFANO DATI (**) - GIOVANNI PISAPIA CIOFFI (***) - MANUELA ACCARDI (*)

(*) Department of Obstetrics and Gynaecology, Catania University (Italy)
(**) Casilino Hospital, Urogynaecology Unit, Rome (Italy)
(***) Obstetrics and Gynaecology Unit, Ospedale Battipaglia Salerno

Abstract: AIM. To assess the importance of birth history in subsequent pelvic floor function. PATIENTS AND METHODS. Between 1996 and 2006 the outcomes of 10,125 patients were evaluated and patients were divided into the following categories: vaginal deliveries, caesarian sections, or both caesarian section and vaginal delivery. Based on self-reported pregnancy and delivery experience, the patients were classified as having delivered 5 years (group A), 5-20 years (group B), and over 20 years before (group C). Epidemiology of Prolapse and Incontinence Questionnaire (EPIQ) was used with questions about agreement or disagreement regarding the history of their delivery. The statistical analysis was performed with chi-squared test applied to a contingency table (2x2) and P value <0.001 was considered statistically significant. RESULTS. The comparison between agreement and disagreement abou t specific modality of delivery failed to demonstrate significant difference in the first group while in the second and third group the difference was statistically significant. CONCLUSIONS. Disorders of the pelvic floor depend mainly on modality of delivery. Anatomic and functional alterations influence both the choice of the patients and their positive or negative perceptions of the birth experience. Pelvic floor disorders depend on many risk factors, but vaginal delivery seems to be one of the most important.

Key words: Perineal damage; Pelvic floor; Quality of life; Caesarean section; Delivery.

INTRODUCTION

The pelvic floor is a network of muscles, ligaments and tissues that act like a hammock to support the organs of the pelvis: uterus, bladder, and rectum. If the muscles become weak or the ligaments or tissues are stretched or damaged, the pelvic organs may fall down and protrude into the wall of the vagina. The result is prolapse, urinary incontinence and reduced sexual response. It is well known that pelvic floor disorders usually result from a combination of factors. Pregnancy and vaginal delivery (VD) may weaken or stretch some of the supporting structures. Pelvic floor disorders are common among women who have had several vaginal deliveries, and the risk may increase with each delivery. The birth itself may damage nerves, leading to muscle weakness. At least 11% of women will require a pelvic floor operation in their lifetime.[1] Many studies suggest that VD is associated with pelvic floor disorders (Fig. 1). Thus the route of delivery is a potentially modifiable risk factor. As a result the role of elective caesarean section (CS) in reducing the risk of pelvic floor disorders is being evaluated considering both the choice of delivery by the physician and the treatment of late post-partum effects. The understanding of the association between vaginal delivery and pelvic floor disorders is a controversial topic. However, an increasing number of women are requesting elective caesarean delivery despite obstetric practice guidelines developed over the past decade aimed at reducing the caesarean delivery rate.[2, 3]

Schindl et al.[4] found that the birth experience was significantly better in elective caesarean section (CS) compared with VD, but worse in women with emergency CS and worst in those with vacuum delivery. They found that 83.5% of women with VD would choose the same mode of birth again compared to 74.3% of women with CS on demand and 66% of women with medically necessary CS. Only 30.1% of women with emergency CS wanted to receive CS at the next birth. Another point to be considered is the difference between elective and emergency CS. Allen et al.[5] observed that of 18,435 pregnancies, 721 were elective caesarean deliveries. There were no maternal deaths or transfers for intensive care. There was no difference in wound infection, blood transfusion or intraoperative trauma. Women undergoing elective caesarean delivery were more likely to have puerperal febrile morbidity (relative risk [RR] 2.2; 95% confidence interval [CI] 1.1, 4.5; *P* = .03), but were less likely to have early postpartum haemorrhage (RR 0.6; 95% CI 0.4, 0.9; *P* = .01) compared with women entering spontaneous labour. Subgroup analyses of maternal outcomes in women delivering by spontaneous and assisted VD and emergency caesarean delivery were also performed. The highest morbidity was found in the assisted VD and emergency caesarean groups.

Another point to be considered is the perineal effect of the labor which reduces the protective role of caesarean section on the pelvic floor.[6-7]

The aim of this study was to evaluate the late perception of patients about their own mode of delivery.

MATERIALS AND METHODS

Between January 1996 and December 2006 a total of 10,125 patients were evaluated and enrolled in the following categories: vaginal deliveries, caesarian sections and history of both CS and VD. Women were categorized into one of

Fig. 1. – Vaginal delivery and genital prolapse.

TABLE 1. – *Statistical evaluation and satisfaction reports among the three groups of patients comparing vaginal delivery (VD) versus caesarean section (CS).*

Groups	***Mode of delivery***	***Satisfaction agree/disagree***	χ^2	***p Value***
A: 5 years	VD: 70.9% (861)	92.9%(800) / 7.1%(61)	2.34	0.12645 NS
12% (n. = 1215)	CS: 29.1% (354)	90.1%(319) / 9.9%(35)		
B: 5-20 years	VD: 78% (2843)	84.9%(2416) / 15.1%(427)	8.11	0.00439
36% (n. = 3645)	CS: 22% (802)	89%(714) / 11%(88)		
C: >20 years	VD: 85% (4475)	77%(3446) / 23%(1029)	91.23	0.0001
52% (n. = 5265)	CS: 15% (790)	92%(727) / 8%(63)		

three groups based on self-reported pregnancy and delivery experience.

The patients were classified in three groups: group A (12%, n = 1215) having delivery 5 years before, group B (36%, n = 3645) having delivery between 5-20 years before and group C (52%, n = 5265) having delivery over 20 years before. Differences between cesarean and vaginally parous groups were identified with a comparison between proportions (chi-square test) applied to a contingency table (2×2); $p < 0.001$ was considered statistically significant. A logistic regression analysis was performed to control covariates that differed in our two groups despite randomization.

Epidemiology of Prolapse and Incontinence Questionnaire (EPIQ) was used, adding two more questions about agreement or disagreement regarding the history of their delivery.[8] In cases of urinary stress incontinence, urodynamic evaluation was requested. Pelvic defects were classified according to the Baden and Walker HWS (degree 0-1-2-3-4). The prolapse was quantified according to the POP-Q system. Severity of SUI was graded according to Ingelman-Sundberg.[9]

RESULTS

In the first group 70.9% (n = 861) of patients have had spontaneous delivery and 92.9% (n = 800) were happy with this mode of delivery; 29.1% (n = 354) have had an elective caesarian section and 90.1% (n = 319) were happy. In the second group 78% (n = 2843) of patients have had spontaneous delivery and 84.9% (n = 2416) were happy; 22% (n = 802) have had an elective caesarian section and 89% (n = 714) were happy. In the third group 85% (n = 4475) of patients have had spontaneous delivery and 77% (n = 3446) were happy; 15% (n = 790) have had an elective caesarian section and 92% (n = 727) were also happy.

The reasons for dissatisfaction with VD were genital prolapse (30%), genital prolapse associated with UI and/or anal incontinence (38%), sexual dysfunction following vaginal birth (29%) and others (3%). The most important reason for dissatisfaction with caesarean section was postoperative pain (58%) and/or general anaesthesia (40%). We also investigated the reasons which influenced the patients' choices.

On comparing the satisfaction and dissatisfaction following delivery between the first group (VD and caesarian section 5 years before), an insignificant difference was found (VD 92.9%, caesarian section 90.1%, p = 0.12645), wheras a significant difference was found within the second group (VD 84.9%, caesarian section 89%, p = 0.00439), and in the third group (VD 77%, caesarian section 92%, p = 0.0001). These results are summarized in table 1.

CONCLUSIONS

Our investigation shows that disorders of the pelvic floor are influenced by the mode of delivery. The anatomic and functional alterations that follow also influence the satisfaction or dissatisfaction of the patients. Disagreement between patients and physicians as to mode of delivery is related to the occurrence of early and late symptoms due to the traumatic consequences of the birth on the pelvic floor.

A woman who delivers an infant vaginally has a risk of a pelvic floor disorder higher than a woman who delivers all infants by caesarean delivery. Development of pelvic floor disorders is dependent on multiple risk factors, where the most important one is the modality of delivery.

Current therapies for pelvic floor disorders are frequently invasive and yield incomplete restoration of function. This makes prevention of these disorders a priority. However, the risks of CS must be evaluated as well, considering that is an operation. It appears reasonable to counsel nulliparous women that prophylactic caesarean delivery could reduce the risk of developing a pelvic floor disorder by up to 85%. However, because these conditions affect only approximately 40% of women delivered vaginally 5-7 women would need to deliver by caesarean delivery to prevent one from developing a pelvic floor disorder.[2] This study has shown that mode of delivery has a significant impact on future pelvic floor function.

REFERENCES

1. Centers for Disease Control and Prevention (CDC).Vaginal birth after cesarean birth. California, 1996-2000. MMWR Morb Mortal Wkly Rep 2002; 51: 996-8.
2. Allen RE, Hosker GL, Smith AR, Warrell DW. Pelvic floor damage and childbirth: a neurophysiological study. Br J Obstet Gynaecol 1990; 97: 770-9.
3. Meyer S, Schreyer A, De Grandi P, Hohlfeld P. The effects of birth on urinary continence mechanisms and other pelvic-floor characteristics. Obstet Gynecol 1998; 92: 613-8.
4. Schindl M, Birner P, Reingrabner M et al. Elective caesarean section vs. spontaneous delivery: a comparative study of birth experience. Acta Obstet Gynecol Scand 2003; 82: 834-40.
5. Allen VM, O'Connell CM, Liston RM, Baskett TF. Maternal morbidity associated with cesarean delivery without labor compared with spontaneous onset of labor at term. Obstet Gynecol 2003; 102: 477-82.
6. Leanza V, Vecchio M, Longo L. Perineum and birth: obstetric, clinical and emg links. Urogynaecol Int J 2006; 20: 223-9.
7. Leanza V, Dati S. The effects of pregnancy on urinary incontinence and pelvic defects Int Urogynecol J 2007; 18: S107-S244.
8. Lukacz ES, Lawrence JM, Buckwalter JG, et al. Epidemiology of prolapse and incontinence questionnaire: validation of a new epidemiologic survey. Int Urogynecol J 2005; 16: 272-84.
9. Ingelman-Sundberg A, Ulmsten U. Urinary incontinence in women. Lakartidningen 1976; 73: 4518-22.

Correspondence to:
VITO LEANZA
Via Antonello da Messina, 83
95021 Acicastello (Catania) Italy
E-mail: leanza@tiscalinet.it

Original article

Surgical complications in coloproctology: a scoring system

FABIO GAJ (*) - PIETRO CRISPINO (**)

(*) Dipartimento di Chirurgia Generale e Trapianti d'Organo, Istituto "Paride Stefanini", Università degli Studi di Roma "La Sapienza"
(**) Dipartimento di Scienze Cliniche, Università degli Studi di Roma "La Sapienza"

Abstract: Surgery for anorectal diseases is frequently performed with good outcomes and is relatively safe. The aim of this study was to assess the reliability of a quantitative score which includes a quality of life (QOL) analysis and evaluation of the severity of early and the late complications of surgery in order to provide a better long term clinical and prognostic evaluation. Three hundred patients were followed-up after 120 haemorrhoidectomies, 80 operations for anal fissure, 50 fistulectomies and 50 procedures for rectocoele. Follow-up at 3, 6 and 12 months included a numerical questionnaire about quality of life and severity of early and late stage complications. Eighty patients were lost to follow-up. We observed an increased severity of early and late stage complications to be significantly associated with a poor QOL. The mean score of QOL significantly differed in comparison to the mean score observed before surgery (4.5 vs 8.5 vs 8.6 vs 8.9, p=0.05). The QOL did not differ significantly when controls at 3, 6 and 12 months were compared (8.5 vs 8.6 vs 8.9, p=ns). Our scoring system includes QOL and severity of the early and late stage complications and provides a better long term clinical and prognostic evaluation of proctological surgery patients.

Key words: Proctological surgery; Quality of life; Complications score.

INTRODUCTION

Symptomatic anorectal diseases frequently present to surgical outpatient departments and many patients with these symptoms undergo surgical treatments.[1] Recent studies have demonstrated that a better understanding of the pathophysiology of anorectal diseases and use of some recently introduced diagnostic tools can lead to better choice of surgery for specific cases.[2-9] In clinical practice the choice of a specific surgical technique is based on the pre-operative assessment.[10] However even an excellent clinical assessment and diagnosis of the various anorectal disorders before surgery cannot provide reliable prognostic information for the post-surgical outcome. The aim of this prospective study was to determine the prognostic and scientific value of a quantitative numerical score assessing quality of life and severity of early and late stage complications of surgery in patients who underwent proctological surgery for various anorectal disorders. This score is accompanied by a legend and it can be easily administered in clinical practice.

MATERIALS AND METHODS

A total of 300 consecutive patients of both sexes, aged between 18 and 75 years were recruited in five referral centres (Dipartimento di Chirurgia Generale "Paride Stefanini", Policlinico Umberto I di Roma, UCP Clinica Annunziatella di Roma, Centro USI di Roma, Unità di Endoscopia e Gastroenterologia Operativa "Fabio Di Giovanbattista" di Roma, Lega Italiana per la lotto contro i tumori sezione di Roma e AIED sezione di Roma).

Inclusion criteria were benign anorectal conditions such as active symptomatic grade III and IV haemorrhoidal disease, perianal fistulae, rectocoele or anal fissure. Exclusion criteria were: any other chronic illness, significant medical conditions such as heart or kidney failure and previous colorectal or proctological surgery. Based on disease characteristics and severity, patients were treated with different surgical techniques. Follow-up lasted one year and included clinical controls and phone interviews at 3, 6 and 12 months after surgery. Patients were asked to rate their quality of life on the basis of a numerical score ranging 0 to 10.

Severity of early stage complications such as pain, bleeding in the first 24 hours and urinary retention was rated with a score ranging 0 to 4, with a global assessment ranging 0 to 12 (Tab. 1).

Pain was assessed using three parameters: requirement of analgesics, time needed for pain relief (12, 24 or 48 hours) and failure to eliminate pain after administering these drugs. The resolution of bleeding was characterised as spontaneous, pharmacological, para-surgical and/or surgical. Urinary retention ranged from mild dysuria to micturition only after drug administration or needing temporary or permanent catheterization.

Each late complication such as pain, bleeding, stenosis, anal secretion, tenesmus and anal incontinence was rated 0 to 4. These scores were then added to create a global assessment ranging 0 to 24 (Tab. 1).

The severity of pain was defined by the need for analgesics and by the duration of drug administration (72 - hours). Late bleeding was assessed in the same way as early bleeding. Anorectal stenosis was evaluated after 6 months, based on a spontaneous symptom relief, need for anal dilators, surgery or no relief. Anal secretion was defined as resolution within 30 days or more than 60 days or with surgery. Tenesmus was defined by frequency, duration and resolution after medical or surgical treatment. Finally anal incontinence, evaluated after 6 months, ranged from incontinence to gas, soiling and loss of liquid or solid stool.

STATISTICAL ANALYSIS

Mean values of all variables were compared to determine if this score improved clinical and prognostic evaluation of patients treated surgically and if quality of life and severity of early and late stage complications were useful in follow-up to predict outcomes. Statistical analyses were calculated using Fisher's exact test and T Student test. A mean value of $p < 0.05$ was considered statistically significant.

RESULTS

In pre-operative assessment of 300 patients, a mean score of 4.5 points was found (0 to 10) for quality of life. Anorectal diseases treated are presented in table 2. Two hundred and twenty of 300 patients were followed up. Post-surgical assessment scored 4.5 points as a mean value for quality of life and 4.9 (0 to 12) as a mean value for early complications, with an overall score of 9.4 points. At three months, a mean score of 8.5 was observed for quality of life for early and 8.5 for late complications, with an overall score arising to 17.

At 6 months a mean score of 8.6 for quality of life and of 3.1 for late complications with an overall score of 11.7 were registered. After twelve months after surgery the quality of life score was 9 points while that of late complications was 1.2 points, with an overall score of 10.2 points.

The mean quality of life score registered pre and post-

TABLE 1. – *Complication Score.*

Early Complications	***Late Complications***
Pain	*Pain*
0 No analgesics	0 No analgesics
1 Resolution with analgesics in the first 12 hours	1 Resolution with analgesics in the first 72 hours
2 Resolution with analgesics in 24 hours	2 Resolution with analgesics in 96 hours
3 Resolution with analgesics in 48 hours	3 Resolution with analgesics in 112 hours
4 No resolution with analgesics	4 No resolution with analgesics after 112 hours
Bleeding in the first 24 hours	*Bleeding*
0 No bleeding	0 No bleeding
1 Spontaneous bleeding resolution	1 Spontaneous bleeding resolution
2 Pharmacological bleeding resolution	2 Pharmacological bleeding resolution
3 Para-surgical bleeding resolution	3 Para-surgical bleeding resolution
4. Surgical bleeding resolution	4. Surgical bleeding resolution
Urinary retention	*Anal Stenosis (evaluation at 6 months)*
0 No retention	0 No stenosis
1 Mild dysuria	1 Subclinical Stenosis
2 Temporary catheterization	2 Resolution of stenosis with dilators
3 Pharmacological therapy	3 Resolution with surgery
4 Permanent catheterization	4 No resolution
	Anal secretion
	0 No secretion
	1 Mild
	2 Resolution in 30 days
	3 Resolution in 60 days
	4 Surgery
	Tenesmus
	0 Absent
	1 Mild
	2 Severe
	3 Medical resolution
	4 Surgical resolution
	Fecal Incontinence (at 6 months)
	0 No incontinence
	1 Gas incontinence
	2 Soiling
	3 Liquid stool incontinence
	4 Solid stool incontinence

surgery resulted statistically different (4.5 vs 8.5 vs 8.6 vs 9, $p < 0.05$). The quality of life Score improved after surgery at ambulatory settings at three, six and twelve months, although the difference did not reach the statistical significance (8.6 vs 8.9 vs 9, p = ns). The overall Score registered after three of follow-up resulted significantly higher compared with the results obtained at the end of follow-up (17 vs 10.2, $p < 0.05$) (Fig. 1).

Stratifying the mean values of the score calculated for early and late complications and for quality of life within the different groups of patients, no statistically significant difference was found. Thus this score can be considered applicable to all anorectal disorders treated in the present study (Fig. 1).

TABLE 2. – *Patients demographics and procedures.*

Parameters	***Values***
Age (mean)	50.4
Sex (M/F)	130/170
Haemorrhoids	120
Perianal fistulae	80
Rectocoele	50
Anal Fissure	50

DISCUSSION

In the present study the introduction of a score which evaluates quality of life and severity of early and late complications after a surgical treatment for various anorectal disease led to a more complete and accurate clinical assessment with improved significance.[5] This study confirmed the findings in the literature that patients' quality of life [11, 12] depends not only on the treatment outcome, but also on all potential complications caused by the surgical technique.[13-18] Most postoperative symptoms were due to pain, bleeding or urinary retention in addition to symptoms related to the specific surgical technique. All procedure related complications were observed during the first 3 months of follow-up. Reduction of these symptoms led to a significant improvement in the quality of life score. This score takes into account all factors

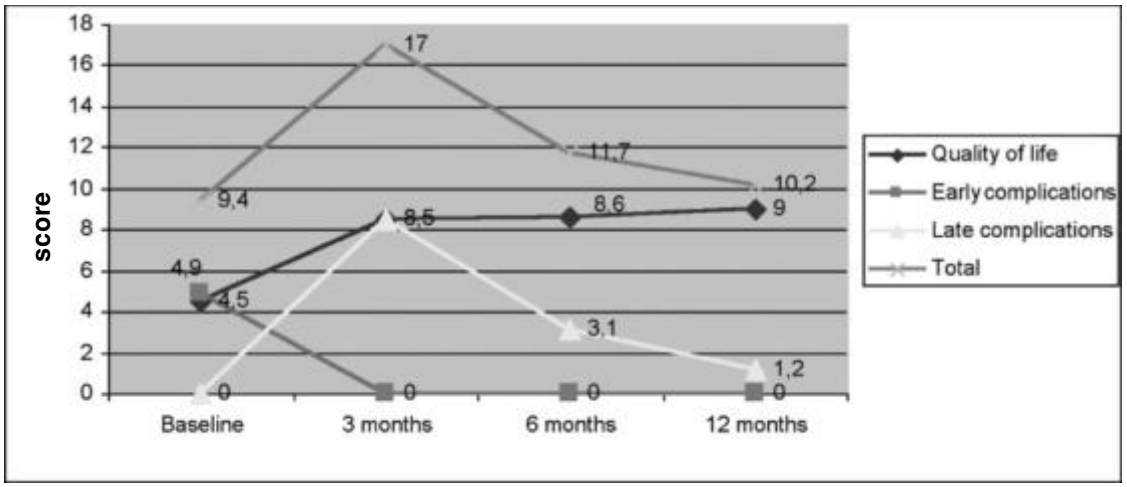


Fig. 1. – Mean score for early and late complications in follow-up.

that can influence the post-surgical outcome when considering the severity of early and late complications. It also determines the length of follow-up and need for medical or surgical reintervention. It is noteworthy that this score, accompanied by the legend introduced in this study, was able to detect those complaints previously difficult to assess due to their ambiguous presentation. Thus, their clinical and scientific importance in the patients' follow-up were underestimated.

This score may be helpful when determining the best treatment options for some clinical problems such as pain, bleeding, urinary retention, anal secretion and tenesmus, the evaluation of pathological strictures or the onset of anal incontinence where a choice between medical therapy or further surgery has to be made. Finally the score considers all parameters that can cause temporary or permanent impairment of QOL and/or result in the need for medical or surgical intervention.

This score has proven to be an important clinical and prognostic tool. Accompanied by a legend it provides a better insight into the therapeutic outcomes of proctological surgery. It may prove to be an accurate scientific measure of treatment efficacy in prospective trials. This tool should help to differentiate a real treatment failure (when treatment is not efficacious) from simple symptoms of a normal surgical recovery which cause significant symptoms but disappear after a short period of time (when treatment is efficacious).

This score highlights different factors able to influence QOL in patients, which is confirmed to be the most reliable measure of a treatment success in proctological surgery, and superior to other clinical, anatomical and functional parameters.

A score which include quality of life and severity of early and late complications, accompanied by a legend, improves clinical and prognostic evaluation during follow-up of patients treated surgically for anorectal disorders. A better understanding of the nature and underlying reasons for the main post-operative complaints in proctological patients should also help to define more precisely the results obtained from prospective clinical trials.

REFERENCES

1. Nelson RL, Abcarian H, Davis FRG, Parsky V. Prevalence of benign anorectal disease in a randomly selected population. Dis Colon Rectum 1995; 38: 341-50.
2. Balasubramaniam S, Kaiser AM. Management option for symptomatic hemorrhoids. Curr Gastroenterol Rep 2003; 5: 431-7.
3. Steele SR, Madoff RD. Systematic review: the treatment of anal fissure. Aliment Pharmacol Ther 2006; 24: 247-57.
4. Berman L, Aversa J, Abir F, Longo WE. Management of disorders of the posterior pelvic floor. Yale J Biol Med 2005; 78: 211-21.
5. Billingham RP, Isler JT, Kimmins MH, et al. The diagnosis and management of common anorectal disorders. Curr Probl Surg. 2004; 41: 586-645.
6. Gaj F, Trecca A, Antonelli MG. New anal retractor in pelviperineology: preliminary experience. Chir Ital 2007; 59: 385-9.
7. Gaj F, Trecca A, Crispino P. Transfixed stitches technique versus open haemorrhoidectomy. Results of a randomised trial. Chir Ital 2007; 59: 231-5.
8. Gaj F, Trecca A, Crispino P. Efficacy of anal dilators in the treatment of acute anal fissure. A controlled clinical trial. Chir Ital 2006; 58: 761-5.
9. Altomare DF, Roveran A, Pecorella G, et al. The treatment of hemorrhoids: guidelines of the Italian Society of Colorectal Surgery. Tech Coloproctol 2006; 10: 181-6.
10. Gaj F, Trecca A. PATE 2000 Sorrento. Un moderno ed efficace strumento per la definizione della malattia emorroidaria: studio multicentrico osservazionale condotto su 930 pazienti sintomatici. Chirurgia Italiana 2004; 56: 509-15.
11. Ortiz H, Marzo J, Armendariz P, De Miguel M. Quality of life assessment in patients with chronic anal fissure after lateral internal sphincterotomy. Br J Surg 2005; 92: 881-5.
12. Sailer M, Bussen D, Debus ES, Fuchs KH, Thiede A. Quality of life in patients with benign anorectal disorders. Br J Surg 1998; 85: 1716-9.
13. Heriot AG, Skull A, Kumar D. Functional and physiological outcome following transanal repair of rectocele. Br J Surg 2004; 91: 1340-4.
14. Cheetam MJ, Mortensen NJ, Nystrom PO, et al. Persistent pain and faecal urgency after stapled haemorrhoidectomy. Lancet 2000; 356: 730-3.
15. Molloy RG, Kingsmore D. Life threatening pelvic sepsis after stapled haemorrhoidectomy. Lancet 2000; 355: 810.
16. Gaj F, Trecca A, Garbarino M, Flati G. Transfixed stitches for the treatment of haemorrhoids. Chir Ital 2004; 56: 699-703.
17. Gaj F, Zobel PB, Trecca A, Antonelli MG, Angher R. Disposable isostatic anal retractor: results of a clinical assessment.Chir Ital 2004; 56: 539-44.
18. Gaj F, Trecca A. How to manage jamming of the dilator during anal dilation. Chir Ital 2005; 57: 227-8.

Correspondence to:
FABIO GAJ
Via Reno, 30 - 00198 Roma
Tel. 335 6524037
Email: fagaj@tin.it

Case report

Prepubic sling in curing non-stress leakage following complete cure of stress incontinence by a midurethral sling

PETER PETROS [(*) (**)] - PETER RICHARDSON [(***)]

(*) Royal Perth Hospital, Perth, Western Australia
(**) University of Western Australia
(***) Gallier's Hospital, Armadale, Western Australia

Abstract: A 46 year old woman entirely cured of stress incontinence by a midurethral sling, continued to leak a large amount of urine. A tampon improved this urine loss from a mean 227 gm/24 hours to 44 gm/24 hours, and a prepubic sling to a residual complaint of drops of urine on bending for household chores. It was concluded that the external urethral ligaments are an important component of distal urethral closure, and that this mechanism is concerned primarily with sealing of the urethra, rather than stress incontinence control.

Key words: Prepubic sling; Minisling; Non-stress incontinence; External urethral ligaments.

HISTORY & EXAMINATION

A 46 year old woman with Von Willebrand's disease gave a history of urodynamically diagnosed severe stress incontinence (SI) cured initially with a tension-free (monofilament) retropubic midurethral sling in August 2002.

The patient was completely cured for almost 2 years. She presented in late 2005 with a history of gradually worsening SI, continuous leaking, no urgency, and no evidence of overactive bladder (OAB) on urodynamic testing.

On transperineal ultrasound, it was evident that the mesh tape was pulling open the posterior urethral wall on straining. At the second operation in November 2005 the mesh was densely adherent to a thin dilated posterior urethral wall. The mesh was carefully excised, piece by piece, and the urethral wall plicated. With 300 ml saline in the bladder, a Tissue Fixation System (TFS) midurethral minisling [1] was applied under local anaesthetic (LA) and sedation (Fig. 1). The sling was tightened until no urine was lost during coughing. The patient was 100% cured until day 9, when she lifted a heavy exercise bike forcibly. Within 20 hours, the patient was admitted as an emergency, with severe vulval swelling and urinary retention, requiring suprapubic catheterisation. The haematoma gradually resolved over 7 days, and the patient was able to urinate spontaneously. However, her SI was far worse than before. Mean urine loss /24 hrs was 900 gm (range 700-1100). With a vaginal tampon, the loss/24 hrs was a mean of 300 gm (range 50-400 gm).

At the 3rd operation in June 2006 the old sling was removed, and a new midurethral TFS minisling was applied under LA/sedation. The vaginal epithelium overlying the urethra was devoid of underlying fascia. The fascial layer with vagina attached was brought across to cover the urethra, and anchored with sutures into the paraurethral tissues. The patient was entirely dry for 4 weeks, when she reported commencement of insensible urine loss, much worse in the 2nd part of the day, and loss of urine with sudden movement accompanied by a "bubble". There was no evidence of OAB on urodynamic testing. Mean urethral closure pressure was 56 cm H_2O.

Multiple tests over some weeks demonstrated a mean urine loss/24 hrs after 3 months of 227gm (range 190-265) reducing to 44 gm/24 hours (range 36-55) with a vaginal tampon. There was no urine loss with 10 coughs with 300 ml saline in the bladder. The external urethral ligaments (EUL) attaching the external meatus to the anterior surface of pubic bone on each side were extremely lax (Fig. 2). It was reasoned that these had become dislocated, and were a major factor in the insensible urine loss.

At the 4th operation in November 2006 the vaginal epithe-

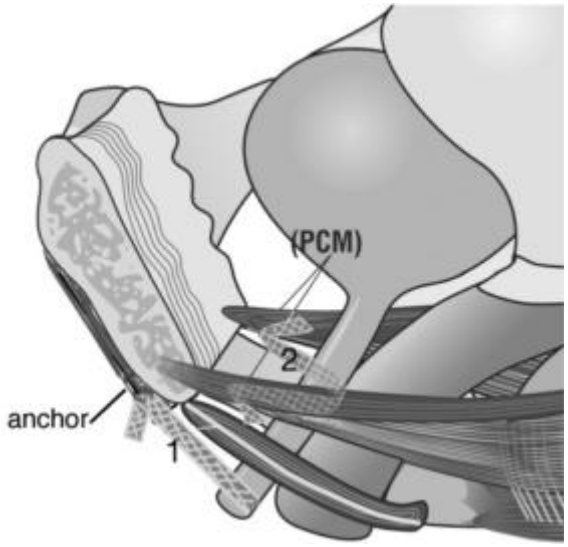


Fig. 1. – TFS pre-pubic and midurethral slings. '1' = prepubic TFS sling; '2'= midurethral TFS sling; 'PCM'= anterior portion of pubococcygeus muscle.

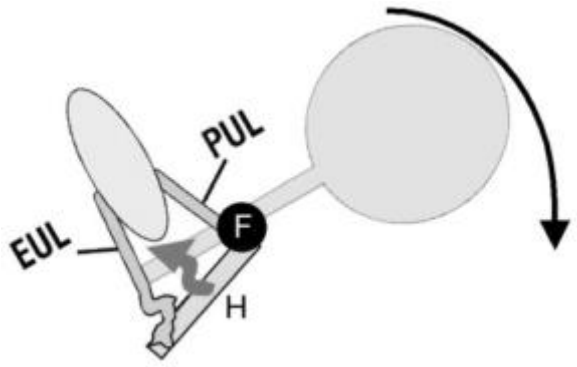


Fig. 2. – Proposed role of a lax external urethral ligament (EUL) in non-stress incontinence. The hammock (H) "tips down", and so cannot be closed by the anterior portion of m. pubococcygeus (small crooked arrow). The curved arrow represents the rotating force acting against the pubourethral ligament insertion point 'F' to close the bladder neck.[2, 3] PUL = pubourethral ligament; crooked arrow represents diminished muscle force consequent on loose EUL. A loose fibrosed mesh tape may interfere with this "sealing" mechanism by 'holding open' the urethra, and preventing 'sealing' by the hammock closure mechanism.

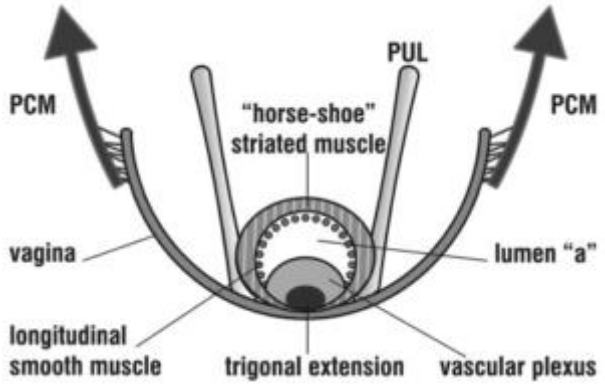


Fig. 3. – Proposed components of the "sealing" mechanism. PUL = pubourethral ligament; PCM = slow-twitch fibres of m. pubococcygeus.

lium was very thin, adherent to the urethra, with no intervening fascia. Under LA/sedation, a prepubic TFS was inserted to repair the damaged EUL. The fascial layer of the vagina was again stretched up and sutured to the suburethral tissues. Within 3 months, the patient was almost 100% continent. There was no SI even on repeated sneezing. She reported a few drops of urine loss mainly on bending down for household tasks. The mean urine loss was 7 gm/24 hours (range 5-20). This pattern has continued unchanged for 12 months. On recent examination, the vaginal epithelium was thin, and tightly attached to the urethra, with no apparent fascial layer.

DISCUSSION

The primacy of the pubourethral ligament (PUL) in SI control during effort is well documented. *a*) Pre-operatively, digital anchoring at midurethra prevents "funnelling" during coughing, and restores continence.[2] *b*) Surgically, a midurethral sling cures SI.

The pathogenesis of non-stress incontinence is not so well understood. The sequence of events in this patient, continued leakage after SI cure, and cure thereof with a pre-pubic sling, indicates that the EUL (Fig. 2) may have a key role in this condition. In 1990, it was demonstrated ultrasonically that the distal urethra was closed by a muscle force acting on the vaginal hammock between the external urethral meatus and midurethra,[3] (crooked arrow, Fig. 2). Firm EUL and PUL ligaments are required for this mechanism to function.

This muscle, the anterior portion of m. pubococcygeus, has a preponderance of slow-twitch muscle fibres,[4] consistent with our proposal that the structures in Fig. 2 have a key role in sealing the urethra: the suburethral vagina is pulled upwards like a trapdoor; this closes off the venous return, and "pumps up" the vascular plexus described by Huisman[5] to close the urethral space (Fig. 3) the thin periurethral striated muscle superiorly, contracts sufficiently to tension the smooth muscle around the urethral cavity.

We hypothesize that a lax EUL will allow the hammock to 'droop', much like an open trapdoor, invalidating every part of this sealing mechanism.

Vastly increased urine loss in the afternoon is consistent with such a 'breaking of the seal'. Vastly decreased urine loss with a tampon, from 227 gm/24 hours to 44 gm, is consistent with preventing downward 'droop' of the distal vagina (Fig. 2).

Enhorning [6] and Constantinou [7] both demonstrated a rise in urethral pressure 0.25 seconds before a cough was registered, indicating a finely co-ordinated neural control of the continence mechanism. The suspensory ligaments contain smooth muscle, nerves, and blood vessels, all of which indicate they are active contractile structures. A sling creates collagen only,[8] and so does not have neural control. We attribute lack of total cure to the inability of the slings to contract the ligaments and fascia, an essential requirement for water-tight tension and, added to this, a deficient fascial layer of the hammock, irreparably stripped by the post-operative haematoma.

REFERENCES

1. Petros PEP, Richardson PA. The midurethral TFS sling- a 'micro-method' for cure of stress incontinence-preliminary report. ANZJOG 2005; 45: 372-375.
2. Petros PE, Von Konsky B. Anchoring the midurethra restores bladder neck anatomy and continence. Lancet 1999; 354: 9193: 997-998.
3. Petros PE & Ulmsten U. An Integral Theory of Female Urinary Incontinence. Acta Obstetricia et Gynecologica Scandinavica 1990; Supplement 153: 697-31.
4. Gosling JH, Dixon JS & Critchley HOD. A comparative study of the human external sphincter & periurethral ani muscles. British Journal Urology 1981; 53: 35-41.
5. Huisman AB. Aspects on the anatomy of the female urethra with special relation to urinary continence. Controv Gynecol Obstets. Karger, Basel 1983; 10: 1-31.
6. Enhorning G. Simultaneous recording of intravesical and intraurethral pressure. Doctoral Thesis, Acta Chir Scand 1961; Supplement 176: 1-68.
7. Constantinou C, Govan H. Contribution and timing of transmitted and generated pressure components in the female urethra. Female Incontinence, Alan R Liss New York 1981; 113-120.
8. Petros PE, Ulmsten U, Papadimitriou J. The Autogenic Neoligament procedure: A technique for planned formation of an artificial neo-ligament. Acta Obstet Gynecol Scand 1990: Supplement 153: 69: 43-51.

Interest Declared: Professor Petros is the original designer and developer of the TFS.

Correspondence to:
Professor PETER PETROS
14A Osborne Pde
Claremont WA 6010 Australia
Phone: +61-411 181 731
Fax: +61-89-384 0176
Email: kvinno@highway1.com.au

Original article

The effect of suture material on outcomes of surgery for pelvic organ prolapse

HOWARD B. GOLDSTEIN (*) - BABAK VAKILI (*) - NICHOLAS FRANCO (**)
KAROLYNN T. ECHOLS (*) - RALPH R. CHESSON (**)

(*) Department of Obstetrics and Gynecology, Division of Female Pelvic Medicine and Reconstructive Surgery, Cooper University Hospital, University of Medicine and Dentistry of New Jersey - Robert Wood Johnson School of Medicine at Camden
(**) Department of Obstetrics and Gynecology Division of Urogynecology and Reconstructive Pelvic Surgery, Louisiana State University Health Sciences Center

Abstract: OBJECTIVE. To evaluate the effect of using different suture material on outcomes of surgery for pelvic organ prolapse. METHODS. This was a retrospective cohort study of all patients having undergone surgery for pelvic organ prolapse from February 1997 to June 2003. All subjects underwent a comprehensive evaluation with ensuing surgery for pelvic organ prolapse. RESULTS. Of the 505 cases of surgery for prolapse, information on suture material was available on 423 procedures (83.8%). Poly L-lactide/glycolide (Panacryl®) was found to have the highest incidence of granulation tissue/infection (53.3%/13.3%) followed by polybutilate-coated polyester (Ethibond®) (26.3%/10.3%), polypropylene (Prolene®) (10.9%/4.5%), and polydioxanone (PDS®) (3.8%/2.5%). These differences were significant ($p < 0.05$). Granulation tissue was more common with vaginal surgery than other routes (19.8% vs. 7.4%), although the difference was not significant. While the overall incidence of recurrent prolapse was 33.9% (all stages) with 3.2% having stage 3 or 4 prolapse, only 9.9% required additional surgery for prolapse and/or incontinence. There was no significant difference in recurrence of prolapse or repeat surgery rates among the different suture materials. CONCLUSIONS. Braided sutures such as polyester and poly-L-lactide/glycolide had a much higher incidence of suture-related complications requiring treatment than monofilament sutures, making monofilament suture preferable in vaginal surgery.

Key words: Suture material; Prolapse surgery; Complications.

INTRODUCTION

Surgery for pelvic organ prolapse (POP) is very common with 11% of women requiring surgery at least once in their life.[1] With dozens of different procedures being performed and more being developed all the time, attempts are being made to find the most durable procedure. Unfortunately failure rates can be as high as 63% after surgery for prolapse.[2]

While most studies investigating surgical outcomes have focused on studying the actual procedures, there is very little information assessing technique. The choice of suture material used in vaginal reconstruction can be as critical as the procedure itself. The selection of suture material has often been at the discretion of the operating surgeon with little scientific evidence to guide the selection. Recently there has been a trend towards increased use of permanent suture in reconstructive pelvic surgery.

The goal of this study is to determine whether surgical outcomes differ when using different suture material.

MATERIALS AND METHODS

Data was collected retrospectively from the office charts of patients having undergone surgery for POP from February 1997 to December 2003. The Institutional Review Board of the Louisiana State University Health Sciences Center granted approval for the study. A systematic audit of all patient charts had been performed for review in a previously published article.[3] This database was queried for patients who met the inclusion criteria.

Patients were included if they underwent surgery for POP during the indicated time frame. Patients were excluded if they only underwent anti-incontinence surgery. Data collected included demographic and background data, including previous surgical history. The initial visit, operative report and all post-operative visits were reviewed.

Outcome variables included recurrence of prolapse, recurrence of incontinence and the incidence of additional surgery for prolapse or incontinence. Recurrent prolapse was defined as any descent of any compartment of the vagina below the normal anatomic position (greater than stage zero by the Baden-Walker Halfway system [4]). Recurrent incontinence was defined as any subjective incontinence recorded in the chart during the post-operative visits. Patients requiring additional surgery for POP or incontinence were only tracked if they followed up with the two primary surgeons (NF and RRC). Patients who left the practice were not followed.

Secondary outcome variables include suture-related complications including the incidence of granulation tissue persisting or occurring beyond the first six post-operative weeks, the incidence of post-operative vaginal infection defined as antibiotic use for vaginal discharge, and the need for surgical treatment for these complications. Follow up interval was defined as the time interval (months) from surgery to the last post-operative visit. In the case of those patients who had additional surgery, the follow up interval was defined as the time from initial surgery to the second surgery.

Cases were excluded from analysis if the suture material was not documented or if the operative report was not available. Additionally, cases in which infrequently-used suture material (less than 5 cases), were excluded from analysis. Patients were also excluded if the follow up interval was less than three months.

Data was recorded in a paper database before compiling them centrally into a computer database (Microsoft Access®, Microsoft Corp., Redmond, WA). Statistical analysis was performed using SPSS 11.0 for Windows (SPSS Inc., Chicago, IL). Student t-test and ANOVA were used to compare means for continuous variables. Chi-square was used to compare categorical data. Fisher's exact test was performed when the assumptions for the Chi-square distribution were violated. The Mann-Whitney U-test was used to compare means when normality assumptions were violated. Logistic regression was used to create both univariate and multivariate models. A p-value < 0.05 was considered significant.

RESULTS

Of the 502 cases occurring during this time frame with adequate follow up, information on suture material was available on 401 patients. The demographic data for this sample is described in Table 1, comparing braided suture

TABLE 1. – *Demographic data.*

Category	*Braided (n=223)*	*Monofilament (n=178)*	*Significance*
Age (years)	61.6	61.7	NS
BMI (kg/m2)	26.8	26.1	NS
Gravidity	3.5	3.6	NS
Parity	3.0	3.0	NS
Race (%)			<.05
– Caucasian	159 (71.3%)	127 (71.3%)	
– Black	12 (5.4%)	1 (0.6%)	
– Hispanic	6 (2.7%)	7 (3.9%)	
– Unknown	46 (20.6%)	43 (24.2%)	
Previous hysterectomy	176 (78.9%)	128 (72.7%)	NS
Prior reconstructive surgery	90 (40.4%)	67 (37.9%)	NS
Tobacco use (n=393)	24 (10.8%)	12 (7.0%)	NS
Menopausal (n=390)	179 (81.4%)	139 (81.8%)	NS
– If menopausal, % on HRT (n=312)	126 (72.4%)	98 (71.0%)	NS
Concurrent anti-incontinence surgery	176 (78.9%)	84 (47.2%)	< 0.001
Concurrent graft use	65 (29.3%)	46 (25.8%)	NS
Vaginal route	206 (92.4%)	166 (93.3%)	NS
Procedures			
– USLS	103 (46.2%)	94 (52.8%)	NS
– ASC	6 (2.7%)	4 (2.2%)	NS
– Posterior repair	42 (18.8%)	47 (26.4%)	NS
– Perineorrhaphy	52 (23.3%)	15 (8.4%)	<0.001
– Other	20 (9%)	18 (10%)	NS
Follow up interval (months)	13.3	8.3	< 0.001

NS = not statistically significant.

to monofilaments. The median follow up interval was 7 months with a range of 3-67 months. The patient's pre-operative stage of prolapse was not statistically different.

There were four different brands of suture material included in the analysis. These sutures were the following: 1) coated polyester (Ethibond®; n = 210), a braided, permanent suture, 2) polypropylene (Prolene®; n = 132), a monofilament, permanent suture, 3) polydioxanone (PDS®; n = 46), a monofilament, delayed-absorbable suture, and 4) poly-L-lactide/glycolide (Panacryl®; n=13), a braided, very delayed-absorbable suture. Outcome measures for each of these materials are listed in Table 2.

For the purpose of analysis, these sutures were then grouped into braided and monofilament sutures. Comparisons are listed in Table 3. There was no difference in the main surgical outcome variables such as recurrent prolapse, recurrent incontinence and additional surgery. Braided sutures were more likely than monofilaments to lead to suture-related complications such as granulation tissue (27.8% vs. 12.4%; p < 0.001) and vaginal infection (10.3% vs. 3.4%; p = 0.008).

Table 4 shows the results when comparing the absorbable to the permanent sutures. As shown in the chart there is no difference with regards to surgical outcomes or complications.

Regression analysis was then performed to identify and control for all factors that could contribute to post-operative granulation tissue and infection. For each outcome, univariate analysis was used to identify those individual variables that showed a significant association. These variables were then all used to build a complete model. Using a stepwise, backward method of analysis, insignificant variables were removed from the model until all variables in the model were considered significant. The results of both the univariate analysis and the multivariate analysis for both outcomes (granulation and infection) are listed in Table 5. With regards to granulation tissue, braided suture and graft use were independent risk factors (r = 0.367). Braided suture was a risk factor after controlling for graft use [O.R. 2.777, 95% CI 1.604-4.808]. With regards to infection, braided suture, graft use and black race were independent risk factors (r=0.492). Braided suture associated with infection [OR 3.236, 95% CI 1.022-10.243] after controlling for graft use and race were also independent risk factors.

DISCUSSION

Surgical correction for pelvic organ prolapse is very common today. It is anticipated that the need for treatment of prolapse will increase dramatically over the ensuing dec-

TABLE 2. – *Comparison of different materials.*

Outcome	*Poly-L-Lactide/ Glycilide (Panacryl®) (n = 13)*	*Coated Polyester Polyester (Ethibond®) (n = 210)*	*Polypropylene (Prolene®) (n = 132)*	*Polydioxanone (PDS®) (n = 46)*	*Significance*
Recurrent prolapse	2 (15.4%)	70 (33.3%)	50 (37.9%)	17 (37.0%)	NS
Recurrent urinary incontinence	3 (23.1%)	55 (26.2%)	29 (22.0%)	8 (17.4%)	NS
Further surgery for prolapse	0	19 (9.0%)	7 (5.3%)	4 (8.7%)	NS
Post-operative complications					
Granulation/ suture erosion	6 (46.2%)	56 (26.7%)	20 (15.2%)	2 (4.3%)	<0.001
Infection	1 (7.7%)	22 (10.5%)	6 (4.5%)	0	<.05
Interval from surgery (months)	3.5	5.0	6.0	7.0	NS
Management of complications (n=78)					
Cautery	2 (100%)	29 (50.9%)	9 (45.0%)	1 (50.0%)	NS
Cut suture	0	16 (28.1%)	7 (35.0%)	1 (50.0%)	NS
Surgery	0	11 (19.6%)	2 (10.0%)	0	NS

NS = not statistically significant.

TABLE 3. – *Braided suture vs. monofilament.*

Category	*Braided (n=223)*	*Monofilament (n=178)*	*Significance*
Recurrent prolapse	72 (32.3%)	67 (37.6%)	NS
Recurrent stage 3 prolapse	8 (3.6%)	4 (2.2%)	NS
Recurrent urinary incontinence	58 (26.0%)	37 (20.8%)	NS
Further surgery for prolapse	19 (8.5%)	11 (6.2%)	NS
Post-operative complications			
Granulation/ suture erosion	62 (27.8%)	22 (12.4%)	<0.001
Infection	23 (10.3%)	6 (3.4%)	<.05
Interval from surgery (months)	4.8	6.1	NS
Management of complications (n=78)			
Cautery	29 (46.8%)	10 (45.5%)	NS
Cut suture	16 (25.8%)	8 (36.4%)	NS
Surgery	11 (17.7%)	2 (9.1%)	NS

NS = not statistically significant.

TABLE 4. – *Absorbable vs. Permanent suture.*

Category	*Absorbable (n=59)*	*Permanent (n=342)*	*Significance*
Recurrent prolapse	19 (32.2%)	120 (35.1%%)	NS
Recurrent urinary incontinence	11 (18.6%)	84 (24.6%)	NS
Further surgery for prolapse	4 (6.8%)	26 (7.6%)	NS
Further surgery for prolapse or incontinence	4 (6.8%)	41 (12.0%)	NS
Post-operative complications			
Granulation/ suture erosion	8 (13.6%)	76 (22.2%)	NS
Infection	1 (1.7%)	28 (8.2%)	NS
Interval from surgery (months)	4.4	5.3	NS
Management of complications (n=78)			
Cautery	2 (25.0%)	37 (48.7%)	NS
Cut suture	1 (12.5%)	23 (30.3%)	NS
Surgery	0	13 (17.1%)	NS

NS = not statistically significant.

ades. To identify the optimal surgical procedure to meet this future demand, surgeons have begun to analyze the way prolapse is corrected. Examples of this include studying the route of surgery, the use of graft to augment surgery and comparison of the different procedures.

Luck et al. compared permanent braided suture to absorbable braided suture in patients undergoing site specific posterior repairs. They found 31% suture erosion in the polyester (Ethibond®) group compared to 9% in the polyglactin group (Vicryl®). Their findings for polyester (Ethibond®) were similar to the finings of this study; however they did not include permanent or delayed absorbable monofilament suture.[5]

One possible explanation why monofilament suture may be less reactive in the vagina relates to the structure of the suture. Braided sutures may permit bacteria to adhere to the individual filaments within the interstices of the suture whereas monofilament suture does not have any such sites to harbor bacteria. Bacteria trapped within the weave of a suture may be difficult for macrophages to access for eradication, leading to chronic granulation and infection.

Suture selection has historically been at the discretion of the surgeon. Although certain characteristics have importance, such as handling, durability, permanence versus absorbability, and training bias, the most common reason a suture is chosen is personal experience.[6] In an attempt to overcome this bias, this trial provides some comparative data.

This study has confirmed what many surgeons have anecdotally noted. Braided suture was more prone to post-operative complications such as granulation and infection.[7-9] Panacryl was the most likely suture material to cause complications. Recently this material has been withdrawn from the market secondary to chronic inflammatory complications as described here.

Braided polyester has become a preferred suture by many reconstructive surgeons, because of its knot security and ease of handling. The data presented here provides an argument for an alternative in vaginal surgery. With polypropylene having an equivalent success rate to polyester with a diminished complication rate, monofilament suture has become preferable in our practice. Polypropylene ties very easily with secure knots when square throws are used. The main concern involves suture erosion resulting in a stiff knot that might cause a sharp sensation to the phallus during intercourse. That complication has been avoided with modifications to the surgical technique which bury the knot further.

TABLE 5. – *Univariate and multivariate analysis using granulation as primary endpoint.*

	GRANULATION		INFECTION	
Variable	*Odds ratio*	*95% CI*	*Odds ratio*	*95% CI*
Univariate				
Graft use	3.351	2.025-5.544	4.891	2.229-10.734
Braided suture	2.731	1.601-4.657	3.297	1.312-8.283
Age > 70	0.527	0.294-0.946	0.578	0.228-1.465
Follow up > 12 months	2.066	1.246-3.428	3.013	1.403-6.474
Black race	4.492	1.456-13.860	9.757	2.896-32.875
Perineorrhaphy	0.670	0.367-1.226	0.410	0.178-0.946
Multivariate	r=0.367		r=0.492	
Graft use	3.382	2.020-5.664	6.835	2.582-18.094
Braided suture	2.777	1.604-4.808	3.236	1.022-10.243
Black race	NS		7.736	1.926-31.067

In this series monofilament suture has a lower complication rate. As previously discussed, braided sutures may harbor bacteria within the interstices of the suture causing a host reaction to the bacteria within the suture. Monofilaments avoid that potential source of infection. Alternatively biomechanical properties of the suture material might also play a role. Examples of these properties include the tensile strength, reactivity or elasticity. Unfortunately while there is a great deal of data analyzing tensile strength, there is little information regarding the response of vaginal tissue to suture material.

There are several limitations to this study. First, the retrospective design limits the conclusions that can be drawn. Controlling for the reasons that different sutures were selected would eliminate one potential source of bias. It was impossible to extrapolate the rationale for suture selection from a retrospective chart review. Recall and recording biases could have affected the results. The short follow up interval only allowed short-term outcomes to be assessed. This study only analyzes vaginal reconstructive cases. A similar assessment of abdominal and/or laparoscopic cases is also warranted.

The ideal study would eliminate selection bias by randomizing patients for all surgeons. A single surgical technique using only select sutures would be ideal. The POP-Q and validated prolapse questionnaires are more reliable measures of outcomes. Longer follow up is necessary. Using a well-designed protocol, the optimal suture material could hopefully be identified.

REFERENCES

1. Olsen AL, Smith VJ, Bergstrom JO, et al. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. Obstet Gynecol 1997; 89: 501-6.
2. Weber AM, Walters MD, Peidmonte MR, et al. Anterior colporrhaphy: a randomized trial of three surgical techniques. Am J Obstet Gynecol 2001; 185: 1229-1306.
3. Vakili B, Zheng YT, Loesch H, et al. Levator contraction strength and genital hiatus as predictors for recurrent pelvic organ prolapse. Am J Obstet Gynecol 2005; 192: 1592-1598.
4. Baden WF, Walker TA. Genesis of the vaginal profile: a correlated classification of vaginal relaxation. Clin obstet Gynecol 1972; 15: 1048-1054.
5. Luck AM, Galvin SL, Theofrastous JP. Suture erosion and wound dehiscence with permanent versus absorbable suture in reconstructive posterior vaginal surgery. Am J Obstet Gynecol 2005; 192: 1626-1629.
6. Arjun J, Janjanin S, Tanna N, et al. Does suture material and technique really matter? Lessons learned from 800 consecutive blepharoplasties. Laryngoscope 2007; 117: 981-984.
7. Postlewait RW, Willigan DA, Ulin AW. Human tissue reaction to sutures. Ann Surg 1975; 181: 144-148.
8. Banche G, Roana J, Mandras N, et al. Microbial adherence on various intraoral suture materials in patients undergoing dental surgery. J Oral Maxillofac Surg 2007; 65: 1503-1507.
9. Katz S, Izhar M, Mirelman D. Bacterial adherence to surgical sutures. A possible factor in suture induced infection. Ann Surg 1981; 194: 35-41.

There was no financial support from industry or otherwise for this project.

Correspondence to:
HOWARD B. GOLDSTEIN, DO, MPH
University Urogynecology Associates
6012 Piazza at Main Street
Voorhees, NJ 08043 USA
(856) 325-6622
Fax: (856) 325-6522
E-mail: howieg91@aol.com

Original article

Pruritus ani: aetiologic and causative factors in 94 adult patients

CLETO VELLER FORNASA [(*)] - ALESSANDRA TRENTO [(*)] - GIANNI BEZZE [(**)]

(*) Local Dermatology Health Center ULSS 16, University of Padova, Italy
(**) Dermatology Division, Department of Medical and Surgical Specialties, University of Padova, Italy

Abstract: Our study analyses data regarding 97 patients (56 females and 41 males; mean age: 50,1; range: 19-91) with a history of pruritus ani with a duration of at least four weeks, who presented to our ambulatory care centre for anal and rectal disease, Surgical Division II - University of Padova. All patients were investigated for surgical and dermatologic diseases. Results show that in a patient suffering from pruritus ani there is an association with surgical anorectal conditions such as haemorrhoids, fissures, and mucosal prolapse as well as dermatologic inflammatory diseases such as eczematous dermatitis and psoriasis. This association is statistically significant ($p < 0.05$) and confirms that the presence of itch as a symptom common to these diseases.

Key words: Pruritis ani; Dermatology; Dermatitis; Anorectal conditions.

INTRODUCTION

A chronic itch around the anal area is called pruritus ani. It can be due to a localised dermatitis (caused by faeces, sweat, or moisture), viral, bacterial and fungal infection, metabolic or systemic diseases (lymphoma, iron deficiency anaemia, hyperthyroidism, diabetes, etc.), skin conditions (psoriasis, contact dermatitis, atopic dermatitis, or lichen planus), anal fissure, haemorrhoids, threadworms, irritants (soaps, perfumes, or creams), some foods (grapes, or tomatoes), some drugs (laxatives, anaesthetic agents, antibiotics), or a carcinoma of the anus.

In many cases Pruritus ani is of unknown origin and is known as idiopathic pruritus ani.

The aim of this study is to assess the prevalence of different causes of pruritus ani in adult patients who presented to the Department of Surgery, University of Padova, between December 2003 and October 2005.

MATERIALS & METHODS

A total of 97 patients (56 females and 41 males; mean age: 50,1; range: 19-91) suffering from pruritus ani for at least four weeks presented to our ambulatory care centre for anal and rectal disease in the Department of Surgery at the University of Padova between December 2003 and October 2005. Initially systemic and/or gastro-intestinal diseases were excluded. All subjects underwent a full proctologic examination. We obtained from each patient a thorough medical and family history to assess the presence of atopy, and each subject underwent a dermatologic examination including a standard European Patch test (FIRMA- Italy) and a patch test to Dermatophagoides mix (Chemotechnique Diagnostics, Sweden).

We also performed a chemical and physical examination of the stool, perianal sample, scotch test, and stool examination for parasites for each patient. Skin biopsy with histologic examination was performed in a single case of uncertain diagnosis. Chi-square statistics were used for statistical analysis of data.

RESULTS

Eczematous dermatitis was diagnosed in 40 patients: 23 of them presented with a history of atopy and 20 out of 23 patients in this group had a positive patch test to one or more allergens (potassium dichromate: 12; cobalt chloride: 6; nickel: 10; dermatophagoides mix: 11; clorexidine: 1; euxyl: 3; formaldehyde: 2; quaternium: 2; disperse yellow: 1; neomycin: 4; balsam of Peru: 6; carba mix: 1; lanolin: 1; katon: 1; benzocaine: 1; disperse blue: 2). perianal sample culture was positive in 7 patients (Staph. aureus: 3; Candida: 2; Strept. B: 2).

One or two non-dermatologic anorectal diseases were present in 21 patients: (haemorrhoids: 14; fissuress: 6; mucosal prolapse: 6; rectocoele: 1). Psoriasis was present in 24 subjects, 3 of them were atopic, 5 (2 of them were atopic) had positive patch test (potassium dichromate: 3; perfume mix: 1; nickel: 2; lanolin: 1; cocamidopropyl betaine: 1; formaldehyde: 1; disperse blue: 1; dermatophagoides mix: 2; katon: 1) and 8 of them had positive perianal samples (Candida: 6; Strept. B: 2). Among the 24 psoriatic patients we observed local non-dermatologic diseases, variously associated, in 15 cases (haemorrhoids: 13; mucosal prolapse: 6; fissure: 6).

Intertrigo caused by Candida with negative patch test and without association to atopic or psoriasis were present in 10 subjects. Among them we observed non-dermatologic anorectal disease in 6 cases (haemorrhoids: 4; fissures: 2; mucosal prolapse: 1).

Lichen planus was present in 4 patients and one of these subjects was atopic with a positive patch test (dermatophagoides mix, nickel, perfume mix); 4 patients had lesions histologically consistent with scleroatrophic lichen, and 2 of them had positive perianal sample to Candida. We observed associated anal and proctologic surgical diseases in 6 patients among those affected by lichen (haemorrhoids: 5; fissure: 3; mucosal prolapse: 1). Non-mycotic infections were present in 8 patients: anal condylomata: 4; primary syphiloma: 2; herpes Zoster: 1; anusitis caused by oxyuris: 1; anusitis caused by threadworms: 1. The patient with herpes Zoster had also mucosal prolapse and haemorrhoids. These patients, as well as a patient affected by Bowen's disease and another one affected by spinocellular carcinoma, had negative patch test and cultures. Six patients had negative physical examination and were negative in all other exams.

In total, among the 97 patients, 65 presented with an association between surgical anorectal diseases (SARD) and inflammatory dermatologic diseases (IDD), 20 patients had IDD without clinical evidence of SARD, while 6 subjects had a SARD without dermatologic involvement.

CONCLUSIONS

Our study shows an association between pruritus ani and the diagnosis of either SARD or IDD. This association was statistically significant ($p < 0.05$). If a disease is present, it is more likely to be dermatologic: 25 IDD against 5 SARD.

It is likely that SARD could be influenced by dermatologic diseases and vice versa, for instance the anal fissure can manifest itself on a skin which loses elasticity due to dehydratation, hyperkeratosis, or infiltration. Haemorrhoids with mucous leakage cause cutaneous maceration with or without complications; even psoriasis can be an expression of Koebner's phaenomenon, a consequence of scratching due to itch of proctologic origin.

Due to the unique environment of the perianal area and to patients' personal habits factors such as humidity, passing of faeces, anaerobiosis, cleaning habits, inappropriate use of ointments and several dermatologic diseases (infective anusitis, psoriasis, atopic eczema, contact eczema) can co-exist and influence each other, resulting in complex clinical presentations. This is well shown by our series of cases, where the presence of pathogenic microorganisms has been reported in 33 cases associated with other non-infective inflammatory cutaneous diseases, and sensitization to different aptens registered with patch tests was present not only in all cases of contact dermatitis, but also in 20 out of 23 atopic patients, in 5 psoriatic patients and in 1 case of lichen planus. The positive allergic reaction on patch testing in psoriasis and lichen can have, in the opinion of some authors, aetiologic significance.[1-5]

In all positive test patients, patch tests were positive to one or more aptens somehow related to the particular place involved, i.e. contained in some ointments, cleansings, cosmetics or dyes (clothing).

In considering the diagnosis and management of pruritus ani, it is important not to forget psychological factors [6-8] which are frequently emphasized by authors but subject to different interpretation. Important psychological factors include latent homosexuality, sexual or professional dissatisfaction, an expression of an obsessive compulsive personality disorder (excessive cleanliness), a sign of self-punishment in subjects with tendencies to masochism. In our series of cases psychological factors seemed significant in at least 6 cases where we could not find any surgical nor dermatologic cause of symptoms.

REFERENCES

1. Clark AR, Sherertz EF. The incidence of allergic contact dermatitis in patients with psoriasis vulgaris. Am J Contact Dermat 1998; 9: 96-9.
2. Heule F, Tahapary GJ, Bello CR, van Joost T. Delayed-type hypersensitivity to contact allergens in psoriasis. A clinical evaluation. Contact Dermatitis 1998; 38: 78-82.
3. Sertoli A, Lombardi P, Spallanzani P, Giorgini S, Reali C, Palermo A. Lichen planus and sesitivity to aptens of "para" group. G Ital Dermatol Venereol 1982; 117: 377-81.
4. Yiannias JA, el Azhary RA, Hand JH, Pakzad SY, Rogers RS 3rd. Relevant contact sensitivities in patients with the diagnosis of oral lichen planus. J Am Acad Dermatol 2000; 42: 177-82.
5. Dodi G, Pirone E, Bettin A, Veller Fornasa C, Infantino A, Pianon P, Mortellaro L M, Lise M. The mycotic flora in proctological patients with and without pruritus ani. Br J Surg 1985; 72: 967-969.
6. Senéjoux A. Dermatoproctologie. In: Chantal Gamby ed. Dermatologie. Elsevier SAS, Paris, 2006; 98-845-A-10.
7. Laurent A, Boucharlat J, Bosson JL, Derry A, Imbert R. Psychological assessment of patients with idiopathic pruritus ani. Psycother Psycosom 1997; 66: 163-6.
8. Magni G, Pirone E, Dodi G. Deux observations de prurit anal psychogène dans la mème famille. Ann Gastroenterol Hepatol 1987; 23: 233-234.

Correspondence to:
Prof. CLETO VELLER FORNASA
Local Dermatology Health Center
ULSS 16 Padova
Via degli Scrovegni 12 - Italy
Phone: +39(0)444753377
E-mail: cleto.vellerfornasa@libero.it

continued from page 155

6 – INCONTINENCES

Changes in urinary and fecal incontinence symptoms with weight loss surgery in morbidly obese women. *Burgio KL, Richter HE, Clements RH. Obstet Gynecol. 2007;110:1034.* In 101 women with BMI of 40 or more undergoing laparoscopic Roux-en-Y gastric bypass and followed to 6 and 12 months, presence, severity, and effect of UI were assessed using the Medical, Epidemiological, and Social Aspects of Aging Questionnaire, Urogenital Distress Inventory, and Incontinence Impact Questionnaire. Fecal incontinence was assessed by self-report of anal leakage. Mean BMI decreased from 48.9 to 30.2 at 12 months postsurgery. Prevalence of UI decreased from 66.7% to 37.0%, and fecal incontinence (solid or liquid stool) from 19.4% to 8.6%.

Hysterectomy and risk of stress-urinary-incontinence surgery: nationwide cohort study. *Altman D, Granath F, Cnattingius S, Falconer C. Lancet 2007;370:1494.* Hysterectomy for benign indications, irrespective of surgical technique, increases the risk for subsequent stress-urinary-incontinence surgery. Women should be counselled on associated risks related to hysterectomy, and other treatment options should be considered before surgery.

[Intravaginal device for the outpatient treatment of stress urinary incontinence: technique and preliminary results]. *Bouffier B. Prog Urol. 2007;17:983.* In 2005, a prospective study was conducted on 37 patients (pure stress, mixed, recurrent urinary incontinence associated with prolapse in 6 cases) with suburethral tape as an outpatient procedure, simplified to decrease the disadvantages of suburethral prostheses. Exclusively intravaginal it avoids skin incisions and the passage of needles. An umbrella is deployed behind each obturator foramen or behind the perineal membrane in order to maintain a fine tape, the other extremity of which is past through a 2 cm prosthesis, then folded on itself to allow tension-free maintenance of the prosthesis under the urethra without catheter. No postoperative complications were observed at 1 year. with 1 immediate failure and 36 cured patients; 9 out of 12 patients no longer experience any urgency.

The effect of mode of delivery, parity, and birth weight on risk of urinary incontinence. *Connolly TJ, Litman HJ, Tennstedt SL et al. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:1033.* The relationship between urinary incontinence (UI) and mode of delivery, parity, and birth weight was examined in a population sample of 3,205 women. Measures include UI symptoms [>or=3 (moderate/severe) Sandvik's severity index]; reproductive history [live birth(s), no live births, never pregnant]; mode of delivery for live births (>or=1 vaginal birth, cesarean delivery only); parity (1, 2, >or=3); and maximum birth weight of live births (<4,000 g, >or=4,000 g). Women with >or=1 vaginal delivery had twice the odds of UI compared to women with no pregnancies (P = 0.002) or only cesarean deliveries (P = 0.032). There was no difference in odds of UI between cesarean delivery only and never pregnant, by parity or birth weight.

Neobladder overactivity; an equivalent to spontaneous rectal contraction. *Sakakibara R, Awa Y, Naya Y et al. Int J Urol. 2007;14:1054.*

Is the role of Burch colposuspension fading away in this epoch for treating female urinary incontinence? *Ng S, Tee YT, Tsui KP, Chen GD. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:937.* The role of Burch colposuspension (BC) as the primary surgical treatment of stress urinary incontinence has been challenged by less invasive methods. To evaluate the long-term results of BC in terms of subjective self-reported outcomes, 159 women who underwent BC between 1993 were evaluated: 55.3% were dry, 36.2% women had improved, and 8.5% had failed; 82.2% were satisfied. BC is an effective alternative surgery for urodynamic proven stress incontinence.

Tension-free vaginal tape for stress incontinence in women with detrusor overactivity. *Basu M, Duckett JR. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:1097.* This is a case report which reviews the literature including the postulated mechanism by which stress leakage due to detrusor overactivity is cured by the TVT.

External iliac artery injury during insertion of tension-free vaginal tape: a case report and literature review. *Sivanesan K, Abdel-Fattah M, Ghani R. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:1105.* Serious vascular injuries after TVT insertion are rare but the clinician should be able to suspect them and patients have to be fully counselled about them. A case of external iliac artery injury was managed successfully by surgical intervention. The literature regarding major vascular injuries and their management is reviewed.

Late erosions of mid-urethral tapes for stress urinary incontinence--need for long-term follow-up? *Mesens T, Aich A, Bhal PS. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:1113.* There is a need for long-term follow-up of patients with TVT. Erosion of the synthetic mesh is a well-described complication where the mean time for the onset is 11.2 months, but there are case reports describing uncommon erosions after 18 and 28 months.

Symptom change in women with overactive bladder after extracorporeal magnetic stimulation: a prospective trial. *Choe JH, Choo MS, Lee KS. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:875.* A prospective evaluation of symptom change after discontinuation of extracorporeal 10 Hz magnetic stimulation was done in 48 women with overactive bladder (OAB) treated with a "magnetic chair" (20 min, twice weekly for 8 weeks). Compared with the baseline 56.3% patients were cured at 2 weeks, and 96.3% among these patients maintained improvement at 24 weeks. In 14 patients with detrusor overactivity the condition was no longer observed in four (28.6%).

A prospective randomised double-blind controlled trial evaluating the effect of trans-sacral magnetic stimulation in women with overactive bladder. *O'Reilly BA, Fynes M, Achtari C et al. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Oct 12; epub.* Transcutaneous electrical nerve stimulation and neuromodulators have success in treating OAB but are expensive, invasive, and sometimes cumbersome. An alternative neuromodulatory technique involving electromagnetic stimulation of the sacral nerve roots with a portable electromagnetic device to produce trans-sacral stimulation of the S3 and S4 sacral nerve roots was tried, but resulted ineffective.

Efficacy, safety and tolerability of fesoterodine for overactive bladder syndrome. *Nitti VW, Dmochowski R, Sand PK et al. J Urol. 2007 Oct 13; epub.* Two 4 mg doses of fesoterodine, a new antimuscarinic agent, are well tolerated and statistically significantly improve overactive bladder symptoms.

Malone antegrade continence enema (MACE) for fecal incontinence in imperforate anus improves quality of life. *Mattix KD, Novotny NM, Shelley AA, Rescorla FJ. Pediatr Surg Int. 2007 Oct 16; epub.*

Fecal incontinence in older adults. *Tariq SH. Clin Geriatr Med. 2007;23:857.* Fecal incontinence is an underreported and underappreciated problem in older adults more common in women than in men. Risk factors that lead to the development of fecal incontinence include dementia, physical disability and fecal impaction. Treatment options include medical or conservative therapy for older adults who have mild incontinence, and surgical options can be explored in selected older adults if surgical expertise is available.

Outcome of primary repair of obstetric anal sphincter rupture using the overlap technique. *Molander P, Vayrynen T, Paavonen J et al. Acta Obstet Gynecol Scand. 2007;16:1.* In grade III and IV anal sphincter ruptures after vaginal delivery the primary overlap technique is highly successful after a median follow-up of 9.4 months (61 consecutive women from 2002 to 2004). Endoanal ultrasonography revealed intact external sphincter in 83% of the patients.

Is a morphologically intact anal sphincter necessary for success with sacral nerve modulation in patients with faecal incontinence? *Melenhorst J, Koch SM, Uludag O, van Gemert WG, Baeten CG Colorectal Dis. 2007 Oct 19; epub.* Two groups of patients were analysed retrospectively to determine whether sacral nerve modulation is as effective in patients with faecal incontinence associated with an anal sphincter defect as in those with a morphologically intact anal sphincter following anal repair, and it was concluded that an anal sphincter defect of <33% of the circumference can be effectively treated primarily with SNM without repair.

The artificial bowel sphincter for faecal incontinence: a single centre study. *Melenhorst J, Koch SM, van Gemert WG, Baeten CG. Int J Colorectal Dis. 2007 Oct 10; epub.* Large anal sphincter defects can be treated by sphincter replacement procedures: the dynamic graciloplasty and the artificial bowel sphincter (ABS). Among 33 patients (25 women) with an ABS followed-up for 0.8-106.3 months, and with a significant improvement of the incontinence score, 7 patients had an infection necessitating explantation. One patient was successfully reimplanted.

7 – PAIN

Short-term results of bilateral S2-S4 sacral neuromodulation for the treatment of refractory interstitial cystitis, painful baldder syndrome, and chronic pelvic pain. *Zabihi N, Mourtzinos A, Maher MG. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Oct 10; epub.* In 30 consecutive patients (21 female, 9 male) with severe refractory symptoms undergone bilateral S2-S4 sacral neuromodulation there was a 42% improvement in symptoms. SF-36 scores did not improve significantly. In refractory patients, bilateral caudal epidural sacral neuromodulation is another possible mode of treatment, which appears to improve both pelvic pain and voiding symptoms.

Endometriomas are more frequent on the left side. *Sznurkowski JJ, Emerich J. Acta Obstet Gynecol Scand. 2007; 16:1.* A left lateral predisposition of endometrioma may be caused by the presence of the sigmoid colon in the left side of the pelvis, which decreases peritoneal fluid movement. These findings may support the transplantation theory of the origin for endometriosis. Ovarian cancer could accompany endometrioma.

Improvement in vulvar vestibulitis with montelukast. *Kamdar N, Fisher L, MacNeill C. J Reprod Med. 2007;52:912.* Montelukast was administered to a series of patients with vestibulitis over a period of 2.5 years. Subjects treated with montelukast showed an average of 52% in improvement in symptoms as compared to a 15% improvement in the controls. This finding implies that leukotrienes have a role in the pathophysiology of vulvar vestibulitis.

Irritable bowel syndrome: current approach to symptoms, evaluation, and treatment. *Videlock EJ, Chang L. Gastroenterol Clin North Am. 2007;36:665.* Symptoms, comorbidities, gender differences, measure of severity in irritable bowel syndrome, current and evidence-based approaches to evaluation and treatment, and the new symptom-based Rome III diagnostic criteria are reviewed and explained.

No difference in symptoms of irritable bowel syndrome between healthy subjects and patients with recurrent depression in remission. *Karling P, Danielsson A, Adolfsson R et al. Neurogastroenterol Motil. 2007;19:896.* There is bidirectional comorbidity between anxiety/depression and irritable bowel syndrome (IBS). To investigate the prevalence of IBS symptoms and factors associated with gastrointestinal symptoms in case of recurrent depressive disorder, 95 patients were investigated. Patients with recurrent depression had higher Gastrointestinal Symptom Rating Scale-IBS scores and showed a strong correlation between symptoms of IBS and anxiety-depression. IBS symptoms were also associated with multiple pain symptoms, higher health-seeking behaviour and selective-serotonin-reuptake inhibitor intake. Depressive patients in remission do not have more IBS symptoms than controls.

8 – FISTULAE

Congenital vesicovaginal fistula with transverse vaginal septum and ectopic ureter opening in proximal vagina: case report and brief review. *Kumar S, Mandal A, Acharya N. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:959.* Congenital vesicovaginal fistula is extremely rare. A 22-year-old woman with menouria and infertility was found to have congenital vesicovaginal fistula, a nonfunctioning right kidney with ectopic ureter and transverse vaginal septum. Abdominal repair of the fistula, right nephroureterectomy, and excision of the vaginal septum was performed.

Rectocutaneous fistula: a rare complication of the posterior intravaginal sling. *Yee YH, Lu CC, Kung FT, Huang KH. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Oct 10; epub.* The posterior intravaginal sling (IVS) is a device used to correct apical vaginal prolapse; there are limited data on associated complications. A case of a rectocutaneous fistula after placement of a posterior IVS in a 59-year-old woman 2 months postoperatively is reported. The sling was resected during sigmoidoscopy with scissors, and the colon laceration was closed. The buttock wound underwent delayed healing 2 weeks later.

Anopenile urethral fistula (APUF). *Ohno K, Nakamura T, Azuma T et al. Pediatr Surg Int. 2007 Nov 1; epub.* According to the embryological studies of the anorectum, APUF could occur due to an incomplete descent of the urorectal septum, or a failed disappearance of the dorsal cloacal membrane, and excessive elongation of the urorectal septum in the phallus. Complete removal of the fistula in the corpus spongiosum penis is unnecessary.

9 – BEHAVIOUR, PSYCHOLOGY, SEXOLOGY

Psychological distress associated with colposcopy: Patients' perception. *Tahseen S, Reid PC. Eur J Obstet Gynecol Reprod Biol. 2007 Oct 31; epub.* To develop an understanding of factors associated with anxiety in relation to cervical screening and colposcopy, the advantages of information leaflet, video-screen display, nursing and medical intervention and exploration of medical terms, were evaluated. Prior to attendance 36% of patients felt they were very worried, 54% slightly worried and 10% not worried. All patients found the standardised NHS information leaflet helpful to a variable degree, 30% found watching on a video-screen display very helpful, whilst a significant number (18%) found it increased their worry. Women with pre-existing high level of anxiety were least satisfied with indices examined. Research should focus on the 'very anxious' women, as they are least satisfied with existing measures in place to reduce anxiety. However this may not be possible.

"You're not a victim of domestic violence, are you?" Provider patient communication about domestic violence. *Rhodes KV, Frankel RM, Levinthal N et al. Ann Intern Med. 2007;147:620.* Victims of domestic violence frequently seek care in an emergency department. The communication between emergency providers and female patients has been analysed. Nonverbal communication was not examined. Providers typically asked about domestic violence in a perfunctory manner during the social history. Provider communication behaviors associated with women disclosing abuse included probing (defined as asking > or =1 additional topically related question). Although hectic clinical environments present many obstacles to meaningful discussions, several provider communication behaviors seemed to facilitate patient disclosure of experiences with abuse.

Sexual function following surgery for urodynamic stress incontinence. *Jha S, Moran P, Greenham H, Ford C. Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:845.* Surgical correction of stress incontinence is associated with an improvement in sexual function. This was demonstrated comparing the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ), the International Consultation on Incontinence Questionnaire (ICIQ) and the Patient Global Impression of Improvement sexual function in women before and after surgery for urodynamic stress incontinence in the absence of pelvic organ prolapse. Previous vaginal surgery, oestrogen status of respondents and hysterectomy status did not affect the PISQ.

Female sexual dysfunction. *Aslan E, Fynes M. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Nov 1; epub.* Female sexual dysfunction is defined as disorders of sexual desire, arousal, orgasm, and sexual pain, which lead to personal distress, the etiology being frequently multifactorial and related to general physical and mental well-being, quality of relationship, past sexual functioning, social class, education, employment, life stressors, personality factors, presence of a sexual partner, partner's age and health. It is very important to adopt the most efficient approach to gather information, and this may be achieved via standardized questionnaires or open-ended questions. Therapy may involve a multidisciplinary team approach including psychosexual counselor/sexologist/therapist and the physician.

Sexual dysfunction associated with antidepressant therapy. *Segraves RT. Urol Clin North Am. 2007; 34:575.* When patients on psychiatric drugs, especially antidepressants, complain of sexual dysfunction, it is important that the clinician take a careful history and it is possible that simple interventions may maintain the desired effect of the drugs eliminating sexual side effects.

Coital urinary incontinence: impact on quality of life as measured by the King's Health Questionnaire (KHQ). *Espuna Pons M, Puig Clota M. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Nov 1; epub.* Among 633 sexually active women seeking treatment for UI and/or overactive bladder in a gynecological clinic, aged between 24 and 83 years, prevalence of coital incontinence was 36.2%, classifying this impact on QoL (KHQ) score as low (59.8%), moderate (32.3%), and high (7.9%).

10 – MISCELLANEOUS

Development, standardization, and evaluation of NOTES cholecystectomy using a transsigmoid approach in the porcine model: an acute feasibility study. *Meining A, Wilhelm D, Burian M et al. Endoscopy. 2007;39:860.* Transluminal cholecystectomy is feasible but poorly standardized so far. A transsigmoid approach for cholecystectomy with minimal transabdominal assistance is performed in the porcine model in a relatively fast way with acceptable complication rates.

Implant infection after two-stage sacral nerve stimulator placement. *Washington BB, Hines BJ Int Urogynecol J Pelvic Floor Dysfunct. 2007;18:1477.* After stage II neurostimulator placement for refractory cases of urge urinary incontinence, urinary frequency, and non-obstructive urinary retention, 5 out of 37 (13.5%) women required device removal for culture positive wound infections occurring a minimum of 33 days, a median of 76 days, and a maximum of 461 days after implantation. The most common pathogen cultured was Staphylococcus aureus. After device removal, all infections resolved. Two patients underwent uncomplicated reimplantation in the contralateral buttock 14 and 16 days after stimulator removal.

Letters to the Editor

STARR Procedure for the treatment of outlet obstruction syndrome

G REBOA *et al.*

Pelviperineology 2007; 26: 127-131

Dear Editor:

I read with interest the paper by Reboa et al. reporting good results after STARR procedure in a group of constipated patients. Less satisfactory results were achieved using the stapled transanal mucosectomy, first described by Pescatori, Favetta, Dedola and Orsini in Techniques in Coloproctology in 1997 for the treatment of rectal internal mucosal prolapse (and not, as stated by the authors, by Longo, who instead reported it for the cure of hemorrhoids one year later).

STARR is a novel operation which gained some popularity despite being introduced in the clinical routine prior to a randomized controlled trial showing its efficacy compared with other manual and less costly techniques. Unfortunately, the authors do not quote at all several important references underlying the limits and the risks of this novel procedure. These include the papers by Dodi et al., Tech Coloproctol, 2003, reporting severe bleeding and pain; Jayne and Finan, Br J Surg 2006, criticizing the introduction in the clinical practice before an adequate scientific evaluation; Pescatori et al., Int J Colorectal Dis 2006, Bassi et al., Tech Coloproctol 2007, describing postoperative recto-vaginal fistulae; Gagliardi et al., Dis Colon Rectum 2006, reporting poor results in large rectoceles and a fatal pelvic sepsis; Arroyo et al., J Am Coll Surg and finally Pechlivanides et al., World J Surg, 2007, reporting high short-term reintervention and recurrence rate.

The same omissions are found on the website www.emorroidiestipsi.com in which transanal stapling supporters state that the STARR is an operation which carries no risk. This simply is not true.

The STARR is an appealing procedure, but its supporters should give the readers an honest and comprehensive review of the existing literature, including both pros and cons of the operation, aimed at minimizing the risk of failure, in the interest of the patients.

MARIO PESCATORI
Villa Flaminia, Rome, Italy

Authors' reply

The original findings by A. Longo regarding stapler-assisted trans-anal surgery for the treatment of hemorrhoids and outlet obstruction syndrome are universally known. He is recognized as the leading author in this field and his reference in this paper is mandatory.

STARR is frequently quoted as a novel operation which has gained popularity despite being introduced in the clinical routine prior to a randomized controlled trial showed its efficacy compared with other manual and cheaper techniques. Actually, apart from a randomized trial including 50 patients by Boccasanta et al.,[1] this is a common limitation of many surgical procedures currently attempted for the resolution of outlet obstruction syndrome, and this should prompt the need to perform a randomized clinical trial in this setting.

However, literature data on STARR are currently available only on a few hundreds of patients, thus suggesting that the procedure still requires a careful prospective assessment as well as an adequate learning-curve that cannot be readily achievable with a few operations.

This was the true message of our report, avoiding any enthusiastic support to STARR with the primary aim of an objective assessment of the clinical outcome of these patients, supported by manometric and defecographic findings. Thanks to the comment of our reader, we now have another opportunity to stress that this is not "easy surgery". It requires a specialist approach that only the modern coloproctologist used to stapling devices can provide, and not the traditional proctologist. Moreover, a learning phase with a simpler procedure such as the stapled anopexy for the treatment of hemorrhoids is advisable, with at least 30 to 50 operations regarded as the cut-off before starting with STARR Procedure. As a matter of fact, looking at the complication rate, those Authors [2-5] who dealt with a rather low number of patients (less than 16 patients) experienced very poor results with a high rate of postoperative bleeding (14-21%), urinary retention (8-28%), pelvic sepsis (7%), urge to defecate (19-25%) and pain (7-28%) while the corresponding figures are remarkably lower with the increasing number of patients.[6-7]

REFERENCES

1. Boccasanta P, Venturi M, Salamina G, Cesana BM, Bernasconi F, Roviaro G. New trends in the surgical treatment of outlet obstruction: clinical and functional results of two novel transanal stapled techniques from a randomized controlled trial. Int J Colorectal Dis 2004; 19: 359-69.
2. Dodi G, Pietroletti R, Milito G, Binda G, Pescatori M. Bleeding, incontinence, pain and constipation after STARR transanal double stapling rectotomy for obstructed defecation. Tech Coloproctol 2003; 7: 148-53.
3. Ommer A, Albrecht K, Wenger F, Walz MK. Stapled transanal rectal resection (STARR): a new option in the treatment of obstructive defecation syndrome. Langenbecks Arch Surg 2006; 391: 32-7.
4. Pechlivanides G, Tsiaoussis J, Athanasakis E, et al. Stapled transanal rectal resection (STARR) to reverse the anatomic disorders of pelvic floor dyssynergia. World J Surg 2007; 31: 1329-35.
5. Arroyo A, Perez-Vicente F, Serrano P, et al. Evaluation of the stapled transanal rectal resection technique with two staplers in the treatment of obstructive defecation syndrome. J Am Coll Surg 2007; 204: 56-63.
6. Boccasanta P, Venturi M, Stuto A, et al. Stapled transanal rectal resection for outlet obstruction: a prospective, multicenter trial. Dis Colon Rectum 2004; 47: 1285-97.
7. Renzi A, Izzo D, Di Sarno G, Izzo G, Di Martino N. Stapled transanal rectal resection to treat obstructed defecation caused by rectal intussusception and rectocele. Int J Colorectal Dis 2006; 21: 661-7.

Ahmed Shafik (1933-2007)

Dear Sir,

I was never able to meet Prof. Ahmed Shafik in person. In comparison to others expressing their feelings following his death I cannot say that I have worked with him, nor was I one of his students. My link with Professor Shafik is through his scientific papers.

My first contact took place as a resident in Surgery when I studied his paper on the pathogenesis of anal abscess and fistula. The original and more complex Shafik theory of anorectal sinus was in contrast to the cryptic glandular and the perineal infection theories of Eisenhammer and Goligher. The originality of his theory was the distinguishing mark of a sharp, unique and sometimes unconventional mind.

The contribution of Professor Shafik to pelvic floor medicine was immense. Over 500 peer reviewed articles are listed in Pub Med. He was unique in the extent of his imagination, exploration and discussion. His papers ranged from his descriptions of the patho-physiology of colorectal, lower urinary tract and genital diseases in both males and females to the development of new surgical techniques. He was a pioneer in surgery and developed techniques such as the cutaneous uretero-ureterostomy urinary diversion "Shafik I" and the ileo-ureteral neo-bladder "Shafik II" procedures. Shafik's description of the pudendal canal syndrome where entrapment of the pudendal nerve in Alcock's canal could be treated by surgical decompression led to a reduction in the symptoms of proctalgia, scrotalgia, prostatodynia, vulvodynia as well as amelioration in erectile dysfunction and faecal incontinence .

Shafik's scientific work was distinguished by a methodological rigor in medical research. He first investigated his ideas in animal models and with cadaveric dissection. He obtained a theoretical and empirical rationale for his clinical diagnosis before he embarked on any new therapeutic intervention with controlled trials.

In the last years of his life functional anatomy and physiology were his most important areas of interest. Prof. Shafik investigated the macro and microscopic anatomy of the pelvic floor musculature and highlighted more than one hundred reflexes regulating and coordinating pelvic organ function. His work increased our understanding of urinary and faecal continence, voiding problems, defaecation, sexual physiology, sexual dysfunction and pelvic pain. He expanded our knowledge of the function of the gastrointestinal and genital systems by discovering four reflexes involved in swallowing and eighteen reflexes which control genital function and sexual performance in both sexes. He described nineteen syndromes and explained the aetiology of a number of other diseases which previously had been considered idiopathic.

Shafik identified the central role of Cajal cells in the generation of the electric waves responsible for colonic motor activity. The absence of Cajal cells in the specimens of patients with total colonic inertia confirmed this brilliant hypothesis. In a series of nine patients with inertia coli, he found that treatment with colonic pacing induced spontaneous rectal evacuation in 66.6% of cases providing a new therapeutic option in the treatment of severe constipation.

Shafik suggested a relationship between the colonic motor disorders due to an aberrant focus in colonic pacemakers, called "tachyarrhythmia", and the symptoms of Irritable Bowel Syndrome (IBS). Colonic pacing in IBS patients not responsive to the other classical therapeutic measures, induced the normalization of the tachyarrhythmic pattern, with a reduction of IBS symptoms. On the basis of finding the same pathophysiological electrical and motility patterns Shafik proposed a new explanation for the pathogenesis of early diverticular disease suspecting this to be an advanced stage of IBS.

In his busy laboratory and clinic in Cairo, Egypt, Shafik pioneered new advances in medical, bio-engineering and diagnostic technology. He developed an electrified urine catheter for decreasing bacteriuria and a fecoflowmetry system to provide a quantitative and qualitative assessment of defecatory function. New routes for drug administration in advanced pelvic malignancy (bladder, prostate and uterus cancer) using rectourogenital communicating veins (haemorrhoidal, vesico-vaginal and the vesico-prostatic venous plexus) were evaluated. Submucosal anal injection with a high local concentration of chemotherapeutics agents could be given with reduced systemic effects. According to Shafik this anatomical pattern could explain the supposed relationship between constipation and lower urinary tract symptoms (LUTS), causing mainly urinary tract infections in female patients.

Thanks to his work in gastroenterology, coloproctology, urology, gynaecology, and andrology Shafik was one of the few surgeons, if not the first and only one, with an effective trans-disciplinary view of the pelvic floor that he considered as a functional unit. He discovered important relationships between the different compartments enhancing the understanding of pelvic physiology and anatomy and he emphasized the importance of connective tissue *in pelvic physiology.*

The fascinating originality of his papers and his scientific proposals, as well as his unique character, appearance and expression, made Ahmed Shafik a figure on the world stage. Like all great thinkers and prophets his teaching was sometimes surrounded with scepticism by the scientific community and accepted with difficulty because according to his critics his work was not supported by evidence based medicine. Shafik preferred to create and describe innovative surgical operations and explain new concepts in physiology and anatomy rather than carrying out meta-analyses or undertake prospective controlled trials. He worked off the beaten track to show us alternative and attractive new ways.

Creativity and unconventionality were the main distinguishing marks of Ahmed Shafik. He showed us that curiosity was central in our work and that clinical practice and academic science have to coexist in the same individual. The surgeon is both a physician and a scientist, and he has to balance the demands of his clinical practice with his academic commitment. Professor Shafik pursued the unitary view of the pelvic floor for his entire life as a scientist. We shall miss him greatly.

Dr. LUCA AMADIO M.D.
Trainee in Colorectal Surgery, Italy.
Email: amadioluca@libero.it

perineology

LATEST NEWS FROM THE **GROUPEMENT EUROPEEN DE PERINEOLOGIE**

EDITORIAL: PERINEOLOGY… THE STORY BEHIND THE CONCEPT

Jack Mouchel, *Clinique du Tertre Rouge, Le Mans, France*
Jacques Beco, *Liege University, Belgium*

The development during the early eighties of the procedure we later called the Mini-Vaginal-Tape (MVT) was the first step on the road to the concept of Perineology.

Development of vaginal surgery for hysterectomy and genital prolapse during the late seventies and the early eighties led inevitably to the need for an efficient vaginal procedure for the cure of the stress urinary incontinence which proved to be frequent in this kind of patients.

Apart from the Marion-Kelly technique, no vaginal procedure was at that time regarded as efficacious enough and the "Gold Standard" for the cure of this urinary dysfunction was then (and remained until the late nineties) the Goebbel-Stoeckel and Burch procedures. The results of the MVT procedure, first done in July 1985, led us not only to abandon the abdominal procedures but also to raise doubts with regard to the theory of Enhorning on which was based these gold standard procedures.

In the same time our understanding of anatomy gained from surgical experience became more concrete during the late eighties with the three dimensional information provided by the new modality of pelvic ultrasound. This led us to define collectively (with physiotherapists and radiologists) a purely anatomical concept (in contrast with the functional) to explain the different pelvic floor dysfunctions.

Finally, collaboration with Professor Ahmed Shafik of Cairo which started in 1994, led to a better understanding of pudendal neuropathy and levator plate sagging as the aetiology of some pelvic floor dysfunctions.

This anatomical approach now is widely accepted but perhaps too focused on the connective tissue defects. It tries to explain the different perineal dysfunctions in terms of specific anatomical defects. Connective tissue defects are more obvious but behind these are hidden other muscular and neurological defects responsible for the gradual development of the different anatomical and functional problems.

In reality it is the same anatomical structures (pudendal nerve, levator plate, pubo-rectalis , superficial muscles of the perineum, pubo-cervical and recto-vaginal fascia) which are all involved in the anatomical arrangement of the perineum and in the integrated command of the different perineal functions. This led us to gather all the dysfunctions brought about by the defects of one or several of these structures into a sole concept which we called "Perineology". The first detailed description of this integrated approach is in : "L'acte sexuel feminin, Mise à jour 1996, Publication du Collège Français de Gynécologie-Obstétrique, Vigot Ed, Paris".

In order to bring together the physicians interested in the study and the treatment of these dysfunctions the " Groupement Européen de Périnéologie (GEP) " was created in November 1996. The GEP is a non-profit association that then organized three meetings in 1997, 1998 and 1999 and collectively published the book : " La Périnéologie… Comprendre un équilibre et le préserver " . At the same time, the website www.perineology.com was created to facilitate communication between members and to propagate the ideas of the group.

Although the name "Perineology" had been quickly adopted, the concepts and teachings of the GEP were not readily understood or accepted. Firstly the concepts of Perineology were not widely disseminated outside the French language and secondly, adoption of these teachings were opposed by some French and Belgian academics who were self proclaimed key leaders in the understanding of pelvic floor dysfunction. The control of the conventional medical media by these individuals has delayed the understanding of the concept of Perineology around the world but despite this the concepts pioneered by the GEP and like minded individuals have continued to gain credibility and the survival and future development of Perineology is now assured.

RESOURCES AVAILABLE FOR CLINICIANS

In addition to the information available on the Perineology website www.perineology.com the following references are provided.

Mouchel J. La fixation aux tendons pubo-coccygiens d'une fronde de Gore-Tex. Une technique simple de la cure d'incontinence urinaire d'effort par voie vaginale pure. J Gynec Obstet Biol Reprod 1987; 16: 507-512.

Beco J, Sulu M, Schaaps JP, Lambotte R. Une nouvelle approche des troubles de continence chez la femme: l'échographie urodynamique par voie vaginale. J Gynecol Obstet Biol Reprod 1987; 16: 987-998.

Mouchel J. Traitement chirurgical de l'incontinence urinaire d'effort de la femme par soutènement sous-uretral par une bandelette de polytétrafluoroéthylène. Rev Fr Gynec Obstet 1990; 85: 399-405.

Mouchel J. Conception purement anatomique des troubles urinaires. In “Les troubles de la statique pelvienne”, Blanc B., Boubli L., Bautrant E., d’Ercole C., Arnette Editeur, Paris, 1993.

Beco J, Mouchel J. Faut-il encore faire des Burch? J Gynecol Obstet Biol Reprod 1995; 24: 772-774.

Mouchel J, Beco J, Bonnet P, Isambert J.L, Mouchel F, Wurst C. L’acte sexuel féminin: son intégration dans la conception anatomo-physiologique du plancher pelvien. In: Mise à jour en Gynécologie-Obstétrique 1996, Collège National des Gynécologues et Obstétriciens Français, M. Tournaire et H. J. Philippe éditeurs, Vigot diffusion, Paris.

Mouchel J, Beco J. Stress Urinary Incontinence : Here we are. Am J Obstet Gynecol 1997;177: 1561.

La Périnéologie… Comprendre un équilibre et le préserver. GEP Editeur, Odyssee 1372, Verviers, Belgique, 1998.

Mouchel J. From Urogynecology to Perineology. XVI FIGO World Congress, September 3-8 2000, Washington DC.

Beco J, Mouchel J. Practical Perineology: Examples. XVI FIGO World Congress, September 3-8 2000, Washington DC.

Beco J., Mouchel J.: Understanding the concept of Perineology. Int Urogynecol J 2002; 13: 275-277.

Beco J, Mouchel J. Perineology : a new area. Urogynaecologia International J 2003; 17: 79-86.

Mouchel T., 3D modelization of the pelvic floor : Static and dynamic aspects of normal, pathological and post-surgery anatomy. DVD (in French), GEP 2007.

A TRIBUTE TO PROFESSOR AHMED SHAFIK

It is with a profound sense of sadness that we announce the untimely death of our Honoured President:

AHMED SHAFIK, MD., PhD.

Professor of Surgery and Experimental Research in Cairo, Egypt

Professor Shafik published more than 1000 peer reviewed papers during his long and celebrated career. Many of these papers were landmark papers concerning the anatomy and physiology of the pelvic floor. He always thought of the perineum as a whole and was probably the first real Perineologist.

Since 1994, we have had the great privilege to be taught by Professor Shafik who became a true mentor as he transmitted to us part of his huge knowledge. Professor Shafik was a generous and kind teacher and a wonderful human being. His publications which describe the role of the pudendal nerve and the levator plate will remain keystones in the understanding and teaching of Perineology.

Thank you Professor Shafik. We are very sad you are already gone.
For the “Groupement Européen de Périnéologie”

Jack Mouchel and Jacques Beco

CONTACT DETAILS:

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

UPCOMING MEETINGS

6TH ANNUAL MEETING OF THE MEDITERRANEAN PELVIC FLOOR SOCIETY

CAIRO, EGYPT APRIL 3-5 2008 - www.mspfd.org

Contact the MSPFD Address: 7 Gamal Salem St, of Mssadek ST – Giza – Egypt
Tel: (202) 7625077 - Fax: (202) 7498851 - Email: info@mspfd.org

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

Venice, Italy October 2nd - 4th 2008
Westin Excelsior > Venice Lido

10th AAVIS Annual Scientific Meeting
International Pelviperineology Congress

AAVIS-IPFDS Joint Meeting
30th September – 2nd October 2008,Padua
2nd – 4th October 2008, Venice Lido

CONFERENCE UPDATE - AAVIS IPFDS 2008

Plans for the AAVIS 2008 Annual Scientific Meeting in September and October 2008 have been expanded with the International Pelvic Floor Dysfunction Society now joining us in Italy for a Joint Meeting.

A number of excellent speakers are already committed to the meeting and several workshops and symposia have been confirmed. The expansion of the meeting has caused a delay in some aspects of the organization but the preliminary program is now taking shape.

THE VENUE

The main meeting will be held in the grandeur and luxury of the Westin Excelsior Resort at Venice Lido. The hotel in itself is an experience to remember. Situated on the Lido the Westin Excelsior Resort faces the Adriatic in one direction and looks over the Venice Lagoon in the opposite direction. Visit the hotel website at
http://excelsior.hotelvenice.com/main_en.htm > for more information.

The Westin Excelsior Resort hotel is a spectacular 5 Star venue and the Conference Organisers Defoe have arranged a special reduced rate for rooms during the meeting. Cheaper accommodation will also be available.

In order to avoid having to travel out of Venice for workshops and surgery sessions we have arranged for two days of Pre-Congress meetings to be held at Padua. The city of Padua is convenient city for workshops and symposia with the hotels, hospital and university all within walking distance. Some delegates will find it easier to stay in Padua before moving to Venice Lido for the main meeting. Defoe, our conference organizers can arrange your hotel stay in both cities.

PRELIMINARY PROGRAM

PreConference Workshops
30th September – 1st October 2008 Padua, Italy

- Anatomy Workshops – Pudendal/Posterior Compartment (Professor Raffaele De Caro)
- Industry Workshops and Symposia
- Ethics Workshop (Dr Bernie Brenner)
- Focal Defect Surgery (Dr Richard Reid, Professor Carl Zimmerman)
- Joint Meeting with Italian Colorectal Society
- Symposium: Ano-rectal incontinence
- Workshop: TFS and Integral Theory (Professor Peter Petros)
- Complications of Surgery with Prostheses
- Mesh Users Meeting and Expert Roundtable Dinner Meeting

AAVIS – IPFDS Joint Meeting
2nd – 4th October 2008 Westin Excelsior - Venice Lido

- Symposium: Pelvic Pain Syndrome
- Symposium: Holistic Concepts of Pelvic Floor Dysfunction – from delivery to dysfunction
- Industry Symposia
- Breakfast Meetings
- Interdisciplinary training sessions
- Plenary Session: Incontinence Update
- Plenary Session: Prolapse Update
- Plenary Session: Controversies in Obstructive Defecation
- Plenary Session: Future Innovations in Pelvic Surgery

SOCIAL PROGRAM

The highlight of the meeting will be the Gala Dinner held in the Sala Stucchi of the Westin Excelsior. There will also be a welcome Cocktail Party on the evening of October 2nd and a family lunch and cruise around the canals of Venice on the afternoon of October 4th.

Watch the AAVIS Website for further information as Conference and workshop details are finalized.

AAVIS Website: www.aavis.org

You can also contact the conference organizers Defoe Congressi

defoe CONGRESS EVENT COMUNICATIONS

via Verdi, 37 _ 29100 Piacenza _ ITALY
tel: +39.0523.338391 - fax: +39.0523.304695
info@defoe.it - www.defoe.it

constipation, irritable bowel, anal diseases

F.D FIBRE system

normalizes
function of bowel ecosystem

F.D FIBRE *system*

available in 3 different formulations

Strong action
F.D FIBRE FLUID

Packaging:
8 small bottles (90 mL / 97 g)

Actives components / bottle
- **11,7 g soluble fermentable fiber**
  - resin of acacia
- **598 mg bioflavonoids**
  - *Sambucus nigra* L. fruits

Maintenance
F.D FIBRE GRANULES

Packaging:
21 bags (12,5 g)

Actives components / bag
- **6,87 g polifiber:**
  - resin of acacia (4,06 g soluble fermentable fiber)
  - beet fructo-oligosaccharides
  - wheat bran (2,81 g insoluble fiber)

minerals: Ca 36,6 mg, K 106 mg, Mg 33,7 mg
vitamins B (1,2,6): 0,1 mg
vitamin E: 0,14 mg

- **42,1 mg di bioflavonoids**
  - *Sambucus nigra* L. fruits (dry extract)

Long term treatment
F.D FIBRE TABLETS

Packaging:
200 tablets (0,55 g)

Actives components / tablet
- **0,24 g polifiber:**
  - resin of acacia (0,17 g soluble fermentable fiber)
  - beet fructo-oligosaccharides
  - wheat bran (0,07 g insoluble fiber)

minerals: Ca 649 µg, K 2623 µg, Mg 1034 µg
vitamins B (1,2,6): 3,6 µg
vitamin E: 3,6 µg

- **1,6 mg di bioflavonoids**
  - *Sambucus nigra* L. fruits (dry extract)

F.D FIBRE *system*
Patent pending

Information
For brochures and samples contact:

DALCO 1978 natural solutions

DALCO s.r.l.
via Cavin di Sala, 76/A
30035 Mirano - Venezia - Italy

Ph. +39 (0)41 430613
Fax +39 (0)41 5700647

www.fdfibre.eu
mail@fdfibre.eu

F.D FIBRE system

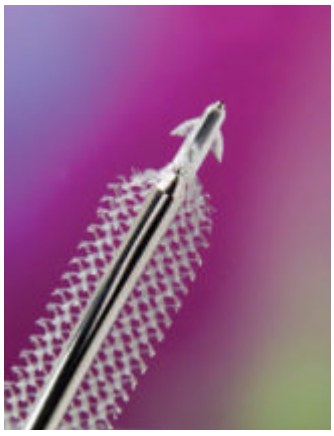
4 more great reasons to choose AMS

New! MiniArc™ Single Incision Sling

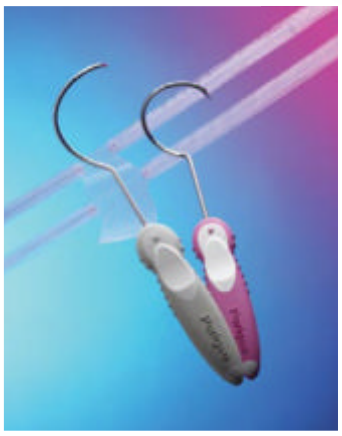
New! Longer Perigee® Needle

New! IntePro Lite™ Prolapse Mesh

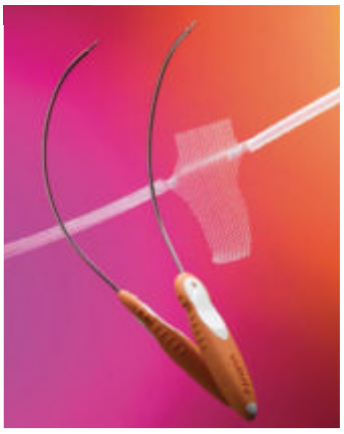
New data on Monarc®, Perigee® and Apogee®



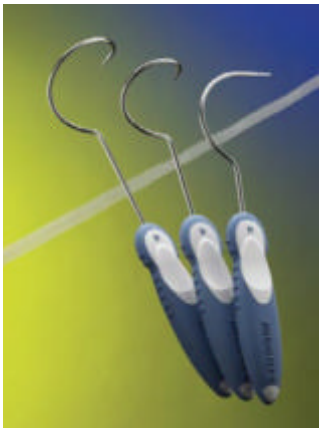
MiniArc
Single Incision Sling System



Perigee
Longer needle with IntePro Lite Mesh



Apogee
With IntePro Lite Mesh



Monarc
Subfascial Hammock

For the latest in gynecologist-driven solutions, un-matched data and comprehensive training, see your American Medical Systems representative

AMS
Solutions for Life™

www.AmericanMedicalSystems.com

INSTRUCTIONS FOR AUTHORS

Pelviperineology publishes original papers on clinical and experimental topics concerning the diseases of the pelvic floor in the fields of Urology, Gynaecology and Colo-Rectal Surgery from a multidisciplinary perspective. All submitted manuscripts must adhere strictly to the following Instructions for Authors.

The manuscript and illustrations must be mailed in three separate copies printed on A4 size paper with double spacing. In addition an electronic copy in Word for Windows format (example.doc) or rich text format (example.rtf) must be sent with the manuscript or emailed separately to one of the joint editors. Images must be in JPEG format (.jpg) with a definition not less than 300 dpi.

Submission address: Manuscripts and letters can be sent to one of the joint editors:

Prof G. Dodi, Dept Surgery, Policlinico University of Padova, Italy; Padova, e-mail: giuseppe.dodi@unipd.it

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

Prof Ghislain Devroede, Dept de Chirurgie, CHUS, site Fleurimont, Sherbrooke (Quebec) Canada jlh5n4; e-mail: Ghislain.Devroede@USherbrooke.ca

Address for correspondence with the Authors: Full details of postal and e-mail addresses of the author(s) should accompany each submitted manuscript.

Responsibility of the Authors: *Pelviperineology* takes no responsibility for the Authors' statements. The manuscripts, once accepted, become property of the journal and cannot be published elsewhere without the written permission of the journal *Pelviperineology.* All manuscripts must carry the following statement that must be signed by all the Authors: *"the Authors transfer the property of the copyright to the journal Pelviperineology, in case their contribution 'xyz' will be published"*. They must also make a written statement that the submitted article is original and has never been submitted for publication to any other journal, nor has it ever been published elsewhere, except as an Abstract or as a part of a lecture, review, or thesis.

Evaluation and review of the manuscripts: All manuscripts are evaluated by a scientific committee and/or by two or more experts anonymously. Only manuscripts that strictly adhere to these Instructions for Authors will be evaluated. Contributions are accepted on the basis of their importance, originality, validity and methodology. Comments of Peer Reviewers may be forwarded to the Author(s) in cases where this is considered useful. The Author(s) will be informed whether their contribution has been accepted, refused, or if it has been returned for revision and further review. The Editors review all manuscripts prior to publication to ensure that the best readability and brevity have been achieved without distortion of the original meaning.

Reprints: Request forms for reprints are mailed to the Author(s) with the proofs.

Preparation of the manuscript: The manuscript should be typed with double spacing and generous margins. Each page must be numbered including the title page.

Abbreviations should only be used when a lengthy term is repeated frequently. Words must appear in full initially with the abbreviation in brackets. All measurements must be expressed in SI units. Drugs must be described by their generic names. If research papers include a survey a copy of the questions must be supplied.

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.

Title page: The title page must contain: 1) the title of the article; 2) full name and family name, institution for each of the Authors; 3) full name and full address and e-mail of the Author responsible for the correspondence; 4) any grants, pecuniary interests or financial support of the Authors.

Summary/Abstract: The summary must not exceed 250 words and should possibly follow the format below: 1. a sentence indicating the problem and the objective of the study; 2. one or two sentences reporting the methods; 3. a short summary on the results, detailed enough to justify the conclusions. Avoid writing "the results are presented" or "… discussed"; 4. a sentence with the conclusions.

Key words: Below the summary, 2 to 5 key words must be listed.

Introduction: Clearly state the objective of the study. Give only strictly relevant references and don't review extensively their topics.

Methods: Clearly explain the methods and the materials in detail to allow the reader to reproduce the results.

Results: Results must be presented in a logic sequence with text, tables and illustrations. All data in the tables and figures must not be repeated in text. Underline or summarize only the most important observation.

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 metanalysis. Dis Colon Rectum 1995; 38: 687-94.

Court FG, Whiston RJ, Wemyss-Holden SA, Dennison AR, Maddern 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 elastiche Sehnen, und einige andere anatomische Verhaltnisse. Viertel Jarhrsxhrift 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.

Tables: Each table must be typed on a separate page, numbered, and with a short title. Each table must be captioned and self explanatory. The layout should be as simple as possible with no shading or tinting.

Illustrations: Only images relating to the text may be used. Illustrations should be professionally produced and of a standard suitable for reproduction in print. The name of the first author, the number of the figure and an arrow to indicate the top should be written on the back of each illustration, using a soft pencil. The identity of any individual in a photograph or illustration should be concealed unless written permission from the patient to publish is supplied. Each table and illustration must be cited in the text in consecutive order. Electronic submission of images must include identification of each image by number (e.g., 1.jpg, 2.jpg) in order of citation. The appropriate position in the text should be indicated in the margin of the manuscript.

Legends must be typed on a separate page.

Proof reading and correction of manuscripts: Final proofs will be sent to the first Author and should be reviewed, corrected and returned within 7 days of receipt.