Urodynamics, Neurourology and Pelvic Floor Dysfunctions

Giulio Del Popolo
Donatella Pistolesi
Vincenzo Li Marzi
Editors

Male Stress Urinary Incontinence

Springer

Functional Devices

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Jérôme Grall

According to the World Health Organisation definition, incontinence is a non-intentional and bothersome loss of urine from the urethral meatus. As a mostly iatrogenic situation (post-radical prostatectomy in a majority of cases), male incontinence has a significant impact on quality of life [1].

Surgical prostate removal, dealing with very close links between prostate, urinary sphincter and neurovascular bundles, always bears high risks on continence. Disappointingly, open and laparoscopic procedures (including robot assisted), do not make any difference on continence, despite technical accuracy has been much improved over time in the quest for continence preservation.

The great variability of incontinence rates (5–45 % at 1-tear follow-up) might be related to differences in patient evaluation tools, incontinence definitions according to severity, time to follow-up and the actual meaning of "cured patient".

Post-prostatectomy continence improves dramatically over the first 6–12 postoperative months, as the result of natural healing, pharmaceutical treatments or pelvic floor muscles training. Around 5 % of patients eventually seek surgical treatment for their incontinence.

Artificial urinary sphincter, with cure rates ranging from 59 to 91 % [2], is considered as the gold standard. But it is a rather challenging procedure, exposing to complications or reoperations for mechanical dysfunctions. It is also an expensive treatment, requiring patient dexterity and motivation to properly use the device. Despite excellent results, many patients prefer less invasive procedures [3] and among them slings.

Male slings are now the best option beside artificial sphincter. The ideal treatment would be a minimally invasive, outpatient procedure with superior, immediate

J. Grall, MD
Department of Urology, Clinique de FONTAINE, 21121,
FONTAINE-LèS-DIJON - France, France
e-mail: grall.j@wanadoo.fr

G. Del Popolo et al. (eds.), *Male Stress Urinary Incontinence*,
Urodynamics, Neurourology and Pelvic Floor Dysfunctions,
DOI 10.1007/978-3-319-19252-9_9

and permanent efficacy, no moving parts, no significant voiding obstruction, low cost and minimal morbidity [4]. Research is under way.

But so far overall sling results are not as good as expected; the way slings work and the explanations for failures are not always understood and there is still a need for a better patient selection.

The huge differences in sling results, when comparing incontinence and cure rates, show how difficult it is to have reliable data based on common definitions and how risky it is to compare study results. As a consequence, the reader must be aware of occasional biases when it comes to drawing conclusions from our observations.

9.1 Some History

Back in 1961, Berry made the first surgical attempt to restore continence with a perineal compressive acrylic mesh. Kaufman, in 1972, presented a new design for urethral compression using tetrafluoroethylene mesh and silicone-filled prosthesis in two different techniques, Kaufman I and Kaufman II. Complications (pain, urinary retention, urethral erosion) and poor results made the techniques rather unpopular and led to their end.

Pubourethral slings had their time. They evolved from both old-fashioned female sub-urethral slings and Stamey-like retropubic suspension. Some of these techniques are still used but they have few convincing and significant results [5].

Bone anchored supports subsequently appeared. The Straight-in® bone anchoring system was published in 2001: safe and efficacious at that time (despite short 12.2 months follow-up and non-statistically convincing results) with no perineal pain reported [6]. The most significant was InVance®sling that provided dry rates ranging from 36 to 65 % with 12 % post-void residual urine; but severe complications (perineal pain up to 76 %, infection-related explantations 15 %, bone anchor dislodgments 5 %) drove it off the market to the advantage of transobturator and modern retropubic slings [7].

9.2 From Incontinence Mechanism to Sling Effectiveness

Postoperative incontinence mechanism remains largely unclear. It might have to do with sphincter performance. Urethral dissection and transection during radical prostatectomy, very close to the sphincter muscular and nervous structures, expose to different degrees of sphincter impairment, loss of functional length and drop in closure pressure. But not always urodynamic assessment, prior and after the operation, shows evidence of this mechanism.

Moreover, prostate apical dissection might lead, depending on the technique, to urethra and sphincter mobilisation, resulting in a loss of urethral support and sphincter effectiveness, thus creating stress incontinence.

Slings are thought to restore sphincter function both by repositioning it in its preoperative position and by supporting it to improve its strength. Some urethral compression may also play a part.

As shown by an MRI study of 12 patients before and after sling placement (AdVance®), urethral mobility is not observed in all cases. On cough test, maximum bladder neck movement along the pubococcygeal line ranges from 3 to 7 mm. None of the patients have postoperative urethral mobility, but the lack of preoperative mobility does not appear to be a negative prognostic factor [8]. As a result, urethral and sphincter mobility is not the only incontinence mechanism and therefore urethral repositioning is not the only way slings might act. This study provided interesting images of bulbar support and seemed to rule out any urethral compression.

A quite better continence recovery is observed in patients with urethral length >12 mm (from bladder neck to bulb upper limit) when measured on MRI imaging [9]. But urodynamic evaluation before and after sling insertion (AdVance®) shows no differences but an increase of abdominal leak point pressure (61 ± 14.2 versus 79 ± 20.4 cm of water) [10].

Urethral and periurethral fibrosis, as shown by MRI [9], are among the causes of postoperative incontinence, may be via a limitation of sphincter mobility and elasticity. Surgical dissection of prostatic apex during prostatectomy should preserve urethral stump as much as possible, without taking excessive oncologic risks.

As a conclusion, there is no clinical test nor any precise pathophysiological template on which surgical indication for sling could be based.

9.3 Clinical Evaluation

Incontinence severity in daily practice is measured with a great variety of definitions and tools (questionnaires, pad weight tests, visual analogic scales) making studies rather difficult to compare. Patients are placed in three groups according to incontinence severity: mild, moderate and severe incontinence. But the boundaries of each group are not precisely defined nor commonly shared. Severity is anyway the most important information for selection.

Before sling placement, all the authors agree on checking for urethral or bladder neck stricture, overactive bladder, previous pelvis radiation, infection, that all appear to be total or relative contraindications.

9.4 Is Urodynamic Assessment Useful?

Urodynamics is not routinely performed, out of clinical studies, for stress urinary incontinence assessment before sling placement. Detrusor overactivity is commonly associated with urgency. Intrinsic sphincter deficiency is related to incontinence severity: the weaker the sphincter, the more the incontinence. Dysuria and urethral stenosis are best explored with uroflowmetry and cystoscopy.

All studies on urodynamics are of limited significance because postoperative investigations are uncommon and the collected data are of different kinds and not easy to compare.

It has been written that no adverse preoperative urodynamic parameter is associated with postoperative outcome [10]. The negative prognostic value of

incontinence severity on functional result is thus an indication that residual sphincter function (retrograde leak point pressure RLPP or pressure profile) might not be the only explanation for incontinence severity. Data from pre- and postoperative urodynamics [11] indicate modifications in mean urethral closure pressure and functional length, without reaching statistical significance due to the reduced number of patients. Another way to assess sphincter function relies on visible sphincter activity on cystoscopy [2].

Whereas it is a common advice to prefer a good sphincter residual function before sling placement, one cannot find any indication on sphincter pressure threshold for good prognosis. Urethral closure pressure represents the sum of all forces (muscular and elastic) aimed at getting the urethra closed, not only the sphincter.

Patients with bladder impaired contractility for voiding and who void with abdominal straining could benefit from perineal sling without risk of retention if they have preoperative complete emptying [12].

Even taking into account the statistical limitation, when comparing "compressive" slings with AdVance® "repositioning" sling, it appears that the consequences of both slings in terms of sphincteric profile (pression and length) are very similar. Urethral and sphincter repositioning in their normal pre-prostatectomy position, as claimed for AdVance® sling, might not be the only mechanism of action. On the contrary, the efficacy of so-called compressive slings can be obtained without any voiding obstruction and with improved closure pressure and sphincter functional length. Moreover, urinary retention occurs in 15 % of cases after AdVance® insertion indicating that some urethral compression is likely to be associated with the so-called non-compressive slings. I-STOP TOMS® sling, which provides excellent functional results, was never associated with any postoperative urinary retention despite its supposed compressive effect. May be the actual mechanism for explaining these findings is the restoration of pelvic floor in both kinds of slings, driving transobturator compressive and repositioning slings differences back to clinically insignificant philosophical discussions.

The real point is to clearly individualise the preoperative patient's characteristics for prognosis. Patient selection is paramount. Urodynamical findings are only a part of the answer and in many ways not necessary for accurate selection.

9.5 Different Kinds of Slings

9.5.1 Adjustable Slings

Adjustable slings are designed in the same way as retropubic slings. They can be considered an evolution from them with the aim of improving the results by allowing postoperative adjustment. Devices are complex, made of different materials (among them silicone) and they bear a greater risk of complications than the straightforward polypropylene mesh.

They are part of contemporary management of post-prostatectomy incontinence [7].

9.5.1.1 Argus®

(Promedón, Córdoba, Argentina)

Argus® device features a silicone cushion placed underneath the bulbar urethra (Fig. 9.1), two retropubic silicone columns with multiple cone structure and two silicone rings/washers running on the columns and resting on the rectus fascia for tension adjustment [1].

Surgical procedure: In lithotomy position, a perineal incision exposes bulbar urethra. A transverse suprapubic incision exposes enough rectus fascia bilaterally to accommodate silicone rings.

A 90° crochet needle is inserted through perineal membrane between bulbar urethra and ischiopubic bone. The silicone column is pulled upward. The same is done on the other side. The cushion is then positioned around the bulbar urethra.

Cystoscopy checks for bladder integrity.

The tension is adjusted by positioning rings along the columns, as to obtain a RLPP of 45 cm of water (water dripping stops while cystoscopy shows bulbar urethral closure).

Silicone columns are left crosswise deep under suprapubic fat.

Revision for tension adjustment is offered to any patient with persistent stress urinary incontinence. Through suprapubic incision, the rings are pushed over one or two cones along the columns bilaterally to increase RLPP up to 55 cm of water.

Argus® success rate at 27 months follow-up is a hopeful 83 %, including improved and cured patients. Whereas 32 % of patients took advantage of tension adjustment up to 3 times [1], the success rate is higher in case of mild incontinence (92 %) than moderate and severe (67 %). But strict dry rate is only 62 % for mild, 44 % for moderate and 28 % for severe incontinence. The worst prognostic factor appears to be

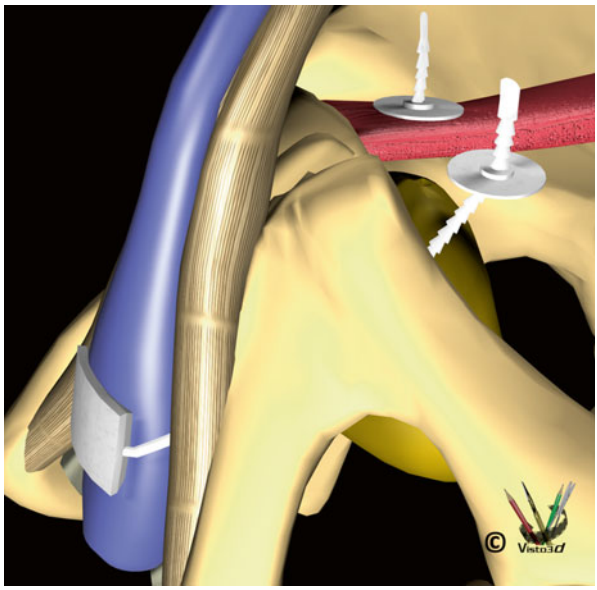

Fig. 9.1 Argus® sling

external radiation for prostate cancer with a poor 15 % success rate [1]. Urethral stricture and bladder neck surgery are also associated with poor prognosis [7].

Complications following Argus placement are as frequent as 55 %, particularly in cases of severe incontinence. They range from urinary retention (16 %), infection, bladder or urethral erosion, to sling rupture, urethral stricture and perineal hypersensitivity and pain, leading to 11 % sling removal.

Argus® experiences are not homogeneous. If some data suggest roughly similar cure rates up to 79 % with 38.6 % readjustment (but 15 % perineal pain and up to 12 % explantations) [7], others are completely different. Some authors consider Argus as highly effective even in radiated patients (54 % dry, 36 % improved). The results raise concerns about the frequent occurrence of postoperative perineal pain (38 %) [13]. Patient selection, learning curve and surgical skills should be taken into consideration when trying to explain such huge differences.

9.5.1.2 Remeex®

(Male Readjustable System® (MRS). Neomedic International, Barcelona, Spain)

Remeex® is an adjustable device featuring monofilament suburethral sling (3 per 4 cm), two retropubic monofilament tension threads and a suprapubic subcutaneous regulation part called "Varitensor" [14]. External manipulator and uncoupler allow for adjustment (Fig. 9.2).

Surgical technique: Vertical perineal incision is made under spinal anaesthesia. Urethra, surrounded by bulbocavernous muscles, is carefully dissected. Urogenital diaphragmatic fascia is sharply penetrated close to the pubic bone and upward dissection is done digitally until reaching rectal muscle fascia and the suprapubic

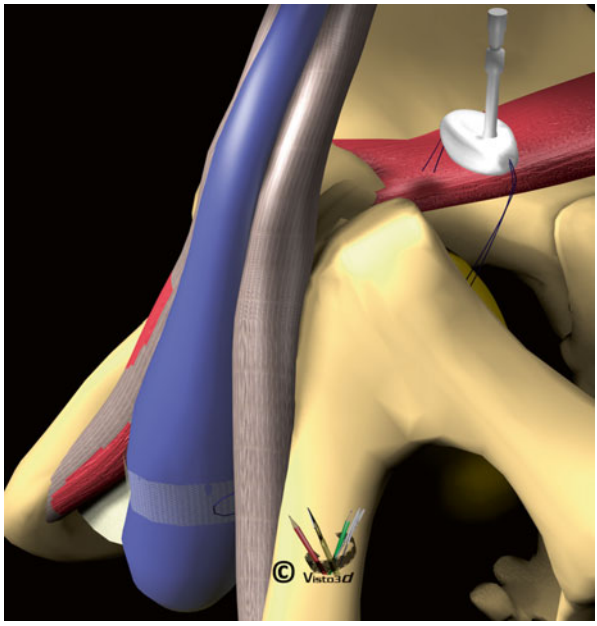

Fig. 9.2 Remeex® sling

transverse incision. The same is done on the other side. Cystoscopy checks for bladder integrity.

The threads are then pulled upward to be secured into the Varitensor. The external manipulator is left connected to the Varitensor via the uncoupler through suprapubic incision.

The morning after tension adjustment is done on the standing patient while performing Valsalva manoeuvre by rotating external manipulator clockwise or counterclockwise. A second adjustment could be done later under local anaesthesia and minimal skin incision [14].

Introduced in the early 2000s, Remeex® provided rather good results in terms of cure rates (64.7 % dry, 19.6 % improved), the majority of patients being submitted to adjustment in the early postoperative period. Among complications are 9.8 % bladder perforation, some device infection leading to explantation of the Variator and perineal pain that resolved under oral medication.

Remeex® and Argus® have comparable results, with necessity of readjustment, 11 % bladder injury and 12 % explantation due to infection [7].

9.5.1.3 ATOMS®

ATOMS® device features an inflatable cushion placed under the bulbar urethra and stabilised with transobturator arms. A subcutaneous abdominal port allows for cushion adjustment by saline injection. So far no reliable data have been found to supporting this technique [15].

One must consider that adjustable sling is an option with acceptable results comparing to artificial sphincter in cases of mild or moderate incontinence but adverse events such as perineal pain and sling removal are likely to occur. Previous radiotherapy should be considered a relative contraindication.

9.5.2 Transobturator Slings

Transobturator slings are currently the most important and used among male perineal slings. Due to its early introduction in the market back in 2005, AdVance® sling, which has been modified into AdVanceXP® in 2010, is by far the most frequently encountered in the literature. This considerable amount of information is of great help when it comes to studying results, mechanisms of action and complications. But, as it has been highlighted for adjustable slings, not all the results are similar, surgical practice is not homogeneous and comparisons are often risky. It is thus impossible to translate particular results from a single study into common rules for comprehensive sling indications and placement. As a recall of the challenging understanding of pathophysiology of incontinence and sling action we bear in mind, the overwhelming presence of AdVance® on the urological scene must not hide the availability of other slings of great interest that might add to our knowledge and help drive surgical practice towards straightforward and safer procedures.

Transobturator sling in men was first published in 2007. The well-known female TOT technique seemed to be interesting even in men, whereas incontinence

mechanism is certainly different (sphincter deficiency is a very poor prognostic factor for TOT). In a 20-patient clinical study, it appeared for the first time that supporting the urethra could lead to an increase in urethral closure pressure from 13 to 86 cm of water, and in urethral length from 3 to 17 mm. Despite much less convincing results were to come, sling design was aimed since the very beginning to supporting urethra and sphincter in order to lengthen and strengthen the functional area [16].

9.5.2.1 Advance and Advance XP

(American Medical Systems: Minnetonka, Minnesota, USA)

AdVance® is a polypropylene sling with two transobturator arms protected with Tyvek liners. Its particular retro urethral position around the proximal bulb makes it support and reposition both urethra and sphincter into their pre-prostatectomy position. Intraoperative urethral pressure measurement allows accurate sling tensioning. A profound kinking on proximal urethral bulb with no direct compression on urethra marks good sling placement [17] (Fig. 9.3).

In the first long-term results publication [18], the overall success rate at 3-year follow-up is 75.7 % including dry and improved patients (with no indication of continence definition, but success appreciation is based on daily pad use). Cure rate at 3 years shifts from 58.6 % in case of mild or moderate incontinence to 42.3 % in case of severe incontinence. Failure rate jumps from 18.2 to 32.7 % respectively. At that time, radiotherapy history seemed to have no impact on results.

Complications occur mostly in the early postoperative stage with mainly dysuria (9 % retention) and perineal pain for up to 6 months. Subsequently, results seem to remain stable over time.

The authors stress on the sling mechanism of action: the sling placed retro- and sub-urethrally around the proximal bulb acts as a support to the distal sphincteric urethra, as a hammock, with no direct compression over urethra. Urodynamic data

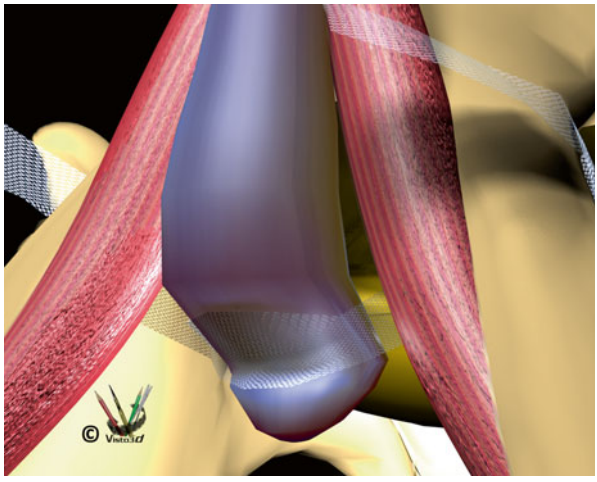

Fig. 9.3 AdVance® sling

show no difference following sling placement neither in urethral pressure nor in uroflow.

Advance® evolved into Advance XP® in late 2010 [19]. Overtensioning of the sling, when removing the Tyvek liners, had been responsible for urinary retention. Modifications were thus designed to secure sling release and anchor it in obturator membrane. The results of a multicentre prospective study at 12 months follow-up show a 67.7 % cure rate and an increase in quality of life. It is a good result, as a matter of fact, but it must be observed that cure rate includes residual urine loss up to 5 g per day, and an incontinence reduction > 50 % was classified as improvement.

In a comparative non-randomized study, AdVance® and AdVanceXP® were evaluated. They provide the same results in terms of success rate with less complications for AdVanceXP® [20, 21].

Efficacy and stability over time were to be associated with AdVance® since the very beginning, spreading the technique all around the world. A number of experiences were subsequently published that show rather different opinions. At an average of 36 months of follow-up after AdVance® implantation, it has been observed a steady decline in cure rate: 40 % cured and 22 % improved [22]. This retrospective review of a prospective database of 102 patients indicates preoperative pad count and detrusor overactivity as negative risk factors. Amazingly 35 % of those patients used more than 5 pads per day, indicating a rather severe incontinence which negatively predicts outcomes [23]. Preoperative selection is of great importance if we want to meet patient expectations.

It is interesting though to observe that, in some single centre experiences, results are not as good as hoped. In a study independent from the originator of the technique, the cure rate at 1 year is only 9 %, with 45 % improved and 36 % with no effect at all or a worsening of incontinence in 14 % of cases [24] putting into question AdVance® ability to cure incontinence.

There is above all a discrepancy between objective and subjective results as exposed by the patients that highlights the dramatic improvement of quality of life whenever postoperative pad use remains rather high with 1–2 pads per day [25]. Patients reporting success a 7 month follow-up experienced an increase of pad use over time (+0.9 at 2 years) without any significant modification of subjective result [26].

It could also be argued that the surgeon must be very careful in respecting the original implantation technique in terms of sling placement and tensioning, but results might indicate that there is a learning curve indeed and that in this kind of functional surgery, outcomes are somewhat surgeon related [24].

Complications

Complications are rare and they occur in the early postoperative period: sling explantation and infection are among the most severe and urinary retention the lightest. Urinary retention is a pretty common complication (up to 46 %) and resolves spontaneously. Data show that retention, despite a bothering postoperative period, could be a positive factor for incontinence cure as 100 % of patients experiencing retention will eventually be cured [27].

Cause of Failure: Slippage

The explanation for delayed failures after an initial dry period might be related to sling slippage as they could occur immediately after an increase of physical activity within a month of sling placement.

Among the reasons for sling failure are most probably inappropriate indication, misplacement or sling "slippage" [28]. MRI, which has been tested as a tool for assessing sling placement, can help to understand the way sling works in restoring continence. T2-weighted sequence with a 3 T MRI is able to differentiate the sling from the hyper-intense urethral bulb. AdVance® accurate placement is associated with deep indentation on proximal bulb, behind membranous urethra, hence displacing upward and forward the urethral and sphincteric complex [28] (Fig. 9.3).

Ultrasound assessment constantly shows sling presence and demonstrates the urethra dynamic compression by AdVance® during Valsalva manoeuvre. Sling is located at the level of inferior border of symphysis pubis in continent patients and more distally in still incontinent patients. Urethral compression is less important with AdVanceXP® and is not observed in incontinent patients [29].

It is likely to be a difference between *technical failure,* in which sling is malpositioned, and *true failure,* in which sling positioning is correct thus indicating a possible sphincter deficiency [17] out of reach for sling action. The normal kinking pattern is not seen in case of technical failure, sling being placed distally in the perineum or proximally and too close to the urethra (possibly as a result of postoperative slippage). Some patients reporting worsened incontinence have a paradoxical opening of the urethra on Valsalva test. Stable sling placement around the bulb with stitches is mandatory.

Recurrent Incontinence

Contrary to prior InVance [30], AdVance® removal is not necessary for artificial sphincter implantation after sling failure. It appears to be a safe procedure [31]. The cuff is placed around the bulbar urethra, distal to the sling. The sling is always left in place. The operation is no more challenging than the primary implantation and results are the same as for naïve patients [32].

9.5.2.2 I Stop TOMS®

(CL Medical, Sainte Foy lès Lyon, France)

I Stop TOMS® is a polypropylene monofilament nonextensible sling with a 2.8 cm central part (22 mm width) placed underneath the bulbo cavernous muscles and bulbar urethra. Two, and subsequently four transobturator arms, bring tension and stabilize the device (Fig. 9.4).

Dissection through perineal incision is minimal and the arms are inserted through an out-in transobturator route [33]. Tension adjustment is achieved by pulling anterior and posterior arms as to obtain a light and homogeneous compression over the bulbocavernous muscles without any string effect. Six stitches secure sling to muscles and corpus cavernous.

This perineal suburethral sling acts as a moderate compressive urethral support [34]. Preliminary report showed encouraging results on mild and moderate incontinence with cure or improvement, but no failure and no urinary retention.

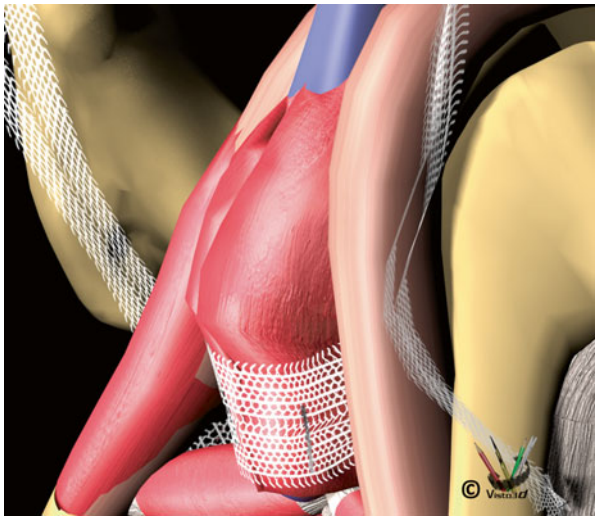

Fig. 9.4 I Stop TOMS® sling

At 1-year follow-up, cure rate (0 pad) is 59.4 % and overall improvement is 87 %; 13 % patients have no improvement. All selected patients have mild or moderate incontinence and no history of radiation. The procedure is safe with very few complications: no urinary retention, no severe perineal pain (mean 2.7 on VAS in early postoperative stage), wound infection is very rare [33]. Interestingly for a "compressive" sling, maximum urinary flow rates are similar before and after surgery. These results are very close to those of AdVance® at 1-year follow-up, with less postoperative complications and show a trend toward superiority when used in difficult cases with urethral damage [35].

Continence rates interpretation in a multicentre study [33] is not straightforward despite homogeneous continence definitions; even with common selection criteria, marked differences in cure rates from one centre to another are observed. This highlights the fact that functional surgery is rather surgeon related.

Continence rate remains stable at 2 year follow-up in a single centre study, 57 % patients being cured and overall 90 % experiencing improvement (0 or 1 pad per day) [36] which compares positively with artificial sphincter.

The promising I-STOP TOMS® achieves adequate suburethral support to obtain good continence without causing obstruction or other adverse events.

9.5.2.3 Transobturator Sling Derived from Gynemesh PS®

(Ethicon, Johnson & Johnson, USA)

A new transobturator male sling is inserted on an inside out basis, with no complication except three suprapubic catheterizations [37]. At 2-year follow-up, 50 % of patients are pad-free and 33 % improved, leading to a subjective satisfaction rate of 72 % [38]. Unfortunately, 25 % failures occur after the first postoperative year. The explanation might be some kind of urethral atrophy or could be related to comorbidities such as previous radiotherapy or bladder neck surgery. In this study, incontinence severity does not seem to be linked to functional result, but obesity is clearly a negative prognostic factor.

9.5.2.4 Quadratic Slings with Four Arms

Transobturator slings currently available are the result of continuous research to simultaneously reach two main goals: high incontinence cure rate and few complications. Combining these targets proves to be rather challenging, as supporting urethra and improving sphincter function is not possible without minimal urethral compression.

Transobturator route is safe and reproducible, as female surgery has been demonstrating since 2001; but male surgery does not leave much degree of liberty to surgeon as perineal anatomy is compelling and the vicinity of complex structures (bulb, urethra, corpus cavernous, vessels and bone) imposes its law. The impossibility to modify transobturator route makes impossible to completely avoid posterior slippage, string effect and compression with the regular 20 mm width sling. Thus, the quest for another design achieving better stability, larger compression area on urethra and no string effect: the four-arm design was born, featuring two additional prepubic arms. Better clinical results remained to be seen in daily practice.

Quadratic Virtue® sling (Coloplast Corporation, Minneapolis, Minnesota, USA) has been presented for the first time in 2011 [39]. The consequence of the new design is an increase of urethral compression which is measured intraoperatively with RLPP. According to published data, mean RLPP jumps from 33 cm of water to 68 cm of water. Overcorrection or excessive urethral compression could increase urinary retention rates: Disappointingly Virtue® studies provide very few information in terms of dysuria and retention.

Considering the poor results in the first trial [40], technique has been modified in order to stabilize tension and prevent postoperative sling loosening. Additional sutures were performed to corpus cavernous and pubic periosteum. After a median

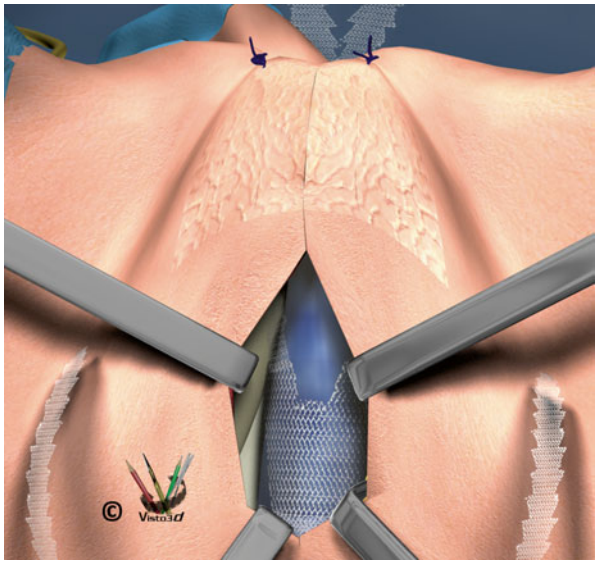

Fig. 9.5 Quadratic Aspide® sling

follow-up of 22 months, continence rate is 45 % with the modified technique (versus 7 % with standard one) while complications are frequent: 63 % postoperative retention and 45 % perineal pain [41].

The same process has been applied to another quadratic sling, Aspide® Male Sling (Aspide Medical, Saint Etienne, France) (Fig. 9.5).

For the time being, quadratic slings have not produced what they were meant to. Follow-up is still short and no conclusion can be drawn from the available data.

9.6 Indications

Sling results could be discouraging if only 45 % of patients reported satisfactory result on their incontinence-related bother [42].

Artificial sphincter is considered as the gold standard. Opposite to it are slings, easier to use, more "friendly", but with less efficacy in some conditions. Identifying such conditions is at the core of selection process: it is not an easy task, considering confusing data exposed above.

Preoperative incontinence severity is among the most significant prognostic factors for success after whatever sling insertion [43]. A patient with a 400 g 24-h pad weight has 80 % lower chance to be cured with AdVance® than another with only 200 g 24-h pad weight. Compared to the overall 51.6 %, the cure rate in case of 24-h pad weight over 200 g is only 28.5 % [44, 45]. Failure rates as high as 78 % could be associated with severe incontinence [46]. Whereas urodynamics is not routinely recommended, urethral pressure of less than 57 cm of water is associated with a sixfold increase in failure risk.

Incontinence severity appears in all the published data as the cornerstone of accurate indication. Severe incontinence is constantly associated with poor efficacy with any sling. Mild and moderate incontinence, with good residual sphincter function, are the best indications for sling. But there is still a lack of standardized and widely accepted definitions. The "repositioning test" could help in clinically selecting those cases; it consists, during flexible cystoscopy, in assessing sphincter closure with or without manual repositioning of the urethra. A wide open urethra, without visible sphincter function, is definitely a bad indication.

Patient expectations are very high as, first of all, they ask to be cured by any technique. But failure rate is related to a variety of criteria that must be carefully examined preoperatively [47, 48]. They could drive medical decision towards different technical options that the patients are not always prepared to accept.

The same could be said about previous radiotherapy. In that case, patients are at risk of failure (60 %) and should be informed and counselled [19]. After radiation, the repositioning effect, as theory states for sling efficacy, might not work [49]. Radiotherapy induced sphincter deficiency, loss of mobility and elasticity are clearly highlighted, not to mention the length of urethral "coaptive" zone. Due to reduced number of patients, there is no statistical validation though. But failure could be associated with a worsening of incontinence which is a very bothering outcome for a patient who has been offered surgery for quality of life. Almost 43 % of radiated

patients are actually worse after surgery compared with 3 % of non-radiated patients [50, 51]. Sling use must be very cautious in this indication.

In a retrospective review of medical records after AdVance® placement, two groups were considered [2]:

Ideal patients: Mild to moderate incontinence, less than 4 pads a day or less than 300 g urine loss, intact appearing urinary sphincter on cystoscopy, without segmental defect; no previous history of pelvis radiation or cryotherapy, no previous surgery for incontinence, urethral or bladder neck stricture, no overactive bladder. Volitional detrusor contraction when voiding and post void residual <100 ml.
No ideal patients: Majority of them for severe incontinence.

Results are poorer in the no ideal group than in the former. Despite an improvement of continence after severe preoperative incontinence, patient satisfaction is low (30 %) [2].

Worst prognosis men should be oriented toward artificial sphincter in order to avoid as much as possible two-stage anti-incontinence surgery [52]. But success is not guaranteed when following best indication criteria [31]. On the contrary, sling implantation on a "no ideal" patient is not a guarantee for failure. This inconsistency shows how difficult it is to understand the true reasons for incontinence and how we lack of clinical reliable tests. But it is also a limitation to the advice the patient awaits: Whenever artificial sphincter should be the best indication, it is acceptable to place a sling on a single motivated patient refusing hydraulic device, provided that he has been fully informed about his negative prognostic characteristics.

Patient selection is almost as important as surgical technique in achieving satisfactory result and relief for the patient. Careful patient selection is part of the learning curve. This is the condition to keep slings in the armamentarium for male incontinence surgery.

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