



Sexual Medicine

Correction of Erosion after Suburethral Sling Insertion for Stress Incontinence: Results and Related Sexual Function

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Abstract

Background: Suburethral slings are commonly used for the surgical treatment of female stress incontinence; occasionally they can cause erosion and dyspareunia.

Objectives: The primary aim of this study is to determine the outcome after reclosure of the vaginal epithelium for suburethral sling erosion. Sexual function was assessed before and after intervention using the Female Sexual Function Index (FSFI) questionnaire.

Design, setting, and participants: This was a prospective case-controlled study in which, between December 2005 and December 2007, we included patients who were referred to the Department of Urogynaecology because of vaginal erosion after suburethral sling insertion for urinary stress incontinence. For evaluation of sexual function, all patients filled in an FSFI questionnaire before intervention and at follow-up.

All patients underwent gynaecological examination including colposcopy, and the site and size of the defect were noted.

Intervention: The edge of the vaginal epithelium was trimmed, mobilized, and closed with interrupted vertical Vicryl mattress sutures in a single layer.

Measurements: FSFI questionnaire and clinical findings.

Results and limitations: Twenty-one patients were included in the study. Eighteen patients with larger defects were operated on, and three defects healed after topical application of estrogen cream.

In 16 patients, the defect had healed at follow-up; two patients with persisting defects were brought back to surgery and the procedure was repeated, paying particular attention to tension-free adaptation of vaginal tissue. In one patient, partial sling removal was performed after the second failed intervention.

The domains of desire ($p < 0.0001$), arousal ($p < 0.0003$), lubrication ($p < 0.0001$), satisfaction ($p < 0.0130$), and pain ($p < 0.0001$) improved significantly. Orgasm remained unchanged ($p = 0.4130$; all two-tailed t-test).

Conclusion: Suburethral erosion can be treated effectively by resuturing. Sexual function is improved in regard to desire, arousal, lubrication, satisfaction, and pain, but not orgasm.

In septic patients and patients with a history of radiation, grossly infected tissue, or severe pain, excision of the mesh needs to be considered.

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1. Introduction

Suburethral slings have become the standard surgical procedure for the treatment of urodynamic stress incontinence after conservative therapy has failed. Various materials can be used, which can be divided into biologic and synthetic. The most commonly used synthetic sling material is polypropylene tape, as in the classical retropubic tension-free vaginal tape described by Ulmsten [1].

Erosion rates vary from 0.3% to 23% and have been reported for various sling materials, with autologous material having the lowest rate [2].

Erosions are a major concern for inorganic synthetic sling materials and happen in 5% of cases after polypropylene sling insertions; they are more frequent if the sling material is not monofilament-macroporous [3].

Erosion may cause vaginal infections, male and female dyspareunia, vaginal discharge, vesicovaginal fistula formation, and fibrosis [4], and it is recommended to have synthetic materials covered.

The impact on sexual function has received little attention in the medical literature, particularly as regards “the G-spot,” a supersensitive area for some women on the anterior vaginal wall. The exact site differs among women [5].

The Female Sexual Function Index (FSFI) is a brief, self-report measure of female sexual function that evaluates six different domains of sexual function: desire, subjective arousal, lubrication, orgasm, satisfaction, and pain. It was first described by Rosen in 2000 [6] and is widely used for the assessment of female sexual function.

The primary aim of this study is to determine the outcome after reclosure of the vaginal epithelium for sling erosion. The secondary aim is to assess sexual function using the FSFI questionnaire before and after intervention.

2. Patients and method

This study was performed in the Department of Gynaecology, Inselspital Bern.

Ethical consent was obtained from the local ethics committee (KEK Bern), and patients gave written consent to participate.

The study included all female patients who were referred to the department of Urogynaecology between December 2005 and December 2007 because of vaginal erosion after suburethral sling insertion for urinary stress incontinence. Exclusion criteria were inability to communicate in one of the local languages or English and/or an unwillingness or inability to fill in the FSFI questionnaire. Patients who were clinically too unwell to participate in the study were also excluded.

All patients filled in an FSFI questionnaire before intervention and at follow-up.

All patients underwent a gynaecological examination, including colposcopy, ICS–Pelvic Organ Prolapse staging (ICS-POP Score), vaginal swab, urine dipstick, and multichannel urodynamics in the case of urinary incontinence complaints before intervention and at follow-up. Urethrocytoscopy was performed when urine dipstick confirmed pathology. The site and size of the defect were noted.

For statistical analysis, GraphPad Prism version 4.0 for Windows was used.

3. Management

All patients were advised to use local estrogen valerate daily and were reviewed after 6 wk.

Those who had not healed after 6 wk underwent surgical intervention. Prior to surgery, all patients received a broad-spectrum antibiotic intravenously.

The edge of the vaginal epithelium was trimmed, mobilized, and closed with interrupted vertical mattress sutures in a single layer using Vicryl 2-0 (Ethicon, Somerville, NJ, USA). The free edges of the tape were buried under the vaginal epithelium and, in case in which needle-like polypropylene filaments were sticking out of the vaginal epithelium, these were cut off.

Patients were advised to abstain from intercourse and insertion of any foreign bodies for 6 wk after intervention and to continue using topical estrogens. Once the operating site had properly healed, patients were allowed to have intercourse again.

After follow-up, we recommended continuation of topical estrogens in those who were postmenopausal. If there is no contraindication, local estrogen treatment can be continued without limitation in these situations.

4. Results

Twenty-one patients were included in the study. Patients complained of vaginal discharge ($n = 18$), female dyspareunia ($n = 15$), male dyspareunia ($n = 11$), and recurrent vaginal bleeding ($n = 3$; some patients with multiple complaints). All patients but two were sexually active.

We were able to obtain operating notes on 14 patients. As for the others, surgeons were reluctant to hand over operating notes. Of the 14 patients, sling insertion was performed under local anaesthetic in 3 patients, spinal anaesthesia in 7, and general anaesthetic in 4. Referring to operating notes, no surgeons used irrigation during sling insertion, all but one used a single-shot antibiotic pre-operatively, and eight performed vaginal sutures with running sutures while six performed vaginal sutures with interrupted sutures. Suture material was Vicryl in nine cases, Vicryl Rapid in three patients, and was not described in two.

Nineteen patients were subjectively continent, and two were subjectively improved but not continent. Both of these patients underwent urodynamics; one demonstrated recurrent urodynamic stress incontinence, and one had uneventful urodynamics. Both patients were referred to physiotherapy as an initial step.

Because of pathological urine dipstick, we performed urethrocytoscopy in four patients, which was without pathological findings in all patients.

We did not prescribe specific antibiotics prior to surgery as none of the vaginal swabs showed specific bacteria. One patient received a single-dose oral antifungal treatment due to a vaginal fungal infection.

Table 1 – Demographic data, size of erosion, time interval, operating time, and follow-up

Age/years (median, range)	BMI (median, range)	Parity (median, range)	Size of erosion cm ²	Time interval between insertion + removal/months (median, range)	Operating time/minutes (median, range)	Follow-up/months (median, range)
52 (43–79)	26 (21–32)	2 (0–4)	0.5–1: n = 3 1.1–2: n = 12 2.1–3: n = 5 >3: n = 1	4 (1.5–8)	15 (12–29)	6 (3–12)

Table 1 shows demographic data, size of erosion, time interval between sling insertion and intervention, operating time, and follow-up.

Twelve patients had had a transobturator sling inserted and nine a retropubic sling.

Of the transobturator slings, five were TVT-O (inside-out technique; Ethicon Women's Health and Urology, Somerville, NJ, USA), four were I-Stop (outside-in technique; CL Medical, Sainte Fay Les Lyon, France), two were Monarch (outside-in technique; AMS Minnetonka, MN, USA), and one could not be identified.

Of the retropubic slings, five were TVT slings (Ethicon, see above) and four were SPARC slings (AMS, see above).

In three patients, the defect healed after local estrogen application, and 18 patients proceeded to surgical intervention.

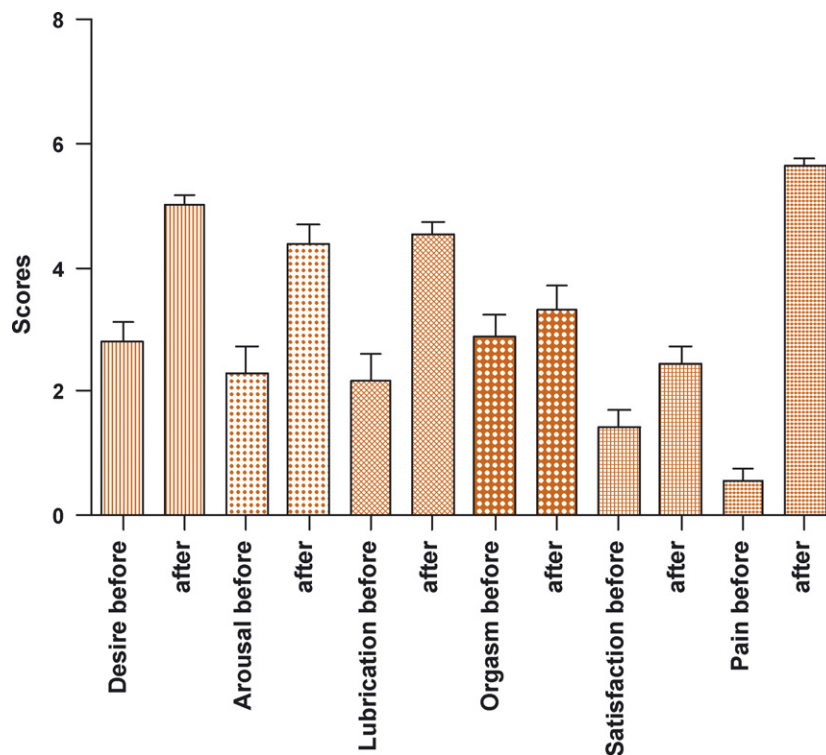
In 16 patients, the defect had healed at follow-up. The two patients with persisting defect were brought back to surgery and the procedure was repeated, paying particular attention to scar removal and tension-free adaptation of vaginal tissue.

One of these two patients had healed at follow-up; the other, with an I-Stop sling, had a persisting erosion of 0.5 × 1.2 cm midsuburethrally. This 44-yr-old patient had had a Wertheim hysterectomy for cervical cancer stage Ib 14 mo ago and was a heavy smoker. In this case, the exposed approximately 20% of the suburethral sling material was excised and the vaginal epithelium closed.

On follow-up, she had no evidence of incontinence and was clinically and urodynamically continent. No further erosion was noted.

Fig. 1 shows the results of the FSFI questionnaire. These results show the scores for all 21 patients, including those who had healed after estrogen application only and did not need further surgical intervention. The domains are marked in different colours, with the initial FSFI score on the left side and the FSFI score 3 mo after intervention to the right.

The domain of desire improved significantly from 2.8 ± 0.32 preoperatively to 5.0 ± 0.2 postoperatively ($p < 0.0001$); arousal from 2.3 ± 0.4 to 4.9 ± 0.2 ($p < 0.0003$); lubrication from 2.2 ± 0.5 to 4.6 ± 0.2 ($p < 0.0001$); satisfaction from 1.4 ± 0.3 to 2.4 ± 0.3

**Fig. 1 – Female Sexual Function Index (FSFI) scores before and after intervention.**

($p < 0.0130$); and pain from 0.6 ± 0.2 to $6.0 \pm 1 \pm 0.2$ ($p < 0.0001$). Orgasm remained unchanged, moving from 2.9 ± 0.4 preoperatively to 3.4 ± 0.5 ($p = 0.4130$; all two-tailed t-tests). All values are mean values plus or minus standard error of the mean.

5. Discussion

The obvious advantages of using a synthetic sling material are durability, nonbiodegradability, and a favourable host response [7]. Polypropylene has proved to be superior to other synthetic materials, including Teflon, Goretex, and silicone in terms of better integration with the host tissue [8].

The primary concern for synthetic slings is the risk of erosion. Vaginal erosion after sling placement may be underreported [9]. Multiple factors such as inadequate vaginal closure, infection, or poor tissue vascularity have been discussed.

Because most of the patients included in this study had their sling insertion performed in hospitals other than our own, we cannot be sure about the exact operating technique used. Certainly, the patient with the twice recurrence of erosion had an obvious risk factor related to smoking, and probably had poor tissue vascularity [10]. Other factors such as poor flaps or suturing techniques or having postoperative intercourse too early may have contributed to erosion.

Multifilament slings and synthetically coated slings do cause more erosion [11] than monofilament slings. However, in this study, only monofilament tapes were used with the exception of one patient for whom we had no documentation on what kind of sling had been inserted. This shows also that slings of the Amid Type I [12] classification may cause erosion.

Some authors suggest removing synthetic slings totally when erosion occurs [13,14]. Sweat, Itano, and Clemens [15] recommended complete removal of the mesh in their series of five patients, and Domingo, Alama, and Ruiz treated vaginal erosion by complete removal of the transobturator suburethral tape mesh [16]. In their series of nine patients, two developed recurrent stress urinary incontinence. In our study, one patient was required to have a small part of the suburethral tape removed after the second erosion. Fortunately, this patient remained continent, and so far the erosion remains cured.

Looking at the current study results, it is absolutely justified not to consider complete sling removal if erosion occurs and additional symptoms as septicaemia, abscess formation, or additional erosion into neighbouring organs are absent. Surgery may have been successful because of consequent use of antibiotics, trimming of scar tissue, and postoperative application of estrogen cream. Particular attention was given to tension-free closure of the vaginal epithelium over the sling.

As the tape was not removed, continence was not threatened, as described in other studies [17]. We did not remove the slings as a first step because we did not consider this necessary in clinically stable patients without signs of

septicaemia or purulent discharge. We assume that immediate sling removal is not necessary as an initial step when erosion occurs. We cannot know for which cut-off size of the erosion it is appropriate to try topical estrogens, but in our experience, it is worthwhile in small lesions. Deferring surgery for 6 wk, even for using estrogens and even in good-size erosions, is probably worthwhile, as vaginal epithelium is then nicely build up, which facilitates mobilisation in those who require surgery.

Polypropylene mesh following Type I of the Amid classification is considered inert; however, there are few histologic and immunohistologic data suggesting an immune response to the foreign material [18,19] which could also explain recurrent tape erosions. Wang et al [18] found a statistically higher cell density percentage of CD20-positive cells in women with recurrent suburethral tape erosion compared to those without tape erosions in a study including 700 patients; they concluded an immunologic reaction.

Sometimes tape erosion is not easily visible, particularly when noncoloured slings have been used. Using colposcopy makes the erosion and its size easily detectable, and in all cases the tape could be felt during digital examination if not seen. In patients complaining of excessive vaginal discharge, recurrent bleeding, or dyspareunia after sling insertion, the vagina needs to be thoroughly examined.

A negative aspect of this study is the short follow-up of only 6 mo. Erosion may occur even after years, as Ward [20] reported in her initial study comparing TVT to Burch colposuspension. Patients need to be informed about the erosion risk and its signs after the insertion of a synthetic tape.

The cure rate for urinary stress incontinence in the current study was similar to that described in reviews by Novara [21] and Zullo [22]—approximately 90%—however, as the number of patients was small, it is difficult to speak about percentages. Over the time, cure rate does decrease as demonstrated in a recent study [23] evaluating long-term efficacy in 134 patients; after 5 yr, cure rate was 77% compared to 1-yr success rates of 90%. The follow-up was short in this study, and probably 1-yr data will be more valuable. We will follow these patients up in the near future.

The literature is contradictory regarding the influence of continence surgery on sexuality.

Tremml [24] found an impairment of sexual life by urinary incontinence without surgery in 30% of women. Generally, sexual function may be impaired after surgery for stress urinary incontinence. Cayan [25] found that Burch colposuspension deteriorated sexual function much more than vaginal surgery in women, but the impact in the vaginal group was evident as well. Shah [26] was unable to show deterioration of sexual function in a series of 29 patients who underwent polypropylene sling insertion for urinary stress incontinence.

The results in the current study are very far from values in healthy controls [6], and this may be explained by scar formation after repeat vaginal surgery or the patients' fear of recurrent problems.

Sexual function improved significantly in all domains but orgasm after the erosion was treated, which is not surprising. However, to our knowledge, this is the first study evaluating sexual function after resuturing the sensitive area that is often referred to as being close to the “G-point.”

Desire, arousal, lubrication, satisfaction, and pain were statistically improved, and patients can be reassured that sexual function will improve; however, patients were still in a level of sexual dysfunction as compared with normal values.

It would be interesting to compare original FSFI data prior to sling insertion with the current data; however, the study was not designed to do this, and patients were initially operated on elsewhere.

For lubrication, improvement may be the result of treatment with local estrogens, which improves lubrication significantly [27]. Regarding the other domains, improved sexual function is likely to result when vaginal discharge and bleeding abate, female and also male dyspareunia are treated, and both partners can be relaxed about sexual life.

The most common symptoms, vaginal discharge and dyspareunia, can be successfully treated by local estrogens depending on the size of the lesion or resuturing of the vaginal epithelium. Erosion of synthetic slings have been reported into neighbouring organs such as the intestines, the bladder, or the urethra, causing severe complications [28]. We have not observed this in our patients as cystoscopies were uneventful, and we have not looked for further pelvic organ damage. However, patients were asymptomatic in this aspect, and we may assume that there were no additional complications.

Suburethral sling removal needs to be considered when recurrent erosion occurs, in septic patients, or in patients with large defects, a history of radiation, grossly infected tissue, or severe pain.

Longer follow-ups and studies with more patients will strengthen our current recommendations.

Author contributions: Annette Kuhn had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Kuhn, Mueller.

Acquisition of data: Eggeman, Burkhard, Kuhn.

Analysis and interpretation of data: Kuhn, Mueller.

Drafting of the manuscript: Kuhn, Burkhard.

Critical revision of the manuscript for important intellectual content: Kuhn, Burkhard.

Statistical analysis: Kuhn.

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Editorial Comment on: Correction of Erosion after Suburethral Sling Insertion for Stress Incontinence: Results and Related Sexual Function

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Functional outcomes for incontinence and pelvic organ prolapse interventions have historically been poorly assessed in the medical literature. The last decade has seen tremendous advances in the reporting of outcomes for primary symptoms (eg, stress incontinence), which promulgated the interventions. General recognition of the need to report criteria for both objective (physical examination, urodynamic, pad testing, diary reporting) and subjective (quality of life, general and specific patient approbation indices) outcomes related to these primary symptoms has also become manifest. Many of the recent contributions to improving outcomes reporting in this field have actually come from the enhanced ability to capture subjective patient responses to the intervention in terms of the primary symptomatic indication. What has become clear is that subjective outcomes are often strongly influenced by issues outside of the primary symptomatic indication. It has been recognized, for example, that persistent and de novo urgency with or without urge incontinence significantly detracts from overall patient subjective appraisal of the intervention in question [1].

The multivariate aspect of the complexity of subjective outcome assessment is further amplified by the relatively recent appreciation of the impact of sexual function on overall patient satisfaction. Obviously, sexual functional can be quite adversely affected by those symptoms that

actually lead the woman to seek therapy for her pelvic floor condition (incontinence and/or prolapse). The development or exacerbation of sexual dysfunction postintervention, while feared, has heretofore been relatively underappreciated. In this month's journal, Kuhn et al assess the impact of surgically implanted mesh erosion on sexual function and the subsequent general improvement in function associated with correction of the erosion [2]. This improvement was captured using a standardized instrument, which, surprisingly, demonstrated improvement in most but not all domains.

So, what does the pelvic floor surgeon deduce from these results? The importance of global assessment of the presenting vignette is clear, as is the essential necessity to inform the patient of aspects of her life that may be positively, or perhaps adversely, affected [3]. Caveat emptor.

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Editorial Comment on: Correction of Erosion after Suburethral Sling Insertion for Stress Incontinence: Results and Related Sexual Function

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The management of vaginal mesh erosion after synthetic sling is certainly no simple venture. We are faced with treating the erosion and, in some cases, infection, traditionally by wide excision, without causing recurrent incontinence or excessive vaginal scarring. Despite effective treatment, we fear the patient will be displeased. This fear has led to the development of conservative treatments including vaginal estrogen cream [1] and reclosure of the vagina, as described by Kuhn et al [2]. We applaud the authors for their foresight in using a validated instrument to measure sexual satisfaction prior to administration of therapy. This type of instrument is probably the most effective way to measure the impact of the eroded mesh on the patient and, subsequently, the treatment success. We can assume that the presence of significant improvement in multiple sexual function domains implies treatment success in a quantifiable manner.

The treatment strategy proposed shows early term success; however, the number of patients in this study is small [2]. The authors show an 89% success rate (16 of 18 treatments), and 1 out of 2 treatments succeeded with a second attempt. Follow-up was only 6 mo, which leaves us in suspense as to whether or not this management strategy is truly effective (given that the mean time for

erosion after initial sling insertion is 11.2 mo) [3]. The potential for late erosion, as much as 2 yr after initial surgery [4], and the recurrent nature when conservative therapy is used (as shown in this paper [2]) bring us to the challenge of deciding which is better: conservative or definitive therapy? The Female Sexual Function Index (FSFI) improved significantly in these patients, but the values were still much lower than normal. Without normative data from women after sling and comparable data from a cohort after more aggressive mesh resection, it is hard to draw conclusions, but this study should prompt us to take a closer look at the sexual impact of the suburethral sling.

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