

## How to prevent mesh erosion in transobturator Tension-Free Incontinence Cystocele Treatment (TICT): a comparative survey

V. LEANZA, G. ZANGHÌ, R. VECCHIO, G. LEANZA

**SUMMARY:** How to prevent mesh erosion in transobturator Tension-Free Incontinence Cystocele Treatment (TICT): a comparative survey.

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**Background.** *Tension-Free Incontinence Cystocele Treatment (TICT) was introduced by Leanza-Gasbarro-Caschetto in 2001, on the basis of experimental and clinical investigations to obtain a physiologic mechanism of closure and opening of the urethra in the event of genuine stress urinary incontinence (S.U.I.) and cystocele. TICT took origin from the previous retropubic tension-free vaginal tape (TVT) based on the integral theory according which mid-urethra has a main role for urinary continence but differs in that the former restores the anatomy and physiology of the entire anterior compartment. Simultaneously Delorme in 2001 spread the TOT (Trans-Obturator Tape) technique, emphasizing the needle passage across the obturator foramen which represents a new and less invasive route in comparison with the retropubic one. Trans-obturator TICT exploits the advantages of TOT, adding the anatomical repair of bladder prolapse. Introduction of mesh for treatment of pelvic defects gives a lower rate of recurrence, but introduces new complications due to the extraneous materials, among which the most common is represented by mesh erosion. At present the rate of mesh erosion reported is 4.7% in the TOT. Aim of our survey was to verify a technique allowing post-operative erosion prevention.*

**Patients and methods.** *230 women with urodynamic stress incontinence and cystocele after diagnostic phase were allocated to 2 treatment groups (A and B-group), with open alternative method. A-group women underwent transobturator TICT procedure after preparation of anterior compartment by means of a transversal incision taking care to preserve the integrity of the vaginal skin in the site where the mesh would be allocated. Conversely, B-group transobturator TICT was carried out in a classical way, through a longitudinal incision of anterior vaginal skin and suturing after placing the mesh. Each of the two groups was initially constituted by 115 subjects. There were 14 preoperative dropouts among which 6 (115-6=109) in A-group and 8 (115-8=107) in B-group and, after, 16 postoperative dropouts including 7 (109-7=102) in the former and 9 (107-9=98) in the latter. Other pelvic defects were solved during the same operation for a complete repair of pelvic floor.*

**Results.** *A-group: subjectively SUI was cured in 87/102 (85.3%) objectively, SUI was cured in 88/102 (86.3%) of patients; cystocele in 87/102 (85.3%). B-group: subjectively SUI was cured in 86/98 (87.7%) and objectively in 87/98 (88.8%) of patients; cystocele was solved in 86/98 (87.7%). Between the two groups both anti-incontinence and cystocele treatment was superimposable (p value > 0.05). Nevertheless regarding mesh erosion, a percentage of 5.1% (5/98) was found among B-group while none among A-group patients where integrity of vaginal skin beneath the mesh was preserved.*

**Conclusion.** *Integrity of the vagina beneath the mesh is the right key to prevent ad externum mesh erosion.*

KEY WORDS: Stress urinary incontinence - Cystocele - Mesh erosion.

### Background

Stress urinary incontinence (SUI) is involuntary leakage from effort, exertion, sneezing or coughing. SUI is usually associated with cystocele, a medical condition that occurs when the tough fibrous wall between a woman's bladder and her vagina (the pubocervical fascia) is torn

by childbirth, allowing the bladder to herniate into the vagina. Shame, depression and anxiety have been found to co-occur in incontinent women. Shame is a negative and self-conscious emotion, described as the sentiment of being exposed, ridiculous and undervalued. It may be elicited by personal perception of cognition according to a specific context (1). The internalization of unworthy or abusing parents (2) may have an important impact in causing such emotion together with other dysfunctional attitudes (i.e. insecure attachment and problematic internet use) (3, 4) and disadaptive disorders (i.e. psychopathic traits) (5). Above all, women of reproductive age are psychologically affected by SUI and cystocele as this factor may have a negative impact on pregnancy,

Surgery Department Obstetric and Gynecological Pathology,  
"Policlinico Vittorio Emanuele" University-Hospital,  
"Santo Bambino" Hospital, Catania University, Catania, Italy

Corresponding Author: Vito Leanza, e-mail: leanzavito53@gmail.com

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particularly if other critical conditions occur (6-9). Several options exist for the treatment of SUI and cystocele including pelvic floor muscle exercises, pessary, and surgery. Tension-Free Incontinence Cystocele Treatment (TICT) was introduced by Leanza-Gasbarro-Caschetto in 2001, on the basis of experimental and clinical investigations to obtain a physiologic mechanism of closure and opening of the urethra in the event of genuine SUI and cystocele (10). TICT took origin from the previous retropubic tension-free vaginal tape (TVT) based on the integral theory according which mid-urethra has a main role for urinary continence but differs in that the former restores the anatomy and physiology of the entire anterior compartment (11). Simultaneously Delorme in 2001 spread the TOT (Trans-Obturator Tape) technique, emphasizing the needle passage across the obturator foramen which represents a new and less invasive route in comparison with the retropubic one (12). Trans-obturator TICT exploits the advantages of TOT, adding the anatomical repair of bladder prolapse. Mesh erosion is considered one of the troublesome complications correlated to the use of heterologous materials used for sling procedure (13, 14). Kokanali et al. (15) found mesh erosion in sixty-one of 1439 (4.2%) women during postoperative period following TOT and TVT procedures. The rate of mesh erosion was 4.7% in the TOT group and 3.5% in the TVT group, and this difference was significant ( $p < 0.05$ ). Mean age, body mass index, current smoking, menopausal status and diabetes mellitus were significantly higher among cases than controls. Univariate analysis showed that length of vaginal incision  $> 2$  cm, recurrent vaginal incision for postoperative complications, and previous pelvic organ prolapse or incontinence surgery were significant risk factors for erosion. Consequently, among various pelvic procedures, a suitable identification of risk factors may enable surgeons to prevent or minimize this complication (15, 16). Aim of our survey was to verify a technique allowing post-operative erosion prevention.

## Patients and methods

230 women with urodynamic stress incontinence and cystocele were in diagnostic phase allocated to 2 treatment groups, with open alternative method (A-group end B-group). Each of the two groups (A-group and B-group) (Figure 1) was initially constituted by 115 subjects. There were 14 preoperative dropouts among which 6 ( $115 - 6 = 109$ ) in A-group and 8 ( $115 - 8 = 107$ ) in B-group. A-group surgery was the following: vaginal approach was carried out with patient lying in a lithotomic position. After inserting a Foley catheter and emptying the bladder, a transversal incision of approximately 3-4 cm was made in the anterior fornix. The next step consisted of

preparation on both sides of bladder and urethra until the medial edge of the ischiopubic bone was reached. Dissection was achieved by scissor and fingers in a postero-anterior direction. Two small skin incisions were made on both sides of the inguocrural sulcus corresponding with horizontal line that runs through the external urethral meatus. The two ends of the sling tape were led through the incisions and the obturator membrane using a special needle-hook (tunneler). The body of sling was settled under mid-urethra and bladder, while the two ends of the sling reached the inguocrural sulcus. After mesh modulation, extremities were sectioned and the transversal vaginal incision were closed, taking care to preserve vaginal integrity beneath the mesh. B-group procedure was as follows: surgery was performed through the same vaginal approach and position. Inserted a Foley catheter and emptied bladder, a median longitudinal incision of the whole anterior compartment was done. After a lateral dissection on both sides of the bladder and urethra, the medial edge of the ischiopubic bone was reached. Two small skin incisions were made on both sides on the inguocrural sulcus. The two ends of the sling tape were led through the external incisions and the obturator membrane using a tunneler. The sling was situated tension-free under mid-urethra and bladder.

After net modulation, the two ends were cut and the vaginal incision was closed longitudinally under the mesh.



Fig. 1 - Transversal and longitudinal median incision of A- and B-group surgery respectively.

Vaginal skin suture lay beneath the mesh. 16 postoperative dropouts were encountered among which 7 ( $109 - 7 = 102$ ) in A-group and 9 ( $107 - 9 = 98$ ) in B-group. All pelvic damages including those of the apical (17, 18) and posterior compartment (19, 20) were solved vaginally. 201/216 (93.1%) underwent either spinal or epidural anesthesia (21), while just 15/216 (6.9%) had general anesthesia.

Before the operation urine culture, micturition diary, 1hr pad test (ICS), prolapse staging according to POP-Q system, Q-Tip test, stress test at 200/400 ml with everted and reduced prolapse, VAS, complete urodynamic examination and informed consent were done.

Comparisons of group means were performed with

“t student” test for independent samples. Proportions were compared with chi-square test ( 2). A logistic regression analysis was performed to control for covariates that differed in our two groups despite randomization.

King’s Health Questionnaire (22) and locus of control of behavior (LCB) were used to evaluate Life Quality (23-25). Female Sexual Function Index (FSFI) was evaluated for sexuality determination (26).

TABLE 1 - DISTRIBUTION PLANE OF A- END B-GROUP.

Distribution plane	Numbers of samples
Initial elective patients	230
Each initial group	115
Overall patients lost before surgery	14
A-group patients lost before surgery	6
B-group patients lost before surgery	8
Overall patients operated	216
Overall patients operated of A-group	109
Overall patients operated of B-group	107
A-group post-operative drop-out	7
B-group post-operative drop-out	9
A-group effective follow-up patient	102
B-group effective follow-up patient	98

## Results

The average follow up was 47 months (range 7-90 months).

A-group: SUI was cured in 87/102 (85.3%) subjectively and in 88/102 (86.3%) objectively, while cystocoele in 87/102 (85.3%). There were no cases of bladder perforation, vaginal haematoma, abscess formation, post-operative haemorrhage or retropubic bleeding requiring laparotomy. Post operative complications included 5/102 (4.9%) cases of voiding difficulties, 2 (1.9%) cases of de novo instability. The five cases of voiding difficulties were solved spontaneously within seven days. No cases of erosion was found. Pollakisuria was found in 10 (9.8%) cases. Urgency was found in 10 (9.8%), urge incontinence in 4 (3.9%) cases. During follow-up one pelvic procedure was requested. Post-operative Q-tip test average was 24 degrees (range 10-45).

B-group: SUI was cured in 86/98 (87.7%) subjectively and in 87/98 (88.8%) objectively; cystocoele in 86/98 (87.7%). There were no cases of bladder perforation, vaginal haematoma, abscess formation, post-operative haemorrhage or retropubic bleeding requiring laparotomy. Post operative complications included 4/98 (4.1%) cases of voiding difficulties owing obstruction, 1 (1.02%) cases of de novo instability. The four cases of voiding difficulties were solved spontaneously within six

TABLE 2 - MESH-RELATED SURGICAL COMPLICATIONS.

Patients	Code	Explanation of complications
1	7A/T1/S3	Retropubic hematoma (3.5 cm×2.3 cm, first 48 hours)
2	7A/T1/S3	Retropubic hematoma (5.4 cm×2.6 cm, first 48 hours)
3	2Aa/T2/S1	A midline vaginal exposure of mesh (1 cm in anterior wall) at 1-month, asymptomatic
4	2Aa/T2/S1	A midline vaginal exposure of mesh (2 cm×1 cm in anterior wall, 1 cm×1 cm in the posterior wall) at 1-month and 1 cm mesh exposure in the right vaginal wall at 24 months, asymptomatic
	3Aa/T2/S1	
5	3Aa/T2/S1	A midline vaginal exposure of mesh (1.5 cm in posterior wall) at 2 months, asymptomatic
6	3Be/T2/S2	Lateral vaginal exposure of mesh (2 cm×1 cm in vaginal fornix) at 1-month, with spontaneous pain
7	1Aa/T3/S2	Lateral vaginal exposure of mesh (mesh fiber in vaginal fornix) at 12 months, asymptomatic
8	2Aa/T3/S2	Lateral vaginal exposure of mesh (0.8 cm in vaginal fornix) at 11 months, asymptomatic
9	2Aa/T3/S1	A midline vaginal exposure of mesh (0.3 cm in anterior wall) at 3 months, asymptomatic
10	2Aa/T3/S1	A midline vaginal exposure of mesh (0.5 cm in anterior wall, mesh fiber in posterior wall) at 3 months, asymptomatic
	1Aa/T3/S1	
11	2Aa/T3/S1	A midline vaginal exposure of mesh (1 cm in upper anterior wall) at 6 months, asymptomatic
12	2Aa/T3/S1	A midline vaginal exposure of mesh (0.3 cm in posterior wall) at 12 months, asymptomatic
13	3Aa/T3/S2	Lateral vaginal exposure of mesh (3 cm×0.5 cm in anterior wall) at 6 months, asymptomatic
14	3Aa/T3/S1	A midline vaginal exposure of mesh (2 cm×1.5 cm in anterior wall) at 4 months, asymptomatic
15	3Ac/T3/S1	A midline vaginal exposure of mesh (3 cm in anterior wall and 1/3 mesh in the posterior wall) at 11 months, with dyspareunia and recurrence
16	1Aa/T4/S2	Mesh contraction in right anterior wall and 1.5 cm mesh exposure in the middle line of the posterior wall at 13 months, asymptomatic
	2Aa/T4/S1	
17	1Aa/T4/S1	Mesh fiber in the posterior wall at 13 months, asymptomatic
18	2Aa/T4/S2	Mesh exposure (0.3 cm in the right anterior wall and 1 cm in the middle line of posterior wall) at 14 months, asymptomatic
	2Aa/T4/S1	
19	1Aa/T4/S1	Mesh fiber in the anterior wall at 13 months, asymptomatic

IUGA: International Urogynecological Association; ICS: International Continence Society.

days. Regarding mesh erosion, a percentage of 5.1% (5/98) was detected. Among the five cases of erosions, two were found after six months. Pollakisuria and micturition urgency were found in 8 (8.2%) cases while urge incontinence in 3 (3.1%) cases.

During follow-up one pelvic procedure was requested. Post-operative Q-tip test average was 25 degrees (range 13-46). We found significant difference in VAS scores and in the majority of the main domains in King's health Questionnaire regarding pre-operative and post-operative data ( $p < 0.001$ ), whereas the results of both procedures were comparable. Subject satisfaction was not significantly different between A and B-group: 90 versus 85%. The mean values of FSFI scores before and 6 months after the operation were  $23.10 \pm 8.21$  vs.  $35.02 \pm 9.13$  ( $p < 0.001$ ) for A-group and  $23.6 \pm 8.14$  vs.  $30.02 \pm 9.10$  ( $p < 0.001$ ) for B-group, respectively.

## Conclusion

Mesh-related surgical complications are important issues after tension-free procedure. IUGA/ICS joint terminology clearly describes the category, time and site of complications (Table 2). The cumulative 39.6% mesh complication rate was reported during follow-up. Mesh contraction or exposure was the main complication (35.4%), although 88.2 of these patients were asymptomatic. Of the patients with vaginal complications,

29.4% were clinically diagnosed over 12 months (T4) after surgery. The anterior vaginal wall was frequently involved (64.7%). Patients with vaginal complications and mesh exposure are to be treated with excision followed by topical estrogen treatment, however recurrence risk persists. Compared with the posterior and apical compartments, mesh exposure requiring excision is more commonly seen after anterior compartment transvaginal mesh repairs (27). Furthermore following trans-obturator techniques, severe late mesh-related complications were reported (28, 29). Consequently, a suitable identification of risk factors may enable surgeons to prevent or minimize this sort of complications (15). The impact on sexuality can be affected by the extrusion of the mesh, which can cause bleeding and dyspareunia facilitating spread of sexually transmitted diseases (30).

Whenever mesh to reinforce the anterior compartment (31) is used, the precaution of adopting sterility is useful but not sufficient to prevent erosion.

In our issue between the two groups, cure of both incontinence and cystocele was superimposable ( $p$  value  $> 0.05$ ). Nevertheless regarding mesh erosion, a percentage of 5.1% (5/98) was found in B-group whereas none in A-group. In the two techniques employed, the most significant difference consisted of suturing vaginal skin under the mesh (B-group), where a higher early and late rate of mesh-related complications were reported. Finally, we may conclude that integrity of vagina under the net is the right key to prevent erosion and to allow a better quality of life for patients (32, 33).

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