Published in final edited form as:

Neurol Urodyn. 2016 June ; 35(5): 589–594. doi:10.1002/nau.22756.

Clinical Application of IUGA/ICS Classification System for Mesh Erosion

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Abstract

Aims—Our aim was to assess the usability of the IUGA/ICS classification system for mesh erosion in a tertiary clinical practice and to determine if assigned classification is associated with patient symptoms, treatment, and outcome.

Methods—We retrospectively identified women who had mesh erosion after prolapse or incontinence surgery. Each erosion was classified using the IUGA/ICS category time site (CTS) system. Associations between classification and presenting symptom (asymptomatic, pain, bleeding, voiding, or defecatory dysfunction, infection, prolapse), treatment type, and outcome were evaluated with chi-squared test, student's *t*-test, and univariate logistic regression.

Results—We identified 74 subjects with mesh erosion; only 70% were classifiable. Asymptomatic patients (*n* = 19) (Category A) were more likely to be managed conservatively (*P* = 0.001). Symptomatic patients (*n* = 55) (Category B) were more likely to be managed surgically (*P* = 0.003). Other variables had no association with treatment. No variables were associated with outcome. Presenting symptom was associated with both treatment (*P* = 0.005) and outcome (*P* = 0.03). Asymptomatic subjects were more likely to have satisfactory outcome (*P* = 0.03). Urinary frequency and urgency were highly correlated with surgical management (*P* = 0.02).

Conclusions—One third of mesh erosions could not be retrospectively coded using the IUGA/ICS classification. The components of the system were not predictive of treatment nor outcome with exception of the Category A (asymptomatic) and Category B (symptomatic). Asymptomatic women with mesh erosion can be successfully managed with conservative measures. Use of a classification system may be enhanced if the system is simplified by limiting the number of variables to those associated with interventions and patient outcome.

Keywords

CTS classification system; IUGA/ICS classification system; mesh erosion; surgery

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Potential conflicts of interest: Nothing to disclose.

INTRODUCTION

The prevalence of symptomatic pelvic floor disorders is 25% in the U.S.¹ The lifetime risk of undergoing surgery for prolapse or incontinence is 20%² and the risk of reoperation is 29%.³ The use of synthetic mesh was introduced to pelvic reconstructive surgery to decrease the rate of recurrence after surgical repair.⁴ However, there are unique complications associated with use of mesh, the most common being vaginal mesh erosion.⁵ The overall risk of erosion is 10% in patients who undergo prolapse repair with mesh^{6–8} and 0.4–3.0% after anti-incontinence procedures with mesh.^{9,10}

A joint commission of the International Urogynecologic Association (IUGA) and the International Continence Society (ICS) published a classification system of mesh complications in January 2011.¹¹ The purpose of the classification system is to develop a common language and increase awareness of complications from procedures using prostheses and grafts in female pelvic surgery. A secondary aim of the classification system is to develop a registry of complications to inform and guide surgeons, patients, and industry. One of the intended applications of the system is retrospective use in analysis of medical records and surgical audits.¹² The system has been called the Category, Time, and Site (CTS) Classification. The CTS Classification seeks to encompass a vast range of clinical scenarios into a numerical and ordinal code so that no additional descriptors are necessary. The first domain—Category—describes the involved organ and size of the eroded mesh, the severity of the complication, and pain grade. The second domain—Time—refers to the interval between the time of the index surgery and the presentation of the complication. The third domain—Site—refers the location of the complication (see Fig. 1).

The primary objective of this study was to assess the usability of the current classification system in an academic clinical practice. The secondary aim was to determine if the IUGA/ICS system for mesh-related complications is associated with treatment and outcome for mesh erosion. We hypothesized that the IUGA/ICS classification system would be cumbersome to use but would be associated with treatment and outcome.

MATERIALS AND METHODS

This IRB approved study is a retrospective cohort analysis of mesh erosion in patients who presented to a tertiary care referral center after surgery for pelvic organ prolapse or urinary incontinence with synthetic mesh (index surgery). There are numerous complications that can result from graft placement, however, we elected to look at mesh erosion rather than all possible complications given that there is a clear causal relationship between mesh placement and erosion.

Patients were included if they were evaluated during a 5-year period from 2007 to 2012. Subjects were identified using *International Classification of Diseases, Ninth Revision* (ICD-9) codes 996.30, 996.65, and 996.76 for mechanical complication of unspecified genitourinary device, implant, and graft; infection and inflammatory reaction due to other genitourinary device, implant, and graft; and other complications due to genitourinary device, implant, and graft, respectively. Subjects were included if they had one of the above

ICD-9 codes associated with the following procedures: synthetic sling for stress urinary incontinence, vaginal mesh placed using a mesh-kit, hand-cut vaginal mesh, sacrocolpopexy, or sacrocervicopexy using synthetic mesh. Subjects were excluded if they had a complication presumed to be associated with mesh (e.g., isolated pain) in the absence of mesh erosion. Based on the newly proposed definitions from IUGA and ICS, we included the expanded definitions of mesh erosion including contraction, prominence, separation, exposure, extrusion, perforation, dehiscence, and sinus tract formation.¹¹

The medical records of eligible subjects were reviewed and demographic data, medical history, information about the index surgery, complications after mesh placement, presenting symptoms associated with mesh erosion, and treatment of the mesh erosion were abstracted.

The subjective complaints of patients with erosion were collected and grouped into the following categories: asymptomatic, pain, bleeding, voiding, or defecatory dysfunction, infection, and prolapse. Treatments were grouped into conservative and surgical management. Conservative management was defined as observation, use of vaginal estrogen, or office excision of exposed vaginal mesh. Outcome categories included (1) resolution of erosion and all or most symptoms (i.e., patient satisfied with outcome) and (2) persistence of erosion or symptoms or additional surgery (i.e., patient dissatisfied with outcome). The subjects were assigned a code describing the mesh erosion based on the CTS classification system (see Fig. 1 for description of classification system).

Study data were managed using REDCap (Research Electronic Data Capture)¹³ tools hosted at Massachusetts General Hospital. Categorical and continuous variables were analyzed with chi-squared and student's *t*-test, respectively. Additionally, univariate logistic regression was used to assess correlation between the CTS category, treatment, and outcome. Differences that resulted in probability values of <0.05 were considered statistically significant. Statistical analyses were performed using SPSS software (version 20; SPSS Inc., Chicago, IL).

RESULTS

Using encompassing ICD-9 codes, 149 patients were initially identified. Based on eligibility criteria, 74 subjects with mesh erosion were included in the study. The majority of patients initially identified by ICD-9 code query but excluded in the study cohort were patients who did not meet criteria of a qualifying procedure (e.g., “complication of unspecified genitourinary device” that upon review of chart was complication of an intrauterine device rather than complication from prolapse or incontinence surgery) or did not have mesh erosion (e.g., isolated pain that resulted from mesh placement). Baseline characteristics and surgical information are summarized in Tables I and II. The mean age at the time of index surgery was 59 ± 12 years and mean body mass index was 27 ± 5 kg/m². For 80% (*n* = 49) of subjects, the index surgery using mesh was their first urogynecologic procedure. Sixty-one percent (*n* = 45) had prolapse surgery with mesh and 39% (*n* = 29) had incontinence surgery with mesh. Eighty-one percent (*n* = 60) of subjects had type I mesh (totally macroporous with pores >75 μ m), no subjects had type II mesh (totally microporous with pores ≤ 10 μ m), 7% (*n* = 5) had type III mesh (microporous with macroporous components),

and no subjects had type IV mesh (non-porous). Fifty-eight percent ($n = 43$) of subjects had their index surgery at the study institution and 42% ($n = 31$) were referrals from outside hospitals. In 11% ($n = 8$) of subjects, the operative report from the index surgery was unavailable.

Of the 74 subjects with mesh erosions, 30% ($n = 22$) were unable to be categorized due to missing information that was not included in the clinical documentation or operative report (Table III). Nine percent ($n = 7$) of the records were missing two or more variables needed to satisfy the CTS system. Twenty percent ($n = 15$) of records did not include Category information. The most common omitted Category variable was size (20%, $n = 15$), followed by anatomic location (8%, $n = 6$), and pain grade (4%, $n = 3$). Seven percent ($n = 5$) of records did not include Time from surgery to clinical diagnosis. Sixteen percent ($n = 12$) of records did not include Site of mesh erosion. Of the 22 subjects with mesh erosions that were unable to be categorized, two were due to sacrocolpopexy, five were due to urinary incontinence procedures (all retropubic slings), and 15 were due to vaginal prolapse repair. The erosions that occurred following vaginal prolapse repair were scattered among all vaginal compartments (i.e., apical, anterior, and posterior compartments). Of the unclassifiable mesh erosions, 64% ($n = 14$) had their index surgery performed at our institution and 36% ($n = 8$) were referrals from outside hospitals.

Seventy percent ($n = 52$) of records were able to be fully categorized using the CTS system (Table IV). The vast majority of mesh erosions in our series were vaginal, falling into Category A or B with varying sizes (Category 1, 2, or 3). There was one vaginal abscess (2DaT4S3) and one vaginal infection (3CbT2S1) from mesh erosion. There were five erosions involving the urinary tract (Category 4).

In a post hoc analysis, we divided the subjects into two groups: those who were seen for evaluation of mesh erosion before the FDA notification regarding mesh safety was released in June 2011 ($n = 50$) and those who were evaluated after the FDA notification was released ($n = 24$). We found no difference in the number of subject able to be coded after the FDA notification ($n = 19$) compared to those who were seen before ($n = 33$) ($P = 0.3$).

We evaluated the association between CTS classification and treatment (conservative vs. surgical). Each domain and subdomain of the classification system was analyzed. Asymptomatic patients (Category A) were more likely to be managed conservatively than Categories B, C, and D ($P = 0.001$). Symptomatic patients (Category B) were more likely to be managed surgically than Categories A, C, and D ($P = 0.003$). There were insufficient patients in Category C and in Category D for independent evaluation. No association between treatment and Category 1–7 ($P = 0.444$), pain grade ($P = 0.151$), Time ($P = 0.708$), or Site ($P = 0.985$) was present. We also evaluated the association between CTS classification and the patient's satisfaction with her final outcome (i.e., resolution of all or most symptoms or persistent complaints) independent of management choice and found no association with Category ($P = 0.055$), pain grade ($P = 0.075$), Time ($P = 0.177$), or Site ($P = 0.098$).

We evaluated the relationship between presenting symptom and treatment and found that presenting symptom was associated with conservative management or surgery ($P = 0.005$). Asymptomatic women were less likely to undergo surgical management (OR = 0.2 (95% CI 0.07–0.6), $P = 0.03$). For subjects who were symptomatic, each symptom was evaluated independently. Women presenting with urinary urgency and frequency were more likely to have surgical management (OR = 4.0 (95% CI 1.2–13.2), $P = 0.02$). Presenting symptom was also associated with outcome. Asymptomatic subjects were nearly five times more likely to have satisfactory outcome and be without persistent complaint (OR = 4.8 (95% CI 1.4–16.0), $P = 0.03$). When evaluated independently, the remaining groups of presenting symptoms (i.e., pain, bleeding, urinary frequency and urgency, recurrent prolapse, and infection) did not demonstrate significant association with outcome, that is, persistence or resolution of symptoms.

DISCUSSION

We found that 30% of mesh erosions could not be retrospectively coded using the IUGA/ICS classification of mesh-related complications in an academic tertiary care referral hospital with Female Pelvic Medicine and Reconstructive Surgery board certified surgeons. Additionally, the IUGA/ICS classification system was not associated with treatment or outcome of mesh erosion other than for patients who were asymptomatic. In contrast, the presenting symptom was associated with both treatment and outcome for those with urinary symptoms and those who were asymptomatic.

There has been a mixed reaction to the IUGA/ICS classification system in the literature. Some studies have also found difficulty assigning a code to patients¹⁴ while others have been able to classify all or most.^{15,16} The interobserver reliability of the CTS system is poor^{14,15} but may be improved with optimized instruction.¹⁷ Some studies have found good general applicability^{16,18,19} but recommend altering the system to include voiding dysfunction and de novo overactive bladder as there is currently no way to account for these common complications.^{18,20} We agree with criticism that the large number of variables makes comparing multiple subgroups challenging.²¹ The findings of our study supports the criticism of the classification system's approach not being patient centered.²¹ Particularly when treating pelvic floor disorders, which are in general quality of life issues, we should strive to keep patient experience and satisfaction at the forefront of our actions and interventions. Complications schemas from other disciplines have been able to do this quite successfully.²² As we tailor and improve on our measurement tools in pelvic reconstructive surgery, we may do well as a specialty to take a patient centered approach in recording the complications of the surgeries we do to improve quality of life.

The principal strength of this study is its clinically relevant end-points providing the surgeon with information to manage complications of mesh erosion. Our study evaluated a wide variety of surgical approaches using mesh. This heterogeneous sample allows evaluation of the IUGA/ICS classification system in diverse contexts. A limitation of our study is the small number of subjects. Given the multiple components of this classification system, a meaningful power calculation is challenging. Including seven anatomic groups,^{1–7} four symptom groups (A–D), five pain subcategories (a–e), four time groups (T1–4), and five site

groups (S1–5) groups, there are over 560 possible codes for an individual mesh complication, making it difficult to draw conclusions about a single component. As we gather more information about mesh complications, a national or international mesh registry could provide data regarding a large number of patients; this could help to clarify the significance of the individual components that make up the classification system.

CONCLUSIONS

An ideal classification system for complications of mesh erosion would be patient centered, would adequately describe the complication, and be agile enough for use in clinical practice. The CTS system more specifically describes mesh erosion than other currently available surgical complication systems.²³ Based on our study, a more expansive description of associated symptoms (such as bowel and bladder symptoms) may enhance the ability to use the scale in counseling and management. Further research should be directed at determining which factors are integral and which are accessory to the IUGA/ICS's stated aim of the classification system to "aid clinical practice and research."

In our experience, 30% of mesh erosions were not able to be coded using the IUGA/ICS classification system for mesh-related complications in an academic tertiary care hospital with all surgeons board certified in Female Pelvic Medicine and Reconstructive Surgery. The classification system is expansive but symptoms frequently associated with mesh erosion such as voiding dysfunction are not included in the system. The components of the system were not predictive of treatment or outcome while patient symptoms were predictive of both. In busy practices, the use of a classification system in a mesh registry may be enhanced if the system has clinical significance and is patient centered.

Acknowledgments

Thank you to Shilpa Iyer, MD, MPH for assistance with data collection.

References

1. Wu JM, Vaughan CP, Goode PS, et al. Prevalence and trends of symptomatic pelvic floor disorders in U.S. women. *Obstet Gynecol.* 2014; 123:141–8. [PubMed: 24463674]
2. Wu JM, Matthews CA, Conover MM, et al. Lifetime risk of stress urinary incontinence or pelvic organ prolapse surgery. *Obstet Gynecol.* 2014; 123:1201–6. [PubMed: 24807341]
3. Olsen AL, Smith VJ, Bergstrom JO, et al. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. *Obstet Gynecol.* 1997; 89:501–6. [PubMed: 9083302]
4. Mistrangelo E, Mancuso S, Nadalini C, et al. Rising use of synthetic mesh in transvaginal pelvic reconstructive surgery: A review of the risk of vaginal erosion. *J Minim Invasive Gynecol.* 2007; 14:564–9. [PubMed: 17848316]
5. Diwadkar GB, Barber MD, Feiner B, et al. Complication and reoperation rates after apical vaginal prolapse surgical repair: A systematic review. *Obstet Gynecol.* 2009; 113:367–73. [PubMed: 19155908]
6. Feiner B, Jelovsek JE, Maher C. Efficacy and safety of transvaginal mesh kits in the treatment of prolapse of the vaginal apex: A systematic review. *BJOG.* 2009; 116:15–24. [PubMed: 19087076]
7. Abed H, Rahn DD, Lowenstein L, et al. Incidence and management of graft erosion, wound granulation, and dyspareunia following vaginal prolapse repair with graft materials: A systematic review. *Int Urogynecol J.* 2011; 22:789–98. [PubMed: 21424785]

8. Nygaard I, Brubaker L, Zyczynski HM, et al. Long-term outcomes following abdominal sacrocolpopexy for pelvic organ prolapse. *JAMA*. 2013; 309:2016–24. [PubMed: 23677313]
9. Abouassaly R, Steinberg JR, Lemieux M, et al. Complications of tension-free vaginal tape surgery: A multi-institutional review. *BJU Int*. 2004; 94:110–3. [PubMed: 15217442]
10. Ogah J, Cody DJ, Rogerson L. Minimally invasive synthetic suburethral sling operations for stress urinary incontinence in women: A short version Cochrane review. *Neurourol Urodyn*. 2011; 30:284–91. [PubMed: 21412819]
11. Haylen BT, Freeman RM, Swift SE, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint terminology and classification of the complications related directly to the insertion of prostheses (meshes, implants, tapes) and grafts in female pelvic floor surgery. *Neurourol Urodyn*. 2011; 30:2–12. [PubMed: 21181958]
12. Haylen BT, Freeman RM, Lee J, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint terminology and classification of the complications related to native tissue female pelvic floor surgery. *Int Urogynecol J*. 2012; 23:515–26. [PubMed: 22527748]
13. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009; 42:377–81. [PubMed: 18929686]
14. Tunitsky E, Abbott S, Barber MD. Interrater reliability of the International Continence Society and International Urogynecological Association (ICS/IUGA) classification system for mesh-related complications. *Am J Obstet Gynecol*. 2012; 206:442e441–6. [PubMed: 22542121]
15. Gowda M, Kit LC, Stuart Reynolds W, et al. Interobserver variability when employing the IUGA/ICS classification system for complications related to prostheses and grafts in female pelvic floor surgery. *Int Urogynecol J*. 2013; 24:1671–8. [PubMed: 23536228]
16. Bontje HF, van de Pol G, van der Zaag-Loonen HJ, et al. Follow-up of mesh complications using the IUGA/ICS category-time-site coding classification. *Int Urogynecol J*. 2014; 25:817–22. [PubMed: 24515543]
17. Haylen BT, Lee J, Maher C, et al. Optimizing study design for interobserver reliability: IUGA-ICS classification of complications of prostheses and graft insertion. *Int Urogynecol J*. 2014; 25:751–4. [PubMed: 24196654]
18. Petri E, Ashok K. Complications of synthetic slings used in female stress urinary incontinence and applicability of the new IUGA-ICS classification. *Eur J Obstet Gynecol Reprod Biol*. 2012; 165:347–51. [PubMed: 22944381]
19. Firoozi F, Ingber MS, Moore CK, et al. Purely transvaginal/perineal management of complications from commercial prolapse kits using a new prostheses/grafts complication classification system. *J Urol*. 2012; 187:1674–9. [PubMed: 22425114]
20. Skala C, Renezeder K, Albrich S, et al. The IUGA/ICS classification of complications of prosthesis and graft insertion: A comparative experience in incontinence and prolapse surgery. *Int Urogynecol J*. 2011; 22:1429–35. [PubMed: 21789657]
21. Hammett J, Peters A, Trowbridge E, et al. Short-term surgical outcomes and characteristics of patients with mesh complications from pelvic organ prolapse and stress urinary incontinence surgery. *Int Urogynecol J*. 2014; 25:465–70. [PubMed: 24085144]
22. Pusic AL, Reavey PL, Klassen AF, et al. Measuring patient outcomes in breast augmentation: Introducing the BREAST-Q Augmentation module. *Clin Plast Surg*. 2009; 36:23–32. v. [PubMed: 19055958]
23. Dindo D, Demartines N, Clavien PA. Classification of surgical complications: A new proposal with evaluation in a cohort of 6336 patients and results of a survey. *Ann Surg*. 2004; 240:205–13. [PubMed: 15273542]

		CATEGORY			
General Description		A (Asymptomatic)	B (Symptomatic)	C (infection)	D (Abscess)
1	Vaginal: no epithelial separation Include prominence (e.g. due to wrinkling or folding), mesh fibre palpation or contraction (shrinkage)	1A: Abnormal prosthesis or graft finding on clinical examination	1B: Symptomatic e.g. unusual discomfort / pain; dyspareunia (either partner); bleeding	1C: Infection (suspected or actual)	1D = Abscess
2	Vaginal: smaller < 1cm exposure	2A: Asymptomatic	2B: Symptomatic	2C: Infection	2D = Abscess
3	Vaginal: larger > 1cm exposure, or any extrusion	3A: Asymptomatic 1-3Aa if no prosthesis or graft related pain	3B: Symptomatic 1-3B (b-e) if prosthesis or graft related pain	3C: Infection 1-3C 1-13D (b-e) if prosthesis or graft related pain	3D = Abscess
4	Urinary Tract: compromise or perforation Including prosthesis (graft) perforation, fistula and calculus	4A: Small intraoperative defect e.g., bladder perforation	4B: Other lower urinary tract complication or urinary retention	4C: Ureteric or upper urinary tract complication	
5	Rectal or Bowel: compromise or perforation Including prosthesis (graft) perforation and fistula	5A: Small intraoperative defect (rectal or bowel)	5B: Rectal injury or compromise	5C: Small or Large bowel injury or compromise	5D = Abscess
6	Skin and/or musculoskeletal: complications including discharge pain lump or sinus tract formation	6A: Asymptomatic, abnormal finding on clinical examination	6B: Symptomatic e.g. discharge, pain or lump	6C: Infection e.g. sinus tract formation	6D = Abscess
7	Patient: compromise including hematomas or systemic compromise	7A: Bleeding complication including haematoma	7B: Major degree of resuscitation or intensive care*	7C: Mortality * *additional complication - no site applicable - § 9)	
TIME (clinically diagnosed)					
T1: Intraoperative to 48 hours		T2: 48 hours to 2 months	T3: 2 months to 12 months	T4: over 12 months	
SITE					
S1: Vaginal: area of suture line	S2: Vaginal: away from from area of suture line	S3: Trocar passage Exception: Intra-abdominal (§5)	S4: other skin or musculoskeletal site	S5: Intra-abdominal	
N.B. 1. Multiple complications may occur in the same patient. There may be early and late complications in the same patient. I.e. All complications to be listed. Tables of complications may often be procedure specific. 2. The highest final category for any single complication should be used if there is a change over time. (patient 888) 3. Urinary tract infections and functional issues (apart from 4B) have not been included.					
			CODE	☐	☐
			T	☐	☐
			S	☐	☐

Fig. 1.
International Continence Society/International Urogynecological Association classification
system.

TABLE I**Patient Demographics (n = 74)**

Variable	N (%)
Age (years)	59 ± 12
Body mass index (kg/m ²)	27 ± 5
Parity	2 (range 0–5)
Menopause	
Before menopause	12 (16)
After menopause	61 (82)
Unknown	1 (1)
Tobacco use	
Never	64 (86)
Former	7 (9)
Current	2 (3)
Unknown	1 (1)
Medical comorbidities	
None (healthy)	66 (89)
Immunocompromised	1 (1)
Diabetes	1 (1)
Cancer	6 (8)
Surgical history	
No previous pelvic surgery	39 (53)
Previous hysterectomy for indication other than POP	28 (38)
Previous POP/UI surgery	15 (20)
ASA physical status classification	
Class 1	2 (4)
Class 2	45 (61)
Class 3	4 (5)
Class 4	0
Class 5	0
Class 6	0
Unknown	23 (31)
Presenting symptom	
Asymptomatic	19 (26)
Pain	21 (28)
Bleeding	14 (19)
Urinary frequency and urgency	16 (22)
Recurrent prolapse	3 (4)
Infection	1 (1)

TABLE II

Characteristics of Index Surgery (n = 74)

Variable	N (%)
Index surgery	
Mesh used for UI surgery	29 (39)
Mesh used for POP surgery	45 (61)
Type of POP surgery with mesh	
Vaginal	39 (53)
Anterior compartment	11 (15)
Posterior compartment only	0
Apical compartment only	2 (3)
Apical and anterior compartments	10 (14)
Apical and posterior compartments	9 (12)
Apical, anterior and posterior compartments	7 (9)
Abdominal	6 (8)
Sacrocolpopexy	6 (8)
Sacrocervicopexy	0
No POP surgery with mesh	29 (39)
Type of UI surgery with mesh	
Retropubic minimally invasive sling	24 (32)
Transobturator minimally invasive sling	2 (3)
Other type of mesh sling	3 (4)
No UI surgery with mesh	45 (61)
Type of mesh for all surgeries	
Type I	60 (81)
Type II	0
Type III	5 (7)
Type IV	0
Other	1 (1)
Unknown	8 (11)
Surgeon	
Female pelvic medicine and reconstructive surgeon	52 (70)
Other	22 (30)
Type of anesthesia	
General	43 (58)
Regional or MAC	11 (15)
Unknown	20 (27)

TABLE III

Missing Variables in Patients Unable to be Fully Indexed Using the CTS System (n = 22)

Category location/size (1–7) n = 10	Category severity (A–D) n = 2	Category pain grade (a–e) n = 3	Time (T1–T4) n = 5	Site (S1–S5) n = 12
xAa-T3-x *	3xc-x-S3 *	2Bx-T2-S1	2Aa-x-S1	xAa-T3-x *
xAa-T4-S1	xxa-T4-x *	3Bx-x-S3 *	3Bd-x-S1 *	xAa-T4-x *
xAa-T4-S1		xBx-T3-x *	3Bx-x-S3 *	xBx-T3-x *
xAa-T4-x *			3xc-x-S3 *	1Be-T4-x
xBa-T2-S2			xBa-x-x *	2Aa-T4-x
xBa-T3-S2				2Aa-T4-x
xBa-T4-S2 *				2Bc-T4-x
xBx-T3-x *				3Aa-T3-x
xBa-x-x *				3Aa-T4-x
xxa-T4-x *				3Bc-T2-x
				xBa-x-x *
				xxa-T4-x *

Missing variable is denoted as x.

* Denotes codes with two or more missing variables (n = 7).

TABLE IV

CTS Codes of Subjects (n = 52)

CATEGORY	A ASYMPTOMATIC (n=20)	B SYMPTOMATIC (n=29)	C INFECTION (n=2)	D ABSCESS (n=1)	TIME
1 VAGINAL No epithelial separation (n=3)					T1
	1AaT2S1				T2
					T3
		1BaT4S1 1BeT4S1			T4
2 VAGINAL 1 cm exposure (n=26)					T1
	2AaT2S1				T2
	2AaT2S1				
	2AaT2S1				
	2AaT2S1				
	2AaT3S1	2BaT3S2			T3
	2AaT3S1	2BeT3S1			
	2AaT3S2				
	2AaT3S2				
	2AaT3S2				T4
3 VAGINAL >1 cm exposure (n=18)	2AaT4S2	2BcT4S1	2BcT4S2	2DcT4S3	
	2AaT4S2	2BcT4S1	2BcT4S2		
	2AaT4S2	2BeT4S1	2BcT4S2		
		2BeT4S1			
		2BeT4S1			T1
					T2
		3BaT2S1	3CbT2S1		
		3BaT2S1			
		3BeT2S1			

CATEGORY	A ASYMPTOMATIC (n=20)	B SYMPTOMATIC (n=29)	C INFECTION (n=2)	D ABSCESS (n=1)	TIME	
	3AaT3S1	3AaT3S3	3BcT3S1		T3	
	3AaT3S1		3BcT3S1			
	3AaT4S1	3BaT4S1	3BeT4S2		T4	
		3BcT4S1	3BeT4S2			
	3BcT4S1	3BeT4S2				
	3BeT4S1					
		3BeT4S1			T1	
		4AT1S5				
	4 URINARY TRACT (n=5)					T2
				4BT3S5		
			4BT4S3	4CT4S3	T4	
			4BT4S5			
No subjects in categories 5, 6, or 7 were found in this cohort						

The numerical component of Category is on the right column and the ordinal component of Category is on the top row. Time is on the left column. Site is in sub-columns within the ordinal Category columns. No subjects in categories 5, 6, or 7 were found in this cohort.