

Female Urology, Urodynamics, Incontinence, and Pelvic Floor Reconstructive Surgery



High Catastrophizing in Subjects With Painful Mesh Complications Leads to Worse Outcomes

Ariel Moradzadeh, Juzar Jamnagerwalla, Karyn S. Eilber, Jennifer T. Anger, and A. Lenore Ackerman

OBJECTIVE	To identify the rate of catastrophizing in a cohort of subjects with chronic pain after self-reported mesh complications and identify interactions of catastrophization with other patient factors, such as age, number of pelvic surgeries, and intent to sue. Catastrophizing has been shown to be a risk factor for chronicity of pain, disability, and depression.
METHODS	The pain catastrophization scale (PCS) identifies patients likely to have an exaggerated, negative thought process in response to pain. Subjects throughout the United States with self-described complications of vaginal mesh completed an internet-based, anonymous survey, featuring multiple standardized questionnaires including the PCS and female Genitourinary Pain Index (GUPI). A previously defined threshold score of >30 on the PCS defined high-pain catastrophizing. Statistical analysis was performed using χ^2 test and <i>t</i> test for categorical and continuous variables, respectively.
RESULTS	Ninety of 167 participants (54%) were found to have high-pain catastrophizing. Age, intent to sue, or number of previous pelvic surgeries did not correlate with high catastrophization. Subjects who catastrophized were significantly more likely to have a higher overall GUPI score (35.0 vs 30.5, $P < .001$), which came from increases in the pain (18.0 vs 14.2, $P < .001$) and quality of life (11.0 vs 9.5, $P < .001$) GUPI subdomains.
CONCLUSION	Subjects with self-described mesh complications have a high rate of pain catastrophizing associated with significantly worse quality of life and higher pain. Identifying high catastrophizing patients in the setting of chronic pelvic pain from mesh complications may help guide treatment and be an indicator for early or adjunctive psychosocial intervention. UROLOGY 124: 83–90, 2019. © 2018 Elsevier Inc.

Stress urinary incontinence (SUI) and pelvic organ prolapse (POP) are highly prevalent conditions that place a large socioeconomic burden on the health care system. SUI has a prevalence approaching 35% among adult women, and POP has a prevalence that varies significantly (3%-50%) depending upon the definition used.^{1,2} By age 80, up to 11% of women undergo surgery to correct SUI or POP; of these, 1 in 3 will require a

repeat operation for recurrence.^{3,4} The advent of polypropylene mesh products for both SUI and POP arguably improved the surgical management of both SUI and POP by providing better durability using a minimally invasive approach. For the most part, mesh is well-tolerated by the majority of patients. The goal of these minimally invasive, mesh-augmented repairs is to provide shorter operative times, reduced postoperative morbidity, and faster resumption of normal activity levels in comparison to abdominal approaches. Over time, however, concerns have arisen regarding the potential for postoperative complications that include organ perforation, vaginal extrusion, urinary outlet obstruction, and chronic pain.

Although the incidence of pain following transvaginal mesh surgeries has been hotly debated, a systematic review of the literature detailing complications following the mesh-augmented treatment of apical vaginal prolapse demonstrates an overall complication rate of 7%-17%, with subjective pain and mesh erosion rates of 2.3% and

Declaration of Interest: Drs. Moradzadeh and Jamnagerwalla have no conflicts of interest. Dr. Karyn Eilber is an investigator and expert witness for Boston Scientific, an investigator for Aquinox, and a consultant for Boston Scientific and Allergan. Dr. Jennifer Anger is an expert witness for Boston Scientific. Dr. A. Lenore Ackerman is an investigator for Urogen and a consultant for Aquinox.

From the Division of Urology, Department of Surgery, Cedars-Sinai Medical Center, Los Angeles, CA

Address correspondence to: A. Lenore Ackerman, M.D., Ph.D., Urology Pelvic Medicine and Reconstructive Surgery, Cedars-Sinai Medical Center, Department of Surgery, Division of Urology, David Geffen School of Medicine at UCLA Health, 99 N. La Cienega Blvd., Suite M102, Beverly Hills, CA 90211. E-mail: A.Lenore.Ackerman@cshs.org

A.Lenore.Ackerman@cshs.org

Submitted: April 25, 2018, accepted (with revisions): May 31, 2018

2.2%, respectively.⁵ Another review of complications after sling surgery reported refractory chronic pain after synthetic midurethral sling surgery at 4.1% with mesh extrusion of 2.1% for transobturator (TOT) slings and 2.4% for retropubic slings.⁶ Groin and thigh pain is also an issue associated with synthetic slings, with approximately 6% of patients reporting pain shortly after TOT sling placement in a recent systematic review.⁷ Complications, though rare, have been associated with negative media attention and a growing frequency of litigation, which has influenced patient opinions of mesh-based repairs.⁸

Although there is no consensus regarding the frequency of these complications, when they happen, the treatment of chronic pelvic pain (CPP) can be challenging, frequently requiring multimodal therapy, including pharmacotherapy, physical therapy, and invasive interventions, such as mesh removal, nerve block, and neuromodulation.⁹ Patients' pain can be out of proportion to objective findings and highly refractory to conservative, nonsurgical treatments. Oral anti-inflammatory, neuromodulatory, and opioid medications, physical therapy, trigger point injections, and nerve blocks are among some of the potential nonsurgical treatments for these complications. When refractory to noninvasive treatments, surgical excision of mesh has been utilized to manage mesh complications. While some patients improve with excision, 20%-30% require additional surgical interventions to attempt to manage their pain.^{10,11}

Catastrophizing is defined as an exaggerated negative mental thought process brought on during an actual or anticipated painful experience.¹² Catastrophizing has been shown to be a risk factor for chronicity of pain, disability, and depression. Furthermore, there are established models demonstrating differences in patients' perception of pain.¹³ The pain catastrophizing scale (PCS), developed to help quantify the degree of catastrophizing, is a 13-item validated questionnaire which helps to evaluate the degree of rumination, magnification, and helplessness toward pain. Catastrophizing can have a dramatic effect heightening individuals' perceptions of pain.¹⁴ Multiple surgical specialties have identified positive correlations between catastrophizing scores and both poorer outcomes and chronic pain severity after surgery.^{15,16} We sought to identify the rate of catastrophizing in a cohort of subjects with mesh complications and chronic pain and to relate this rate to pain severity, intent to sue, complications, and number of surgeries.

MATERIALS AND METHODS

After approval from the local institutional review board (IRB #16-000858), patients throughout the United States with self-described complications of vaginal mesh were recruited through online advertisements to complete an anonymous, internet-based survey. All survey participants provided answers to a range of demographic questions, including their age, intent to sue, and number of pelvic surgeries since their mesh-augmented repair.

Subjects indicated their attitude toward recovery with a consolidation of related questions from the Personal Visions of Recovery Questionnaire and Fear Avoidance Beliefs Questionnaire ("I am hopeful that I will receive treatment and recover from the conditions indicated in this survey").¹⁷ To assess realistic expectations of treatment, survey participants were also assessed on the extent with which they agree or disagree with the following statement "Recovery does not mean going back to the way things used to be," a question taken from the Recovery Attitudes Questionnaire (RAQ-16), agreement with which indicates hope for improvement.¹⁸ Both questions measured agreement with the specified statement using a 7-point score (0 = completely agree, 1 = mostly agree, 2 = somewhat agree, 3 = unsure, 4 = somewhat disagree, 5 = mostly disagree, and 6 = completely disagree). All survey participants then filled out the PCS and the Genitourinary Pain Index (GUPI) questionnaires. The PCS is a 13-question survey with scores ranging from 0 to 52 (see Supplementary Table), with higher scores corresponding to a higher degree of catastrophization.¹⁹ As previous studies have established a PCS score of 30 or higher as representing the highest quartile, we defined a score of ≥ 30 in our study as high-pain catastrophizing. The GUPI questionnaire is a 15-item, validated questionnaire with total scores ranging from 0 to 45 that quantifies a patient's genitourinary pain symptoms and severity. The GUPI pain subdomain assesses the nature of pain in a binary fashion with subjects responding yes or no to multiple types of painful genitourinary symptoms. The questionnaire has a total of 10 pain items (total pain subdomain score 0-23) with higher scores indicating more pain, 2 urinary symptom items (subdomain score 0-10), and 3 quality of life items (subdomain score 0-12).²⁰ Subjects who did not complete any of the measures detailed above were excluded from the study.

Our primary outcome was to identify the rate of catastrophizing among subjects with mesh complications and pain. Secondary outcomes were to test the association between catastrophizing and age, intent to sue, number of previous pelvic surgeries, GUPI scores, and subjective hope for recovery. Our analysis compared the two PCS score groups—those with PCS scores < 30 and those with high PCS (≥ 30). Total GUPI scores, GUPI pain subdomain, GUPI urinary subdomain, and GUPI quality of life subdomain were also analyzed between the two PCS scoring groups. Statistical analysis was performed using χ^2 test and *t* test for categorical and continuous variables, respectively.

RESULTS

Of 293 subjects who participated in this internet-based survey, a total of 167 subjects completed all of the specified items required for inclusion in the study. The demographics of this population are summarized in Table 1. The median score on the PCS for all subjects with self-described pain after transvaginal mesh placement was 31 (Supplementary Table). Subjects were divided into 2 populations based on PCS score, using the cut-off of 30 described in previous studies to represent the highest quartile of pain. In this cohort, however, more than half (90/167; 53.9%) of subjects were found to be in the highest catastrophization range of PCS scores ≥ 30 (median score: 42 ± 12.8). Of the remaining subjects, however, a large proportion still exhibited significant catastrophization, with more than 80% of subjects scoring higher than 18 on the PCS (Fig. 1). Seventy-seven of 167 subjects (46%) had PCS scores < 30 (median score: 22 ± 6.8).

Table 1. Subjects' responses separated by catastrophizing level. Subjects were categorized into high-pain catastrophizing (>30) and low-pain catastrophizing (<30) groups. **P* value by *t* test, except where noted. †*P* value by χ^2

Variable	Pain Catastrophizing <30	Pain Catastrophizing >30	<i>P</i> value*
Total Subjects (%)	77 (46.1%)	90 (53.9%)	
Age at study entry (SD)	53 (±8.3)	52 (±9.6)	.881
Intent to sue (%)			.432†
Yes	55 (71.4%)	68 (75.6%)	
No	22 (28.6%)	22 (24.4%)	
Number of surgeries	3.8 (3.2)	3.6 (3.0)	.683
GUPI (SD)			
Total	31.0 (±6.04)	35.0 (±6.0)	<.001
Pain	14.2 (±3.7)	18.0 (±3.7)	<.001
Urinary	6.0 (±2.9)	8.0 (±2.7)	.003
QOL	11.0 (±2.1)	12.0 (±1.5)	<.001
Hope for recovery (%)			
Yes	55 (71.4%)	54 (60%)	.053†
No	22 (28.5%)	36 (40%)	

SD, standard deviation; QOL, quality of life.

There were significant differences between scores for each individual question on the PCS between the two groups, highlighting the separation of the two populations.

There were no significant differences in baseline age, intent to sue, or number of previous pelvic surgeries between those who catastrophized and those who did not. Subjects who catastrophized were significantly more likely to have higher total GUPI scores (35 vs 31, $P < .001$) along with worse scores on the GUPI pain (18.0 vs 14.2, $P < .001$), urinary (8.0 vs 6.0, $P = .003$), and quality of life (12.0 vs 11.0, $P < .001$) subdomains (Table 1). Furthermore, subjects who catastrophized tended to have less hope that they would recover (60.0% vs 78.8%) which approached statistical significance ($P = .053$; Fig. 2). Interestingly, while hopefulness for recovery correlated inversely with catastrophization scores, there was no association between hopefulness for recovery and GUPI total, pain, urinary, or quality of life scores (data not shown).

Based on the pain localization determined from the GUPI pain subdomain, both catastrophization and hopefulness for recovery were associated with vaginal pain and dyspareunia

($P = .04$ and $.05$, respectively), but unrelated to other types of genitourinary pain, including bladder or pelvic pain, pain with urination, pain with bladder filling, and urethral pain (Fig. 3A). Catastrophization was significantly higher in patients with dyspareunia than those without, independent of pain scores (Fig. 3B).

Last, we also assessed subjects' expectations for recovery in relation to both catastrophization and pain. Those who felt that recovery was defined as a return to the condition they had been in prior to their mesh surgery had significantly higher catastrophization scores (41.0 vs 28.0, $P < .001$) without differences in pain (32.0 vs 32.0, $P = .44$; Fig. 2D).

COMMENT

This study utilized a population-based online survey to assess catastrophization, an as-yet unexplored dimension of mesh complications, in a national cohort of subjects with CPP after prior transvaginal mesh surgery. Our data suggest a strong interplay between catastrophization and both the physical symptoms of mesh complications and subject attitudes toward their recovery. In this study, patients with high catastrophization had increased pain severity and worse pain-related quality of life.

This result is not surprising, as catastrophization has substantial impacts on outcomes and satisfaction associated with surgical treatments, with higher catastrophization associated with higher pain intensity, disability, and psychological distress.²¹ Elevated presurgery catastrophizing scores correlate with higher postsurgical pain, narcotic use, depression, and disability.²² Patients who catastrophize after surgery also have inferior prognoses, including increased pain intensity, and pain interference (the extent to which pain inhibits individual engagement with social, cognitive, emotional, physical, and recreational activities).¹⁵

Catastrophization is also highly linked to patient outcomes in chronic urogenital pain syndromes, such as CPP and interstitial cystitis and/or bladder pain

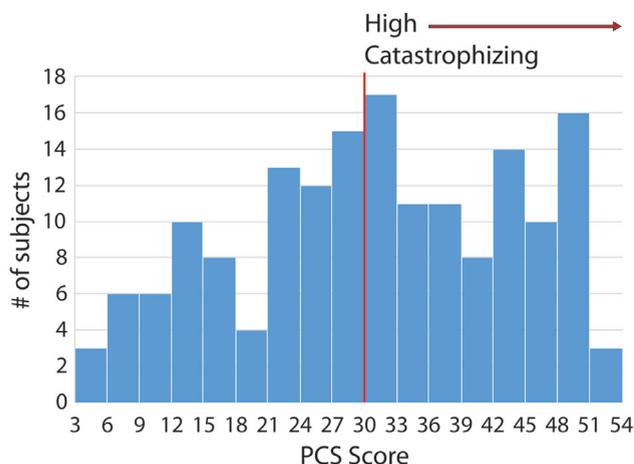


FIGURE 1. Distribution of subject pain catastrophizing scale (PCS) scores. The red line indicates the previously established threshold of 30 on the PCS designating high catastrophization demonstrated to be associated with poorer clinical outcomes. (Color version available online.)

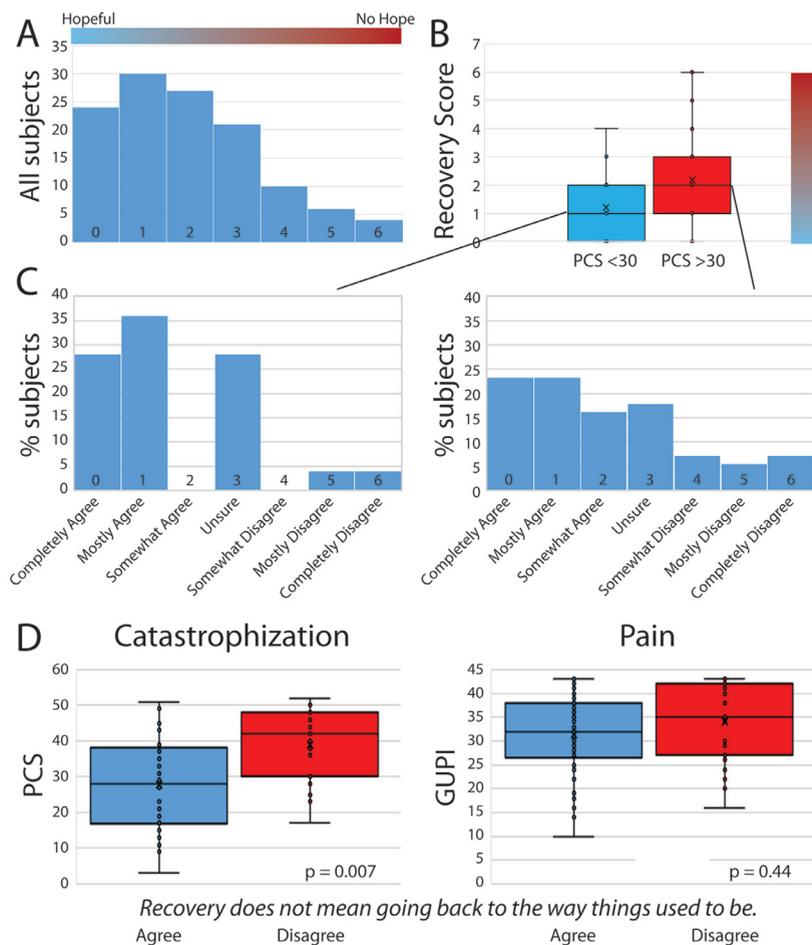


FIGURE 2. Subject hope for recovery after mesh complications is associated with catastrophization. (A) As a population, most subjects express a positive attitude toward recovery, with skewing of responses toward the lower numbers, indicating greater agreement with the statement “I am hopeful that I will receive treatment and recover from the conditions indicated in this survey”. (B) This recovery score was significantly higher in the subjects with PCS >30 in comparison to subjects with PCS <30, indicating significantly less hope for recovery ($P < .001$). (C) The distribution of recovery scores for subjects with PCS scores <30 (left) and >30 (right), indicating a flattening of the bell curve seen in (A) in the subjects with higher catastrophization, indicating less hope for recovery after treatment. (D) Subjects were separated based on their understanding of recovery after mesh complications, as assessed by their agreement about the statement “Recovery does not mean going back to the way things used to be.” Significantly lower catastrophization scores on the PCS were observed in subjects with realistic expectations of improvement with treatment (left) without significant differences in overall scores on the fGUPI (right). fGUPI, female Genitourinary Pain Index. (Color version available online.)

syndrome. In studies of women, catastrophizing is a significant predictor of both general pelvic ($P < .001$) and urogenital ($P < .001$) pain severity.^{23,24} Patients with the combination of CPP and pain catastrophizing behaviors demonstrate high levels of anxiety and depression. The severity of CPP is independently associated with catastrophization, making it one of the few potentially modifiable risk factors for the outcomes of this condition.²⁵ While the exact mechanisms underlying the development of chronic pain after transvaginal mesh surgery remain poorly characterized, the similarities between the data previously described for patients with chronic urogenital pain syndromes and for subjects with mesh complications support the role of catastrophization as a key component influencing the physical and psychological

morbidity of chronic pelvic and urogenital pain, regardless of its origins.

While it is impossible to establish causation, our study also sought to identify potential clinical factors *in addition to pain severity* interacting with catastrophization, which we postulated would be measures indicating a higher complication severity or poorer clinical outcomes. We had hypothesized that catastrophization would be related to intent to pursue litigation based on mesh complications and the number of surgeries undertaken to address chronic postsurgical pain, two factors we expected would be associated with the severity of mesh complications. Neither of these factors, however, were significantly associated with catastrophization, pain presence or severity, or attitudes toward recovery, which casts doubt on our initial hypothesis that a subject’s intent to pursue litigation and their

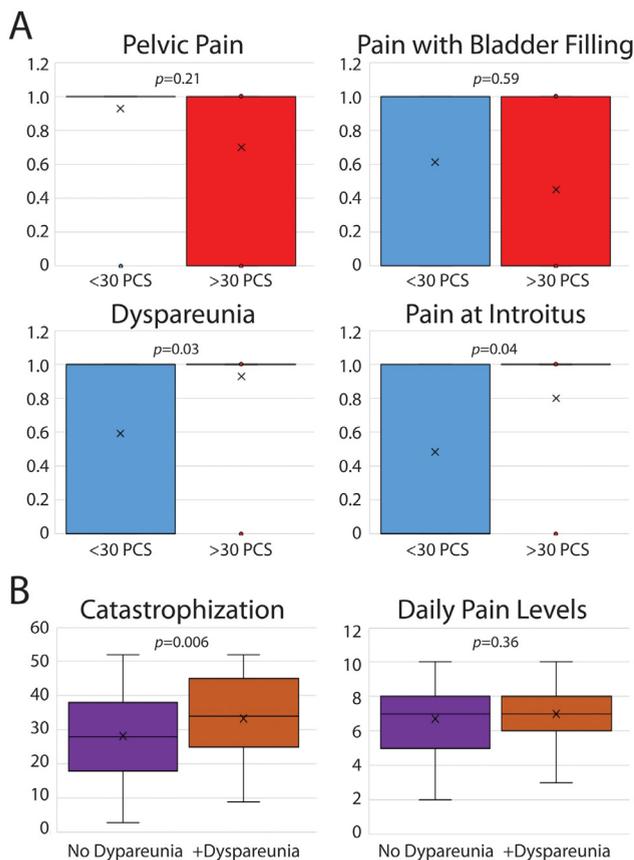


FIGURE 3. Association of catastrophization with the type of pain developing after vaginal mesh surgery. (A) Responses on individual questions from the female Genitourinary Pain Index (fGUPI) providing a binary report on the nature of the pain experienced were graphed according to patient catastrophization. High catastrophization (PCS >30) was associated with increased rates of dyspareunia (pain during or after intercourse) and pain at the vaginal introitus (bottom), while there was no association with generalized pelvic pain or pain with bladder filling. (B) When subjects were separated by the presence or absence of dyspareunia, a significant increase in catastrophization was seen in subjects with dyspareunia (left) without any significant differences in overall pain scores (right). (Color version available online.)

desire to pursue additional surgeries were related to poorer outcomes after treatment for mesh complications.

While associated with increased pain severity, catastrophization was not associated equally with all types of pain, but appeared to be more strongly associated with sexual pain, such as dyspareunia and vaginal pain. While previous studies have demonstrated associations of sexual pain with catastrophization,^{26,27} our examination of this large population with CPP demonstrates the strong association of sexual pain with catastrophization, which was not observed for other types of nonsexual pelvic pain. This theme is suggested by a qualitative study of women with mesh complications by Dunn et al,²⁸ which describes the pervasive, debilitating, emotional, and life-changing experiences of women with mesh complications. The women,

who had developed CPP as a result of these complications, suffered from altered body image and personal relationships, as well as changes in intimacy practices, accompanied by emotions of self-consciousness, embarrassment, self-blame, shame, and reluctance to seek care.

While catastrophization was not formally assessed as part of the Dunn study, the women evaluated stressed the despair of their severe pain and the permanent loss of physical and socioemotional health resulting in a need to redefine their personal health and identity to overcome these challenges.²⁸ Catastrophization, which is infrequently assessed clinically, may be a strong contributor to the inability to make this adaptive transition to a new normal. Our study implies fundamental differences in the subjective experiences of postoperative recovery milestones in patients who catastrophize vs. those who do not that influence recovery and postoperative outcomes. In our study, subjects with high-pain catastrophization scores exhibited decreased hope of recovery and impractical attitudes toward their symptomatic improvement. Independent of pain, subjects who felt that recovery after mesh complications was defined as returning to a presurgical state without morbidity had higher catastrophization scores. In addition, subjects who catastrophized tended to have less hope that they would recover. Although this did not reach statistical significance, it helps shed light on the psychosocial impact that pain catastrophizing can have on a patient's psychological outlook toward this chronic condition.

The relationship between higher catastrophizing scores and both decreased hope for and unrealistic attitudes toward recovery indicates the importance of early management of the expectations for recovery. A woman who has undergone multiple corrective surgeries to treat mesh-related complications is unlikely to return to her baseline prior to her initial surgery. In chronic pain conditions, patients who have the expectation of cure or substantial improvements in the treatment of chronic pain can present challenges to treating physicians. In general, cure is infrequent, and even remissions are rare; on average, only half of patients will achieve reductions in pain levels of approximately 30%.²⁹

As realistic, hopeful expectations for recovery are associated with better functional improvements,³⁰ patients who exhibit high PCS may benefit from a multidisciplinary approach aimed at adjusting expectations and breaking the reinforcing cycle of catastrophization that impedes the recovery process. In addition to dealing with the biological manifestations of pain, this integrated approach should incorporate counseling, most commonly through cognitive behavioral therapy, and may also require substantive patient education, particularly focused on changing maladaptive beliefs about pain and developing adaptive coping strategies. Adjunctive techniques can be applied depending on patient needs such as biofeedback, relaxation techniques, and mindfulness meditation. Most important, however, is recognition of the consequences of catastrophization; as surgeons, optimal medical care not

only includes the surgery itself, but careful management of patient expectations, recognition of complicating factors such as catastrophization, and the facilitation of supportive services from counselors, psychologists, and psychiatrists when appropriate.

The data collection method utilized in this study necessitated a reliance on subject report for all data. While this methodology allows for the recruitment of a large population from across the United States, it limits the opportunities to explore the relationships of pain and catastrophization to more objective clinical data. In addition, potential differences in the willingness of subjects with mesh complications to participate in our anonymous survey makes it likely that the participating subjects represent a population with more severe complications and poor quality of life, who are more likely to catastrophize. This cohort may not, therefore, be representative of most patients suffering from mesh complications. The identification of differences within this population in catastrophization and attitudes toward recovery suggests that, even in this population with severe symptoms, the psychosocial aspects of treatment influence outcomes. It is this type of patient who may be most likely to benefit from identification and management of high catastrophization.

CONCLUSION

Treatment options for CPP and pain secondary to mesh complications frequently take on a multidisciplinary approach.⁹ Our data suggest that psychological counseling should be included in the scope of treatment, particularly in patients exhibiting high catastrophization. Additionally, the assessment of sexual pain and institution of therapies aimed at this aspect of chronic pain may be crucial to breaking the reinforcing cycle of chronic pain and catastrophization, although additional studies will be needed to evaluate this assumption further. Thus, the identification of high catastrophization in patients with CPP from mesh complications should be an indicator for early, adjunctive psychosocial intervention to improve overall outcomes and patient quality of life.

SUPPLEMENTARY DATA

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.urology.2018.05.050](https://doi.org/10.1016/j.urology.2018.05.050).

References

1. Luber KM. The definition, prevalence, and risk factors for stress urinary incontinence. *Rev Urol*. 2004;6(Suppl 3):S3–S9.
2. Barber MD, Maher C. Epidemiology and outcome assessment of pelvic organ prolapse. *Int Urogynecol J*. 2013;24:1783–1790.

3. Olsen AL, Smith VJ, Bergstrom JO, Colling JC, Clark AL. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. *Obstet Gynecol*. 1997;89:501–506.
4. Wu JM, Hundley AF, Fulton RG, Myers ER. Forecasting the prevalence of pelvic floor disorders in U.S. Women: 2010 to 2050. *Obstet Gynecol*. 2009;114:1278–1283.
5. Diwadkar GB, Barber MD, Feiner B, Maher C, Jelovsek JE. Complication and reoperation rates after apical vaginal prolapse surgical repair: a systematic review. *Obstet Gynecol*. 2009;113:367–373.
6. Ford AA, Rogerson L, Cody JD, Ogah J. Mid-urethral sling operations for stress urinary incontinence in women. *Cochrane Database Syst Rev* 2015; CD006375.
7. Shah HN BG. Mesh complications in female pelvic floor reconstructive surgery and their management: a systematic review. *Indian J Urol*. 2012;28:129–153.
8. Souders CP, Eilber KS, McClelland L, et al. The truth behind transvaginal mesh litigation: devices, timelines, and provider characteristics. *Female Pelvic Med Reconstr Surg*. 2018;24:21–25.
9. Dalpiaz O, Kerschbaumer A, Mitterberger M, Pinggera G, Bartsch G, Strasser H. Chronic pelvic pain in women: still a challenge. *BJU Int*. 2008;102:1061–1065.
10. Marcus-Braun N, von Theobald P. Mesh removal following transvaginal mesh placement: a case series of 104 operations. *Int Urogynecol J*. 2010;21:423–430.
11. Rogo-Gupta L, Grisales T, Huynh L, Rodriguez LV, Raz S. Symptom improvement after prolapse and incontinence graft removal in a case series of 306 patients. *Female Pelvic Med Reconstr Surg*. 2015;21:319–324.
12. Sullivan MJL, Thorn B, Haythornthwaite JA, et al. Theoretical perspectives on the relation between catastrophizing and pain. *Clin J Pain*. 2001;17:52–64.
13. Edwards RR. Individual differences in endogenous pain modulation as a risk factor for chronic pain. *Neurology*. 2005;65:437–443.
14. Weissman-Fogel I, Sprecher E, Pud D. Effects of catastrophizing on pain perception and pain modulation. *Exp Brain Res*. 2008;186:79–85.
15. Coronado RA, George SZ, Devin CJ, Wegener ST, Archer KR. Pain sensitivity and pain catastrophizing are associated with persistent pain and disability after lumbar spine surgery. *Arch Phys Med Rehabil*. 2015;96:1763–1770.
16. Kremer R, Granot M, Yarnitsky D, et al. The role of pain catastrophizing in the prediction of acute and chronic postoperative pain. *Open Pain J*. 2013;6:176–182.
17. Waddell G, Newton M, Henderson I, Somerville D, Main CJ. A fear-avoidance beliefs questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low-back-pain and disability. *Pain*. 1993;52:157–168.
18. Steffen JJ BJ, Krzton K, Wishnick H & Wilder KE. Recovery Attitudes Questionnaire (RAQ-16) 1998.
19. Sullivan MJL, Bishop SR, Pivik J. The pain catastrophizing scale: development and validation. *Psychol Assess*. 1995;7:524–532.
20. Clemens JQ, Calhoun EA, Litwin MS, et al. Validation of a modified National Institutes of Health chronic prostatitis symptom index to assess genitourinary pain in both men and women. *Urology*. 2009;74:983–987. quiz 987 e981-983.
21. Severeijns R, Vlaeyen JWS, van den Hout MA, Weber WEJ. Pain catastrophizing predicts pain intensity, disability, and psychological distress independent of the level of physical impairment. *Clin J Pain*. 2001;17:165–172.
22. Groth-Marnat G, Fletcher A. Influence of neuroticism, catastrophizing, pain duration, and receipt of compensation on short-term response to nerve block treatment for chronic back pain. *J Behav Med*. 2000;23:339–350.
23. Tomakowsky J, Carty JN, Lumley MA, Peters KM. The role of social constraints and catastrophizing in pelvic and urogenital pain. *Int Urogynecol J*. 2016;27:1157–1162.
24. Andrews J, Yunker A, Reynolds WS, Likis FE, Sathe NA, Jerome RN. *Noncyclic chronic pelvic pain therapies for women: comparative effectiveness*. Rockville (MD) 2012.

25. Yosef A, Allaire C, Williams C, et al. Multifactorial contributors to the severity of chronic pelvic pain in women. *Am J Obstet Gynecol*. 2016;215:760 e761-760 e714.
26. Thomten J, Lundahl R, Stigenberg K, Linton S. Fear avoidance and pain catastrophizing among women with sexual pain. *Womens Health*. 2014;10:571–581.
27. Lemieux AJ, Bergeron S, Steben M, Lambert B. Do romantic partners' responses to entry dyspareunia affect women's experience of pain? The roles of catastrophizing and self-efficacy. *J Sex Med*. 2013;10:2274–2284.
28. Dunn GE, Hansen BL, Egger MJ, et al. Changed women: the long-term impact of vaginal mesh complications. *Female Pelvic Med Reconstr Surg*. 2014;20:131–136.
29. Bhana N, Thompson L, Alchin J, Thompson B. Patient expectations for chronic pain management. *J Prim Health Care*. 2015;7:130–136.
30. Myers SS, Phillips RS, Davis RB, et al. Patient expectations as predictors of outcome in patients with acute low back pain. *J Gen Intern Med*. 2008;23:148–153.

Ervin Kocjancic, MD, University of Illinois at Chicago, Department of Urology. 840 S Wood Street, 515 CSN, Chicago, IL 60612, United States

<https://doi.org/10.1016/j.urology.2018.05.051>
UROLOGY 124: 89, 2019. © 2018 Elsevier Inc.



AUTHOR REPLY

Without doubt, substantial controversy surrounds mesh, its efficacy and the potential complications arising from its use. This study did not seek to address the utility of mesh in pelvic floor repairs nor draw any new connections between the use of mesh and patient pain. While the incidence and severity of chronic pain following vaginal mesh placement is not clear, it is a well-accepted and frequently debilitating complication after mesh-augmented vaginal procedures. This study examined a selective population, almost all of whom had substantial chronic pain as a complication after mesh-augmented vaginal surgery, to identify modifiable factors contributing to the patient's experience and recovery. The most significant feature associated with a poorer outcome was the degree of catastrophization by the subject, which varied substantially despite relatively similar pain levels.

Perhaps the most interesting feature of our results is the association of greater catastrophization with sexual pain. There exists a large body of evidence demonstrating increased catastrophization among women with dyspareunia and/or vestibulodynia¹ and exploring the significant negative impact of this pain-related psychosocial factor in magnifying the patient's pain experience.² Most of these studies, however, have examined patients with dyspareunia in comparison to patients without pain. Within our cohort, however, the large number of subjects allowed for a comparison of well-matched patients with similar pain levels in the same body region, differing primarily in the association of that pain with sexual relations. Thus, this study confirmed that sexual pain *in particular* is potently associated with negative beliefs toward pain and poorer attitudes towards recovery than other types of genitourinary pain. In fact, the combination of sexual pain and catastrophization is associated with altered systemic pain processing and generalized sensory dysregulation³ suggesting that the presence of dyspareunia may negatively impact other pain domains in these patients, which could serve as a significant barrier to recovery.

Our study reinforces the substantial body of data that sexual pain, regardless of its origin, remains a large factor in women's pain perception and overall emotional and physical health. Dyspareunia/sexual pain in any context remains underrecognized; education and discussion regarding these disorders remain poor in most clinical settings. However, just asking about it and recognizing it as an important aspect of the patient's pain is the beginning of working to manage the self-effacing impact of sexual pain on patient well-being. A detailed characterization of the pain should include the location and nature of that pain, including inciting factors such as intercourse, as well as exploration of the patient's perception of the pain, which needs to include an assessment of catastrophization.

A multitude of options exist for the management of catastrophization after its recognition; greater incorporation of multidisciplinary care may ease negative perceptions and help break the cycle of pain that is reinforced by catastrophization. But only

EDITORIAL COMMENT



In the past decade, we witnessed a dramatic change in female pelvic surgery. We started by offering slings and meshes to all the patients that needed a procedure to correct stress urinary incontinence and pelvic organ prolapse, and ended up banning them all. The complications correlated with mesh surgery were so dramatic that some national regulating bodies around the world interdicted their use. Many pelvic floor surgeons encountered a new clinical entity, known as “mesh-o mania”. Many patients, even the ones with a perfectly successful outcome and without complications, asked meshes to be removed. The real incidence of the complications associated with mesh surgery is not really known. There are clear outcome advantages in the use of meshes compare to the procedures we used in the pre-mesh era: stress urinary incontinence and correction of the apical components of the vagina are some examples of it.

Therefore, there must be something more than a solely interaction between the mesh and patient's body to explain the complication rates for this surgery. The current article explores precisely this issue, namely how can patient's perception of the events influence surgical outcome. Some patients experience surgery and post-operative pain due to an exaggerated mental thought process known as “catastrophization”. This psychic condition could be the actual cause of development of chronic pain, disability and depression in some of the patients with mesh surgery complications. Pelvic surgeons are not the only ones who are dealing with this entity. Catastrophization is actually well-known in many other surgical specialties. The good news is that there are tools such as questionnaires that can be used to identify these patients and offer them a proper treatment. Interestingly, the authors found in their study a higher incidence of catastrophizing among patients complaining of dyspareunia and, more in general, of vaginal pain. Patients with a high catastrophizing scores had a decreased hope and an unrealistic expectation for recovery. The outcome of our procedure clearly does not depend solely on the surgical act. Proper patients counseling and managing expectations is as important as the surgical skills used in treating our patients. We should become familiar with the variety of non-surgical techniques such as biofeedback, relaxation techniques, mindfulness, meditation, and coopt them in our everyday practice.

with an appreciation of the patient's experience can we empower her to take positive steps towards recovery.

Ariel Moradzadeh, MD, Juzar Jamnagerwalla, MD, Karyn S. Eilber, MD, Jennifer T. Anger, MD MPH, A. Lenore Ackerman, MD PhD, Division of Urology, Department of Surgery, Cedars-Sinai Medical Center, Los Angeles CA

References

1. Desrochers G, Bergeron S, Khalife S, Dupuis MJ, Jodoin M. Fear avoidance and self-efficacy in relation to pain and sexual impairment

in women with provoked vestibulodynia. *Clin J Pain*. 2009;25(6):520–527.

2. Alappattu MJ, George SZ, Robinson ME, Fillingim RB, Moawad N, LeBrun EW, et al. Painful intercourse is significantly associated with evoked pain perception and cognitive aspects of pain in women with pelvic pain. *Sex Med*. 2015;3(1):14–23.
3. Granot M, Friedman M, Yarnitsky D, Zimmer EZ. Enhancement of the perception of systemic pain in women with vulvar vestibulitis. *BJOG*. 2002;109(8):863–866.

<https://doi.org/10.1016/j.urology.2018.05.052>
UROLOGY 124: 89–90, 2019. © 2018 Elsevier Inc.