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Patient-centered Treatment Decisions for Urethral Stricture: Conjoint Analysis Improves Surgical Decision-making

Lindsay A. Hampson, **Isabel E. Allen**, **Thomas W. Gaither**, **Tracy Lin**, **Jie Ting**, **E. Charles Osterberg**, **Leslie Wilson**, and **Benjamin N. Breyer**

Philip R. Lee Institute for Health Policy Studies, Department of Urology, UCSF School of Medicine, San Francisco, CA; the Department of Epidemiology & Biostatistics, UCSF School of Medicine, San Francisco, CA; the UCSF School of Medicine, San Francisco, CA; the Department of Clinical Pharmacy, UCSF School of Pharmacy, San Francisco, CA; and the Department of Urology, UCSF School of Medicine, San Francisco, CA

Abstract

OBJECTIVE—To determine whether the use of a choice-based conjoint analysis (CA) exercise decreased patients' decisional conflict about treatment preferences for surgical management of urethral stricture disease. Understanding patient preferences for treatment decisions assists in shared decision-making and emphasizes patient-centered outcomes. CA offers a method to understand what risks patients are willing to take for what gains.

METHODS—The CA methodology was used by providing participants with case-based choices to elucidate the relative importance that individuals place on various treatment aspects. Patients' decisional conflict regarding surgery for urethral stricture was assessed before and after the CA exercise to assess the impact the exercise had on their decisional conflict.

RESULTS—Completion of the CA exercise resulted in a significant decrease in decisional conflict ($P < .001$). The majority (59.5%) of participants with decisional conflict before the CA exercise experienced a decrease in decisional conflict afterwards, with only a minority (16.5%) experiencing new decisional conflict after the exercise. Participants felt the choice-based CA exercise was helpful in deciding what was important in making treatment decisions (70%) and in expressing their priorities and treatment preferences (82%). The number needed to counsel to achieve a decrease in decisional conflict was 1.69 and to achieve no decisional conflict was 3.65.

CONCLUSION—Choice-based CA improves patients' ability to express their treatment preferences and decreases decisional conflict. CA may be a new tool that physicians and patients can use to aid in shared decision-making with a focus on patient-centered outcomes.

Healthcare decisions inevitably involve trade-offs of risks and benefits, and these trade-offs become particularly important when evaluating treatment options for medical conditions that have a significant quality-of-life impact. Understanding patient preferences for treatment

Address correspondence to: Lindsay A. Hampson, M.D., Philip R. Lee Institute for Health Policy Studies, Department of Urology, UCSF School of Medicine, 400 Parnassus Ave., Box 0738, San Francisco, CA 94143-0410. Lindsay.Hampson@ucsf.edu.

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decisions and considering what aspects of treatment patients value thus become integral to the decision-making process.[1–3] Seeking to understand patients' preferences helps to move toward shared decision-making between patients and physicians by placing an emphasis on patient-centered outcomes, which may improve patients' satisfaction with clinical outcomes by giving them a more realistic understanding of the risk-benefit profile of various treatment options.[2,4]

In facing treatment decisions, patients are faced with potentially difficult decisions that require weighing the benefits and harms of treatment options. Patients may have uncertainty around these decisions given that they have to navigate the potential up- and downsides of several treatment choices. Decisional conflict is a term that has been described to reflect the uncertainty that patients have when making a treatment decision.[5] Decisional conflict scales have been developed to capture this phenomenon, and these scales can be utilized as a tool to understand and describe the level of comfort that patients have with making a treatment choice.[6,7]

Methods to promote shared decision-making and decrease decisional conflict include using patient decision aids to help patients understand the relevant benefits and harms of treatment decisions.[8] Choice-based conjoint analysis was originally an analytical method used in market research to investigate which attribute of a product is the most influential for consumers making a product choice. This methodology has recently been applied to clinical research as a method to understand patients' treatment preferences and what risks patients are willing to take for which treatment gains.[9–15] The conjoint analysis model provides patients with iterative case-based choices to elucidate the relative importance and ranking that individuals place on the various aspects, or attributes, of treatment alternatives. These rankings potentially offer valuable insight in choosing therapies that best meet patients' objectives and can potentially help both patients and physicians determine what patients are willing to sacrifice to reach those outcomes. In this way, the case-based conjoint model may be able to serve as a decision tool by enhancing patients' knowledge about their disease process and management options, elucidate their treatment values, and understand their own risk aversion when it comes to possible side effects or complications of treatment.

We applied the choice-based conjoint model to urethral stricture disease, a condition which can have a significant impact on quality of life and has several management options that have various trade-offs in terms of risks and benefits.[16] Two of the mainstays of surgical treatment include incision of the urethral stricture with direct vision internal urethrotomy or urethral reconstruction with urethroplasty.[17] Differences in these treatment options include the extent of the procedure, the duration of the postoperative catheterization, recovery time, and overall success rate. Understanding and weighing these treatment options with varied risks and benefits can be understandably difficult for patients, particularly when the disease process and treatment options may impact quality of life.

In this study, we hypothesized that the process of the choice-based conjoint survey would decrease participants' decisional conflict and improve patients' decision-making ability regarding treatment preferences for surgical management of urethral stricture disease.

METHODS

Male patients with urethral stricture disease completed a three-part anonymous online survey consisting of (1) an assessment of decisional conflict regarding surgical management of urethral stricture disease, (2) a choice-based conjoint analysis exercise, and (3) a reassessment of their decisional conflict and evaluation of the usefulness of the conjoint analysis process. Demographic and past treatment data were also collected, including age, race or ethnicity, education, and employment status. We assessed marital status, income, prior procedures for urethral stricture management (urethral catheter, suprapubic tube, urethral dilation, direct vision internal urethrotomy, urethroplasty), and urinary quality of life score at worst and current state (assessed by the International Prostate Symptom Score[18] quality of life question: "If you were to spend the rest of your life with your urinary condition the way it is now, how would you feel about that?"). An institutional review board approval was obtained for this study.

Surveys were completed either in the physician's office or at home depending on patient preference. Before completing the conjoint analysis exercise, patients received pictorial and descriptive education about the two treatment options that were being studied: internal urethrotomy and urethroplasty. They were also provided with a reference guide to use while completing the choice-based conjoint analysis exercise, which described the treatment attributes that were being studied: extent of procedure, long-term success, possible future procedures, catheter duration, time to recovery, and patient co-pay cost (Fig. 1). The conjoint analysis exercise then provided a series of 18 treatment scenarios to evaluate patient preferences for treatment of urethral stricture disease (Fig. 2). An additional control question was used as a surrogate to identify lack of understanding of the conjoint choice-based scenarios; participants were excluded if they did not answer that question appropriately.

We evaluated for decisional conflict using the validated SURE scale (each question is worth 1 point if answered "yes," with a score of 4 corresponding to absence of decisional conflict and <4 corresponding to presence of decisional conflict).[6,19] (#1 "Do you feel SURE about the best choice for you?", #2 "Do you know the benefits and risks of each options?", #3 "Are you clear about which benefits and risks matter most to you?", #4 "Do you have enough support and advice to make a choice?" with a "yes" response providing 1 point and a "no" response providing 0 point.)

We assessed the usefulness of the conjoint analysis process by asking a series of two yes/no questions that have previously been used in conjoint analysis for prostate cancer decision-making ("This choice survey would help me decide what was important in making a treatment decision." "This choice survey would allow me to express my priorities and preferences for different possible outcomes and side effects of surgery for urethral stricture disease.")[20]

Categorical variables were summarized using counts and percentages, and the chi-square statistic was used to test for lack of independence between variables. Differences between proportions were tested using the z-test. For continuous variables, means and standard deviations were used to summarize the data, and analysis of variance controlling for multiple

comparisons was used to test differences in means by categorical variables. All tests were two-sided, with .05 used as the threshold for statistical significance. The study sponsors had no role in study design, data collection, interpretation, or reporting.

RESULTS

One hundred ninety-one patients elected to participate in the study; of those who initiated the survey, 89% (169 out of 191) finished the survey and correctly answered the control question, for a total of 169 participants in the final analysis (Table 1). Prior to completing the choice-based survey, 50% (N = 84) reported having decisional conflict about what treatment option to pursue, whereas after the conjoint analysis only 44% (N = 75) had decisional conflict ($P < .01$). Of participants with decisional conflict pre-survey, 60% had a higher SURE score post-survey, indicating less decisional conflict (mean increase in SURE score of 1.1), whereas only 12% had a lower SURE score post-survey, indicating more decisional conflict (mean decrease in SURE score of 0.2). Of the participants without decisional conflict pre-survey, the vast majority (84%) had no change in their SURE score post-survey and the remainder had a decrease in their SURE score (mean decrease in SURE score of 0.3) (Table 2).

Individuals who had decisional conflict before the conjoint exercise compared to those without pre-exercise decisional conflict were significantly more likely to have no history of urethroplasty ($P < .01$). Those who had decisional conflict after the conjoint exercise compared to those without post-exercise decisional conflict were more likely to have undergone urethral dilation ($P = .03$) and be younger ($P < .01<$).

The vast majority (70%) of participants felt that the choice-based conjoint analysis exercise was helpful in deciding what was important in making a treatment decision, and 82% felt that it helped them express their priorities and preferences for side effects and outcomes of surgical management. Of those participants with decision conflict before the choice-based conjoint analysis exercise, 66% agreed that the survey helped them decide on what was important ($P = .04$) and 82% agreed that it helped them express their priorities ($P = .06$). To understand the impact of the choice-based survey as a decision tool in terms of how many people need to be counseled to gain improved understanding, we calculated the number needed to counsel. To achieve *any* decrease in decisional conflict, the number needed to counsel would be 1.7 individuals, and the number needed to counsel to attain *no* decisional conflict would be 3.7.

DISCUSSION

We found that the process of choice-based conjoint analysis improves patients' ability to make treatment decisions and to express their treatment preferences, and decreases decisional conflict. Our findings show that the process of answering choice-based scenarios helps patients elucidate what benefits are important and what risks are acceptable to them when making treatment decisions. The Institute of Medicine and the American Urological Association have promoted shared decision-making and the use of decision aids as a goal for physicians to better improve patient understanding and satisfaction.[21,22]

A recent Cochrane review on decision aids for patients facing medical decisions showed that decision aids overall increased patients' knowledge, and if a decision aid was focused on clarifying patients' values a higher proportion of patients ultimately made choices that correlated with their values (relative risk: 1.51; 95% confidence interval: 1.17–1.96).[8] The iterative case-based method of conjoint analysis in this way serves to clarify values by requiring patients to prioritize treatment attributes according to their own values. The Cochrane review also showed that the use of decision aids results in lower decisional conflict, and this is supported by our data, which showed that the use of conjoint survey improved decisional conflict in the vast majority of patients. We speculate that even those who had decreased decisional conflict after the survey may still have been better informed with improved identification of their treatment goals and values after the process. The number needed to counsel for a decrease in decisional conflict was only 1.7, and in a setting where this less than 10-minute exercise could be performed outside of the clinicians' office this offers an inexpensive, feasible method of counseling and value-setting that can improve patients' understanding and goals of treatment.

Studies have shown that decision aids that focus on elucidating patients' values not only improve patient decision-making, but also improve patient-physician communication.[23–28] Although conjoint analysis has thus far been used as an analytical technique to determine treatment preferences, our results offer a potential new use for conjoint analysis as a practical decision support mechanism. As much as patients are helped by the process of defining their values and goals, if this information can then be provided to the physician caring for these patients, physicians can gain a better understanding of patient goals and hopefully better orient their discussion and treatment options toward individual patients' values. During a short office appointment, ferreting out these treatment goals can be difficult, and this tool might allow both patients and physicians to gain a better mutual understanding that could then inform a discussion about management options. For example, if patients went through a choice-based conjoint exercise prior to an initial clinic consultation visit, and then brought the results of their conjoint exercise showing their treatment attribute preferences to the clinic appointment, this could facilitate a more patient-centered discussion about treatment options, risks, and benefits in the office consultation. Future research will need to be done to validate the conjoint choice-based survey as a decision aid.

Our study is limited in that a large minority (74 out of 169, 44%) of the patients who answered the survey had already undergone some type of treatment for urethral stricture disease, so this does not represent a true assessment of untreated patients. However, a sensitivity analysis showed that the decrease we saw in decisional conflict after completing the choice-based conjoint survey stayed true whether or not participants had previously undergone previous stricture-related procedures, such as urethroplasty, internal urethrotomy, or dilation. Furthermore, 24 of 169 (14%) had undergone all three procedures, and these participants did not have any differences in their survey responses compared to individuals without any prior treatment.

In addition, although the effect of completing the conjoint exercise was significant in terms of decreasing decisional conflict, the number of participants who had decisional conflict

before the survey and transitioned to absolutely no decisional conflict after the survey (SURE score of 4) was smaller; 23 of the 84 participants who started with a SURE score ≤3 increased their score to a 4 after completing the choice-based survey. The measure we used for decisional conflict sets a high bar for lack of decisional conflict, requiring the participant to answer yes to all questions. However, these results are more robust when taking into account all participants who had any decrease in decisional conflict, in other words improvement in their SURE score. Ultimately, the SURE score could be utilized as a pretest to identify people who need further counseling and may benefit more from the choice-based conjoint exercise.

Finally, our study was limited to those participants with English-language and computer literacy. However, given the participants' range of education, age, and income, we feel that our study population is representative of the urethral stricture treatment population and believe that these results can be generalizable despite these limitations.

Our study also has many strengths. Our population exclusively comprised patients with urethral stricture disease rather than assessing a general population without intimate knowledge of stricture disease. In addition, it is the first study we know of that seeks to evaluate the usefulness of conjoint analysis for patient decision-making.

Moving forward, choice-based conjoint decision surveys may represent a new tool to use in defining patient preferences, promoting shared patient-physician decision-making, and improving decisional conflict. In addition to evaluating the effect that decision aids have on patients, we must also evaluate the impact that physicians observe on their patients' understanding of treatment choices and treatment preferences after having completed a choice-based conjoint survey, the effect on physicians in terms of ease of counseling, and ultimately the translation to patient satisfaction with treatment outcomes. In an era where patient-centered outcomes are highly valued, conjoint analysis could serve to expand the repertoire for shared decision-making.

CONCLUSION

We found that administration of a choice-based conjoint analysis exercise resulted in a significant decrease in decisional conflict about surgery for urethral stricture. The conjoint exercised helped participants decide what was important in making treatment decisions and express their priorities and treatment preferences. In the future, conjoint analysis may be useful as a decision support mechanism to help patients clarify their own treatment goals, understand their own personal risk assessments, prioritize treatment attributes, and potentially improve communication of these aspects with their physicians.

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ATTRIBUTE	DESCRIPTION	OPTIONS	DESCRIPTION
Extent of Procedure	Describes the surgical approach of the operation and if a hospital stay is required after surgery	Endoscopic incision (come-and-go)	• In this procedure, the surgeon will place a cystoscope in through your penis to cut open the scar tissue from the inside of the urethra. • This procedure is come-and-go (does not require a hospital stay).
		Open reconstruction (1 hospital night)	• In this procedure, the surgeon will make a skin incision under the scrotum and will cut open the urethra to repair the scar tissue. • This procedure requires a 1-night hospital stay.
Long-term success	The chance you will have long-term success after the procedure. Success means that you will be able to urinate without obstruction in the long-term.	85% success rate	85% (or 85 out of 100 people) will be able to urinate without obstruction after this procedure
		50% success rate	50% (or 50 out of 100 people) will be able to urinate without obstruction after this procedure
		25% success rate	25% (or 25 out of 100 people) will be able to urinate without obstruction after this procedure
Possible Future Procedures	Describes the number of endoscopic procedures you may need to undergo in the future to continue to urinate without obstruction in the long-term	0 future procedures	No procedures needed in the future to allow you to continue to urinate without obstruction
		1 future procedure	One procedure may be needed in the future to allow you to continue to urinate without obstruction
		5 future procedures	Five procedures may be needed in the future to allow you to continue to urinate without obstruction
		10 future procedures	Ten procedures may be needed in the future to allow you to continue to urinate without obstruction
Catheter Duration	Amount of time you will have a urinary (foley) catheter after your procedure	No catheter needed	You will not have a catheter
		Catheter for 1 week or less	You will have a catheter for one week or less
		Catheter for 3 weeks	You will have a catheter for three weeks
Time to Recovery	Amount of time until you are able to return to *all* of your normal activities without restriction. This includes heavy lifting, exercise, and sexual activity.	No recovery	You can resume all of your normal activities right away
		2 weeks recovery	You will have to wait 2 weeks until you can resume your normal activities without restrictions
		6 weeks recovery	You will have to wait 6 weeks until you can resume your normal activities without restrictions
		12 weeks recovery	You will have to wait 12 weeks until you can resume your normal activities without restrictions
Copay Cost to You	When you are insured, the total amount of money *you* would have to pay. This includes all costs related to the procedure, including clinic visits, diagnostic evaluation, the surgery and hospital stay, & medications.	You pay $0 (nothing)	Your insurance would pay for everything
		You pay $500	You would have to pay $500 of your own money in addition to what your insurance pays
		You pay $1,000	You would have to pay $1,000 of your own money in addition to what your insurance pays
		You pay $10,000	You would have to pay $10,000 of your own money in addition to what your insurance pays

Figure 1.

Reference guide provided to patients before participating in the conjoint analysis exercise. Participants were required to acknowledge understanding of each attribute before proceeding with the exercise.

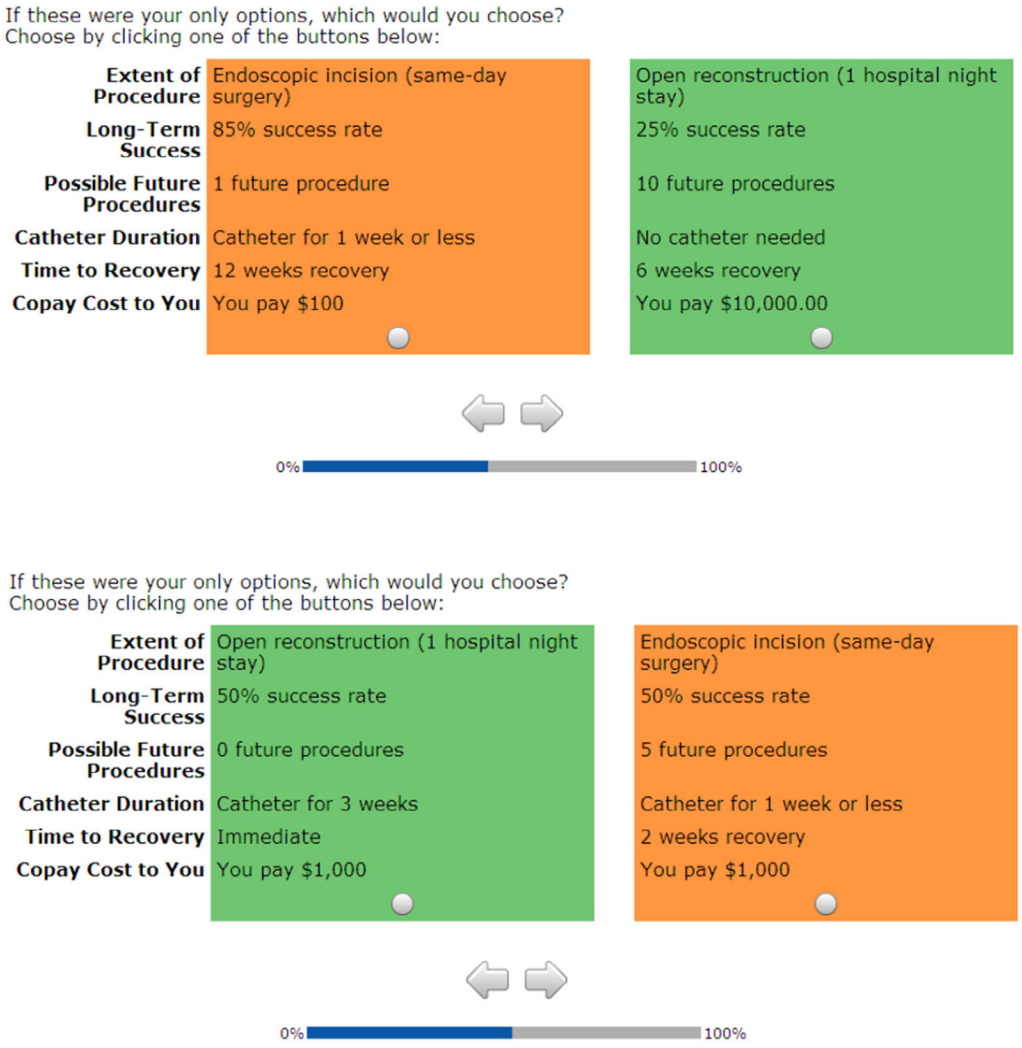

Figure 2.

Examples of two case-based scenarios offering a choice between two randomly generated treatment options. Attributes are listed along the left, and each choice scenario was generated with changes in the attribute level to elicit patient preferences. (Color version available online.)

Table 1.

Participant demographic and treatment data

Participant Demographic and Treatment Data	
Characteristic (N = 169)	**n (%)**
Age, mean (y) ± 95% confidence interval	59.2 ± 17.2
Race, n (%)	
Asian	16 (9.5)
Black/African American	10 (5.9)
White	122 (72.2)
Other	13 (7.7)
Missing/Unknown	8 (4.8)
Education, n (%)	
High school graduate or less	55 (32.5)
Technical school graduate	18 (10.7)
College ± postgraduate	96 (56.8)
Employment, n (%)	
Employed/Self-employed	77 (45.6)
Retired	66 (39.1)
Other (out of work, student, not working, disability)	26 (15.4)
Marital status, n (%)	
Married/Partnered	122 (62.2)
Divorced/Widowed	17 (10.1)
Never married	28 (16.6)
Missing	2 (1.2)
Income, n (%)	
<$50,000	49 (29.0)
$50,000-< $100,000	48 (28.4)
>$100,000	61 (36.1)
Missing	2 (1.2)
Past treatments	
Urethral dilation	74 (43.8)
Internal urethrotomy	72 (42.6)
Urethroplasty	86 (50.9)
Urinary quality of life (0–6 scale)	
At worst	0.85 ± 1.3
Currently	3.16 ± 2.0

Table 2.

SURE scores pre- and postchoice-based survey

		SURE Post					Total (N)	Change in SURE Score (Mean Change in Score)		
		0	**1**	**2**	**3**	**4**		**Increase**	**Decrease**	**No Change**
SURE Pre	0	10	9	2	1	5	27	17 (1.3)	n/a	10
	1	3	2	5	4	6	20	15 (1.6)	3 (0.3)	2
	2	0	2	7	6	3	18	9 (0.7)	2 (0.1)	7
	3	1	1	2	6	9	19	9 (0.5)	4 (0.2)	6
	4	2	2	4	6	71	85	n/a	14 (0.3)	71
Total (N)		16	16	20	23	94	169	50	23	96