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Use of Conjoint Analysis to Determine Patient Preferences for Surgical Treatment of Urethral Stricture Disease

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Abstract

Introduction: Understanding patient preferences for characteristics of treatments facilitates patient participation and doctor-patient communication and enhances patient-centered care. Patient participation is especially important for urethral stricture disease, which has no definitive treatment guidelines favoring either endoscopic incision or open reconstruction, making patient preference an important factor in treatment choice. However, to date, there have been no studies assessing factors that patients value when choosing a treatment option.

Methods: We employ choice-based conjoint analysis to assess patient preferences in the trade-offs of treatment attributes for urethral stricture disease. Male patients undergoing treatment or follow-up examination for urethral stricture disease were recruited through a University Medical Practice. We included 169 patients in the analysis. Six attributes of both risk and benefit were examined: treatment type, success rate, number of future procedures, post-treatment catheter duration, recovery time, and copayment amount.

Results: The treatment success rate was by far the most important attribute. Relative to a 25% success rate (OR = 1) an 85% success rate (OR = 26.72, $p<.01$) increased patient preference by approximately 27 times. Furthermore, patients are willing to pay a $10,000 copayment to double the success rate from 25% to 50%. Patients demonstrated a strong aversion to time with a urinary catheter. Catheter duration for 1 week or less (OR = .67, $p<.01$) reduced patient preference by about 1.5 times when compared to requiring no catheter. We also found that patients place low importance on both how invasive the treatment seems and low copayment amounts but are willing to pay $10,000 copayment for an open reconstruction surgery compared with an endoscopic incision procedure.

Conclusion: The findings highlight the importance of shared and detailed physician/patient discussions of all the risk and benefits of each treatment choice and suggest that conjoint analysis

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may be helpful as a decision aid to guide discussions with individual patients deciding on a treatment.

Keywords

Urethral stricture disease; open reconstruction/ urethroplasty; endoscopic incision/ direct vision internal urethrotomy (DVIU); choice based conjoint analysis; patient-centered care; patient preference; United States

Introduction:

In 2001, the Institute of Medicine Report[1] introduced patient-centered care as one of the fundamental approaches to improving the quality of healthcare in the U.S.[2] The Patient Protection and Affordable Care Act (ACA) has reinforced this patient-centeredness with its policies of performance payments, patient-centered outcomes, and focus on prevention.[3] To encourage patient participation and facilitate patient-centered care, it is important for clinicians to understand patient preferences. Conjoint analysis, which is becoming increasingly popular in the medical fields, is one of the most comprehensive ways to analyze patients' decision-making process.[4] The method, which induces patient participation, has been utilized in various medical fields, successfully advancing the understanding of patient preferences[5–13]. Furthermore, the methodology has been used by the United States Food and Drug Administration to collect evidence and incorporate patient preference into regulatory decision-making. In this study, we used a choice-based conjoint (CBC) analysis methodology to examine preferences for treatment characteristics of patients with urethral stricture disease.

Male urethral stricture disease is a common disease with prevalence rate of 0.6% in susceptible populations.[14] 10 out of 100,000 men in their youth, 20 out of 100,000 men by the age of 55 years, and 100 out of 100,000 men over the age of 65 years are likely to experience the disease, which can severely influence patient quality of life.[15] Without adequate treatment, stricture disease can result in significant complications, such as infection, bladder stones, and renal failure. In 2000, the cost of the disease was approximately $200 million, excluding medication costs. [14]

There are no definitive guidelines for treating urethral stricture disease.[15] Endoscopic incision (also called direct visual internal urethrotomy (DVIU)) and open reconstruction (also called urethroplasty) are the two common treatments, which differ by procedure invasiveness and frequency, costs, side effects, surgical recovery, and long-term outcomes.[16] When deciding on a treatment, urologists consider patients' treatment history, the length and location of the stricture, and etiology of the stricture disease.[17–18] The communication between urologists and patients as well as patients preferences after discussions with urologists about the life consequences of each treatment will also influence what therapy is ultimately delivered to patients since many patients are potential candidates for both open reconstruction and endoscopic incision. Therefore, patient participation and preference can be an important determinant of selected treatment and its associated risks and benefits.

Thus far, there have been no studies such as this one assessing factors that patients value when choosing a urethral stricture treatment option. Understanding the relative importance of these factors and their role in the decision-making process of patients contributes to the quality of care. The knowledge allows urologists to highlight the treatment characteristics and potential alternatives based on the patients expressed value of factors of risk and benefit. This allows urologists to provide more personalized counseling rather than a "one size fits all" medical recommendation. The aim of this study is to compare patient preferences for the attributes describing the risks, benefits, and costs of two main treatments for urethral stricture disease: endoscopic incision and open reconstruction.

Material and Methods:

Study Sample

Male patients undergoing treatment or follow-up examination for urethral stricture disease were recruited from a single surgeon's reconstructive clinic between July 22, 2014 and November 13, 2014. These patients were invited to participate in an online choice-based conjoint analysis exercise which was formulated based on input from urologists and patient interviews. Based on the resulting attributes and levels included in our conjoint measure, the sample goal was 250 patients. 203 patients agreed to participate and 183 patients fully completed the online survey. 14 patients were excluded from the final analysis as they did not answer correctly the two questions designed to demonstrate understanding of the survey, resulting in 169 patients in the final analysis. Patients completing the survey were entered into a raffle to receive an iPad. The University Committee on Human Research approved the study.

Development of CBC Preferences

The CBC survey was developed using web-based Sawtooth Software[18–19] and followed the good practice guideline.[20] We adopted a random, full profile balanced overlap CBC design to maximize obtainable information for each response. The CBC survey (Appendix A) presented participants with a series of 18 different pairs of treatment scenarios and asked to choose the preferred treatment of each pair. (Figure 1). We designed two fixed scenarios; one which compared all desirable with all not desirable attributes to determine who did not understand the conjoint exercise, and the other which was a realistic scenario designed to assess which treatment patients would choose between all endoscopic incision attributes and all open reconstruction attributes. We removed patients who illogically and incorrectly answered the fixed choice pair purposely skewed towards one choice based on rational and reasonable decision-making. Before completing the CBC, participants reviewed educational materials (Appendix D) describing the attributes of the two treatment options. Participants also received a reference guide (Appendix B) of definitions to use as they went through the CBC.

CBC is an increasingly utilized methodology to evaluate patient preference in healthcare decision-making.[6, 18–20] This method systematically elicits risk-benefit trade-offs and quantifies the relative preferences and risk acceptance for attributes of medical interventions.[23] CBC is based on the theory that patients will choose the combination of

attributes that maximizes their utility. A patient choice is associated with the total utility, which is a summation function of the utilities contributed by each attribute of that choice. As such, patient choices and preference for attributes chosen during CBC surveys implicitly reveal the relative preferences for specific characteristics of a medical intervention.[6] We constructed our CBC survey to mimic the decision-making process of patients with urethral stricture disease choosing a treatment procedure.

Administration of CBC

In the computer based CBC survey, patients indicated their preferences by choosing between two hypothetical profiles, which consist of randomly selected levels within each fixed set of the six attributes. The levels of attributes within each hypothetical choice pair were created employing a balanced overlap method, which purposely forgoes some efficiency to allow for some overlap in choice tasks. The overlap presents an advantage as it improves the efficiency for detection of first-level interaction effects.[6] The overlap is also advantageous in that it accounts for respondents who simplify the decision-making task always to select based on one attribute; the overlap forces these respondents to make a choice using other attributes.[24]

Determination of Attributes and Levels

Clinician surgeons identified the attributes of both risk and benefit that were the most important to patients with urethral stricture disease (Appendix C). These factors were presented to a series of patients who had urethral stricture disease and had undergone treatment, to determine what attributes were the most important to this class of patients. The process led to a revision and resulted in the final 6 attributes, which include 3 risk attributes: 1) extent of procedure (more or less invasive), 2) number of possible future procedures, 3) post-treatment catheter duration, 2 benefit attributes: 1) long-term success rate, 2) time to recovery, and a cost attribute 6) copayment amount. The levels under each attribute were selected to include realistic rates and amounts as well as to allow for assessment above and below the actual realistic levels to check for linearity. We also kept both the number of attributes to 6 and the number of levels within each attribute to 3 or 4 in order to increase validity by making the choice tasks easier for the patients.

Description of Instrument Content

Each patient was presented with choices across the same 6 attributes, but different attribute levels and included 1) extent of procedure/treatment type (open reconstruction (i.e. urethroplasty) and endoscopic incision (i.e. direct visual internal urethrotomy)), with open reconstruction being the more invasive option, 2) success rate (25%, 50%, 85%), 3) number of possible future repeat procedures (0, 1, 5, and 10), 4) post-treatment catheter duration (no catheter needed, catheter needed for 1 week or less, and catheter needed for 3 weeks), 5) time to recovery (immediate, 2 weeks, 6 weeks, and 12 weeks), and 6) the copayment amount ($0, $100, $1,000, and $10,000). The levels and attributes were chosen to reflect the characteristics of open reconstruction and endoscopic incision procedures.

Data Analysis

This study employed a mixed-effects logistic regression model to analyze the CBC preferences. Mixed-effects logistic regression is logistic regression containing both fixed effects and random effects.[25] Mixed-effects models allow the slope of variables in the model to be random effects and calculated for subgroups or individuals before the slopes of variables for the population are estimated. This characteristic controls the within-group differences prior to estimating the between group effects. For this model, patient attributes were considered random effects. The model was chosen to account for the inter- and intra-person variability due to each patient answering multiple choice pairs.[6] A logistic regression was employed due to the dichotomous nature of the decision tasks. We present both the beta coefficient from the mixed effects logistic regression reflecting the estimated utility of each level of each attribute and also the odds ratio by calculating the exponential of the beta coefficients. The odds ratio (OR), represents the relative increased and decreased likelihood of a patient's choice for a level within an attribute. The baseline i.e. reference level OR was a value of 1. ORs greater than 1 indicate a positive preference and an increased likelihood of choice by a patient over the reference case, while ORs lower than 1 indicate a negative preference and a decreased likelihood of choice over the reference case.[6] The relative preferences for the levels within the six attributes are presented in term of beta coefficients and odds ratio (Table 2 Model 1 and Figure 3).

Results:

Patient Characteristics

Table 1* contains information on patient demographics and past treatments. The mean age is 59.2 years old. The majority are white (72.2%) with 9.5% Asians, 5.9% African-Americans, and 12.5% other or unknown. Most patients have college or higher education, though 32.5% are educated at high school or less and 10.7% are technical school graduates. Most (45.6%) of the patients are employed and have incomes greater than $100,000, although, 29.0% of the patients in the sample have income less than $50,000 annually. Lastly, most patients previously had some type of urethral procedure with 43.8% with previous urethral dilation, 42.6% internal urethrotomy, and 50.9% urethroplasty.

Patient Preferences

In order to evaluate patients' preference order for attributes, we calculated the relative attribute preferences. The coefficients for the levels within each attribute are not considered comparable across attributes; so we obtained the mean relative importance of each attribute by calculating the difference between the most important level and the reference level for each attribute and normalized to a value of ten, making them comparable despite the different attribute ranges. Figure 2 shows that among the six attributes studied, the treatment success rate was by far the most important attribute. The next most important attributes were copayment, and number of future procedures that would be needed, followed by catheter duration. The attributes of least importance were recovery time and procedure type. Patients' preference for no future procedure and patients' placement of low importance

*The information from Table is also in a previous paper by Hampson et al.

for recovery time indicates that patients would favor open reconstruction, which requires no future procedures but have a longer recovery time than endoscopic incision. Relative attribute preferences thus provide a direct comparison of what patients weigh the most, which helps initiate physician-patient discussion.

To further understand how patient preference varies across levels within each attribute we evaluated OR of each level. Patient preferences are statistically significant in the following attributes: success rate, future procedure, catheter duration, procedure type, and most of the levels within the copayment attribute. Relative to the lowest (25%) success rate (OR = 1) an 85% success rate (OR = 26.72, p<.01) increased patient preference by approximately 27 times, while anticipating a 50% success rate (OR=4.91, p<.01) increased patient preference by approximately 5 times. Patients clearly show that an 85% success rate is most strongly preferred is also their most heavily preferred attribute. Additionally, of the risk attributes, patients demonstrated the strongest aversion to time with a urinary catheter, which is commonly required after both endoscopic incision (typically for less than 1 week) and open reconstruction (for 3 weeks on average). Catheter duration for 1 week or less (OR = .665, p<.01) reduced patient preference by about 1.5 times when compared to requiring no catheter. The decrease in patient preference between a 1 week and 3 week catheter duration, however, was less strong but patients showed a strong preference for avoiding catheterization. Patients clearly showed decreasing preference as the number of procedures increased, but a stronger negative preference for going from 1 to 5 future procedures than going from 0 to 1 future procedure, and then less negative preference going from 5 to 10 future procedures (Figure 3). Patients disliked 5 future procedures (OR=.345, p<.01) more strongly than 1 (OR=.759, p<.01) and, of course, least prefer 10 (OR=.245, p<.01). This pattern of non-linearity in preference for future procedure suggests that patients primarily prefer to avoid the first catheter procedure, but once it is required, they are more indifferent to the subsequent ones.

The inherent risk of the invasiveness of a procedure was one of the least important attributes of patient preference. Patients showed a positive preference for open reconstruction (OR=1.23, p<.01). Nevertheless, the difference in patient preference was not as large as when compared to other attributes, making the preference to avoid an invasive treatment least important to patients except for recovery time. This finding suggests that patients are willing to look past this general description of the invasiveness of the procedures to make their decisions based on a more comprehensive set of attributes. Related to this, the long-term outcome benefits were clearly more preferred than the type of procedures invasiveness as demonstrated by patients' strong preference for 0 future procedure and high success rate.

Copayment was asked about to reflect whether or not this would affect one's choice of treatment procedure or its attributes. Patients' negative preference for copayment amount was not statistically significant until the copayment amount reached $1,000. Relative to no copayment, a $1,000 copayment (OR=.699, p<.01) decreased patient preference by approximately 1.4 (1.0/.699) times, while $10,000 (OR =.228, p<.01) decreased patient preference by about 4.4 (1.0/.228) times.

Patients did not have a statistically significant preference for time to recovery, which ranged from immediate to six weeks until recovery. Compared to the baseline of immediate recovery time, patients prefer 2 weeks recovery time (OR=1.043, p=.1), followed by 12 weeks (OR=.95, p=.09), then 6 weeks (OR= .87, p=.08), which is somewhat counter-intuitive.

Willingness to Pay

Our analysis demonstrates that patients were willing to make trade-offs between benefits and risks related to a treatment decision as demonstrated by comparing their utility weights. The beta coefficients from the logistic regression (Table 2 Model 2) can be interpreted as preference or utility weights, which measure the effect of the attributes on utility when all other attributes are held constant.[25] A positive beta coefficient indicates that the attribute is associated with higher willingness to pay preference whereas negative coefficients are associated with lower willingness to pay type preference.

While the invasiveness of the procedure is not the most important attribute, we found that individuals are willing accept a $1,000 co-payment ($\beta=-.36$, $p<.01$) for an open reconstruction surgery ($\beta=.21$, $p<.01$) rather than undergoing endoscopic incision. In addition, individuals are willing to pay $10,000 ($\beta=-1.48$, $p<.01$) to double their success rate from 25% to 50% ($\beta=1.59$, $p<.01$).

In addition to willingness to pay, we also evaluated disutility trade-offs. We find that undergoing 10 future procedures ($\beta=-1.41$, $p<.01$) has a similar disutility as having the copayment of $10,000 ($\beta=-1.48$, $p<.01$). Furthermore, having a catheter for 1 week or less ($\beta=-.41$, $p<.01$) has a similar disutility as copayment of $1,000 ($\beta=-.36$, $p<.01$).

In summary, while the estimates reflecting patient preferences were generally consistent with the natural ordering of the levels within the attributes based on the expected risks and benefits, some of their attribute preferences were surprising. All levels for treatment type, success rate, future procedures, and catheter duration attributes were statistically significant. For the copayment attribute, we found that a low copayment value of $100 did not significantly impact preferences, but for very high co-pays ($10,000) patients had a strong negative preference. The treatment benefits were most important, avoiding the risks of treatment (catheterization, and time to recovery, and treatment invasiveness) were also weighted as important to avoid, but with consideration for gaining the overall long-term positive outcome. Patients demonstrated that they were willing to undergo and pay for an invasive procedure for the longer outcome success gained. This finding has implications for the patient-surgeon communications around explanations of treatment options in preparation for the best treatment choice for each patient.

Realistic Treatment Groups:

To examine which actual treatment procedure is accompanied by characteristics that patients prefer, we adjusted the baseline for each attribute to reflect realistic scenarios for the risks and benefits likely for each actual treatment choice; open reconstruction and the less invasive endoscopic incision treatment. Table 3 shows the results from using open reconstruction and its most likely associated characteristics as the baseline comparator;

that is, 85% success rate, 0 future procedures, 3 weeks of catheter use, and 6 weeks recovery time as baseline. The results show that with the exception of catheter duration, patients prefer all the characteristics associated with the more invasive open reconstruction procedure. It is important to note that the decrease in patient preference between a 1 week and 3 week catheter duration, however, was less severe as when compared with not needing catheter at all, clearly showing a strong preference for avoiding the need for a catheter at all. The data show that overall patients prefer the attributes associated with open reconstruction compared to endoscopic incision.

Looking at the beta coefficients in Table 3, endoscopic incision has a similar trade-off in preference to the catheter duration of 1 week or less. That is, patients are willing to give up choosing endoscopic incision as a treatment if the catheter duration is 1 week or less. Similarly, the trade-off between endoscopic incision and 1 future procedure is comparable. The results suggest that patients would trade the preference for treatment type of shorter catheter duration and less future procedures. The finding highlights that patients care less about the invasiveness of the treatment than they do about the outcome of the treatment.

Discussion

This study is the first conjoint analysis study to examine patient preferences for urethral stricture disease treatments. We quantified the preference utility of each of the attributes that is crucial to making a treatment decision and compared their relative importance to understand different aspect of how patients weigh risks and benefits when deciding between open reconstruction and endoscopic treatment. Our findings have two important implications.

First, we show that patients place low importance on the type of treatment procedure itself or how invasive the procedure seems when it is described. This finding demonstrates that patients value other characteristics and outcomes more than the general invasiveness of the procedure. Our results show that patients make their decisions based on weighing the risks and benefits of all of the other attributes of the treatment choices rather than just wanting to avoid an invasive procedure at any cost. For example, patients show they might be willing to trade their preference for treatment type for fewer future repeat procedures as shown by their similar beta coefficients. This finding illustrates the importance for the physician and patient to discuss in detail the risk/benefit characteristics of each treatment type, rather than relying on a patient choice by just describing the nature and invasiveness of the treatment. It is crucial for physicians and other healthcare providers to communicate the accompanying risk and benefit characteristics of each procedure when assisting patients in medical decision-making.

Second, our study highlights that the long-term success rate is the most important consideration for patients as shown by their willingness to pay $10,000 to double the success rate from 25% to 50%. As Figure 3 illustrates, the preference is not linear throughout the range of success rates. There is a more significant increase from 50% to 85% success rate than from 25% to 50% success rate, which indicates that patients are willing to pay the copayment of more than $10,000 to increase the success rate from 50% to 85%.

Concomitantly, we also find that patients do not place high importance on copayment amount until the copayment is unrealistically high. The charge of the urethroplasty procedure itself is $1,085 and Diagnosis-Related Group fee schedule is $1,078 (Medicare payment by 53415 Current Procedural Terminology code 1992) and a $1,000 copayment amount would represent this total payment. Actual charges may be higher, however usual copayments range from 10% to 25% in Medicare for surgical procedures. Therefore, our results demonstrate that patients do not have a strong disutility for their likely copayment amount. We also find that patients are not overly concerned about recovery time for the procedure. This may be because our patient population was enriched with retired, not working, and/or not seeking employment individuals (55.5%). Patients do have strong aversion for needing any future repeat procedures or having any catheter time post-procedure all primarily attributes associated with endoscopic surgery. This pattern suggests that patients are willing to bear current discomfort and financial payments to avoid more prolonged discomfort and medical needs and as long as the overall outcome is better.

One of the potential limitations of our study is that in order to obtain a large enough sample size, we included both patients who were considering treatment for the first time, and those that had already undergone one of the treatments for urethral stricture disease. In our sample, 74 (43.8%) patients had urethral dilation, 72 (42.6%) patients had internal urethrotomy, and 86 (50.9%) patients had urethroplasty previously. This population however reflects a urologist practice as most patients who present to an urologist have already had at least one if not more treatments/procedures previously. But this sample does not represent untreated patient views alone but tells us what patients with urethral stricture disease prefer in general. Another possible limitation, as with all conjoint analyses, is how the different attributes were interpreted by each patient. The attributes were explained to the patient prior to undergoing the survey, and they also had a description of the attributes in front of them as they were taking the survey. Therefore, we felt the patient had adequate opportunity to interpret the attributes as we defined them.

Conclusion

This study contributes to the understanding of patient decision-making and highlights the importance of shared and detailed physician/patient discussions of all the risk and benefits of each treatment choice, including costs and show a preference for open reconstruction and it attributes. Utilizing conjoint analysis, which is an advantageous methodology for incorporating patient participation and patient preference, we demonstrate that patients do not place importance on the treatment type description itself (invasive surgery or less invasive endoscopic surgery) in the context of urethral stricture disease. Instead, patients highly value the treatment's expected outcomes and characteristics involving prolonged discomfort (catheterization) and need for repeat procedures. We quantified and compared the importance of different risk and benefit attributes associated with treatments for urethral stricture disease and show that high success rate and absence of future procedures are most preferred by patients in general and these are more commonly associated with patient preference for an open reconstruction procedure. We suggest that this conjoint measure may be helpful as a decision aid, providing the risk/benefit characteristics of each treatment type, to guide discussions with individual patients deciding on a treatment for strictures. We plan,

on a follow-up study to determine if completing this conjoint decision-making exercise prior to the visit with his physician may help in their shared decision-making discussions. Patient preferences may differ for each individual patient, and therefore listening to each patient's preference after discussions around these six attributes may assist each patient to make his best treatment choice.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Research highlights

- How patients trade-off the risks/benefits for urethral stricture disease treatments
- Patients show WTP preference for attributes of open reconstruction and endoscopic incision treatments
- Patients value success rate more than invasiveness of treatment
- Importance of shared and detailed physician/patient discussions emphasized
- Choice based conjoint analysis facilities patient participation and patient-centered decision making

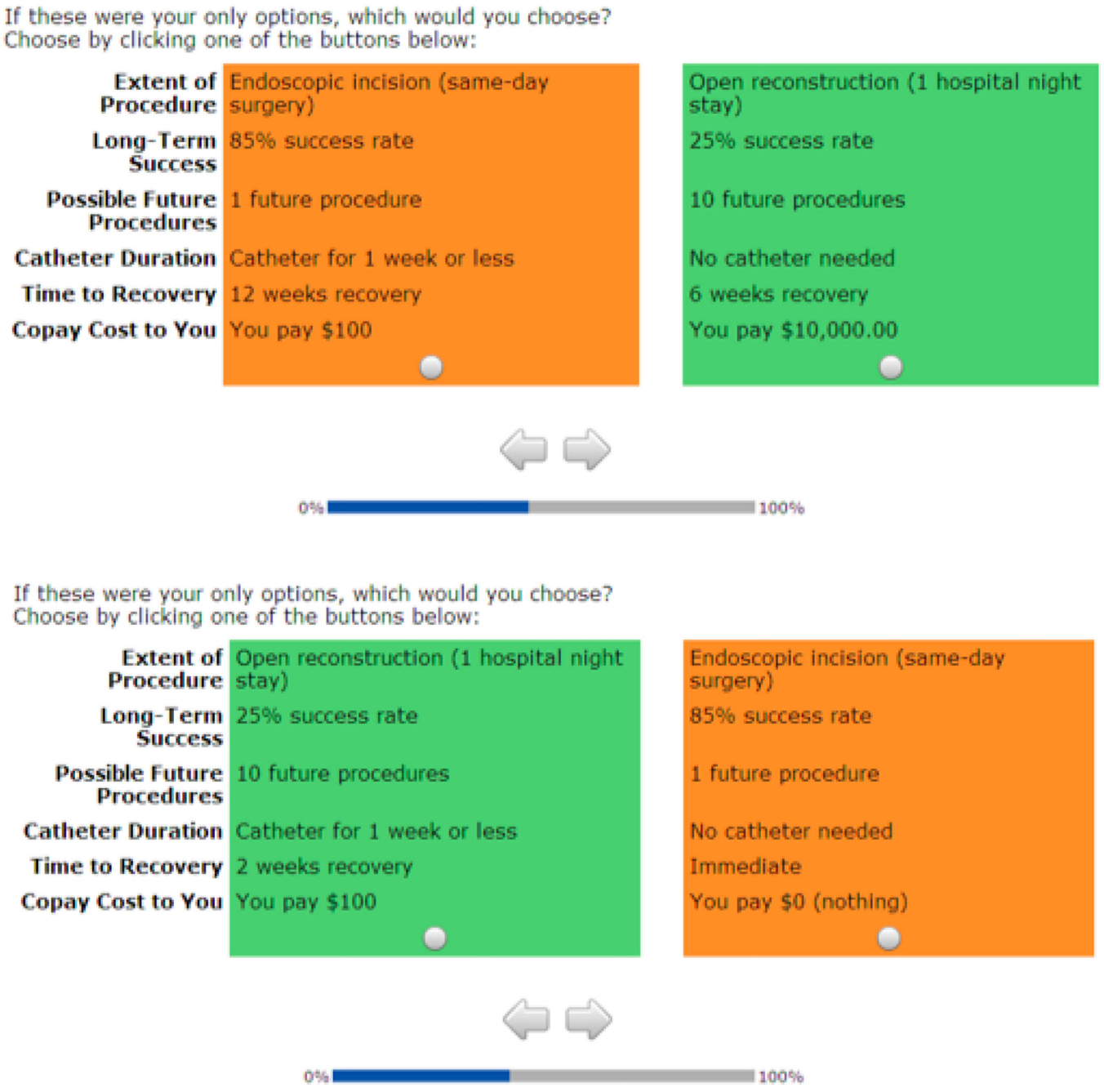

Figure 1:
Case-based Conjoint Analysis Scenarios

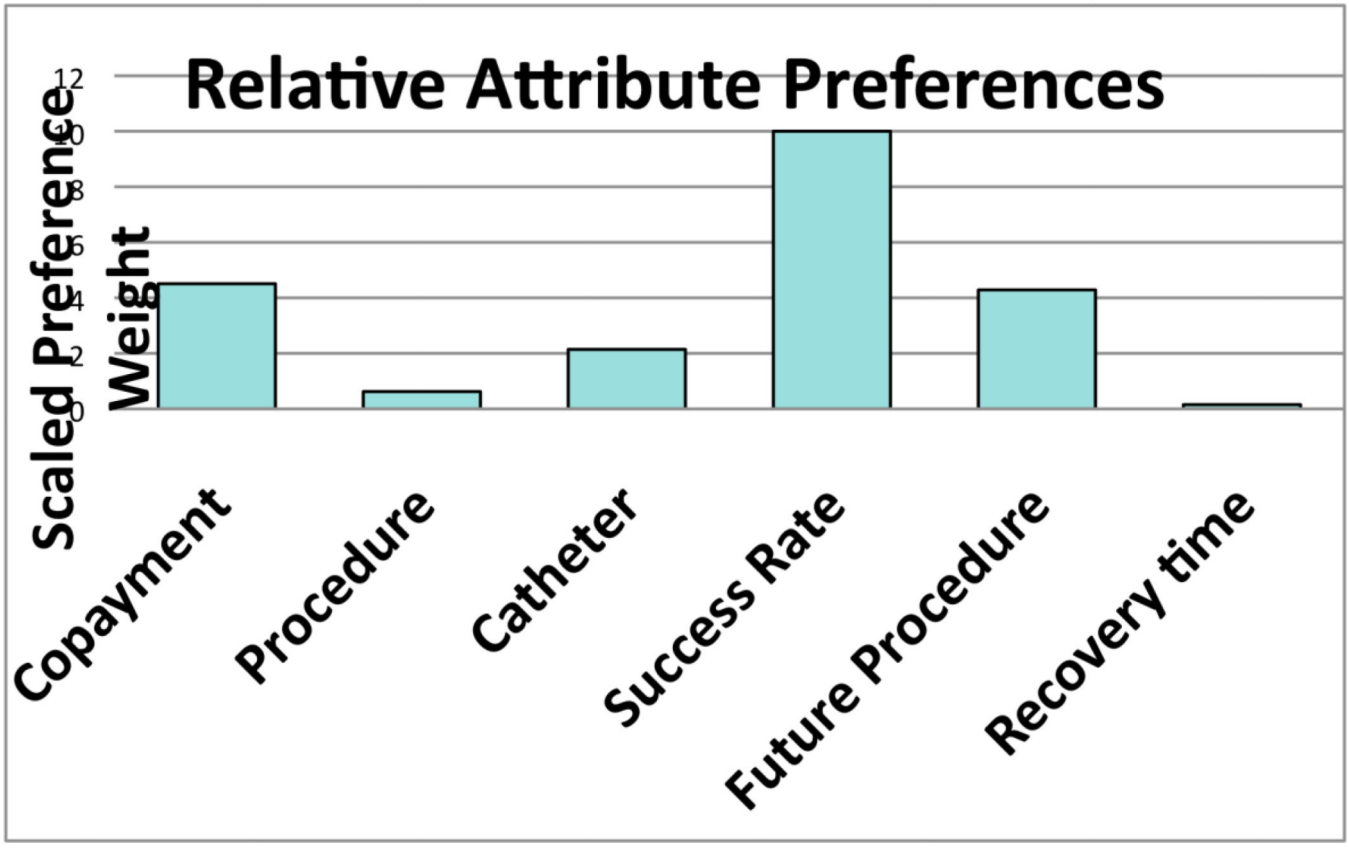

Figure 2:
Relative Attribute Preferences (normalized to a value of 10)

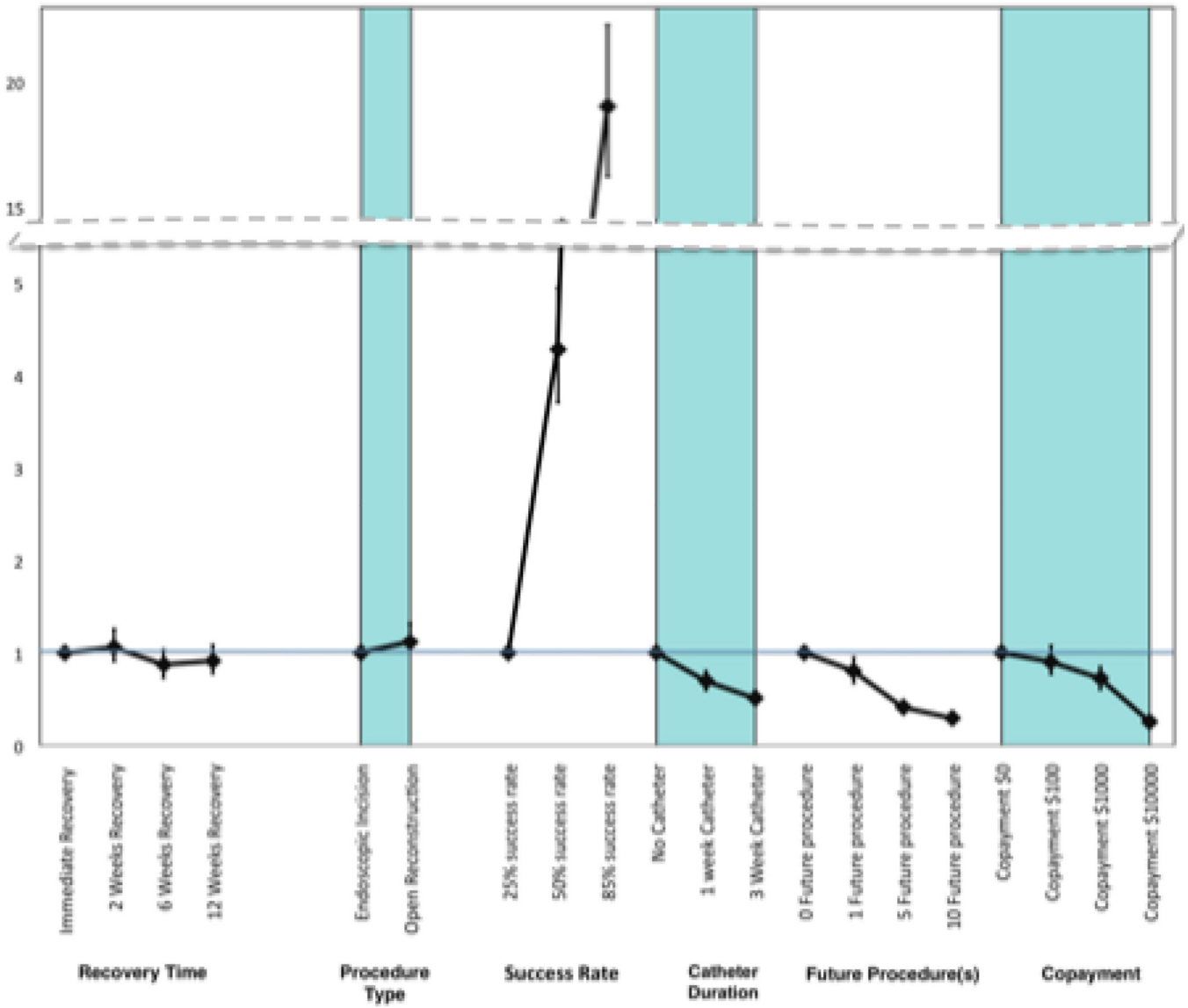

Figure 3:
Preferences for levels within each attribute compared to a reference level

Table 1:

Participant Demographic and Treatment Data

PARTICIPANT DEMOGRAPHIC & TREATMENT DATA	
Characteristic (N = 169)	**n (%)**
Age, mean (yrs) ± 95% CI	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 grad or less	55 (32.5)
Technical school grad	18 (10.7)
College ± PostGrad	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)

Table 2:

Mixed Effects Logit Model

VARIABLES	Model 1 Odds Ratio	Model 2 Coefficient
Baseline $0		
Copayment $100	0.928	−0.075
	(0.084)	(0.090)
Copayment $1000	0.699***	−0.358***
	(0.064)	(0.092)
Copayment $10000	0.228***	−1.481***
	(0.021)	(0.093)
Baseline: Endoscopic Incision		
Open Reconstruction	1.227***	0.205***
	(0.080)	(0.066)
Baseline: 25% Success Rate		
50% Success Rate	4.912***	1.592***
	(0.389)	(0.079)
85% Success Rate	26.719***	3.285***
	(2.426)	(0.091)
Baseline: 0 Future Procedure		
1 Future Procedure	0.759***	−0.275***
	(0.070)	(0.092)
5 Future Procedures	0.345***	−1.064***
	(0.031)	(0.090)
10 Future Procedures	0.245***	−1.408***
	(0.023)	(0.093)
Baseline: No Catheter Needed		
1 Week or Less	0.665***	−0.408***
	(0.053)	(0.080)
3 Weeks	0.495***	−0.704***
	(0.040)	(0.081)
Baseline: Immediate Recovery		
2 Weeks Recovery	1.043	0.042
	(0.095)	(0.091)
6 Weeks Recovery	0.869	−0.140
	(0.081)	(0.093)
12 Weeks Recovery	0.951	−0.050
	(0.090)	(0.095)
Observations	6,156	6,156
Number of groups	169	169

Standard errors in parentheses

*** p<0.01,

** p<0.05,

* p<0.1

Table 3:

Mixed Effects Logit Baseline Model: Open Reconstruction Treatment as Baseline

Urinary Stricture Treatment Attributes and Levels	(1) Coefficient	(2) Odds Ratio
Baseline $0 (standard baseline)		
Pay $100	−0.075	0.928
	(0.090)	(0.084)
Pay $1000	−0.358***	0.699***
	(0.092)	(0.064)
Pay $10000	−1.481***	0.228***
	(0.093)	(0.021)
Baseline: Open Reconstruction		
Endoscopic Incision	−0.205***	0.815***
	(0.066)	(0.053)
Baseline: 85% success	−1.694***	0.184***
50% success	(0.082)	(0.015)
	−3.285***	0.037***
25% success	(0.091)	(0.003)
Baseline: 0 future procedures		
1 future procedures	−0.275***	0.759***
	(0.092)	(0.070)
5 future procedures	−1.064***	0.345***
	(0.090)	(0.031)
10 future procedures	−1.408***	0.245***
	(0.093)	(0.023)
Baseline: 3 weeks of catheter		
1 week or less	0.296***	1.344***
	(0.080)	(0.108)
No catheter needed	0.704***	2.022***
	(0.081)	(0.163)
Baseline: 6 weeks until recovery		
12 weeks until recovery	0.090	1.094
	(0.095)	(0.104)
Immediate recovery	0.140	1.150
	(0.093)	(0.107)
2 weeks until recovery	0.182**	1.200**
	(0.090)	(0.108)
Constant	2.487***	12.029***
	(0.122)	(1.467)
Constant	−16.794	0.000
	(646,895.634)	(0.033)

Urinary Stricture Treatment Attributes and Levels	(1) Coefficient	(2) Odds Ratio
Observations	6,156	6,156
Number of groups	169	169

Standard errors in parentheses

*** p<0.01,

** p<0.05,

* p<0.1