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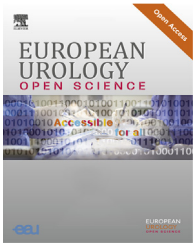

Bladder Cancer

Patient Preferences for Treatment of Bacillus Calmette-Guérin–unresponsive Non–muscle-invasive Bladder Cancer: A Cross-country Choice Experiment

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Abstract

Background: Patients with non–muscle-invasive bladder cancer (NMIBC) that is unresponsive to bacillus Calmette-Guérin (BCG) immunotherapy face a difficult choice. Immediate radical cystectomy (RC) is effective but might represent overtreatment. Continuing bladder preservation with medical therapy is an alternative, but it risks progression to muscle-invasive bladder cancer (MIBC) and a reduction in survival.
Objective: To understand the trade-offs patients are willing to make in selecting treatments for BCG-unresponsive NMIBC.
Design, setting, and participants: Adults with NMIBC from the UK, France, Germany, and Canada who reported current receipt of BCG, disease unresponsive to BCG, or receipt of RC in the previous 12 mo after failure of BCG were recruited to participate in an online choice experiment. Patients were asked to make repeated choices between two hypothetical medical treatments and the option to undergo immediate RC. The medical treatments required trade-offs between the time to RC, the mode and frequency of administration, the risk of experiencing serious side effects, and the risk of disease progression.
Outcome measurements and statistical analysis: Error component logit models were used to calculate relative attribute importance (RAI) scores as the maximum percentage contribution to a preference and acceptable benefit-risk trade-offs.
Results and limitations: Most of the 107 participants (average age 63 yr) never selected RC (89%) as their preferred option in the choice experiment. Preferences were most affected by time to RC (RAI 55%), followed by risk of progressing to MIBC (RAI 25%), medication administration (RAI 12%), and the risk of serious side effects (RAI 8%). To increase the time to RC from 1 yr to 6 yr, patients accepted a 43.8% increase in the risk of progression and a 66.1% increase in the risk of serious side effects.

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Conclusions: Patients with BCG-treated NMIBC valued bladder-sparing treatments and were willing to make substantial benefit-risk trade-offs to delay RC.
Patient summary: Adults with bladder cancer not invading the bladder muscle completed an online experiment in which they chose between hypothetical medications and bladder removal. The results show that patients would be willing to accept different risks associated with medications to delay bladder removal. Patients considered disease progression the most important risk of medicinal treatment.

1. Introduction

Approximately 75% of patients with bladder cancer (BC) present with non–muscle-invasive BC (NMIBC). Treatment options for high-risk NMIBC include bladder preservation with bacillus Calmette-Guérin (BCG) immunotherapy and radical cystectomy (RC) [1,2]. BCG immunotherapy is effective for many patients [3,4]. However, some patients discontinue BCG because of side effects or relapse. RC may be the best treatment in this setting but is associated with numerous complications [5] and a 1–3% risk of mortality [5,6]. Importantly, RC can lead to substantial changes in quality of life (QOL) from adapting to urinary diversion, including altered body image and loss of sexual function [6].

Given the risks of RC, many patients choose BCG for first-line management of NMIBC. Patients with BCG-unresponsive NMIBC face a difficult choice between RC and medical treatments that could preserve their bladder for longer [7]. In choosing between these two options, patients must make trade-offs between treatment benefits and risks. Given the risks associated with RC, many patients choose bladder-preserving strategies using second-line treatments, with 95% declining RC in a recent trial involving patients with high-risk BCG-unresponsive NMIBC [8]. These treatments avoid major surgery but expose patients to side effects and may lead to worse survival outcomes if the disease progresses to muscle-invasive BC (MIBC) [9].

Little is known about factors that help patients in deciding between different treatment approaches and their views on trading the risk of survival against QOL and bladder preservation. In this study, we used a one-time online choice experiment to elicit trade-offs that patients with BCG-treated NMIBC would be willing to accept when choosing treatments. A good understanding of these trade-offs may help clinicians in communicating with patients when discussing treatment priorities and available treatment options and is vital for regulators and health care providers. Trade-off data may also support the development of new treatments by establishing the minimum required efficacy to be worthwhile from a patient perspective.

2. Patients and methods

2.1. Participants

Participants were adult (≥18 yr) residents of the UK, France, Germany, or Canada with NMIBC who reported current receipt of BCG, disease unresponsive to BCG (relapsed or refractory) [10], or receipt of RC in the previous 12 mo after failure of BCG. Patients who had undergone RC for MIBC were excluded. Patients were recruited via physician referrals, patient associations, and social media. Potential participants completed a screening form online or over the phone and were required to provide proof of their diagnosis. Eligible patients provided consent, and ethical approval was obtained from Ethical & Independent Review Services (Lee's Summit, MO, USA; approval no. 21009–01). Patients who completed the choice experiment were compensated for their time.

2.2. Study design

To elicit the treatment preferences of patients with NMIBC, we used a choice experiment that was developed and tested via a mixed-method approach [11]. In the choice experiment, patients made trade-offs between treatment attributes identified from a targeted literature review and semistructured qualitative interviews with 12 patients with NMIBC. The interviews took place in June–November 2020 and were analysed via deductive and inductive thematic coding of verbatim transcripts [12].

During the semistructured qualitative interviews, patients reported concerns regarding the surgical risk of RC and its anticipated impact on QOL. When considering medical treatments that delayed RC, they reported worries in relation to the risk of progressing to MIBC while on treatment, as well as the risk of serious side effects associated with medical treatments. Patients had differing preferences for the route of administration. Some, particularly men, thought that intravesical treatments were more invasive than intravenous treatments, while others perceived this route to be the most direct way of treating BC. Further details on the qualitative interviews are available in the Supplementary material.

The treatment attributes that were included in the choice experiment comprised one benefit attribute (time until RC), two risk attributes (risk of progressing to MIBC while on medication, risk of experiencing serious side effects), and one administration attribute (Table 1). For each treatment attribute, patients were presented with a description of the attribute and its consequences (eg, worse prognosis in the case of progression to MIBC).

Ngene v1.2.1 (ChoiceMetrics, Sydney, Australia) was used to obtain a D-efficient experimental design in which 24 experimental choice tasks were divided into two blocks of 12 tasks each to limit the cognitive burden of the experiment. Each choice task included two bladder-preserving medications (A and B) and RC. To limit the risk of treatment decisions being dominated by time to RC, the difference in time to RC between the two bladder-preserving medications could not exceed 4 yr. Patients were asked to choose their most-preferred and second most-preferred options. An example choice task is shown in Figure 1. Three nonexperimental choice tasks were included to explore the internal validity of patient responses: a warm-up task (to familiarise patients with the format of the choice questions); a repeat question (stability test: to verify the con-

Table 1 – Treatment attributes, definitions, and levels

Attribute	Definition	Possible levels
Time until radical cystectomy	Time until radical cystectomy refers to the length of time the medication works and allows you to keep your bladder intact before your disease recurs. When your disease recurs, you will need to undergo radical cystectomy. During this time, you would retain your bladder and its current level of functioning. Without medication, you would immediately undergo radical cystectomy.	1 yr 3 yr 6 yr
Risk of progressing to MIBC while on medication	This refers to how likely it is that your cancer will progress to a more advanced stage whilst on the medication. You would continue to undergo regular monitoring for recurrence and progression, and if your cancer did progress or recur, you would be recommended for immediate radical cystectomy. Patients who progress to muscle-invasive disease have a reduced 5-year survival rate (25% lower) compared to those who do not progress.	0 out of 100 patients (0%) 10 out of 100 patients (10%) 20 out of 100 patients (20%)
Risk of experiencing serious side effects	This refers to how likely it is that you will experience serious side effects as a result of taking the medication. Serious side effects can be of short duration although may also be experienced over a longer period and may last for several weeks or be permanent. Serious side effects require treatment in hospital and can be life-threatening. These side effects would have a significant impact on your quality of life, and you would be limited in your ability to carry out your usual activities. Examples include severe infections such as pneumonia or death from allergic reaction.	0 out of 100 patients (0%) 5 out of 100 patients (5%) 10 out of 100 patients (10%)
Administration	Administration refers to the way in which you would receive the medication, and how frequently you would receive it. There are different ways to receive medications for bladder cancer—intravenous (into a vein) or intravesical (directly into the bladder). Different medications are administered at different frequencies. Intravenous medications are systemic, which means they affect your whole body. Side effects of intravenous medications are also systemic and will be experienced across the body in a variety of ways. Intravesical medications are administered locally, only to the area affected by the cancer. Side effects of intravesical medications are also local and will be experienced in the bladder and urinary tract by most patients.	Intravesically, once weekly for 6 wk Intravesically once weekly for 6 wk, then monthly for 1 yr Intravesically, once every 3 mo Intravenously, once every 3 wk Intravenously, once every 6 wk

MIBC = muscle-invasive bladder cancer.

sistency of patient choices); and a question in which one of the bladder-preserving medications was superior to the other and was expected to be preferred by patients (dominance test: to verify patient engagement in the choice experiment). Only choices from the 12 experimental tasks were used to model treatment preferences.

The choice experiment was integrated into an online survey that provided information about the study and collected clinical and sociodemographic information from patients. In addition, patients answered three validated health literacy questions and five validated numeracy questions [13,14] and scored the EQ-5D Visual Analogue Scale (VAS) [15].

Following best practice, the survey was tested and iteratively refined in qualitative pilot interviews with eight patients in March–April 2021. Before launching the full survey, a quantitative pilot with 22 patients was conducted from May to June 2021. The final survey is included in the Supplementary material.

2.3. Statistical analysis

Statistical analyses were conducted using R v4.0.5 (R Foundation for Statistical Computing, Vienna, Austria). Descriptive statistics were used to summarise sociodemographic and clinical characteristics. Treatment preferences were modelled with a multinomial logit model that accounted for the panel nature of the choice data. This model estimated the effect of changes in attribute values (eg, a 1-yr increase in time to RC) on the probability of a treatment option being preferred. These estimated effects were then used to compute the contribution of each attribute to preferences as the relative attribute importance (RAI). Trade-offs were evaluated using the maximum acceptable risks of progressing to muscle-invasive disease and serious side effects, and the minimum acceptable time to RC.

In a subgroup analysis, the model was expanded to include interaction effects between attributes and age, sex, living status, dependents, treatment stage, Eastern Cooperative Oncology Group (ECOG) performance status, and the EQ-5D VAS score. More details are provided in the Supplementary material.

3. Results

3.1. Sample characteristics

Patients were recruited from June to October 2021. In total, 281 patients were contacted, of whom 114 (41%) were eligible (Supplementary Fig. 1). The final survey was completed by 107 (94%) of the eligible patients. Patients had a mean age of 63 yr (Table 2). Most were male (64%) and had been diagnosed with NMIBC 1–5 yr before screening (64%). Patients were currently being treated with BCG (39%), were unresponsive to BCG (43%), or had undergone RC within the previous 12 mo (18%). Patients currently receiving medication for NMIBC (65%) had been for a mean of 6.6 mo. The mean EQ-5D VAS score was 68. Most patients had high health literacy (77%) and numeracy (82%) (Supplementary Table 1).

3.2. Main results

In the choice experiment, most patients passed the dominance test (93%) and the stability test (79%, Supplementary Table 2). The majority based their choice of treatment on multiple attributes rather than a single attribute (83%). Most patients (89%) never selected RC as their most-preferred alternative, and it was always the least desirable option for 70% of patients.

The results from the main analysis of the choice experiment data are shown in Figure 2 and Supplementary Table 3. The model had a good data fit (adjusted McFadden pseudo-R^2 = 63.06%). The positive constant captured patients' tendency to avoid surgery ($p < 0.001$), indicating their preference for medical treatment over RC (Supplementary

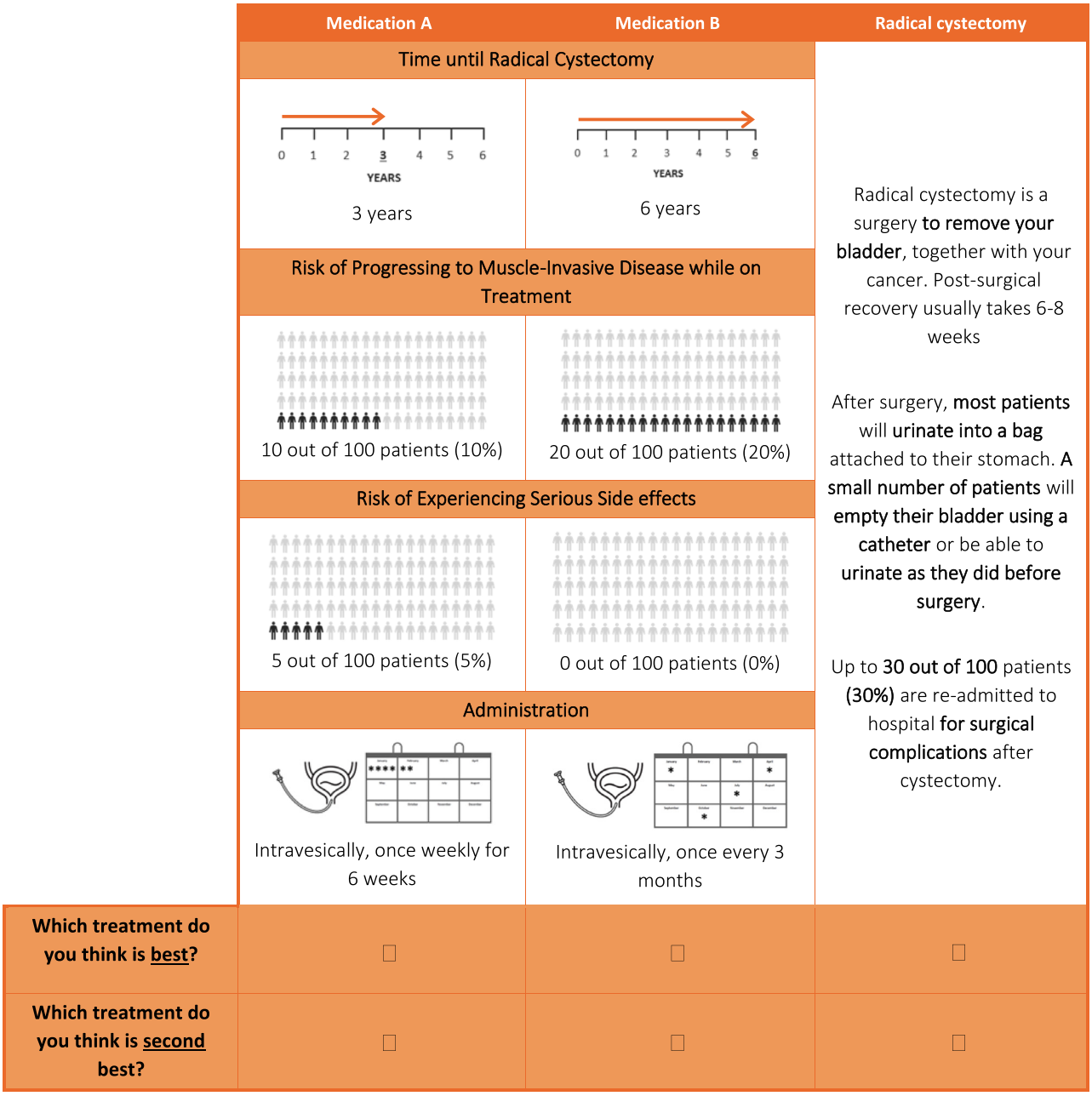

Fig. 1 – Example of a choice task presented to patients.

Table 3). Patients preferred treatments that delayed the time to RC ($p < 0.001$). Lower risk of progression to MIBC was favoured ($p < 0.001$) as were treatments with a lower risk of serious side effects ($p < 0.001$). All intravesical administration cycles were favoured over intravenous administration once every 3 wk ($p < 0.001$). Overall, time to RC was the biggest driver of patient preferences, accounting for 55% of decision-making (95% confidence interval [CI] 51–59%), followed by the risk of progressing to MIBC (RAI 25%, 95% CI 22–28%), treatment administration (RAI 12%, 95% CI 8–16%), and the risk of serious side effects (RAI 8%, 95% CI 5–11%).

Patients were willing to tolerate a 17.5% (95% CI 15.1–19.9%) increase in the risk of progressing to MIBC to lengthen the time to RC from 1 yr to 3 yr, and a 43.8% (95% CI 37.7–49.8%) additional risk of progressing to MIBC to lengthen the time to RC from 1 yr to 6 yr (Table 3). Patients were also willing to tolerate large increases in the risk of serious side effects to increase the time to RC from 1 yr to 3 yr (26.4% increase in risk, 95% CI 16.4–36.5%) or from 1 yr to 6 yr (66.1% increase in risk, 95% CI 41.1–91.2%; Table 4). Patients required a minimum increase of 2.3 yr (95% CI 2.0–2.6) in the time to RC to accept an increase in the risk of progressing to MIBC from 0% to 20%, and of 0.8 yr (95% CI 0.5–1.0) in the time to RC to accept an increase in the risk of serious side effects from 0% to 10% (Supplementary Table 4).

Table 2 – Baseline patient characteristics

	Overall cohort (*n* = 107)	Canada (*n* = 13; 12%)	Germany (*n* = 51; 48%)	France (*n* = 21; 20%)	UK (*n* = 22; 21%)
Mean age, yr (SD)	63.25 (9.68)	65.62 (7.65)	61.45 (10.73)	70.14 (6.79)	59.45 (6.90)
Age ≥65 yr, *n* (%)	50 (47)	9 (69)	19 (37)	17 (81)	5 (23)
Female sex at birth, *n* (%)	39 (36)	3 (23)	21 (41)	5 (24)	10 (45)
Living situation, *n* (%)					
Live alone	23 (21)	3 (23)	14 (27)	2 (10)	4 (18)
Live with partner/spouse or other family	77 (72)	9 (69)	33 (65)	18 (86)	18 (82)
Other	7 (7)	1 (8)	4 (8)	1 (5)	0 (0)
Look after dependent family members					
Yes	22 (21)	3 (23)	9 (18)	5 (24)	5 (23)
No	82 (77)	10 (77)	39 (76)	16 (76)	17 (77)
Prefer not to say	3 (3)	0 (0)	3 (6)	0 (0)	0 (0)
Time since diagnosed with NMIBC, *n* (%)					
<6 mo	10 (9)	0 (0)	1 (2)	5 (24)	4 (18)
6–12 mo	21 (20)	1 (8)	6 (12)	7 (33)	7 (32)
1–5 yr	69 (64)	10 (77)	42 (82)	6 (29)	11 (50)
6–29 yr	7 (7)	2 (15)	2 (4)	3 (14)	0 (0)
Treatment stage, *n* (%)					
Currently on BCG	42 (39)	9 (69)	10 (20)	6 (29)	17 (77)
Unresponsive to BCG	46 (43)	4 (31)	23 (45)	15 (71)	4 (18)
Undergone radical cystectomy	19 (18)	0 (0)	18 (35)	0 (0)	1 (5)
Currently receiving MDx for NMIBC, *n* (%)	70 (65)	9 (69)	27 (53)	15 (71)	19 (86)
Mean time using current NMIBC MDx, mo (SD)	6.60 (4.01)	7.67 (5.22)	6.26 (3.74)	5.60 (3.74)	7.37 (4.03)
Current MDx for NMIBC, *n* (%)					
Mitomycin C	6 (6)	0 (0)	6 (12)	0 (0%)	0 (0%)
Gemcitabine	8 (7)	0 (0)	8 (16)	0 (0%)	0 (0%)
Don't know	6 (6)	0 (0)	3 (6)	3 (14%)	0 (0%)
BCG [a]	50 (47)	9 (69)	10 (20)	12 (57%)	19 (86%)
None	37 (35)	4 (31)	24 (47)	6 (29%)	3 (14%)
Previous MDx for NMIBC, *n* (%)					
Mitomycin C	15 (33)	1 (25)	10 (43)	3 (20%)	1 (25%)
Other	5 (11)	1 (25)	2 (9)	2 (13%)	0 (0%)
Don't know	18 (39)	0 (0)	8 (35)	7 (47%)	3 (75%)
BCG [a]	57 (53)	4 (31)	41 (80)	9 (43%)	3 (14%)
ECOG performance status. *n* (%) [b]					
0	44 (41)	12 (92)	6 (12)	11 (52%)	15 (68%)
1	41 (38)	0 (0)	25 (49)	9 (43%)	7 (32%)
2	21 (20)	1 (8)	19 (37)	1 (5%)	0 (0%)
3	1 (1)	0 (0)	1 (2)	0 (0%)	0 (0%)
Mean EQ-5D VAS score (SD) [c]	67.95 (19.53)	73.77 (24.92)	61.33 (18.22)	69.90 (20.97)	78.00 (11.14)

BCG = bacillus Calmette-Guérin; ECOG = Eastern Cooperative Oncology Group; MDx = medication; NMIBC = non–muscle-invasive bladder cancer; SD = standard deviation; VAS = Visual Analogue Scale.

[a] Eight patients who were screened into subgroup 2 (unresponsive to BCG) reported currently receiving BCG. For all patients, this was as a result of changes in the availability of subsequent treatments, including radical cystectomy, because of COVID-19.

[b] Scores: 0 = fully active, able to carry on all predisease performance without restriction; 1 = restricted in physically strenuous activity but ambulatory (eg, able to walk) and able to carry out work of a light or sedentary nature (eg, light housework, office work); 2 = ambulatory (eg, able to walk) and capable of all self-care but unable to carry out any work activities; up and about more than half of waking hours; 3 = capable of only limited self-care, confined to bed or a chair for more than half of waking hours.

[c] Scored from 0 (worst imaginable health) to 100 (best imaginable health).

3.3. *Preference heterogeneity*

Propose grouping all references together, e.g., 'Age, sex, living status, treatment stage, ECOG performance status, and EQ-5D VAS score all significantly affected preferences for at least one attribute (Supplementary Tables 5-10). However, patients aged <65 yr placed similar value on delaying the time to RC as patients aged ≥65 yr did (RAI 53.2% vs 55.5%; Supplementary Table 11). Reducing the risk of disease progression was less important to women than to men (RAI 20.9% vs 27.0%). Those who lived with others placed similar value on delaying the time to RC as those who lived alone did (RAI 53.8% vs 54.2%). Patients currently on BCG placed less value on reducing the risk of serious side effects than patients who had undergone RC did (RAI 4.3% vs 14.4%). Greater value was placed on delaying the time to RC as ECOG performance status decreased (RAI 49.1% for a 1-unit increase vs 58.5% for a 1-unit decrease). Reducing the risk of disease progression was valued less as the EQ-5D VAS score decreased (RAI 25.3% for a 1-unit increase vs 24.9% for a 1-unit decrease). Having dependents had no significant impact on treatment preferences (Supplementary Table 12).

4. Discussion

To the best of our knowledge, this is the first study to quantify preferences for medical treatment in comparison to RC among patients with NMIBC. Time to RC was the biggest driver of treatment preferences, and patients were even willing to accept a higher risk of disease progression to delay RC. Age, sex, living status, treatment stage, ECOG performance status, and EQ-5D VAS score all significantly affected preferences. This suggests that preferences vary from patient to patient and that acceptable benefit-risk

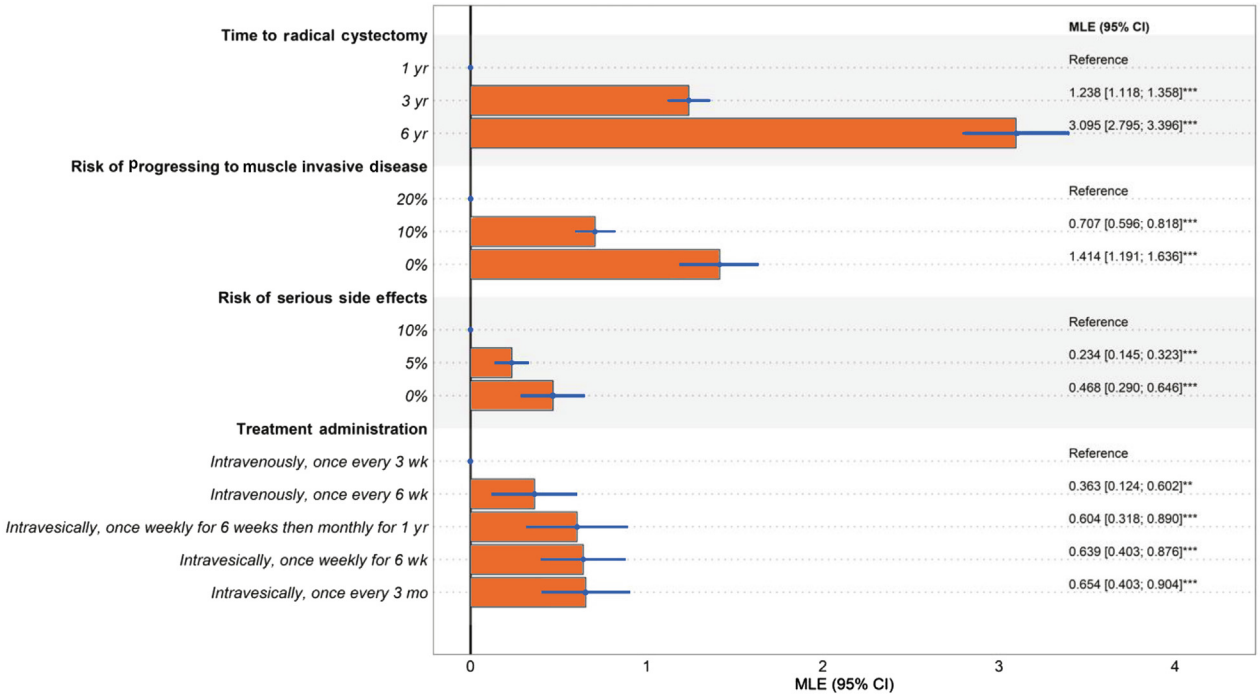

Fig. 2 – Main analysis of data for the choice experiment showing preference incremental results.
BCG = bacillus Calmette-Guérin; CI = confidence interval; MLE = maximum likelihood estimate; NMIBC = non–muscle-invasive bladder cancer. *** $p < 0.001$; ** $p < 0.01$.

Table 3 – Maximum acceptable increase in the risk of progressing to muscle-invasive disease while on treatment

Attributes and levels	Marginal rate of substitution, % (SE) [95% CI]
Time to radical cystectomy	
1 yr	Reference
3 yr	17.5 (1.2) [15.1–19.9]
6 yr	43.8 (3.1) [37.7–49.8]
Risk of experiencing serious side effects	
10%	Reference
5%	3.3 (0.7) [2.0–4.6]
0%	6.6 (1.3) [4.0–9.2]
Administration	
Intravenously, once every 3 wk	Reference
Intravenously, once every 6 wk	5.1 (1.8) [1.6–8.7]
Intravesically once weekly for 6 wk then monthly for 1 yr	8.5 (2.1) [4.5–12.6]
Intravesically, once weekly for 6 wk	9.0 (1.8) [5.5–12.6]
Intravesically, once every 3 mo	9.2 (1.9) [5.5–13.0]

CI = confidence interval; SE = standard error.

Table 4 – Maximum acceptable increase in the risk of serious side effects

Attributes and levels	Marginal rate of substitution, % (SE) [95% CI]
Time to radical cystectomy	
1 yr	Reference
3 yr	26.4 (5.1) [16.4–36.5]
6 yr	66.1 (12.8) [41.1–91.2]
Risk of progressing to muscle-invasive disease while on treatment	
20%	Reference
10%	15.1 (3.0) [9.2–21.0]
0%	30.2 (6.1) [18.3–42.1]
Administration	
Intravenously, once every 3 wk	Reference
Intravenously, once every 6 wk	7.8 (3.1) [1.7–13.8]
Intravesically once weekly for 6 wk then monthly for 1 yr	12.9 (4.1) [4.9–20.9]
Intravesically, once weekly for 6 wk	13.7 (3.7) [6.3–21.0]
Intravesically, once every 3 mo	14.0 (3.9) [6.3–21.6]

CI = confidence interval; SE = standard error.

trade-offs depend on individual circumstances, emphasising the importance of physician-patient interactions.

High-grade NMIBC requires careful follow-up after diagnosis, with high rates of progression to MIBC (10–20%) and 5-yr recurrence (up to 70%) after successful initial treatment [16–18]. Regrettably, BCG therapy—the first-line treatment for high-grade NMIBC—suffers from a high likelihood of failure, side effects that lead to treatment discontinuation, and supply problems [19]. As guidelines do not strongly recommend any specific second-line treatment apart from RC, any nonsurgical treatment requires careful consideration.

The gold-standard second-line treatment for high-risk NMIBC after failure of BCG is RC [20], although timing is crucial for better prognosis [21]. Our quantitative findings confirm existing qualitative evidence that RC is considered with reluctance by NMIBC patients, despite its acknowledged survival benefits [22]. On the basis of comparison of RAIs in the present study, time to RC was more than twice as important to patients as the risk of progression to MIBC, four times as important as treatment administration, and six times as important as the risk of serious side effects. Concerns about short-term surgery-related morbidity and mortality and long-term detrimental effects—for example, on functional independence, urinary and sexual function, social and emotional health, body image, and psychosocial stress—explain much of this reluctance [23,24].

Delaying RC by using alternative medical treatments for NMIBC may increase the risk of progression to MIBC and thus has negative implications for survival [2,25]. In our study, we presented this to patients as a 25%-point higher risk of death if cancer progressed. Despite these clear differences in survival between early and delayed RC, patients still preferred bladder-sparing treatments. Interestingly, younger patients placed more value on delaying RC than older patients did, even though they have the greatest life expectancy to gain from successful surgery, as RC is potentially curative. Receipt of a preferred treatment option may positively influence satisfaction, treatment adherence, and clinical outcomes [26]. Notwithstanding their negative survival consequences in comparison to RC, alternative medical treatments for NMIBC remain important because some patients, especially those with high ECOG performance status, are ineligible and/or unfit for radical surgery.

Our study has multiple strengths. First, the choice experiment was based on iterative best-practice research that considered patient input at every stage. Second, confirmation of diagnosis helped to verify patient eligibility and to correctly categorise patients into treatment stage subgroups. Third, by including patients in different treatment stages, ex ante bias was minimised, as the treatment preferences of patients might be expected to differ according to whether they had undergone RC. Finally, validity assessment findings were in line with other studies [27].

Despite these strengths, limitations remain. First, the preference estimates cannot be compared with the results of other choice experiments, as they only have meaning within the context of this study. We are also unable to test whether the preferences of patients who participated in the survey align with those of patients who opted not to complete the survey. Second, the small sample size precluded comparisons between countries and meaningful subgroup analyses. Third, as with other preference studies, this work is subject to hypothetical bias, because treatment choices made in real life may differ from those made in a study. For example, final treatment decisions are likely to be affected by medical advice as well as interactions with the social environment. However, an advantage of the DCE approach is that it provides unbiased patient perspectives before engaging in dialogue with others. Fourth, the average age of patients who completed the survey (63 yr) was lower than the average age reported for BC patients at diagnosis (73 yr) [28]. This difference may be because of online screening of some potential participants and administration of the DCE as part of an online survey. Finally, fewer patients than expected had undergone RC because the COVID-19 pandemic led to the cancellation or postponement of this surgery [29,30]. The preferences of this patient subgroup may therefore be under-represented, potentially skewing preferences away from RC.

5. Conclusions

This study offers new insights into perceptions of patients with BCG-treated NMIBC. Respondents preferred bladder-sparing treatment over RC and would even accept a significantly higher risk of progression to MIBC as a trade-off. Preferences were heterogeneous, which implies that an optimal treatment strategy in NMIBC needs to be patient-specific. Validation in larger cohorts with more patients who have undergone RC are required to confirm the validity of these findings.

Author contributions: Hannah Collacott had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Collacott, Heidenreich, Ghatnekar.
Acquisition of data: Collacott, Heidenreich.
Analysis and interpretation of data: Collacott, Heidenreich, Ghatnekar, Krucien, Catto.
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Critical revision of the manuscript for important intellectual content: Collacott, Heidenreich, Ghatnekar, Krucien, Catto.
Statistical analysis: Krucien.
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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.euros.2022.12.016.

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