

## Research Paper

# Selecting the right treatment: Health outcome priorities in older patients with bladder cancer

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## ABSTRACT

**Introduction:** Selecting the appropriate treatment for older patients with non-muscle invasive (NMIBC) or muscle-invasive bladder cancer (MIBC) is challenging due to smoking-related comorbidities, treatment toxicity, and an increased risk of adverse health outcomes. Considering patient preferences prior to treatment is therefore crucial. Here, we aimed to identify the health outcome priorities of older patients with high-risk NMIBC (HR-NMIBC) or MIBC.

**Materials and Methods:** Patients aged 70 years or older or at risk for frailty, diagnosed with HR-NMIBC or MIBC without distant metastases, were referred for a comprehensive geriatric assessment (CGA). The CGA consisted of an interview, physical examination, and several tests to examine physical, cognitive, functional, and social status. Quality of life was assessed using EQ5D and EORTC QLQ-C30 questionnaires. Health outcome priorities were discussed using the Outcome Prioritization Tool (OPT) and associations between health outcome priorities and CGA-determinants and quality of life were studied.

**Results:** Of 146 patients (14 HR-NMIBC, 132 MIBC), OPT data was available for 139. Life extension was most often prioritized (44%), closely followed by preserving independence (40%). Reducing pain (7%) and other symptoms (9%) were less often prioritized. Patients prioritizing life extension had fewer musculoskeletal problems than patients prioritizing reducing pain or other symptoms ( $p = 0.02$ ). Patients at risk of or suffering from malnutrition more frequently selected reducing pain or other symptoms as their health outcome priority ( $p = 0.004$ ). For all other CGA-determinants and quality of life, there were no significant differences between groups based on health outcome priorities.

**Discussion:** In older patients with HR-NMIBC and MIBC, life extension and preserving independence are the most common health outcomes priorities. CGA-determinants and quality of life are generally not associated with the prioritization of health outcomes. As health outcome priorities cannot be predicted by CGA-determinants or quality of life, it is crucial to discuss health outcome priorities with patients to promote shared decision-making.

## 1. Background

Bladder cancer (BC) is the tenth most common cancer worldwide [1]. The incidence of BC increases with age and as life expectancy continues to rise globally, an increase in the number of older patients with BC is anticipated [2]. Bladder cancer is categorized into non-muscle invasive cancer (NMIBC) and muscle-invasive cancer (MIBC). The current standard treatment for non-metastatic MIBC is neoadjuvant chemotherapy followed by radical cystectomy (RC) with pelvic lymph node dissection

(LND) [3]. Selected high-risk NMIBC patients are also offered RC as a treatment option [3]. For patients with MIBC unfit or unwilling to undergo surgery, bladder-sparing treatment alternatives are available [3]. RC is a complex surgical procedure associated with a high risk of post-operative morbidity and mortality, despite advances in surgical techniques and perioperative care pathways [4]. Post-operative outcomes of patients with MIBC aged 70 or older may be inferior to their younger counterparts, as illustrated by lower survival rates and higher perioperative mortality [4]. Therefore, the risk-benefit ratio of undergoing

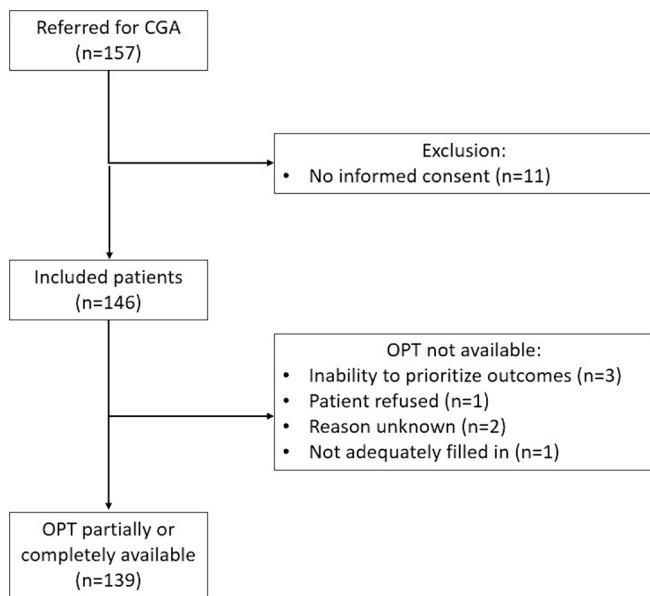
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**Fig. 1.** Flowchart of patients aged 70 years or older or at risk for frailty with high-risk NMIBC and MIBC referred for a CGA. Abbreviations: NMIBC = non-muscle invasive bladder cancer, MIBC = muscle invasive bladder cancer, CGA = Comprehensive Geriatric Assessment, OPT = Outcome Prioritization Tool.

treatment may be less favourable in the older population and treatment may affect patients' quality of life and functional outcomes.

For an individualized treatment strategy in older adults, weighing the trade-off between treatment risks and benefits is crucial [5]. To this end, knowledge of patients' priorities regarding possible health outcomes is essential [6]. Previous studies demonstrated that older patients often value maintaining independence or quality of life over life extension [5]. Moreover, health care providers encounter challenges anticipating their patients' health outcome priorities, which highlights the importance of discussing patients' priorities explicitly during treatment decision making [7,8]. In this way, treatment strategies can be carefully considered to fit the older individual.

The comprehensive geriatric assessment (CGA) offers a disease-independent, systematic, and objective approach to evaluate physical, cognitive, functional, and social domains. It is conducted to identify disabilities and geriatric conditions that may contribute to frailty and hence collects valuable information to guide treatment decision making, especially for vulnerable patients [9]. In addition, it offers an opportunity to discuss patients' preferences with regards to treatment outcomes. This can be done by using the Outcome Prioritization Tool (OPT), which is specifically designed to elicit health outcome priorities. Literature on patient preferences and health outcome priorities in patients with BC is limited. [5,10]

Therefore, this study aimed to map health outcome priorities of older patients with BC using the OPT. In addition, we assessed the relationship between health outcome priorities and CGA-determinants, including general health status, physical, cognitive, and social functioning, and quality of life.

## 2. Materials and Methods

### 2.1. Study Design

A single centre, prospective observational cohort study was conducted in collaboration with the Geriatrics Department and the Bladder Cancer Centre (BCC) of the Erasmus Medical Center (MC) in Rotterdam, the Netherlands. The BCC, an initiative of the Erasmus MC Cancer Institute, offers comprehensive counselling to patients with BC through

**Table 1**

Baseline and treatment characteristics of patients aged 70 years or older or at risk for frailty with high-risk NMIBC and MIBC undergoing a CGA (n = 146).

Characteristic	N (%), mean ± SD or median [IQR]
Age	76.3 ± 4.9
Sex	
Male	115 (78.8)
Female	31 (21.2)
Smoking	
Yes	21 (14.4)
Ex-smoker	91 (62.3)
No	34 (23.3)
Medication count	4 [2–7]
Level of education	
Early childhood and primary	21 (17.1)
Lower secondary	31 (25.2)
Upper secondary	44 (35.8)
Post-secondary, non-tertiary, and short-cycle tertiary	20 (16.3)
Bachelor's, master's, or doctoral	7 (5.7)
Housing situation	
With partner	104 (71.2)
Alone	42 (28.8)
BMI	26.2 [23.6–29.5]
CIRS CI	4 [3–6]
Comorbidity	
Previous malignancy	38 (26.0)
Myocardial infarction	24 (16.4)
Heart failure	6 (4.1)
Peripheral arterial disease	29 (19.9)
Hypertension	90 (61.6)
Diabetes mellitus	38 (26.0)
Pulmonary disease	22 (15.1)
Kidney disease	77 (52.7)
Cerebral vascular accident	24 (16.4)
Musculoskeletal problems	37 (25.3)
Tumor type	
Urothelial cell carcinoma	139 (95.2)
Squamous cell carcinoma	3 (2.1)
Other	4 (2.7)
Concomitant CIS	60 (43.2)
T stage	
CIS only	1 (0.7)
Ta	2 (1.4)
T1	11 (7.5)
T2	76 (52.1)
T3 or T4	56 (38.3)
Treatment	
RC	47 (32.2)
Pre-operative chemo + RC <sup>a</sup>	8 (5.5)
Chemoradiotherapy	23 (15.8)
Radiotherapy only	19 (13.0)
Palliative chemo- or radiotherapy	19 (13.0)
Best supportive care	10 (6.8)
Salvage RC after CRT	5 (3.4)
Other <sup>b</sup>	15 (10.3)

a) Pre-operative chemotherapy can be either neoadjuvant or induction chemotherapy.

b) Includes: induction chemotherapy without RC due to progression or complications (n = 6), death before treatment (n = 3), Bricker ileal conduit without RC (n = 1), TURBT + intravesical chemo hyperthermia (n = 2), LND without RC due to metastasis (n = 1), treatment unknown (n = 2). Two patients received multiple treatments and were categorized according to their first received treatment (radiotherapy + Bricker ileal conduit without RC; induction chemotherapy + LND and Bricker ileal conduit without RC).

Data incomplete for: level of education (n = 123), BMI (n = 142) and concomitant CIS (n = 139).

Abbreviations: SD = standard deviation, IQR = interquartile range, NMIBC = non-muscle invasive bladder cancer, MIBC = muscle invasive bladder cancer, CGA = comprehensive geriatric assessment, BMI = body mass index, CIRS CI = Cumulative Illness Rating Scale Comorbidity Index, CIS = carcinoma in situ, RC = radical cystectomy, CRT = chemoradiotherapy, TURBT = transurethral resection of bladder tumor, LND = lymph node dissection.

**Table 2**

Determinants of physical and cognitive functioning and quality of life questionnaires of patients aged 70 years or older or at risk for frailty with high-risk NMIBC and MIBC undergoing a CGA ( $n = 146$ ).

Determinant	N (%), mean $\pm$ SD or median [IQR]
IADL dependent	
Lawton score $\geq 4$	44 (30.1)
ADL dependent	
Katz score $\geq 1$	58 (39.7)
Katz score $\geq 1$ excluding incontinence	13 (8.9)
Use of walking aid	22 (15.1)
Falls in the previous 12 months	33 (22.9)
Orthostatic hypotension	37 (34.6)
MNA-SF score	
Normal (12–14)	95 (66.0)
(At risk of) malnutrition (0–11)	49 (34.0)
Clock test score $< 11$	22 (16.7)
MMSE score $< 24$	10 (7.0)
Clinical Frailty Scale	
1–3	97 (67.4)
4–5	41 (28.5)
$> 6$	6 (4.2)
GDS-2, depressive symptoms present	8 (8.4)
Grip strength (kg)	
Men	35.7 $\pm$ 8.2
Women	24.7 [22.0–26.9]
Low grip strength ( $< 16$ kg for females, $< 27$ kg for males)	25 (14.6)
Gait speed (m/s)	1.15 [0.98–1.34]
Low gait speed ( $\leq 0.8$ m/s)	22 (13.1)
Five Times Sit to Stand (sec)	10.9 [9.4–14.8]
Timed Up and Go Test (sec)	9.0 [7.6–11.0]
EQ5D	
How would you rate your health today on a scale from 0–100?	78 [60–85]
EORTC QLQ-C30	
How would you rate your overall health during the past week?	
Poor	15 (13.0)
Fair	42 (36.5)
Good	58 (50.4)
How would you rate your overall quality of life during the past week?	
Poor	14 (12.2)
Fair	40 (34.8)
Good	61 (53.0)

Data incomplete for: Orthostatic hypotension ( $n = 107$ ), falls in the previous 12 months ( $n = 144$ ), MNA-SF ( $n = 144$ ), clock test ( $n = 132$ ), CFS ( $n = 144$ ), GDS-2 ( $n = 95$ ), gait speed ( $n = 142$ ), Five Times Sit to Stand ( $n = 82$ ), Timed Up and Go Test ( $n = 58$ ), EQ5D ( $n = 115$ ) and EORTC QLQ-C30 ( $n = 116$ ).

Abbreviations: SD = standard deviation, IQR = interquartile range, NMIBC = non-muscle invasive bladder cancer, MIBC = muscle invasive bladder cancer, CGA = comprehensive geriatric assessment, IADL = instrumental activities of daily living, ADL = activities of daily living, MNA-SF = Mini Nutritional Assessment Short Form, MMSE = Mini-Mental State Examination, GDS = Geriatric Depression Scale, EQ5D = EuroQol 5D and EORTC QLQ = European Organization for Research and Treatment for Cancer Quality of Life Questionnaire.

a multidisciplinary team of urologists, oncologists, and radiotherapists. Routinely, patients aged 70 years and older and patients at risk for frailty are referred to the Geriatrics Department for a CGA as part of treatment planning and decision making. All patients who met the following inclusion criteria were eligible for inclusion: (a) diagnosis of high-risk NMIBC or MIBC, (b) aged 70 years and older or at risk for frailty as determined by the multidisciplinary board, and (c) received a CGA between June 2020 and April 2023.

The exclusion criterion was absence of written informed consent. This study was approved by the Medical Ethical Committee of the Erasmus Medical Center (MEC-2019-0711).

### 2.1.1. Comprehensive Geriatric Assessment

A standardized CGA assessment was performed by a geriatric

resident or geriatrician at the outpatient department. The CGA consisted of: (a) a thorough interview, including a review of medical history, use of medication, and sociodemographic status; (b) physical examination including measurements of height, weight, blood pressure (including orthostatic challenge), hand grip strength, gait speed, Five Times Sit to Stand and/or Timed Up & Go Test (TUGT) [11–15]; and (c) various forms to assess functional, cognitive, and nutritional status. These included the Katz' Activities of Daily Living (ADL) scale, Lawton's Instrumental Activities of Daily Living (IADL) scale, Mini Nutritional Assessment Short Form (MNA-SF), Mini-Mental State Examination (MMSE), clock drawing test, Clinical Frailty Scale (CFS), and the Geriatric Depression Scale (GDS-2) [16–22].

Education was categorized into five levels according to the International Standard Classification of Education (ISCED) [23].

Medical history was discussed during the assessment and reviewed in the patient's medical records. The presence or history of comorbidities was scored (yes/no). The following comorbidities were included: (a) previous malignancy; (b) myocardial infarction, (c) heart failure, (d) pulmonary disease, (e) kidney disease, (f) cerebral vascular accidents, and (g) musculoskeletal problems. An overview of the definitions used to categorize comorbidities and the cut-off scores for the CGA-determinants can be found in Supplementary Table 1. Finally, the Cumulative Illness Rating Scale Comorbidity Index (CIRS CI) score was calculated. This scale consists of 13 disease categories and grades the severity of present diseases from mild to severe. The CIRS CI score represents the count of the disease categories graded as moderate to severe [24].

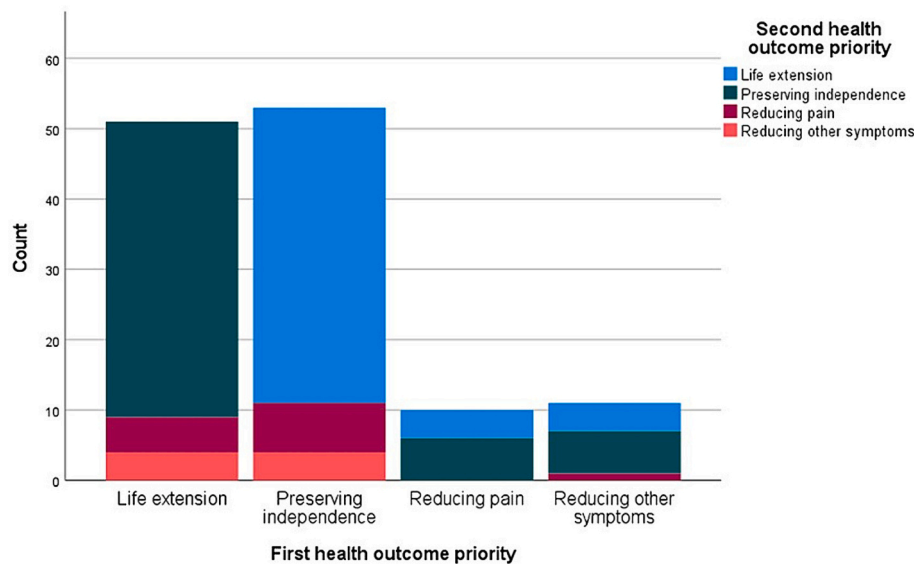
Due to recent transurethral resection of the bladder tumor (TURBT), patients may suffer from (temporary) incontinence which causes an overestimation of ADL dependency within the cohort. Therefore, we added a separate Katz score in which the item continence was excluded. Orthostatic hypotension was defined as a decrease in systolic blood pressure of  $\geq 20$  mmHg and/or a decrease in diastolic blood pressure of  $\geq 10$  mmHg during three blood pressure measurements performed within three minutes [25]. During the study, the CGA standard protocol changed: the Timed Up and Go test was replaced by the Five Times Sit to Stand test. For patients without a Five Times Sit to Stand test, the Timed Up and Go Test was reported.

### 2.1.2. Health Outcome Prioritization

Patients' health outcome priorities were discussed during face-to-face CGA consultation using a paper version of the OPT. Patients were asked to provide a rank order of priorities and to assign a score to each priority by placing the boxes on a visual analogue scale from 0 to 100. A higher score indicates that the outcome is more important to the patient [26]. Simultaneously, the OPT was used as tool to guide conversation on health outcome priorities. The following health outcomes were assessed: maintaining independence, extending life, reducing pain, and reducing other symptoms. For data entry and analyses, the scores were ranked from highest (first choice) to lowest (fourth choice) priority. When a patient was not able to score all four items, only the scored items were registered and entered the database. Reasons for not filling in the OPT were noted, if applicable.

### 2.1.3. Health-Related Quality of Life (HR-QoL) and Reported Overall Health (OH)

At the first consultation with the urologist, patients were asked to fill in two questionnaires on quality of life: the EuroQol 5D (EQ5D) and European Organization for Research and Treatment for Cancer Quality of Life Questionnaire-Core 30 version 3 (EORTC QLQ-C30) [27,28]. To assess quality of life, the final question of the EQ5D ("How would you rate your health today on a scale from 0–100?") and two questions of the EORTC QLQ-C30 were selected ("How would you rate your overall health during the past week?" and "How would you rate your overall quality of life during the past week?"). Outcomes of the EORTC QLQ-C30 were categorized into poor, fair, and good HR-QoL or OH (score



**Fig. 2.** Distribution of second health outcome priority per chosen first health outcome priority among patients aged 70 years or older or at risk for frailty with high-risk NMIBC and MIBC undergoing a CGA.

Data based on patients who reported a first and second health outcome priority ( $n = 125$ ). Numbers are expressed at the Y-axis as counts. Patients who prioritized life extension as their first priority most often selected preserving independence as second priority (82%), followed by reducing pain (10%) and reducing other symptoms (8%).

Patients who selected preserving independence as their first health outcome priority, most often choose life extension as second priority (79%), followed by reducing pain (13%) and reducing other symptoms (8%).

1–3, score 4–5, and score 6–7, respectively). HR-QoL and OH data were retrospectively collected.

## 2.2. Statistical Analysis

Continuous data are reported as mean values with standard deviations (SD) when normally distributed, or as median with interquartile range (IQR) when skewed. Categorical data are reported as counts with percentages. One-way ANOVA or Kruskal-Wallis tests (continuous data) and multinomial logistic regression (categorical data) were used to assess the association between health outcome priorities and CGA measurements. A  $p$ -value  $< 0.05$  was considered statistically significant. All data was analysed using SPSS version 28.0.1.0 (SPSS Inc. IBM company, Armonk, USA).

## 3. Results

### 3.1. Enrolment and Patient Characteristics

Between June 2020 and April 2023, 157 patients with MIBC or high-risk NMIBC received a CGA. Eleven patients declined informed consent. Thus, 146 patients were included in the study. OPT outcomes were not available for seven patients due to inability to prioritize outcomes ( $n = 3$ ), refusal to fill in OPT ( $n = 1$ ) and an inadequately filled in OPT ( $n = 1$ ). For two patients, OPT data was missing for unknown reason. Data of 139 patients were included for final analysis. The flowchart of the study is depicted in Fig. 1.

Patient's characteristics and treatment specifications are reported in Table 1. The majority of the cohort was male (79%) with a mean age of 76.3 years (SD  $\pm$  4.9, median 76.0, IQR = 73–80). Most of the patients were smoking or had a history of smoking (14% and 62%, respectively) and lived with a partner or family (71%). The median number of medications used was four (range 2–7). Prevalent co-morbidities included hypertension (62%), kidney disease (53%), previous malignancy (26%), and diabetes mellitus (26%). Almost all patients (95%) were diagnosed with urothelial carcinoma of the bladder, predominantly clinical stage T2 and T3 (52% and 34%, respectively). Fifty-five patients were treated

with radical cystectomy (38%), followed by other treatment (23%) and chemo-radiotherapy (16%). The subcategory 'other treatment' included induction chemotherapy without RC due to disease progression or complications, Bricker ileal conduit without RC, TURBT followed by intravesical instillations of hyperthermic chemotherapy, LND only, death before treatment, and treatment unknown due to follow-up in another hospital.

Determinants of physical and cognitive functioning are reported in Table 2. IADL dependency was present in 30% of patients, whereas ADL dependency was present in 40% of patients. After exclusion of the item 'continence' from the Katz Index, 9% of patients remained ADL dependent. Forty-nine patients suffered from or were at risk of malnutrition (34%). Most patients had a CFS score of 1–3 (67%). Few patients had a low grip strength or low gait speed (15% and 13%, respectively).

### 3.2. Health Outcome Priorities

Data on the first health outcome priority was available for 139 patients. Most patients selected *life extension* as their first health outcome priority, although this was closely followed by *preserving independence* (44% and 40%, respectively). *Reducing other symptoms* and *reducing pain* were less often prioritized (9% and 7%, respectively). Data on the second health outcome priority was available for 125 patients. Patients selected *preserving independence* most often as second health outcome priority (43%), followed by *life extension* (40%), *reducing pain* (10%), and *reducing other symptoms* (6%).

When examining data on patients who reported both first and second health outcome priority ( $n = 125$ ), *preserving independence* was most often prioritized (42%) closely followed by *life extension* (41%). Patients who prioritized *preserving independence*, most often selected *life extension* as second health outcome priority (79%), followed by *reducing pain* (13%) and *reducing other symptoms* (8%). Among patients who prioritized *life extension*, the majority chose *preserving independence* as their second priority (82%), with a smaller percentage opting for *reducing pain* (10%) and *reducing other symptoms* (8%). Fig. 2 displays the distribution of patients' second health outcome priority per chosen first health outcome priority.

**Table 3**

Baseline and treatment characteristics per first health outcome priority of patients aged 70 years or older or at risk for frailty with high-risk NMIBC and MIBC undergoing a CGA.

Characteristic	First health outcome priority			P-value
	N (%) or median [IQR]			
	Life extension (n = 61)	Preserving independence (n = 56)	Reducing pain or other symptoms (n = 22)	
Age	77.0 ± 5.3	75.5 ± 4.7	76.0 ± 4.5	0.2
Sex				0.9
Male	47 (77.0)	44 (78.6)	18 (81.8)	
Female	14 (23.0)	12 (21.4)	4 (18.2)	
Smoking, n (%)				0.9
Yes	7 (11.5)	8 (14.3)	4 (18.2)	
Ex-smoker	40 (65.6)	36 (64.3)	12 (54.5)	
No	14 (23.0)	12 (21.4)	6 (27.3)	
Medication count	4 [2–6]	4 [2–7]	5 [4–8]	0.2
Level of education				0.4
Early childhood and primary	12 (22.2)	6 (12.5)	2 (11.8)	
Lower secondary	13 (24.1)	12 (25.0)	5 (29.4)	
Upper secondary	18 (33.3)	19 (39.6)	7 (41.2)	
Post-secondary, non-tertiary, and short-cycle tertiary	10 (18.5)	6 (12.5)	3 (17.6)	
Bachelor's, master's, or doctoral	1 (1.9)	5 (10.4)	0 (0.0)	
Housing situation				0.5
With family	47 (77.0)	38 (67.9)	15 (68.2)	
Alone	14 (23.0)	18 (32.1)	7 (31.8)	
BMI	26.2 [23.9–28.7]	26.2 [23.5–30.1]	26.5 [24.1–30.6]	0.9
CIRS CI	4 [3–5]	4 [3–6]	4 [3–6]	0.7
Comorbidity				
Previous malignancy	15 (24.6)	5 (22.7)	5 (22.7)	0.7
Myocardial infarction	10 (16.4)	12 (21.4)	1 (4.5)	0.1
Heart failure	3 (4.9)	3 (5.4)	0 (0)	0.4
Peripheral arterial disease	16 (26.2)	6 (10.7)	5 (22.7)	0.1
Hypertension	35 (57.4)	38 (67.9)	12 (54.5)	0.4
Diabetes mellitus	12 (19.7)	16 (28.5)	8 (36.3)	0.3
Pulmonary disease	14 (23.0)	5 (8.9)	3 (13.6)	0.1
Kidney disease	31 (50.8)	32 (57.1)	9 (40.9)	0.4
Cerebral vascular accident	10 (16.4)	10 (17.9)	4 (18.2)	1.0
Musculoskeletal problems	9 (14.8) <sup>a</sup>	20 (35.7)	8 (36.4) <sup>a</sup>	<b>0.02</b>
T stage				0.1
CIS only	0 (0)	0 (0)	1 (4.5)	
Ta	0 (0)	2 (3.6)	0 (0)	
T1	5 (8.2)	3 (5.4)	2 (9.1)	
T2	35 (57.4)	32 (57.1)	7 (31.8)	
T3 + T4	21 (34.4)	19 (33.9)	12 (54.5)	
Treatment				0.2
RC	22 (36.1)	17 (30.4)	7 (31.8)	
Pre-operative chemo + RC <sup>b</sup>	6 (9.8)	2 (3.6)	0 (0)	
Chemoradiotherapy	11 (18.0)	8 (14.3)	4 (18.2)	
Radiotherapy only	5 (8.2)	10 (17.9)	2 (9.1)	
Salvage RC after CRT	0 (0)	3 (5.4)	1 (4.5)	
Palliative chemo- or radiotherapy	10 (16.4)	5 (8.9)	3 (13.6)	
Best supportive care	1 (1.6)	4 (7.1)	3 (13.6)	
Other <sup>c</sup>	6 (9.8)	7 (12.5)	2 (9.1)	

a) There is a significant difference between the groups 'life extension' versus 'reducing pain or other symptoms' (last mentioned was set as reference category).

b) Pre-operative chemotherapy can be either neoadjuvant or induction chemotherapy.

c) Includes: induction chemotherapy without RC due to progression or complications (n = 6), death before treatment (n = 3), Bricker ileal conduit without RC (n = 1), TURBT + intravesical chemo hyperthermia (n = 2), LND without RC due to metastasis (n = 1), treatment unknown (n = 2). Two patients received multiple treatments and were categorized according to their first received treatment (radiotherapy + Bricker ileal conduit without RC; induction chemotherapy + LND and Bricker ileal conduit without RC).

Data incomplete for: Level of education (n = 123) and BMI (n = 142).

Abbreviations: IQR = interquartile range, NMIBC = non-muscle invasive bladder cancer, MIBC = muscle invasive bladder cancer, CGA = comprehensive geriatric assessment, BMI = body mass index, CIRS CI = Cumulative Illness Rating Scale Comorbidity Index, CIS = carcinoma in situ, RC = radical cystectomy, CRT = chemoradiotherapy, TURBT = transurethral resection of bladder tumor, LND = lymph node dissection.

### 3.3. Associations of Health Outcome Priorities with Patient Characteristics and Measures of Functioning

General patient and treatment characteristics and determinants of physical, cognitive, and social functioning per first health outcome priority are displayed in Tables 3 and 4. Because there were a limited number of patients who prioritized *reducing pain* or *reducing other symptoms* as their primary health outcome, these groups were combined for analysis.

Patients who prioritized *life extension* were less likely to have musculoskeletal problems as a comorbidity compared to patients

prioritizing *reducing pain* or *reducing other symptoms* ( $X^2(2, n = 139) = 8.12, p = 0.02$ ). Patients at risk or suffering from malnutrition selected more frequently *reducing pain* or *reducing other symptoms* as their primary health outcome priority ( $X^2(2, n = 137) = 11.07, p < 0.01$ ). For all other measures of physical, cognitive, or psychosocial functioning, there were no significant differences between groups based on health outcome priorities.

### 3.4. Quality of Life and Associations with Health Outcome Priorities

Data on the quality of life questionnaires was available for 116

**Table 4**

Determinants of physical and cognitive functioning and quality of life questionnaires per first health outcome priority of patients aged 70 years or older or at risk for frailty with high-risk NMIBC and MIBC undergoing a CGA.

Determinant	First health outcome priority N (%) or median [IQR]			P-value
	Life extension (n = 61)	Preserving independence (n = 56)	Reducing pain or other symptoms (n = 22)	
IADL dependent				
Lawton score $\geq 4$	17 (27.9)	15 (26.8)	10 (45.5)	0.3
ADL dependent				
Katz score $\geq 1$	21 (34.4)	22 (39.3)	13 (59.1)	0.1
Katz score $\geq 1$ excluding incontinence	4 (6.6)	5 (8.9)	4 (18.2)	0.3
Use of walking aid	11 (18.0)	9 (16.1)	2 (9.1)	0.6
Falls in the previous 12 months	15 (25.4)	11 (19.6)	5 (22.7)	0.8
Orthostatic hypotension	14 (29.8)	16 (41.0)	6 (35.3)	0.6
MNA-SF score				<b>0.004</b>
Normal nutritional status	39 (65.0) <sup>a</sup>	44 (78.6) <sup>b</sup>	8 (38.1) <sup>a,b</sup>	
(AT risk for) malnutrition	21 (35.0)	12 (21.4)	13 (61.9)	
MMSE score < 24	2 (3.4)	6 (10.7)	1 (4.8)	0.3
Clock test score < 11	6 (10.9)	8 (15.7)	6 (28.6)	0.2
Clinical Frailty Scale				0.1
1–3	42 (70.0)	38 (67.9)	12 (57.1)	
4–5	18 (30.0)	14 (25.0)	7 (33.3)	
>6	0 (0)	4 (7.1)	2 (9.5)	
GDS-2, depressive symptoms present	4 (10.0)	2 (5.3)	1 (6.7)	0.7
Low grip strength (<16 kg for women, <27 kg for men)	11 (15.9)	10 (16.1)	3 (10.7)	1.0
Gait speed (sec)	1.19 [1.06–1.36]	1.10 [0.91–1.26]	1.15 [0.88–1.39]	0.2
Low gait speed ( $\leq 0.8$ m/s)	6 (8.7)	11 (18.0)	5 (19.2)	0.3
EQ5D				
How would you rate your health today on a scale from 0–100?	80 [60–84]	75 [62–90]	71 [60–80]	0.8
EORTC QLQ-C30				
How would you rate your overall health during the past week?				0.7
Poor	6 (12.2)	7 (15.6)	1 (6.7)	
Fair	17 (34.7)	15 (33.3)	8 (53.3)	
Good	26 (53.1)	23 (51.1)	6 (40.0)	
How would you rate your overall quality of life during the past week?				0.2
Poor	4 (8.2)	9 (20.0)	1 (6.7)	
Fair	16 (32.7)	13 (28.9)	8 (53.3)	
Good	29 (59.2)	23 (51.1)	6 (40.0)	

a) There is a significant difference between the groups 'life extension' versus 'reducing pain or other symptoms' (last mentioned was set as reference category).

b) There is a significant difference between the groups 'preserving independence' versus 'reducing pain or other symptoms' (last mentioned was set as reference category).

Data incomplete for: Orthostatic hypotension (n = 107), falls in the previous 12 months (n = 144), MNA-SF (n = 144), clock test (n = 132), CFS (n = 144), GDS-2 (n = 95), gait speed (n = 142), EQ5D (n = 115) and EORTC QLQ-C30 (n = 116).

patients (EQ5D: n = 115, EORTC QLQ-C30: n = 116) (Table 2). The median EQ5D score, indicating how patients assess their current health on a scale from 0 to 100, was 78 (range 60–85). According to the EORTC QLQ-C30 assessment, most patients reported their overall health and overall quality of life in the past week as good (50% and 53%, respectively). About one-third of patients rated their overall health and quality of life as fair (37% and 35%, respectively).

Table 4 shows the quality of life of the study population per first health outcome priority. No significant differences were found in quality of life according to the first prioritized health outcome.

#### 4. Discussion

This study aimed to identify health outcome priorities of older patients with high-risk NMIBC and MIBC using the OPT and assessed the relationship between health outcome priorities and CGA-determinants, including general health status, physical, cognitive, and social functioning, and quality of life. Most patients selected *life extension* as their first health outcome priority, closely followed by *preserving independence*. Patients who prioritized *life extension* most often selected *preserving independence* as second health outcome priority, and *vice versa*. Patients prioritizing *life extension* had a lower likelihood of musculoskeletal comorbidity compared to patients with other health outcome priorities. Patients at risk of or suffering from malnutrition chose *reducing pain or reducing other symptoms* more often as their primary

health outcome priority.

Health outcome priorities have been studied in patients suffering from other cancers, although literature on a bladder cancer-specific population is lacking. One study examined specific treatment preferences of patients with NMIBC who were either undergoing current BCG treatment, were BCG-unresponsive or had undergone a RC in the last 12 months [10]. In an online choice experiment, they selected their preferred hypothetical treatment based several trade-offs, including mode and frequency of medication, risk of serious side effects and progression, and the option to undergo immediate RC. In contrast to our approach, the trade-offs were hypothetical and did not affect patients' definite treatment and were retrospective for some patients, as they had already undergone RC. Results demonstrated that 87% of participants never selected RC as their preferred option. The methodology used in our study prioritizes broader health outcome priorities rather than inquiring about specific treatment preferences.

A recent systematic review mapped patient preferences for treatment outcomes in oncology. The authors aimed to include studies focusing on older patients specifically; however, data was limited. The final analysis included 4374 patients from 28 studies. These studies were heterogeneous considering age, cancer type, treatment setting, and prioritization tool method used. Subgroup analysis demonstrated that these patients prioritized *quality of life* and *overall survival* above other treatment outcomes (83% and 67%, respectively) [5]. As various prioritization methods were used and outcome categories were not uniformly defined,

it is hard to compare these outcomes directly to our own results using the OPT.

Other studies using the OPT describe comparable results regarding health outcome priorities. Among older patients who underwent geriatric assessment to guide treatment decision making for heart disease or cancer, the most common health outcome priority was *maintaining independence* (55%), followed by *life extension* (21%) [29]. In older patients with head and neck cancer, most patients prioritized *maintaining independence* (54%), followed by *life extension* (34%) [30]. Patients with non-curative oncological diseases, including lung, prostate, and gastrointestinal cancer, were asked to prioritize their health outcomes several times within six months. *Life extension* and *preserving independence* were prioritized most often (34% and 31%, respectively) [31].

We found that patients prioritizing *life extension* had a lower likelihood of musculoskeletal comorbidity than those prioritizing *reducing pain* or *reducing other symptoms*. This is in accordance with the findings in a cohort of older patients with head and neck cancer, where musculoskeletal comorbidities were more common in patients prioritizing *reducing pain* or *reducing other symptoms*. It was postulated that this association might be explained by the disability and discomfort that musculoskeletal disease often causes [30]. Also, although not statistically significant, patients with malnutrition tended to prioritize reducing pain or reducing other symptoms in the head and neck cancer cohort [30]. This is in congruence with our findings. We hypothesize that due to increased pain or presence of symptoms, patients may lose appetite and/or weight, which results in (a risk of) malnutrition according to the MNA-SF.

Our results demonstrated that patients with abnormal scores on determinants of physical or cognitive functioning did not show different health outcome priorities compared to patients with normal scores. Therefore, patients' prioritized health outcomes cannot be predicted based on CGA-determinants of general health; physical, cognitive, and social functioning; or quality of life. Consequently, health outcome priorities should be discussed in clinical practice with each individual patient. Moreover, healthcare providers demonstrated a restricted ability to anticipate their patients' prioritized health outcomes. Research examining the discernment of health care professionals regarding their patients' health outcome preference reveals a low level of consensus, with agreement rates ranging from 35% to 40% [32,33]. Additionally, health outcome priorities may change over time, emphasizing the necessity of repeated discussion [31]. This highlights the importance of shared decision making in treatment planning and the necessity of explicit discussion of health outcome priorities in clinical practice. Within our hospital, the OPT is a standard part of the CGA. Geriatricians highly value the use of the OPT to guide a conversation about health outcome priorities in clinical practice. Within the Dutch setting, the OPT is increasingly part of the CGA as performed by geriatricians.

To our knowledge, this is the first study investigating health outcome priorities in patients suffering from bladder cancer prior to selection of a definite treatment strategy. Moreover, we included a relatively large number of patients compared to previous studies examining health outcome priorities. Detailed information on physical, cognitive, and social functioning was available, as well as data from quality-of-life questionnaires. This study also has limitations. First, there may be a potential selection bias as patients referred for CGA assessment were opting for curative treatment. Patients undergoing palliative treatment or best supportive care may prioritize different health outcomes than patients considered for curative treatment. Second, after categorization, the subgroups *reducing pain* and *reducing other symptoms* had a very small sample size and may therefore lack power to identify any differences between the subgroups. To secure sufficient group sizes, we merged these two groups during analysis. Third, we did not take the long-term outcomes into account. Finally, the majority (91%) of the included patients were diagnosed with MIBC (91%), which may limit the generalizability of the results to patients with NMIBC. Despite these limitations, our findings provide a valuable insight into patients' health outcome

priorities in a population of older adults with bladder cancer.

## 5. Conclusions

Older patients with high-risk NMIBC and MIBC selected life extension and preserving independence most often as their first health outcome priority. These preferences cannot be predicted adequately by determinants of general health; physical, cognitive, and social functioning; or quality of life. To facilitate shared decision making and treatment planning, it is essential to explicitly discuss health outcome priorities with older patients with high-risk NMIBC and MIBC.

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## Author Contributions

*Concept and design:* Rutten, Boormans, Zuiverloon, Polinder-Bos.

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*Drafting of the manuscript:* Rutten, Al.

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## Declaration of Competing Interest

None of the authors have a conflict of interest to report.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jgo.2024.101811>.

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