Original Article

A comparative study of survival outcomes between partial and radical cystectomy in octogenarians with muscle-invasive bladder cancer

Arjun Pon Avudaiappan[1], Pushan Prabhakar[1], Ciara Lusnia[2], Mohmmad Arfat Ganiyani[1], Muni Rubens[1], Rohan Garje[1], Ahmed Eldefrawy[1,2], Murugesan Manoharan[1,2]

[1]Department of Urologic Oncology Surgery, Miami Cancer Institute, Miami, Florida, USA; [2]Herbert Wertheim College of Medicine, Florida International University, Miami, FL, USA

Contributions: (I) Conception and design: M Manoharan, A Pon Avudaiappan; (II) Administrative support: M Manoharan, A Eldefrawy, R Garje; (III) Provision of study materials or patients: M Manoharan, A Eldefrawy; (IV) Collection and assembly of data: P Prabhakar, A Pon Avudaiappan; (V) Data analysis and interpretation: P Prabhakar, A Pon Avudaiappan, C Lusnia, M Rubens; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Arjun Pon Avudaiappan, MBBS, MS, MCh (Uro). Department of Urologic Oncology Surgery, Miami Cancer Institute, 8900 N Kendall Drive, Miami, FL 33176, USA. Email: Arjun.PonAvudaiappan@baptisthealth.net.

Background: Neoadjuvant chemotherapy with radical cystectomy (RC) is the preferred first-line treatment for localized muscle-invasive bladder cancer (MIBC). Due to the concern about morbidity associated with RC, the elderly population considers bladder preservation alternatives. Guidelines suggest partial cystectomy (PC) can be considered a viable option in carefully selected individuals. We used the National Cancer Database (NCDB) to compare the overall survival (OS) among octogenarians treated with PC and RC.

Methods: Using NCDB, we retrospectively evaluated individuals aged 80 years and above diagnosed with localized MIBC (cT2–4aN0M0) with tumor size less than 5 cm and urothelial histology between 2004 and 2018. Our primary cohort was divided into the RC cohort, which included patients who underwent RC with or without chemotherapy/radiotherapy, and the PC cohort, which included those who underwent PC. After propensity-matching, we compared the OS.

Results: Of 94,104 patients with MIBC, 2,528 octogenarians met our selection criteria. Among them, 313 were treated with PC, and 2,215 were treated with RC. A total of 151 (48.2%) PC patients had pelvic lymph node dissection, while 1,967 (88.8%) RC patients had lymph node dissection (P<0.001). The OS for matched PC and RC was 33.4 and 29.9 months, respectively (P=0.68). In T2 tumors, the OS for PC and RC was 37 and 33.5 months, respectively (P=0.52); for T3 tumors, the OS was 22.3 and 24.4 months, respectively (P=0.98).

Conclusions: Our study compared PC and RC in octogenarians with localized MIBC and observed that PC is safe and not inferior to RC in carefully selected octogenarians. The role of PC needs further exploration by comparing or integrating with strategies like concurrent chemoradiation to improve the oncological and survival outcomes.

Keywords: Muscle-invasive bladder cancer (MIBC); octogenarians; radical cystectomy (RC); partial cystectomy (PC); bladder preservation strategies

Submitted Mar 19, 2024. Accepted for publication Jun 23, 2024. Published online Aug 16, 2024.
doi: 10.21037/tau-24-139
View this article at: https://dx.doi.org/10.21037/tau-24-139

Introduction

Bladder carcinoma is the 10th most common cancer worldwide, and in the United States, it is ranked as the 6th most common cancer. American Cancer Society estimated that in 2023, approximately 82,290 new cases and 16,710 mortality to occur due to bladder carcinoma (1). The life expectancy of an individual has been increasing over the years, and the average overall life expectancy is 76 years. In males and females, the average life expectancy is 73 and 79.3 years, respectively (2). The life expectancy for an 80-year-old individual ranges between 8 and 10 years, which may vary based on associated co-morbidities, and in the United States, life expectancy for men and women aged 80 years is 7 and 9.1 years, respectively (3,4). As the age increases, the incidence of carcinoma bladder increases, with a median age of 73 years during diagnosis (5). In the United States, carcinoma bladder cancer ranked as the 4th most common cause of death among individuals aged 80 and above. During diagnosis, around 20% to 30% are found to have muscle-invasive bladder cancer (MIBC) (6). With the advancements in the healthcare system and the increase in life expectancy, many individuals in their eighties are undergoing major surgeries.

The preferred first-line treatment for MIBC is neoadjuvant chemotherapy with radical cystectomy (RC), and its effectiveness has been well documented. However, some elderly individuals, due to their concern about the morbidity associated with RC and the limited overall survival (OS) for age, consider bladder preservation options like partial cystectomy (PC) and concurrent chemoradiation. PC was used in earlier days to treat bladder cancer, but due to the lack of definitive indications and concerns about treatment failure and disease progression, the use has been limited. Current National Comprehensive Cancer Network guidelines suggest PC can be considered a viable option in carefully selected individuals with MIBC (7). The objective of the study is to evaluate the survival outcomes in octogenarians treated with RC and PC using the National Cancer Database (NCDB). We present this article in accordance with the STROBE reporting checklist (available at https://tau.amegroups.com/article/view/10.21037/tau-24-139/rc).

Highlight box

Key findings

- Partial cystectomy (PC) is not inferior to radical cystectomy (RC) among octogenarians with muscle-invasive urothelial bladder carcinoma.

What is known and what is new?

- RC is the preferred standard of care for the muscle-invasive bladder cancer.
- In this National Cancer Database-related study, we observed that PC may not be inferior to RC in terms of overall survival among carefully selected octogenarians with well-defined criteria. Therefore, role of PC needs further evaluation.

What is the implication and what should change now?

- This finding could help in patient counselling and shared-decision making among octogenarians with carcinoma bladder. Concern about the oncological outcomes and the need for salvage cystectomy limits the utilization of PC. With the evolution of bladder preservation protocols, further exploration on the PC by incorporating with other strategies like chemoradiation may help us understand its role in bladder preservation.

Methods

Patient selection

In our retrospective study using NCDB, we identified individuals aged 80 years and above with localized MIBC (cT2–4aN0M0) with less than 5cm tumor size and urothelial histology diagnosed between 2004 and 2018. The NCDB is a comprehensive nationwide database that covers approximately 70% of all oncological cases in the United States. The data utilized in the study is deidentified data provided as a participant user file. All collected information adheres to Health Insurance Portability and Accountability Act regulations. NCDB data undergo regular validation through yearly quality monitoring checks (8,9). As the data entered are publicly available on request, which are deidentified and not re-identifiable, and as human subjects are not directly involved in the study purpose, institutional review board approval was not necessary. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). Depending on the treatment modalities, patients who met our selection criteria were divided into PC and RC groups. PC group included those who underwent PC (coded as PC) with or without chemotherapy/radiotherapy. RC group included those who underwent RC (coded as RC/total cystectomy) with or without chemotherapy/radiotherapy. We excluded patients who received other treatments, non-urothelial histology, and missing data (clinical T, clinical N, histology, treatment, follow-up, and vital status). Based on the inclusion and exclusion criteria, we identified 2,528 octogenarians who

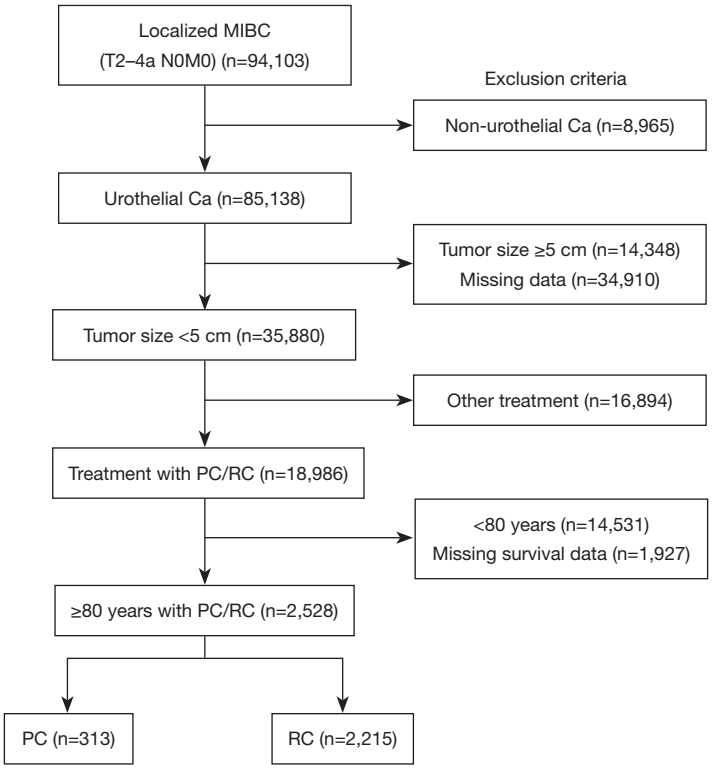

Figure 1 Study population of our final analysis. MIBC, muscle-invasive bladder cancer; PC, partial cystectomy; RC, radical cystectomy.

were included in our final analysis (*Figure 1*).

Statistical analyses

We compared the treatment groups using sociodemographic parameters such as gender, race and ethnicity, insurance, treatment facility, median income, and clinical parameters such as comorbidity index, tumor size, clinical stage, and tumor grading. Race and ethnicity were categorized into white, black, Asian, other/unknown, and Hispanic or non-Hispanic, as only a small proportion of patients were present in some classes. The sociodemographic and clinical parameters were analyzed using the chi-squared test and contingency tables. Later, a 1:1 propensity matching between the 2 treatment arms among the octogenarian population was conducted to limit the potential bias and the effects of possible confounding factors. Facility type, gender, ethnicity, race, median income, comorbidity index, clinical T, tumor grade, and tumor size were the parameters used for propensity matching. After matching, we identified 285 patients who underwent PC and 285 who underwent RC. We used Kaplan-Meier survival analysis and multivariate Cox regression analyses to compare the OS between both treatment modalities, and a P value <0.05 was considered statistically significant. SAS statistical software, version 9.4, was used to perform the analyses.

Results

There were 671,462 patients diagnosed with bladder carcinoma between 2004 and 2018. Among these patients, 94,103 patients had localized MIBC. Of these patients, 2,528 patients aged 80 or above met our selection criteria being treated with PC or RC following the exclusion of patients with incomplete survival or follow-up data (*Figure 1*). In this octogenarian cohort, 313 patients underwent PC, and 2,215 underwent RC. After 1:1 propensity-matching, PC and RC groups had 285 and 281 patients, respectively (*Figure 1*). The mean follow-up of PC and RC patients were 39.5 and 36.3 months, respectively. In the univariate analysis (*Table 1*), the average and median age in the PC group were 84.1±3.3 and 83 years, and in the RC group were 82.9±2.5 and 82 years, respectively. 138 (44.1%) of patients who underwent PC were treated in community

Table 1 Sociodemographic and clinical parameters for matched and unmatched population of partial and radical cystectomy among octogenarians

Parameters	Unmatched population			Matched population		
	PC (N=313)	RC (N=2,215)	P value	PC (N=285)	RC (N=281)	P value
Age (years)			<0.001			<0.001
Mean ± SD	84.1±3.3	82.9±2.5		84.1±3.3	83±2.6	
Median	83	82		83.5	83	
Gender			0.97			0.84
Male	224 (71.6)	1,587 (71.6)		202 (70.9)	197 (70.1)	
Female	89 (28.4)	628 (28.4)		83 (29.1)	84 (29.9)	
Race			0.47			0.46
White	289 (92.3)	2,082 (94.0)		262 (91.9)	264 (94.0)	
Black	12 (3.8)	78 (3.5)		11 (3.9)	10 (3.6)	
Asian	8 (2.6)	28 (1.3)		8 (2.8)	4 (1.4)	
Others	4 (1.2)	27 (1.2)		4 (1.4)	3 (1.1)	
Ethnicity			0.79			0.52
Non-Hispanic	296 (94.6)	2,098 (94.7)		268 (94.0)	269 (95.7)	
Hispanic	5 (1.6)	44 (2.0)		5 (1.8)	5 (1.8)	
Unknown	12 (3.8)	73 (3.3)		12 (4.2)	7 (2.5)	
Median income			0.74			0.89
<$40,227	37 (13.0)	274 (13.8)		37 (13.0)	41 (14.6)	
$40,227–50,353	71 (24.9)	451 (22.7)		71 (24.9)	64 (22.8)	
$50,354–63,332	70 (24.6)	535 (26.9)		70 (24.6)	67 (23.8)	
≥$63,333	107 (37.5)	730 (36.7)		107 (37.5)	109 (38.8)	
Unknown	28	225				
Insurance			0.50			0.71
Not insured	0 (0.0)	9 (0.4)		0	2 (0.7)	
Private	26 (8.3)	166 (7.5)		23 (8.1)	22 (7.8)	
Medicaid	1 (0.3)	28 (1.3)		1 (0.4)	2 (0.7)	
Medicare	282 (90.1)	1,982 (89.5)		257 (90.2)	251 (89.3)	
Others	4 (1.3)	30 (1.3)		4 (1.4)	4 (1.4)	
Facility type			<0.001			0.85
Community CP	23 (7.3)	100 (4.5)		22 (7.7)	23 (8.2)	
Comprehensive CCP	138 (44.1)	668 (30.2)		125 (43.9)	119 (42.3)	
Academic program	88 (28.1)	1,073 (48.4)		79 (27.7)	86 (30.6)	
Integrated network CP	64 (20.4)	374 (16.9)		59 (20.7)	53 (18.9)	

Table 1 (*continued*)

Table 1 (*continued*)

Parameters	Unmatched population			Matched population		
	PC (N=313)	RC (N=2,215)	P value	PC (N=285)	RC (N=281)	P value
Comorbidity index			0.08			0.76
0	200 (63.9)	1,430 (64.6)		181 (63.5)	184 (65.5)	
1	70 (22.4)	556 (25.1)		64 (22.5)	64 (22.8)	
2	27 (8.6)	170 (7.7)		26 (9.1)	24 (8.5)	
3	16 (5.1)	59 (2.7)		14 (4.9)	9 (3.2)	
Clinical T			<0.001			0.47
cT2	248 (79.2)	1,858 (83.9)		221 (77.5)	226 (80.4)	
cT3	60 (19.2)	261 (11.8)		59 (20.7)	48 (17.1)	
cT4	5 (1.6)	96 (4.3)		5 (1.8)	7 (2.5)	
Pathological T			<0.001			<0.001
≤ pT1	12 (3.8)	362 (16.3)		11 (3.9)	35 (12.5)	
pT2	97 (31.0)	600 (27.1)		84 (29.5)	68 (24.2)	
pT3	126 (40.3)	943 (42.6)		117 (41.1)	135 (48.0)	
pT4	2 (0.6)	37 (1.7)		2 (0.7)	1 (0.4)	
pTx	65 (20.8)	231 (10.4)		62 (21.8)	33 (11.7)	
Unknown	11 (3.5)	42 (1.9)		9 (3.2)	9 (3.2)	
Pathological N			<0.001			<0.001
pN0	153 (48.9)	1,433 (64.7)		137 (48.1)	177 (63.0)	
pN+	16 (5.1)	431 (19.5)		16 (5.6)	53 (18.9)	
pNx	122 (39.0)	296 (13.4)		114 (40.0)	42 (14.9)	
Unknown	22 (7.0)	55 (2.5)		18 (6.3)	9 (3.2)	
Tumor location			<0.001			<0.001
Dome	109 (34.8)	87 (3.9)		102 (35.8)	11 (3.9)	
Lateral wall	48 (15.3)	372 (16.8)		44 (15.4)	41 (14.6)	
Anterior wall	30 (9.6)	82 (3.7)		25 (8.8)	9 (3.2)	
Posterior wall	23 (7.3)	192 (8.7)		21 (7.4)	21 (7.5)	
Others	36 (11.5)	707 (31.9)		30 (10.5)	92 (32.7)	
Bladder, NOS	67 (21.4)	775 (35.0)		63 (22.1)	107 (38.1)	
Surgical margin			<0.001			<0.001
Negative	234 (74.8)	1,864 (84.2)		211 (74.0)	244 (86.8)	
Positive	57 (18.2)	270 (12.2)		54 (18.9)	25 (8.9)	
Unknown	22 (7.0)	81 (3.7)		20 (7.0)	12 (4.3)	

Table 1 (*continued*)

Table 1 (*continued*)

Parameters	Unmatched population			Matched population		
	PC (N=313)	RC (N=2,215)	P value	PC (N=285)	RC (N=281)	P value
Tumor grade			0.38			0.36
Grade I	1 (0.3)	9 (0.4)		0 (0.0)	1 (0.4)	
Grade II	6 (1.9)	57 (2.6)		2 (0.7)	7 (2.5)	
Grade III	129 (41.2)	793 (35.8)		122 (42.8)	111 (39.5)	
Grade IV	153 (48.9)	1,145 (51.7)		138 (48.4)	138 (49.1)	
Unknown	24 (7.7)	211 (9.5)		23 (8.1)	24 (8.5)	
LN dissection			<0.001			<0.001
No	162 (51.8)	248 (11.2)		149 (52.3)	28 (10.0)	
Yes	151 (48.2)	1,967 (88.8)		136 (47.7)	253 (90.0)	
30-day mortality			0.001			0.03
Alive	305 (97.4)	2,107 (95.1)		277 (97.2)	262 (93.2)	
Dead	8 (2.6)	108 (4.9)		8 (2.8)	19 (6.8)	
90-day mortality			0.01			0.01
Alive	297 (94.9)	1,989 (89.8)		269 (94.4)	248 (88.3)	
Dead	16 (5.1)	226 (10.2)		16 (5.6)	33 (11.7)	
Neoadjuvant			0.003			0.27
No	225 (71.9)	1,707 (77.1)		207 (72.6)	216 (76.9)	
Yes	50 (16.0)	357 (16.1)		42 (14.7)	41 (14.6)	
Unknown	38 (12.1)	151 (6.8)		36 (12.6)	24 (8.5)	
Radiation			<0.001			<0.001
Yes	23 (7.3)	31 (1.4)		21 (7.4)	4 (1.4)	
No	290 (92.7)	2,184 (98.6)		264 (92.6)	277 (98.6)	

Data are presented as n (%) unless otherwise specified. PC, partial cystectomy; RC, radical cystectomy; CCP, comprehensive cancer program, CP, cancer program; cT, clinical T; pT, pathological T; pN, pathological N; LN, lymph node; NOS, not otherwise specified; SD, standard deviation.

centers, and 88 (28.1%) were treated in academic centers (P<0.001). Similarly, 1,073 (48.4%) of patients who underwent RC were treated in academic centers, and 668 (30.2%) were treated in community centers (P<0.001). In both the PC and RC cohorts, most of the patients had T2 tumors (79.2% *vs.* 83.9%) (P<0.001). Among the patients who underwent PC, most of the tumors were located in the dome, lateral, anterior, and posterior walls. Among patients who underwent PC, 57 (18.2%) patients had margin positivity, whereas 270 (12.2%) in the RC arm had margin positivity (P<0.001). Pelvic lymph node dissection was done in 151 (48.2%) PC patients, while 1,967 (88.8%) RC patients had lymph node dissection (P<0.001). Lymph node positivity was noted in 17 (5.4%) of PC patients and 474 (21.4%) of RC patients (P<0.001). The utilization of neoadjuvant chemotherapy was limited in both PC and RC groups, with 50 (16.0%) and 357 (16.1%), respectively (P=0.003). The 30-day mortality in PC and RC group were 8 (2.6%) and 108 (4.9%), respectively (P=0.001) and the 90-day mortality was 16 (5.1%) and 226 (10.2%), respectively (P=0.01). Mean hospital stay for PC and RC arms were 5.4 (8.5) days and 10.2 (9.7) days, respectively (P<0.001). Among patients who underwent PC and RC, radiation was used limitedly in both groups, 23 (7.3%) and

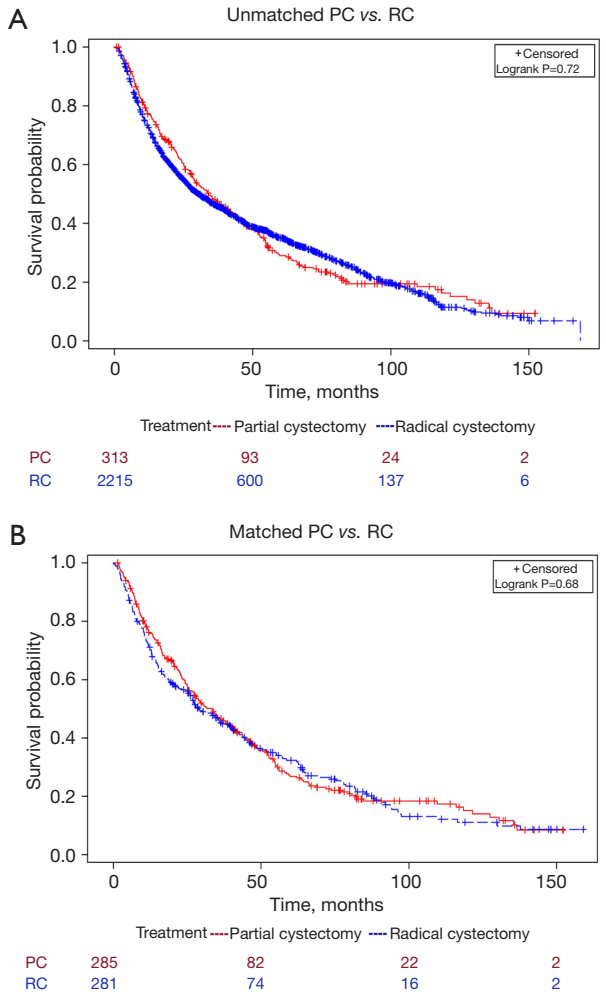

Figure 2 Overall survival comparing PC and RC among octogenarians. PC, partial cystectomy; RC, radical cystectomy.

31 (1.4%), respectively. Similarly, adjuvant chemotherapy was also used limitedly, 20 (6.4%) and 102 (4.6%), respectively. However, there were no statistically significant differences in gender, race, ethnicity, median income, education, insurance, comorbidity index, tumor grade, and 30-day readmission.

Kaplan-Meier survival analysis for the unmatched population of PC and RC (*Figure 2A*) showed that the median OS was 34.3 (95% CI, 28.4–41.5) and 30.2 (95% CI, 27.5–33.9) months, respectively (P=0.72), and for the matched population (*Figure 2B*) was 33.4 (95% CI, 26.6–39.3) and 29.9 (95% CI, 25.3–39.6) months, respectively (P=0.68). In T2 tumors the median OS for the unmatched population of PC and RC (*Figure 3A*) was 38.3 (95% CI, 31.6–46.7) and 33.3 (95% CI, 30.3–37.7) months (P=0.82), and for the matched population (*Figure 3B*) was 37 (95% CI, 29.8–45.8) and 33.5 (95% CI, 25.6–43.8) months, respectively (P=0.52). Likewise, in T3 tumors the median OS for the unmatched population of PC and RC (*Figure 3C*) was 22.3 (95% CI, 14.1–34.2) and 20.1 (95% CI, 15.3–28.9) months, respectively (P=0.70), and for the matched population (*Figure 3D*) was 22.3 (95% CI, 14.1–34.2) and 24.4 (95% CI, 13.7–41.3) months, respectively (P=0.98). Multivariate Cox regression analysis (*Table 2*) showed there was no difference in the risk of mortality between PC and RC (HR =1.15; 95% CI, 0.99–1.34; P=0.07). Similarly, there was no significant difference in survival hazards between tumor locations.

Discussion

Our study compared the survival outcomes between PC and RC in octogenarians with localized MIBC and observed that PC was safe and not inferior to RC. Patients treated in comprehensive Community cancer programs are more likely to undergo PC, and in academic centers, they are likely to undergo RC. The neoadjuvant chemotherapy was underutilized in both PC and RC patients, and pelvic lymph node dissection was less performed in PC compared to RC. The 30- and 90-day mortality rates were lower in PC. Tumors located in the dome of the bladder were mostly treated with PC, but on multivariate analysis, tumor location did not show a significant difference in survival hazards, and patients with higher comorbidity scores and those with T4 disease had increased mortality risk.

Over decades, the oncological and survival outcomes after PC have been a concern, so it was not performed as much. Few studies evaluated PC and compared the outcomes to the standard of care. Knoedler *et al.*, in their study on localized MIBC treated with PC for urothelial carcinoma, observed no significant differences between PC and RC in terms of 10-year cancer-specific survival (CSS) (58% *vs.* 63%, P=0.63). However, retreatment for PC with RC was seen in 16 (18.6%) patients due to intravesical tumor recurrence (10). Studies have shown that in PC, 5-year recurrence-free (RFS) and OS were between 39–62% and 57–70%, respectively, and superficial tumors, clinical stage, and adjuvant chemotherapy were associated with RFS (11-13). In carefully selected individuals with solitary MIBC lesions, PC offered good control, and the factors associated with undergoing PC were age above 70 years (14,15). In a study by Chung *et al.* from the NCDB, RC had better OS than PC, but in T2 tumors <5 cm, the OS was comparable (16). In our study on octogenarians, we

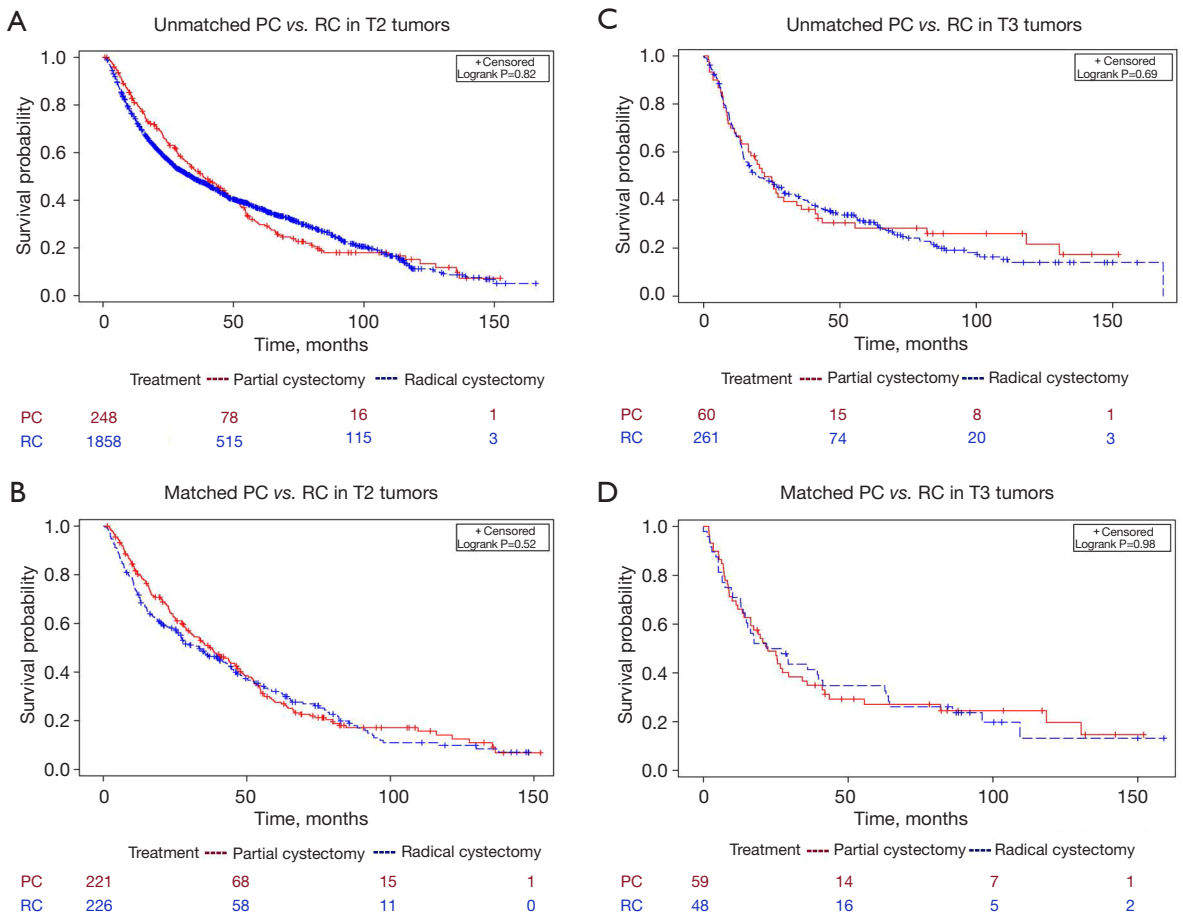

Figure 3 Overall survival comparing PC and RC among octogenarians based on tumor stage. PC, partial cystectomy; RC, radical cystectomy.

observed PC was not inferior in terms of OS compared to RC. Even though positive surgical margin status was higher in PC compared to RC, details on recurrence-free survival (RFS) and retreatment rates were unavailable.

Long *et al.*, in their study from the SEER database, observed that 18.9% and 81.1% of patients underwent PC and RC, respectively. Even though the clinical and sociodemographic parameters were not similar in both treatment groups, they had similar oncologic outcomes after propensity matching. Among the patients who underwent PC and RC, 45.4% and 92.0% of patients had pelvic lymph node dissection (PLND), respectively. PLND performed for curative purposes may be necessary for better long-term survival (17). Mistretta *et al.* also observed that PLND was performed limitedly in patients treated with PC (18). Our study showed similar results, with 12.4% and 87.6% undergoing PC and RC, respectively. Also, 48.2% of PC and 88.8% of RC patients had PLND. There was a higher pN+ rate in the RC group than in the PC group, and PLND was performed less in PC compared to RC. This could have been due to the differences in patient selection based on the surgeon's concern about the risk-benefit ratio from PLND in this advanced age group.

Studies have shown that utilization of NAC has been limited among patients who underwent PC, and the 30-day mortality rate in PC and RC was 1.6% and 2.1%, respectively (19). Peak *et al.* observed in their review that 7% to 10% of cystectomies performed for carcinoma bladder were PC; only 2.8% were MIBC (20). Our research on octogenarians also observed limited use of NAC, and the 30- and 90-day mortality rates were 2.6% and 5.6%, respectively. We also observed that PC had higher margin positivity compared to RC, but limited data was available on adjuvant therapies. The extent of utilization of NAC

Table 2 Multivariate Cox regression analysis of patients undergoing partial and radical cystectomy among octogenarians

Parameter	Hazard ratio	95% confidence interval	P value
Intervention			
Partial cystectomy	Ref.		
Radical cystectomy	1.15	0.99–1.34	0.07
Facility type			
Community CP	Ref.		
Comprehensive CCP	0.98	0.78–1.23	0.04
Academic center	0.90	0.72–1.13	0.80
Integrated network	0.96	0.75–1.23	0.10
Comorbidity score			
0	Ref.		
1	1.15	1.03–1.29	0.01
2	1.41	1.18–1.67	0.0001
≥3	1.30	0.97–1.73	0.08
Pathological T			
≤ pT1	Ref.		
pT2	0.70	0.59–0.82	<0.001
pT3	1.06	0.91–1.23	0.47
pT4	1.82	1.27–2.62	0.001
Pathological N			
pN+	Ref.		
pN0	0.59	0.52–0.66	<0.001
pNx	0.66	0.51–0.85	0.001
LN dissection			
No	Ref.		
Yes	0.88	0.75–1.04	0.13
Neoadjuvant			
No	Ref.		
Yes	0.79	0.69–0.91	0.001
Tumor location			
Dome	Ref.		
Lateral wall	0.95	0.77–1.18	0.66
Anterior wall	1.02	0.77–1.35	0.90
Posterior wall	0.89	0.70–1.14	0.36
Others	1.02	0.83–1.25	0.85
Bladder, NOS	0.92	0.75–1.12	0.39

CP, cancer program; CCP, community cancer program; pT, pathological T; LN, lymph node; NOS, not otherwise specified.

and adjuvant therapies could have been variable due to the concern about the tolerability in this age group. Studies have shown that patients with histological tumor-free status or complete pathological response are still prone to develop recurrence or metastasis due to exosomes from the bladder (21,22). Therefore, considering the possible risk of recurrence in patients undergoing PC, a close follow-up is necessary, and combining with adjuvant chemotherapy or chemoradiation as an adjunct may contribute to the oncological and survival benefits.

A study on tetra-modality treatment by Kijima *et al.* observed that in selected individuals, consolidative PC after transurethral resection of bladder tumor with chemoradiotherapy for MIBC had good oncological and functional outcomes. The 5-year MIBC RFS, CSS, and OS were 97%, 93%, and 91%, respectively (23). Tanaka *et al.*, in a similar study among elderly above 75 years, observed that 5-year RFS and CSS were 98% and 95%, respectively (24). Koga *et al.*, in their research, noted that in selected patients treated with tetra-modality with PC for localized MIBC, all patients reached a 5-year CSS and metastatic RFS endpoint (25). Further randomized studies with strict inclusion and comparing or combining PC with other bladder preservation strategies like concurrent chemoradiation could help us understand their impact on various outcomes.

There are several limitations to be considered in this study, including its database-related retrospective study design. Though the results are from a database-related study, they warrant careful interpretation. It also highlights the necessity of additional evaluation and validation of the role of PC in octogenarians. Propensity matching was done to minimize the effect of confounding factors and selection bias, but it cannot eliminate the bias completely. The tumors located in the dome of the bladder were mostly treated with PC compared to RC, and the pN+ rate was higher in RC compared to PC, suggesting a possible selection bias. Many other factors, like RFS, CSS, chemotherapy dose, and regimen, were unavailable. Details on salvage cystectomy were also not available. As limited data was available on adjuvant chemotherapy and radiation in octogenarians undergoing PC and RC, further studies are required to understand their impact on survival outcomes. Future prospective studies with carefully structured criteria are required to evaluate the role of PLND, treatment failure, and the oncological outcomes of PC in elderly individuals. With bladder preservation protocols gaining popularity, research on PC with a multi-modality approach, transurethral resection with irradiation, and concurrent chemoradiation could help us understand their impact on functional, oncological, and survival outcomes. This also could help in the shared decision-making with healthier elderly individuals concerned about bladder preservation.

Conclusions

Our study on PC and RC among octogenarians with localized MIBC showed that PC is safe and not inferior to RC. Still, the concern about the oncological outcomes and the need for salvage cystectomy limits the use of PC. With bladder preservation protocols gaining popularity, further research focusing on integrating or comparing PC with strategies like concurrent chemoradiation may help us understand the impact of PC on the oncological and survival outcomes among octogenarians.

Acknowledgments

We would like to thank Miami Cancer Institute, Baptist Hospital, for allowing us to conduct the study.
Funding: None.

Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://tau.amegroups.com/article/view/10.21037/tau-24-139/rc

Peer Review File: Available at https://tau.amegroups.com/article/view/10.21037/tau-24-139/prf

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://tau.amegroups.com/article/view/10.21037/tau-24-139/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013).

References

1. Siegel RL, Miller KD, Wagle NS, et al. Cancer statistics, 2023. CA Cancer J Clin 2023;73:17-48.
2. Xu J, Murphy SL, Kochanek KD, et al. Mortality in the United States, 2021. NCHS Data Brief 2022;(456):1-8.
3. Manton KG, Vaupel JW. Survival after the age of 80 in the United States, Sweden, France, England, and Japan. N Engl J Med 1995;333:1232-5.
4. Thinggaard M, McGue M, Jeune B, et al. Survival Prognosis in Very Old Adults. J Am Geriatr Soc 2016;64:81-8.
5. Fang W, Yang ZY, Chen TY, et al. Ethnicity and survival in bladder cancer: a population-based study based on the SEER database. J Transl Med 2020;18:145.
6. Hanna N, Trinh QD, Seisen T, et al. Effectiveness of Neoadjuvant Chemotherapy for Muscle-invasive Bladder Cancer in the Current Real World Setting in the USA. Eur Urol Oncol 2018;1:83-90.
7. Flaig TW. NCCN Guidelines Updates: Management of Muscle-Invasive Bladder Cancer. J Natl Compr Canc Netw 2019;17:591-3.
8. Bilimoria KY, Stewart AK, Winchester DP, et al. The National Cancer Data Base: a powerful initiative to improve cancer care in the United States. Ann Surg Oncol 2008;15:683-90.
9. Boffa DJ, Rosen JE, Mallin K, et al. Using the National Cancer Database for Outcomes Research: A Review. JAMA Oncol 2017;3:1722-8.
10. Knoedler JJ, Boorjian SA, Kim SP, et al. Does partial cystectomy compromise oncologic outcomes for patients with bladder cancer compared to radical cystectomy? A matched case-control analysis. J Urol 2012;188:1115-9.
11. Kassouf W, Swanson D, Kamat AM, et al. Partial cystectomy for muscle invasive urothelial carcinoma of the bladder: a contemporary review of the M. D. Anderson Cancer Center experience. J Urol 2006;175:2058-62.
12. Golombos DM, O'Malley P, Lewicki P, et al. Robot-assisted partial cystectomy: perioperative outcomes and early oncological efficacy. BJU Int 2017;119:128-34.
13. Capitanio U, Isbarn H, Shariat SF, et al. Partial cystectomy does not undermine cancer control in appropriately selected patients with urothelial carcinoma of the bladder: a population-based matched analysist. Urology 2009;74:858-64.
14. Leveridge MJ, Siemens DR, Izard JP, et al. Partial cystectomy for urothelial carcinoma of the bladder: Practice patterns and outcomes in the general population. Can Urol Assoc J 2017;11:412-8.
15. Smaldone MC, Jacobs BL, Smaldone AM, et al. Long-term results of selective partial cystectomy for invasive urothelial bladder carcinoma. Urology 2008;72:613-6.
16. Chung R, Moran GW, Movassaghi M, et al. Survival outcomes in patients with muscle invasive bladder cancer undergoing radical vs. partial cystectomy. Urol Oncol 2023;41:356.e11-8.
17. Long G, Hu Z, Liu Z, et al. Partial and radical cystectomy provides equivalent oncologic outcomes in bladder cancer when combined with adequate lymph node dissection: A population-based study. Urol Oncol 2023;41:327.e1-8.
18. Mistretta FA, Cyr SJ, Luzzago S, et al. Partial Cystectomy With Pelvic Lymph Node Dissection for Patients With Nonmetastatic Stage pT2-T3 Urothelial Carcinoma of Urinary Bladder: Temporal Trends and Survival Outcomes. Clin Genitourin Cancer 2020;18:129-137.e3.
19. Whalen MJ, Danzig MR, Pak JS, et al. Utilization and Perioperative Outcomes of Partial Cystectomy for Urothelial Carcinoma of the Bladder: Lessons from the ACS NSQIP Database. Urol Pract 2015;2:109-14.
20. Peak TC, Hemal A. Partial cystectomy for muscle-invasive bladder cancer: a review of the literature. Transl Androl Urol 2020;9:2938-45.
21. Hiltbrunner S, Mints M, Eldh M, et al. Urinary Exosomes from Bladder Cancer Patients Show a Residual Cancer Phenotype despite Complete Pathological Downstaging. Sci Rep 2020;10:5960.
22. Eldh M, Mints M, Hiltbrunner S, et al. Proteomic Profiling of Tissue Exosomes Indicates Continuous Release of Malignant Exosomes in Urinary Bladder Cancer Patients, Even with Pathologically Undetectable Tumour. Cancers (Basel) 2021;13:3242.
23. Kijima T, Tanaka H, Koga F, et al. Selective tetramodal bladder-preservation therapy, incorporating induction chemoradiotherapy and consolidative partial cystectomy with pelvic lymph node dissection for muscle-invasive bladder cancer: oncological and functional outcomes of 107 patients. BJU Int 2019;124:242-50.
24. Tanaka H, Fukushima H, Kijima T, et al. Feasibility and outcomes of selective tetramodal bladder-preservation

therapy in elderly patients with muscle-invasive bladder cancer. Int J Urol 2020;27:236-43.
25. Koga F, Kihara K, Yoshida S, et al. Selective bladder-sparing protocol consisting of induction low-dose chemoradiotherapy plus partial cystectomy with pelvic lymph node dissection against muscle-invasive bladder cancer: oncological outcomes of the initial 46 patients. BJU Int 2012;109:860-6.

Cite this article as: Pon Avudaiappan A, Prabhakar P, Lusnia C, Ganiyani MA, Rubens M, Garje R, Eldefrawy A, Manoharan M. A comparative study of survival outcomes between partial and radical cystectomy in octogenarians with muscle-invasive bladder cancer. Transl Androl Urol 2024;13(8):1486-1497. doi: 10.21037/tau-24-139

