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Original Article

Safety and feasibility of robot-assisted radical prostatectomy for clinically localized prostate cancer in elderly Japanese patients

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ABSTRACT

Background: This study was conducted to assess the safety and feasibility of robot-assisted radical prostatectomy (RARP) for elderly Japanese (aged ≥ 70 years) patients with clinically localized prostate cancer (PCa).

Methods: From April 2012 to March 2016, a total of 302 consecutive patients with clinically localized PCa underwent RARP at our institute. In this series, 109 (36.1%) and 193 (63.9%) of the patients were divided into older (aged ≥ 70 years) and younger (aged <70 years) groups, respectively. The correlation between the categorized patient age and various clinicopathological factors, including preoperative characteristics, perioperative outcome, and urinary continence outcome after RARP, was retrospectively analyzed.

Results: Except for age and Gleason score at biopsy, there was no difference in the preoperative features between the two groups. A nonnerve-sparing RARP was performed more often in the younger group; however, other perioperative variables in the elderly group were comparable to those in the younger group. Similarly, the urinary continence rates at 1 month, 3 months, and 6 months after the surgery were equally favorable in the younger and older groups.

Conclusion: RARP may be a reasonable therapeutic option for elderly patients with PCa and provides comparable perioperative and functional outcomes to those in younger patients.

1. Introduction

Prostate cancer (PCa) is the most common malignancy among elderly men, accounting for 65% of new cases diagnosed in men aged ≥ 65 years and 25% in men aged ≥ 75 years.[1] In the context of demographic changes in the Japanese population, life expectancy has steadilyincreased; a 70-year-old man will still have a life expectancy of 14.1 years. With this increase, the percentage of the population aged 65 years or older is projected to increase from 25.0% in 2014 to an estimated 35.7% by 2050.[2] It is expected that in the near future, many elderly men with a long remaining life expectancy will present with localized PCa. Although the optimal treatment for elderly men diagnosed with PCa is controversial,[3] the effective management of this population is becoming increasingly important.

Radical prostatectomy (RP) has been regarded as one of the most effective treatment options for clinically localized PCa and is generally recommended for patients with a life expectancy of >10 years,[4] whereas Miller et al[5] concluded that men older than 70 years bore the greatest burden of this potential overtreatment because of perceptions of increased side effects and complications. However, the recent introduction of robotic technologies has been shown to provide surgeons with certain inherent advantages to perform RP with precise techniques, leading to fewer postoperative complications and better perioperative and functional outcomes than those of traditional RP.[6] Therefore, this paradigm shift in RP procedures might increase the suitability of elderly candidates for surgery. Despite the fact that the potential role for robot-assisted RP (RARP) in elderly patients needs to be further defined as the elderly population grows, there have been few reports of RARP in these patients,[7–10] and none in elderly Japanese men with PCa.

Considering these findings, we retrospectively assessed the influence of age on perioperative and functional outcomes after RARP in one institution.

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2. Materials and methods

From April 2012 to March 2016, 302 consecutive men underwent RARP for localized PCa at our institution. In this study, two surgeons performed 302 RARP (A, 207; B, 95) in a standard fashion, using the DaVinci system (Intuitive Surgical, Sunnyvale, CA, USA). The original surgical technique used for RARP was previously described by Patel et al.[11] Clinicopathological information on these patients was extracted from their medical records. Patients who had RARP were retrospectively divided into two groups based on their chronological age, with 109 men aged ≥ 70 years and 193 aged <70 years. Patients who had a follow-up of <6 months were excluded from this study. Collected data consisted of preoperative variables including age, body mass index, serum prostate-specific antigen (PSA) at diagnosis, clinical tumor stage, Gleason score at biopsy, and D'Amico risk group.[12] Comorbidities were also evaluated using the age-adjusted Charlson comorbidity index scoring system.[13] Perioperative factors analyzed in this study included the total and console operative time, estimated blood loss, status of preservation of the neurovascular bundles, prostate weight, and duration of catheterization and hospitalization. Complications were recorded using the Dindo modification of the Clavien Grading System.[14] In this study, the continence status was classified into requiring one precautionary pad or less per day and two or more pads per day, and the continence status was evaluated by interviews prior to and 1 month, 3 months, and 6 months after RARP. The design of the current study was approved by the Research Ethics Committee of our institution and, prior to participating in this study, informed consent was obtained from each patient.

All statistical analyses were performed using Statview 5.0 software (Abacus Concepts, Berkeley, CA, USA), and P values < 0.05 were considered significant. Differences in several parameters between the two groups according to chronological age were compared using an unpaired t test or the chi-square test.

3. Results

Table 1 lists the preoperative baseline clinicopathological characteristics. Of the 302 men analyzed, 36.1% and 63.9% were aged ≥ 70 years and <70 years, respectively. Except for age and Gleason score at biopsy (compared with younger men, older men had a significantly higher Gleason score at biopsy; $P = 0.013$), there was no difference in the clinical features including body mass index, PSA, clinical tumor stage, D'Amico risk group, and Charlson comorbidity index between the two groups.

Although a nonnerve-sparing RARP was performed more often in the younger group (19.3% in older group vs. 32.6% in younger group; $P = 0.040$), the total and console operative time, estimated blood loss during surgery, and prostate weight did not significantly differ between the two groups. The postoperative factors including duration of catheterization and hospitalization and complications were also similar between the groups, as shown in Table 2.

In this study, all patients were continent prior to the surgery. Table 3 shows the short-term continence status of the two groups. Continence rates, as defined by no leak or the use of a security pad, were equivalent between the two age groups at 1 month, 3 months, and 6 months after RARP.

Table 1
Comparison of preoperative characteristics between the two groups

	A: ≥70 yr ($n = 109$)	B: <70 yr ($n = 193$)	P
Age (yr)	72.7 (70–78)	63.7 (46–69)	<0.005
BMI (kg/m^2)	23.2 (16.7–29.8)	24.0 (17.4–34.4)	0.10
PSA(ng/mL)	10.1 (4.1–45.7)	10.4 (1.2–70.4)	0.71
Prostate volume (mL)	28.7 (11–88)	28.2 (10–100)	0.72
Clinical stage			0.066
cT1c	21 (19.3)	63 (32.6)	
cT2a	68 (62.4)	95 (49.2)	
cT2b	8 (7.4)	13 (6.7)	
cT2c	8 (7.4)	9 (4.7)	
cT3a	4 (3.7)	13 (6.7)	
Gleason score at biopsy			0.013
6	11 (10.1)	39 (20.2)	
7	63 (57.8)	101 (52.4)	
8	13 (11.9)	33 (17.1)	
9	22 (20.2)	20 (10.4)	
D'Amico risk classification			0.082
Low	10 (9.2)	34 (17.6)	
Intermediate	64 (58.7)	93 (48.2)	
High	35 (32.1)	66 (34.2)	
Mean Charlson comorbidity	2 (0–3)	2 (0–3)	0.64

Data are presented as mean (range) or n (%).
BMI, body mass index; PSA, prostate-specific antigen.

4. Discussion

Because of the increasing life expectancy and the widespread use of PSA tests, a growing number of elderly men are being diagnosed with PCa. With the aging of the population, the issue of managing PCa in the elderly is of increasing importance. In the case of clinically localized PCa, the patient's age as well as tumor characteristics are considered to be a key determinant in terms of treatment decisions. However, the management of localized PCa in older populations is often challenging, because disease progression can occur slowly, and most elderly patients with localized PCa will not die from their PCa.[1] In fact, Albertsen et al[15] revealed that in patients aged 70 to 74 years with clinically localized PCa diagnosed and managed by either surveillance or androgen withdrawal alone, only 29% died from PCa over a 20-year follow-up period. Meanwhile, Alibhai et al reported that in elderly patients with few comorbidities and moderately or poorly differentiated localized PCa, RP results in significantly improved life expectancy and quality-adjusted life years.[16] In addition, treatment for localized PCa involves watchful waiting, active surveillance, surgery, external beam radiation therapy, brachytherapy, cryosurgery, hormonal therapy, or their combinations. Collectively, although it is difficult to establish standard strategies for elderly patients with PCa owing to a lack of comparative randomized controlled trials, decisions in this population should be made after careful consideration of the tumor aggressiveness, life expectancy based on comorbidities, and potential adverse effects of treatment.

Table 2
Comparison of intra- and postoperative outcomes of the two groups

	A: ≥70 yr ($n = 109$)	B: <70 yr ($n = 193$)	P
Total operative time (min)	239 (153–479)	248 (156–549)	0.21
Console operative time (min)	184 (104–434)	192 (83–436)	0.10
Estimated blood loss (mL)	10.1 (4.1–45.7)	10.4 (1.2–70.4)	0.71
NVB preservation			< 0.001
Negative	72 (19.3)	78 (32.6)	
Universal	34 (62.4)	94 (49.2)	
Bilateral	3 (7.4)	21 (6.7)	
Prostate weight (g)	42.3 (14–85)	40.5 (16–93)	0.22
Duration of catheterization (d)	6.2 (5–54)	5.7 (4–60)	0.50
Duration of hospitalization (d)	8.2 (6–31)	7.8 (5–30)	0.22
Postoperative complications			0.97
None	91 (83.5)	159 (82.4)	
Clavien–Dindo Grade 1, 2	9 (8.3)	17 (8.8)	
Clavien–Dindo Grade 3a	9 (8.3)	17 (8.8)	

Data are presented as mean (range) or n (%).
NVB, neurovascular bundles.