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Should radical prostatectomy be encouraged at any age? A critical non-systematic review

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Abstract

Elderly men are likely to be diagnosed with clinically localized prostate cancer, however only few studies have assessed the appropriate treatment in such patients. Radical prostatectomy is one valid alternative. Perioperative outcomes, functional outcomes and oncological outcomes have to be carefully discussed in patient counselling. Fewer perioperative complications, lower perioperative mortality, and shorter hospitalization times have been reported for patients undergoing radical prostatectomy by high-volume surgeons at high-volume centres. Although elderly patients are more likely to be preoperatively incontinent, and increasing age impacts negatively on continence recovery, long-term urinary continence rates have been reported to be satisfactorily high also in older patients. Potency should not be considered as a relevant outcome, since many elderly patients already suffer from longstanding erectile dysfunction and advanced age itself is associated with low chances of recovery. Although some inter-study variability exists in different oncological outcomes measured, most studies are consistent in showing no different cancer-specific survival rates between younger and older patients, thus implying that even elderly patients may benefit from radical treatment. Biological rather than chronological age should be used to base the decision as to whether a patient will profit from definitive treatment. Therefore, elderly men should undergo a health assessment using validated tools before any treatment decision. Only fit and motivated individuals with a reasonable life expectancy and, above all, high-risk disease should be offered radical prostatectomy. In these patients, high-volume surgeons and minimally invasive approaches should be preferable to minimize perioperative complications.

Keywords: radical prostatectomy, prostate cancer, comorbidity assessment, life expectancy

Introduction

International guidelines recommend radical prostatectomy (RP) as single-modality treatment with curative intent in patients with clinically localized prostate cancer (PCa) and in the context of multimodal therapy in patients with clinically locally advanced disease. [1, 2] Moreover, some authors have recently proposed RP as local treatment of the primary in adjunct to androgen deprivation in patients with oligometastatic PCa. [3]

Elderly men are likely to be diagnosed with clinically localized PCa, however the most appropriate treatment in such patients is yet to be determined. Many elderly men are excluded from radical treatment, especially RP, mainly in consideration of their age, but those with high-risk disease are known to have a higher mortality risk if managed conservatively [4]. Although improvements in surgical technique including adoption of minimally invasive approaches would encourage wide adoption of RP also in elderly men, life expectancy (LE) should be strictly regarded as a selection criterion, namely >20 years in very-low risk disease and >10 years in other risk categories. [1, 2] According to US Social Security Administration tables based on 2013 mortality data, the maximum age limit for potential candidates for RP should be 61 years for very low-risk disease and 76 years for all other risk categories. [2] However, clinical experience has taught us that very often patients <76 years are unfit for surgery, and, conversely, some patients, even older than 76 years, may qualify as fit surgical candidates. Indeed, looking at the highest and lowest percentiles of LE for adult men reported by the latest National Comprehensive Cancer Network Guidelines on Older Adult Oncology [5], values range between 8 and 19 years for elderly man in their seventh decade, and between 3.8 and 11.5 years for men in their eighth decade. This means that, hypothetically, and according to international guidelines, many patients <76 years could not be ideal candidates for RP. Conversely, some patients >76 years could have an appropriate LE. It is, then, evident that the wide ranges of LE

observed are strongly dependent on the different comorbidity profiles. Therefore, clinical evaluation of comorbidities should be considered more relevant than chronological age.

Based on these premises, counselling and decision-making in elderly patients referred for RP is a challenging task. Several questions remain open: is RP safe in elderly patients? Which is the best surgical approach? What are the functional outcomes after RP? Are oncological outcomes good in elderly patients after RP? In this review, we discuss the critical points that need to be considered when offering RP to elderly patients with clinically localized PCa.

Life expectancy assessment in prostate cancer patients

The natural history of untreated, early-stage PCa is quite favourable. Most cases of clinically localized PCa are thought to have an indolent course. Indeed, PCa progression and mortality remain substantially stable after a very long follow-up. Within 15 years of diagnosis, most deaths among men with PCa can be attributed to other competing causes. Cancer-specific survival (CSS) is roughly >80% after 10 years and slightly decreases to 40% with after >30 years of follow-up. As expected, however, survival for men with non-palpable, well-differentiated tumours declines slowly through 20 years, and between 20 and 25 years from 75.2% (95% CI, 48.4-89.3) to 25% (95% CI, 22.0-72.5). On the contrary, >50% of patients with Gleason grade 8-10 disease are destined to die of disease within the first 10 years of follow-up. [6]

Compared to patients <75 years, their older counterparts have a higher pathological Gleason score and are more likely to harbour non-organ-confined disease. In one large study of nearly 14.000 patients, 5-year biochemical recurrence-free survival (BRFS), metastasis-free survival, CSS and overall survival (OS) rates after RP were 64.2%, 84.7%, 98.4% and 91.3% in patients ≥75 years, and 76.9%, 96.2%, 99.0% and 96.2%,

respectively, in patients <75 years. [7] In this context of extreme variability of survival in PCa patients with the same tumour characteristics, physicians are not able to accurately estimate LE using traditional clinical tools. In a study published in 2005, Wilson et al showed that both urologist and oncologist consultants underestimated LE of their PCa patients. [8] For this reason, many authors have suggested to use specific tools where clinicians attribute a score to the single comorbidities with the final aim to predict overall survival probabilities.

Available tools can be classified in generic, age-specific, disease-specific and treatment-specific (Table 1). The Charlson comorbidity index [9] is one of the most popular generic tool used by clinicians to estimate overall survival of patients that may have a range of comorbid conditions. [10] A total of 22 conditions are included for the score assessment. Each condition is assigned a score of 1, 2, 3, or 6, depending on the risk of dying associated with each one. Single scores are summed up to provide a total score that predicts risk of mortality. CCI is correlated also with other outcomes such as postoperative complications and length of hospital stay. It has been validated in older cancer patients, where it also correlates with progression-free survival. [11] This tool has been largely tested in urological patients and, specifically, in patients with PCa. Many variations of CCI have been presented, including the age-adjusted version in which an additional score is applied according to patient age.[10] An interesting tool able to predict 10-year mortality was recently proposed and tested by Suemoto et al in men ≥60 years. [12] Interestingly, besides age and common chronic diseases (i.e. diabetes, cardiovascular diseases, pulmonary diseases and cancers), the tool considers some behavioural aspects such as smoking status, alcohol use and physical activity. These tools can be used for general population and are not specific for PCa patients.

In 2015 Daskivich et al proposed a disease-specific questionnaire for patients with PCa regardless of the stage of the disease and the type of treatment performed. The

Prostate Cancer Comorbidities Index was generated to predict other-cause mortality according to patient age and comorbidities. The Authors proposed to cluster patients in 6 categories characterized by 10-year other-cause mortality probabilities ranging between 10 and 99%.[13] Froehner et al have recently validated this tool in a large European cohort of patients with PCa.[14] The same authors proposed a treatment-specific questionnaire to evaluate the 10-year competing mortality in a series of men who underwent RP. In details, this tool includes conditions such as angina pectoris, chronic lung disease, diabetes mellitus, current smoking status and ASA categories in adjunct to the different age categories. The 10-year competing mortality rates ranged between 0 to 50% in patients with score 0 to 7, respectively. [15]

Although the application of the previous tools may help urologists select patients for treatment more appropriately according to their estimated LE, the International Society of Geriatric Oncology (SIOG) have highlighted the importance to distinguish “fit” or “frail” elderly patients from those who are “disabled” or “with severe comorbidities” [9]. Health status evaluation of geriatric oncological patients entails a stepwise process (Figure 1). The initial mandatory step consists of the administration of two tools (G8 and mini-COG). This is followed, where indicated, by a simplified geriatric evaluation (if G8 is ≤ 14) (step 2) and then, again when indicated, by a comprehensive geriatric evaluation (step 3). The first two steps are performed by a trained nurse, while the third one by a geriatrician and other health care professionals. Unfortunately, these evaluations are time consuming. For a complete step 1 and 2 evaluation, ten and seventeen minutes, respectively, are required, whereas for step 3 it would be necessary a hospital stay ranging from 2 hours to 1 day. Briefly, if step 1 has a score >14, the patient is considered “fit”. With a score ≤14 and non-reversible conditions at step 2 (Cumulative Illness Rating Score-Geriatrics ≥2, weight loss >10% and Abnormal Activities of Daily Living of 3-4) patients should be considered “disabled” or “with severe comorbidities”. In all remaining reversible conditions at step 2,

patients are considered “frail”. However, as a limitation of the patient’s decision tree, the assessment of comorbidities could be very challenging in those health systems without a trained nurse and limited resources [9]. According to SIOG recommendations, only “fit” or “frail” patients in the D’Amico high-risk group with a chance of surviving >10 years are likely to benefit from treatment with curative intent. Conversely, elderly patients in the low- and intermediate-risk groups are likely to benefit from active surveillance or watchful waiting based on their individual estimated survival. A curative approach should be discussed with patients in the intermediate-risk group who have the longest LE [9]. The geriatric assessment might increase the number of patients with high-risk disease and estimated >10-year survival who are candidate for curative treatment. Indeed, in 2015 Bratt et al showed that men with high-risk non-metastatic PCa in their seventies were significantly undertreated, and, interestingly, when a treatment was proposed, it was radiation therapy and not RP. [16]

Outcomes of radical prostatectomy in elderly patients

When evaluating the role of RP as a treatment modality for clinically localized PCa in elderly patients, three major points should be considered, namely perioperative, functional and oncological outcomes. The findings of the most representative studies selected for this non-systematic review are summarized in Table 2.

1) Perioperative outcomes

A retrospective study based on the US Surveillance, Epidemiology, and End Results (SEER) - Medicare linked database evaluated the health-related outcomes in 1522 patients who underwent RP between 1992 and 1996 [17]. The primary outcome was to assess the variations in outcomes among hospitals and among surgeons. Postoperative

morbidity was significantly lower in very high-volume hospitals than in low-volume hospitals (27% vs. 32%, p=0.03), and was also significantly lower when RP was performed by very high-volume surgeons compared to low-volume surgeons (26% vs. 32%, p<0.001). Interestingly, in this study age was a strong independent predictor of 30-day surgery-related mortality and 3-month postoperative complications. Specifically, the percentage of 30-day surgery related mortality was 0.4%, 0.5% and 0.9% in patients aged between 65-69, 70-74 or ≥75, respectively.

More recently, data on >115.000 patients of the Health Care Utilization Project Nationwide Inpatient Sample who underwent open RP between 1998 and 2007 were analysed[18]. The aim of this study was to evaluate whether morbidity and mortality rates were higher in a subgroup of 2109 patients aged >75 years. On multivariable analyses, patients aged >75 years had a significant increase in rates of blood transfusions, intraoperative and postoperative complications and in-hospital mortality. Furthermore, age was an independent predictor of need for blood transfusion and postoperative complications in a multivariable analyses including only patients aged >75 years.

A Sweden nationwide Population Based Study investigated hospital readmission frequency during the 90 days after RP performed between 2000 and 2011 [19]. During 90 postoperative days 2,317 of the 24,122 men (10%) identified were readmitted, specifically 10% after open, 11% after laparoscopic and 9% after robot-assisted procedure. A higher readmission risk was associated with more advanced age (>70 vs. <60 years, OR 1.17, 95% CI 1.00-1.36) and a higher number of comorbidities (CCI ≥3 vs. 0, OR 1.77, 95% CI 1.29-2.44). Interestingly, also the hospital surgical volume was a predictor for higher readmission rate (≥150 vs <30 RPs per year, OR 0.70, 95% CI 0.60-0.81). Notably, the association of increased age with increased readmission risk was no longer evident during the last two years of the study, maybe due to a better management of these patients.

However, age at third quartile was only 67 years, implying that these results may be not applicable to elderly individuals.

The adoption of minimally invasive surgery may theoretically result in an increase in the number of elderly surgical candidates who would better tolerate a less morbid procedure. Indeed, SEER registry data in the period 2004-2009 showed a favourable trend in favour of minimally invasive RP even in patients aged >70 years[20], with an utilization rate increasing from 15% to 69%. Comparative analyses between open and minimally invasive RP demonstrated that open approach was associated with a higher risk of blood loss, cardiac and pulmonary complications, and vesico-urethral anastomotic strictures. Conversely, open RP was superior to minimally invasive RP in terms of risk of genitourinary complications, urinary incontinence and erectile dysfunction. These inconsistent results could be an expression of selection bias. Indeed, in a recent propensity-score analysis comparing 400 patients aged <70 years with 400 patients aged >70 years treated with robot-assisted RP (RARP), no significant differences in perioperative outcomes were observed in selected elderly patients (i.e. minimal comorbidities, LE >10 years, clinically localized disease) as compared to younger patients. [21]

2) Functional outcomes

Urinary incontinence after RP is multifactorial. The most commonly described underlying mechanism is intrinsic sphincter deficiency, followed by bladder dysfunction with detrusor overactivity [22]. It has been widely demonstrated that age is an independent predictor of urinary continence recovery in patients who underwent RP regardless of the approach used.[23, 24] Moreover, elderly patients are more prone to suffer from lower urinary tract symptoms or even be incontinent preoperatively, which represent a further factor negatively influencing the postoperative urinary continence status. Additionally, overactive

bladder has been reported to be twice as prevalent in individuals aged >65 years than in younger patients. [25]

Data from the Martini Clinic showed that the probabilities of both 3-month and 12-month urinary continence recovery after RP were significantly correlated with patient age in a large dataset including >8000 patients [26]. Continence rates at 12 months postoperatively significantly decreased with increasing age. For age groups <65, ≥65 and <70, ≥70 and <75, ≥75 years, 3-month continence rates were 80.3%, 74.0%, 70.3%, and 66.1%, respectively, while 12-month rate were 93.3%, 90.8%, 86.0%, and 86.5%, respectively. Urinary continence rate in patients aged <60 years increased from >80% to >90% from 3 to 12 months after RP, whereas in patients aged >75 years, continence rate increased from <70% to >80%. Interestingly, although age impacted negatively on urinary continence recovery, the rate of continence 1-year after RP was satisfactorily high also in older patients.

In another single-centre series of 1636 RP patients including 411 aged >70 years, the 2-year postoperative continence rates were comparable in younger and older patients, and depended only on the preoperative male incontinence symptom score ($p< 0.001$), but not on age ($p=0.341$) at multivariable analysis.[27] In 2014, Basto et al observed that patients aged >70 years had a similar percentage of urinary incontinence at 3 and 12 months after RARP as in younger counterparts.[28] Unfortunately, this study from a high-volume centre retrospectively compared only 24 patients aged >70 years to 238 patients aged <70 years.

Erectile function is usually significantly impaired in patients aged >75 years. [29, 30] When considering the Briganti criteria, age is a critical factor to select good candidate for nerve-sparing procedure. Indeed, men with the highest risk for postoperative erectile dysfunction were those aged >70 years or with baseline IIEF-6 ≤10 or with CCI ≥2. [31] If only patients with an IIEF-5 score ≥17 before RP who had undergone at least unilateral

nerve sparing and had attempted sexual intercourse after RP were included, results were comparable between younger and older patients. [27] However, in a large series of patients undergoing open RP, Mandel et al observed that 3-mo and 1-yr potency rates in patients aged ≥75 years were as low as 10% and 31%, respectively. These rates resulted significantly lower compared to those reported by younger patients.[26] Therefore, potency recovery should not be considered as a relevant outcome in elderly candidates for RP.

3) Oncological outcomes

In 2013, Kunz et al compared oncological outcomes in patients treated with RP aged ≥70 years vs. <70 years in a retrospective study. Patients aged ≥70 years showed similar BRFS and CSS compared to younger counterparts. The only significant difference between the two groups was observed for OS probability.[27] However, on multivariable analysis advanced age was not an independent predictor of CSS or OS. Similarly, Kumar et al did not observe any difference in terms of BRFS and CSS in patients aged > or <70 years who underwent RARP. [21] More recently, Mandel et al stratified the oncologic outcomes after RP according to the age limit of 75 years. Out of nearly 14000 patients, 265 patients aged ≥75 years showed a significantly worse BRFS and metastases-free survival in comparison with their younger counterparts on multivariable analysis, whilst no differences were observed for CSS [7]. In the same year, in a multicentre retrospective study including 258 men, Ryu et al failed to demonstrate significant differences in terms of BRFS between patients aged >75 years (n=89) or between 65 and 69 years (n=168) at a median follow-up of roughly 3 years [32]. In conclusion, although some inter-study variability exists in different oncological outcomes measured, most studies are consistent in showing no different cancer-specific survival rates between younger and older patients, thus implying that even elderly patients may benefit from radical treatment.

Main limitations of the reported studies are their retrospective nature and the relatively small size of the elderly subgroup. Moreover, most studies come from high-volume centres and their results may not be applicable to the general urology community. Furthermore, results might be limited by a “positive” selection bias in favour of elderly patients, because only fitter and/or more motivated individuals are likely to be referred for, and eventually treated with, RP. It remains to be ultimately determined what benefit the increasing use of RARP has on functional and oncological results in the elderly. As for the latter point, a clear trend towards more RARP for unfavourable tumour characteristics over time was recorded. [33] Additionally, the rates and extent of pelvic lymph node dissection increased with increasing experience and thanks to the robotic technique that allow a higher lymph node yield even when compared to conventional laparoscopy [34] in intermediate and high-risk PCa. These are exactly the tumours that pose a life threat to elderly patients as well.

Conclusions

RP should not be encouraged at any age, but only in strongly motivated patients with a LE >10 years. According to the number and severity of comorbidities, health status rather than chronological age plays a crucial role. Therefore, preoperative assessment of physical status is an essential step requiring a comprehensive approach above all in elderly patients. In this subgroup of patients, RP should be strongly considered, above all in patients with high-risk disease in the context of a multimodal treatment. Fewer perioperative complications, lower perioperative mortality, and shorter hospitalization times have been reported for patients undergoing RP by high-volume surgeons at high-volume centres. Moreover, a minimally invasive approach might increase the number of elderly patients by decreasing perioperative morbidity and accelerating convalescence. Thus,

expert surgeons and minimally invasive approaches may be preferable in order to minimize the risk of perioperative complications in elderly patients. Finally, referral centres are the most appropriate in order to have an adequate multidisciplinary perioperative care for this frail category of patients (Figure 2).

Figure legends

Figure 1. Flowchart showing the preoperative assessment of elderly patients before radical prostatectomy according to the International Society of Geriatric Oncology (SIOG) recommendations (ADL: Activities of Daily Living; CIRS-G: Cumulative Illness Rating Score-Geriatrics).

Figure 2. Flowchart showing the key aspects in counselling elderly patients before radical prostatectomy.

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Table 1. Common tools used by clinicians to measure comorbidities and estimate survival, classified as generic, age-specific, disease-specific and treatment-specific.

Tool		Measured outcome	Variables included	Points
Generic	Charlson comorbidity index	Overall survival	Myocardial infarction Congestive heart failure Peripheral vascular disease Cerebrovascular disease Dementia Chronic pulmonary disease Connective tissue disease Ulcer disease Mild liver disease Diabetes Hemiplegia Moderate or severe renal failure Diabetes with end-organ failure Any tumour Leukaemia Lymphoma Moderate or severe liver disease Metastatic solid tumour AIDS	1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 3 6 6
	American Society of Anesthesiology physical status	Fitness before surgery	Normal healthy patient A patient with mild systemic disease A patient with severe systemic disease A patient with severe systemic disease that is a constant threat to life A moribund patient who is not expected to survive without the operation	1 2 3 4 5
	Framingham risk score	10-year cardiovascular risk	Age Total cholesterol High-density lipoprotein cholesterol Blood pressure History of diabetes mellitus History of smoking	Multivariate logistic function to calculate the conditional probability of cardiovascular events
	Model developed by Suemoto et al [12]	10- year mortality	Age Sex Diabetes Heart disease Lung disease Cancer Smoking	Multivariable Cox model to predict the probability of 10-year mortality in older adults

			Alcohol use Body mass index Physical activity Self-reported health Difficulty to bathing Walking several blocks Reporting date correctly	
Age-specific	Age-adjusted Charlson comorbidity index	Overall survival	Same as Charlson comorbidity index + add: 40–49 yrs 50–59 yrs 60–69 yrs 70–79 yrs 80–89 yrs 90–99 yrs	 0 1 2 3 4 5
Disease-specific	Prostate Cancer-specific Comorbidity Index [13]	Competing mortality in patients with prostate cancer	metastatic solid tumour lymphoma leukaemia moderate to severe liver disease moderate to severe chronic obstructive pulmonary disease moderate to severe renal disease hemiplegia dementia congestive heart failure mild liver disease peripheral vascular disease other neurological disease mild renal disease angina mild chronic obstructive pulmonary disease arrhythmia valve disease connective tissue disease gastrointestinal bleed inflammatory bowel disease and peptic ulcer disease cerebrovascular disease any tumour and diabetes with end organ damage	6 6 6 3 3 3 3 3 3 3 3 3 3 3 2 2 2 2 2 1 1 1
Treatment-specific	Single condition-based combined mortality index [15]	10-year competing mortality in patients who underwent radical prostatectomy	50–59 yrs 60–69 yrs 70–79 yrs 80–89 yrs ≥90 yrs Angina pectoris (Canadian Cardiovascular Society classes 2–4) Chronic lung disease	1 2 3 4 5 1 1

			Diabetes mellitus Current smoker American Society of Anesthesiology classes 3–4	1 1 1

Table 2. Summary of perioperative, functional and oncological outcomes after radical prostatectomy in elderly patients.

	Study	Design	N. elderly patients/N. total patients	Outcome(s) of interest	Age cut-off (yrs)	Values (elderly patients)
Perioperative outcomes	Begg CG et al, 2002 [17]	Retrospective Population-based	11522 (only elderly pts)	30-day complications	65–69	0.4%
					70–74	0.5%
					≥75	0.9%
				60-day complications	65–69	0.5%
					70–74	0.6%
					≥75	0.9%
	Trinh QD et al, 2012 [18]	Retrospective Population-based	2109/15554	Intraoperative complications	≥75	Low AHC 2.9%
						Intermediate AHC 2.7%
						High AHC 1.7%
				Postoperative complications		Low AHC 22.2%
						Intermediate AHC 17.4%
						High AHC 14.5%
	Kumar A et al, 2015 [21]	Retrospective Single-surgeon	400/3241	Postoperative complications: - None - Clavien-Dindo grade 1,2 - Clavien-Dindo grade 3,4,5	≥70	 377 (94.3%) 18 (3.8%) 9 (1.9%)
				Anastomotic leakage Urinary retention Wound Infection Deep venous thrombosis Ileus Urine leak Reoperation-bleeding Reoperation-other Lymphocele Other complication		0 (0.0%) 6 (1.5%) 3 (0.8%) 2 (0.5%) 1 (0.3%) 6 (1.5%) 0 (0.0%) 1 (0.0%) 1 (0.0%) 7 (1.8%)
				Length of stay (days), mean±SD		1.4±2.0

Functional outcomes	Kunz I et al, 2013 [27]	Retrospective Single-centre	411/1636	Continence 2 years postoperatively (mean ICSmaleSF score)	≥70	2.1
	Basto MY et al, 2014 [28]	Retrospective Multicentre	24/262	Continence rate 4-6 weeks postoperatively	≥70	13%
	Mandel P et al, 2015 [26]	Retrospective Single-centre	140 (only open RP)/8295	Continence rate 3 months postoperatively	≥75	66.1%
				Continence rate 12 months postoperatively		86.5%
				Potency rate 3 months postoperatively		10%
				Potency rate 12 months postoperatively (bilateral nerve sparing)		31%
	Mak R et al, 2001 [29]	Retrospective Population-based	302/799	Prevalence of erectile dysfunction: - No erectile dysfunction, % (95% CI) - Mild erectile dysfunction, % (95% CI) - Moderate erectile dysfunction, % (95% CI) - Severe erectile dysfunction, % (95% CI)	>60	 19.5% (15.3±24.6%) 22.9% (17.4±27.0%) 34.1% (28.8±39.8%) 24.5% (19.8±29.8%)
	Ryu JH et al, 2016 [32]	Retrospective Single-centre	89/257	Continence rate 12 months postoperatively	≥75	76.4%
Oncological outcomes	Kunz I et al, 2013 [27]	Retrospective Single-centre	411/1636	10-year OS 10-year CSS 10-year BRFS	≥70	67% 70% 38%
	Kumar A et al, 2015 [21]	Retrospective Single-surgeon	400/3241	5-year BRFS 5-year CSS	≥70	81.1% 95.3%
	Mandel P et al, 2016 [7]	Retrospective Single-centre	265/13732	5-year BRFS 5-year MFS 5-year CSS 5-year OS	≥75	76.9% 96.2% 99.0% 96.2%
	Ryu JH et al, 2016 [32]	Retrospective Single-centre	89/257	BRFS	≥75	NR (approximately 85% at 5 years from visual estimation of survival curves)

AHC: annual hospital caseload; BRFS: biochemical recurrence-free survival; CI: confidence interval; CSS: cancer-specific survival; ICSmaleSF: International Continence Society Male Short Form; MFS: metastasis-free survival; NR: not reported; OS: overall survival; RP: radical prostatectomy; SD: standard deviation