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Original Article

Prostate cancer in young adults—Seventeen-year clinical experience of a single center

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Abstract

Background: In the general population, prostate adenocarcinoma affects predominately older men. If fact, most current guidelines suggest that males over the age of 50 years should undergo prostate cancer screening. However, the clinical behavior and prognosis of prostate cancer in young adults is not well defined. The aim of this study was to evaluate the clinical behavior, pathological characteristics, and prognosis of prostate cancer in young adults.

Methods: We retrospectively reviewed the records of young patients (age, ≤50 years) in our hospital with prostate adenocarcinoma between 1997 and 2013. We compared data including initial presentation, cancer cell type, Gleason score, disease stage, prostate-specific antigen (PSA) level, prostate volume, treatment, and survival between patients both younger and older than 50 years. Data were analyzed using the Kaplan–Meier method to assess survival.

Results: Twenty-six patients were enrolled in our study, accounting for 0.55% of all patients with a diagnosis of prostate cancer at our facility. All 26 patients had a pathology diagnosis of adenocarcinoma, with a mean age on diagnosis of 46.8 ± 2.8 years (range, 39–50 years). On initial presentation, patients older than 50 years more frequently displayed lower urinary tract symptoms (LUTS) than younger patients (62.3% vs. 30.4%, $p = 0.008$). There was no statistical difference in histological grade, disease stage, PSA level, overall survival, and biochemical-free survival between the two groups.

Conclusion: The result of our investigation indicated that prostate adenocarcinoma patients younger than 50 years had similar histological grade, disease stage, PSA level, overall survival, and biochemical-free survival as the older population. However, patients younger than 50 years with prostate cancer less frequently showed initial symptoms of LUTS.

Keywords: prognosis; prostate cancer; young adults

1. Introduction

Prostate adenocarcinoma is a condition that primarily affects older men. Males younger than 50 years account for approximately 1% of all patients diagnosed with prostate adenocarcinoma.[1] The current literature suggests that clinical characteristics and prognosis of prostate cancer in young adults are conflicting and remain unresolved. Some observers

Conflicts of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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had suggested than young age is a poor prognostic indicator.[2,3] Several studies reported a better survival outcome in men younger than 50 years of age.[4,5] However, others have revealed no significant difference in disease recurrence, histological grade, and disease stage.[6–9] We retrospectively evaluated the clinical behavior, pathological characteristics and prognosis of prostate cancer in men younger than 50 years of age.

2. Methods

We retrospectively reviewed the Taipei Veterans General Hospital cancer registry, examining the charts of patients with prostate cancer between January 1997 and December 2013 whose age at diagnosis was younger than 50 years. All patients who were diagnosed or treated at our hospital were included in this study.

Demographic data, symptoms at initial presentation, histological grade, clinical or pathological stage, initial prostate-specific antigen (PSA) level on diagnosis, prostate volume on transrectal ultrasound, treatment, and clinical outcome were all recorded. Patients with nonadenocarcinoma condition or inadequate medical records data were excluded. For disease stage analysis, pathological stage was used when available; otherwise, clinical stage was used. The disease stage was assessed according to the AJCC (American Joint Committee on Cancer) (2010) tumor–node–metastasis system. Histological grade was defined as Gleason score in the following manner: low grade (score 2–5), intermediate grade (score 6–7), and high grade (score 8–10). Symptoms on initial presentation were categorized into seven groups as follows: lower urinary tract symptoms (LUTS), incidental finding, bone pain, hematuria, dysuria, acute urinary retention, and others. The LUTS consisted of a feeling of incomplete bladder emptying, frequency, intermittency, urgency, weak stream, straining, and nocturia. Patients who survived without evidence of disease, or who were lost to follow-up, were censored. Survival was defined as the time from initial presentation to the study end point, including death or censoring.

A patient group comprising study participants older than 50 years was selected for comparison with the younger patients. There were 106 patients randomly selected with a confidence level of 95% and a confidence interval of 9.4%.

Differences in the distribution of demographic, clinical, and pathological variables, such as symptoms of presentation, PSA level, D'Amico risk classification, and disease stage, between younger and older men were evaluated using Fisher's exact test. The difference of prostate volume was assessed by use of the t test. Survival curves were plotted using the Kaplan–Meier method, with statistical significance calculated according to the log-rank test. Data were analyzed using IBM SPSS Statistics 20.0 (IBM, Armonk, NY, USA). A p value < 0.05 was considered statistically significant.

We informed the patients about the study, and consent was obtained from each patient.

3. Results

A total of 4716 patients were diagnosed with prostate cancer in the 17-year period, and 29 patients were younger than 50 years of age. Of 29 prostate cancer cases identified, 26 had pathological diagnosis of adenocarcinoma, which accounted for 0.55% of all patients. The other three had the pathological diagnosis including embryonal rhabdomyosarcoma and stromal sarcoma. The mean age of the patients at initial diagnosis was 46.8 ± 2.8 years (range, 39–50 years). The median follow-up duration was 79.6 months (range, 4.5–198.2 months). The average prostate volume on transrectal ultrasound was 29.33 ± 10.0 mL. Nine patients were positive and eight were negative on digital rectal examination. The most common presenting symptoms were incidental findings in nine patients (38%), LUTS in seven (29%), bone pain in three (13%), and hematuria in three (13%) (Table 1). Additionally, six of 26 patients (23%) had a family history of prostate cancer in our study group.

Of those 26 patients, cancer staging was as follows: Stage I ($n = 0$, 0%), Stage II ($n = 14$, 56%), Stage III ($n = 4$, 16%),

Table 1
Characteristics and univariant analysis of the patients with prostate cancer.

	Age ≤ 50 y	Age > 50 y	p
Patients (n)	26	108	
Age (y)	47.0 ± 2.7	75.13 ± 8.1	
DRE			
Positive	8 (47%)	43 (62%)	0.191
Negative	9 (53%)	26 (38%)	
TRUS prostate volume (mL)	29.33 ± 10.0	37.10 ± 17.9	0.122
PSA (ng/mL)			0.847
<4	0 (0%)	5 (6%)	
4–10	7 (32%)	25 (32%)	
10–20	5 (23%)	18 (23%)	
>20	10 (45%)	30 (39%)	
Initial presentation			0.011
LUTS	7 (29%)	50 (63%)	
Incidental finding	9 (38%)	10 (13%)	
Bone pain	3 (13%)	3 (4%)	
Hematuria	3 (13%)	5 (6%)	
Dysuria	2 (7%)	3 (4%)	
AUR	0 (0%)	5 (6%)	
Others	0 (0%)	3 (4%)	
Stage			0.652
I	0 (0%)	5 (6%)	
II	14 (56%)	38 (48%)	
III	4 (16%)	13 (17%)	
IV	7 (28%)	23 (29%)	
Risk classification[a]			0.678
Low	2 (12%)	17 (22%)	
Intermediate	7 (44%)	29 (37%)	
High	7 (44%)	33 (42%)	
Treatment[b]			0.001
Surgery	13 (59%)	14 (18%)	
Nonsurgery	9 (41%)	62 (82%)	

AUR = acute urinary retention; DRE = digital rectal examination; LUTS = lower urinary tract symptoms; PSA = prostate-specific antigen; TRUS = tracsrectal ultrasound.

[a] According to D'amico risk classification, for localized disease or locally advanced disease. Metastatic disease not included.

[b] Nonsurgery group includes hormone deprivation therapy, radiotherapy, watchful waiting, and active surveillance.

and Stage IV ($n = 7$, 28%). A review of histological grade revealed one patient (4%) with low grade, 18 patients (72%) with intermediate grade, and six patients (24%) with high grade (Table 1). Furthermore, 13 of the 26 patients underwent surgical management of radical prostatectomy, and nine patients underwent nonsurgical management, including hormone deprivation therapy and/or radiotherapy (Table 1).

Compared with older patients with prostate adenocarcinoma, patients younger than 50 years of age had lower digital rectal examination positive rate (47% vs. 62%, $p = 0.191$) and smaller prostate volume on transrectal ultrasound (29.33 ± 10.0 mL vs. 37.10 ± 17.9 mL, $p = 0.122$), but both were not statistically significant. Distribution of PSA on initial diagnosis showed no significant difference (Table 1). For the initial presentation, the majority of older patients presented with LUTS. Nevertheless, more patients were incidentally found to have prostate cancer in the younger patients group without obvious voiding symptoms. Other symptoms, including bone pain, hematuria, and dysuria, accounted for a relatively small proportion of the patients' initial symptoms. The distribution difference was statistically significant ($p = 0.011$; Table 1).

For cancer staging and tumor grading, most patients presented with Stage II disease as well as an intermediate risk group on D'Amico classification.[10] No significant difference was observed between the two groups (Table 1). Patients younger than 50 years of age mostly underwent radical prostatectomy. The older patients were more frequently treated with nonsurgical intervention, including hormone deprivation therapy, radiotherapy, watchful waiting, or active surveillance (Table 1).

Kaplan–Meier survival curves revealed no overall survival difference between the younger and older patients ($p = 0.454$; Fig. 1). No significant difference could be demonstrated between the two groups in stage-specific survival (Figs. 2 and 3). Biochemical-free survival, which was evaluated in patients who underwent curative treatment, i.e., radical prostatectomy or curative radiotherapy with or without androgen deprivation therapy, revealed no significant difference between the two age groups ($p = 0.960$; Fig. 4). Patients with Stage I and Stage III diseases have 100% survival during the follow-up period in both age groups; therefore, they are not shown in the survival analysis. For different treatment modalities, neither surgical nor nonsurgical intervention revealed a significant difference in overall patient survival (Fig. 5). Patients who underwent radical prostatectomy had 100% survival in both age groups, and are also not shown in the survival analysis.

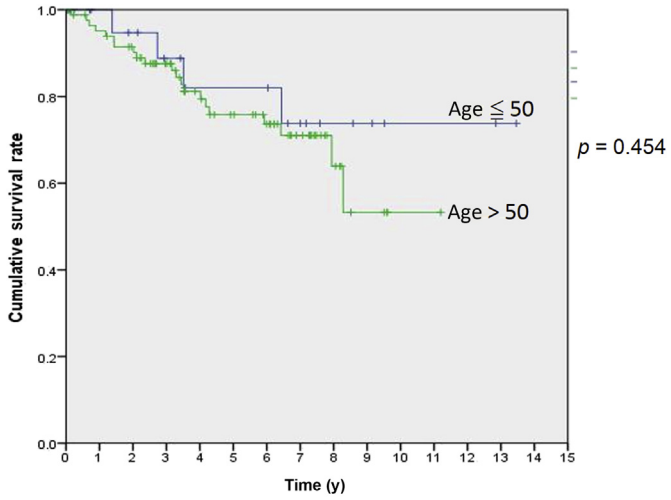

Fig. 1. Overall survival rate according to age ($p = 0.454$).

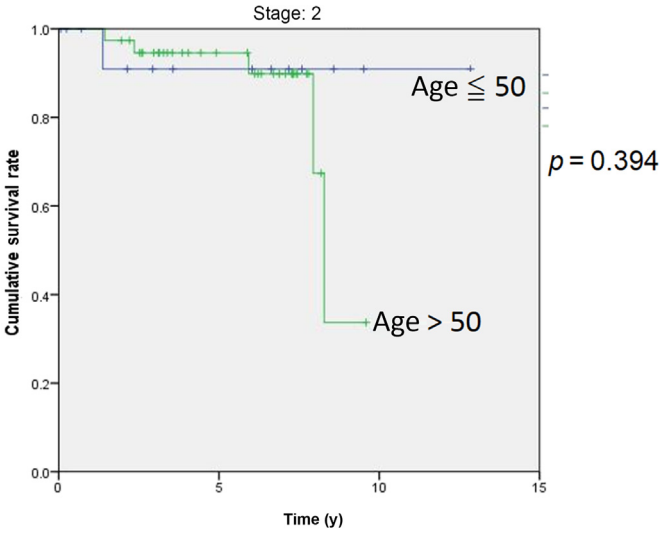

Fig. 2. Stage-specific overall survival rate in patients with Stage II prostate cancer ($p = 0.394$).

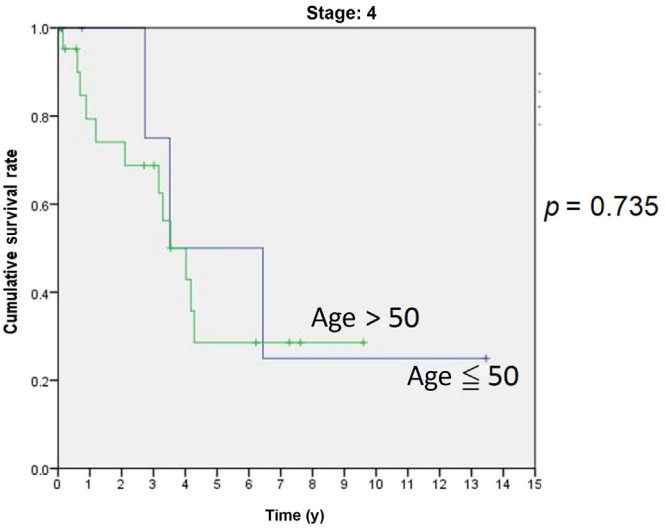

Fig. 3. Stage-specific overall survival rate in patients with Stage IV prostate cancer ($p = 0.735$).

4. Discussion

Prostate cancer has been infrequently reported in men younger than 50 years of age. Review of the literature shows that prostate cancer traditionally occurs in approximately 1%

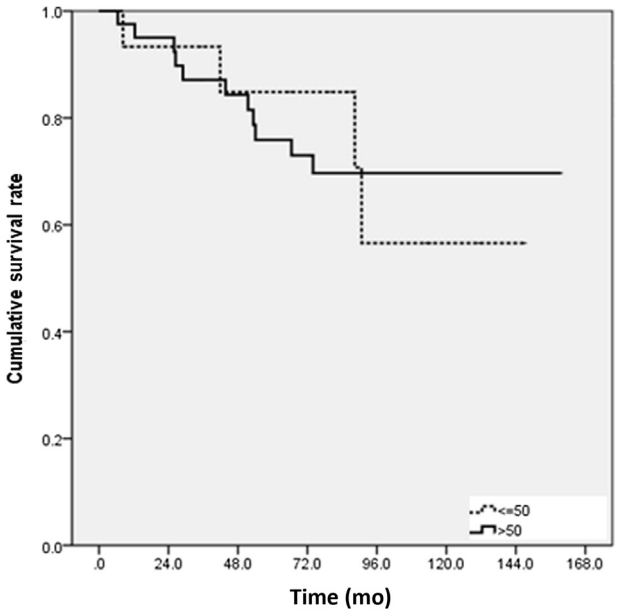

Fig. 4. Biochemical-free survival according to age ($p = 0.960$).

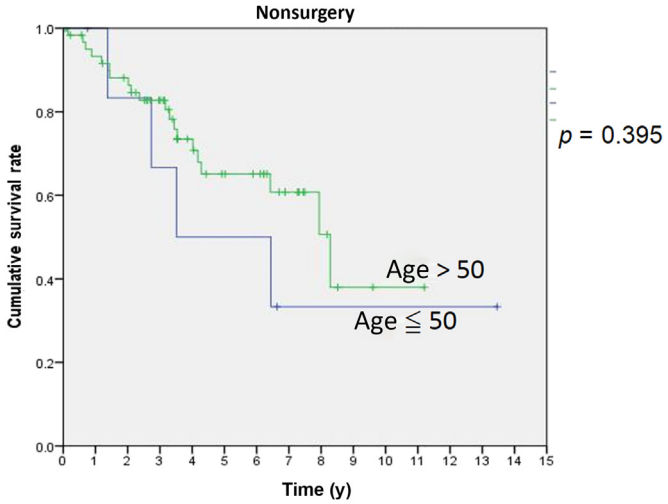

Fig. 5. Overall survival rate in patient who underwent nonsurgical treatment ($p = 0.395$).

of this younger age group.[1] The present study revealed that patients younger than 50 years accounted for 0.55% of all patients with prostate cancer, which was less than described in the previous reports. It has been estimated that approximately 43% of early onset disease (in those younger than 55 years) is of the inherited form of prostate cancer,[9] whereas in the present series we found that 23% of patients have a family history of prostate cancer.

Existing reports provide conflicting views regarding the clinical characteristics of prostate cancer in young men. Tjaden et al[2] reported their experience with 56 patients younger than 50 years and observed a very poor clinical outcome. Johnson et al[3] observed the same biologic aggressiveness of prostate cancer in 26 patients younger than 50 years. Other researchers, however, have not observed the same findings. Byar and Mostofi[4] reviewed 51 cases and reported that younger men may have a better prognosis. Silber and McGavran[5] observed favorable survival rates in men younger than 50 years. Benson et al[6] reported their experience with 14 patients aged 45 years or younger with prostate cancer, which revealed similar outcomes as in the older population. Huben et al[7] reported data from the American College of Surgeons National Survey, which demonstrated 168 patients younger than 50 years diagnosed with prostate cancer prior to 1975. The data suggested no significant differences in survival by cancer stage when compared with older men. The most recent series was reported by Werthman et al,[8] examining 20 patients younger than 50 years of age. In that investigation, the authors observed in younger men a similar presentation and clinical course as found in older men. Aprikian et al[9] reported a series of 151 patients younger than 50 years with prostate cancer and revealed similar symptomatology, histologic grade, and disease stage between the younger and older populations. The existing literature demonstrates a high level of discrepancy on this issue, and Byar and Mostofi[4] supposed that the impression of poor outcome in younger men may in fact result from the psychological effect of clinicians. And there are few studies available focusing on treatment and outcomes in these specific patient groups. Smith et al[11] reported that patients 50 years or younger undergoing radical prostatectomy have a more favorable disease-free outcome.

Populations included in the reported English literature primarily consisted of races derived from Western countries. There was sparse English-language literature regarding Asian young men with prostate adenocarcinoma. In the present study, our result revealed that patients younger than 50 years had similar risk classification, disease stage, and PSA level as the older population. However, patients younger than 50 years with prostate cancer less frequently presented with initial symptoms of LUTS. Therefore, urologists must bear in mind that prostate cancer should be one of the several differential diagnoses in young patients who present with any abnormal urinary tract symptoms.

There are several limitations in this study. The major limitation is that our research involved a single institution database and retrospective recruitment. A total of 26 patients were included, which represents a relatively small sample size. Some patients had short follow-up duration (less than 3 years). The short follow-up duration may be inadequate to reflect the actual disease characteristics. Owing to the above reasons, some subgroups could not demonstrate survival variation sufficiently for the purpose of analysis. In the future, it would be beneficial for additional studies to involve multiple centers as well as a longer follow-up period for further investigation.

In conclusion, our experience showed that patients younger than 50 years had similar histological grade, disease stage, PSA level, disease stage, overall survival, and biochemical-free survival as the older population. However, patients younger than 50 years with prostate cancer less frequently presented with initial symptoms of LUTS.

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