Factors influencing treatment decisions in patients with low risk prostate cancer referred to a brachytherapy clinic

Daniel Taussky, MD,[1] Aihua Liu, MSc,[2] Michal Abrahamowicz, PhD,[2] Eve Léger-Bélanger,[1] Jean-Paul Bahary, MD,[1] Marie-Claude Beauchemin, MD,[1] Thu Van Nguyen, MD,[1] David Donath, MD,[1] Fred Saad, MD[3]

[1]Department of Radiation, University of Montreal Medical Center (CHUM), Montreal, Quebec, Canada
[2]Department of Epidemiology and Biostatistics, McGill University, Montreal, Quebec, Canada
[3]Department of Urology, University of Montreal Medical Center (CHUM), Montreal, Quebec, Canada

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Objective: *The present study aimed to analyze factors influencing treatment decisions in patients diagnosed with low risk prostate cancer who were referred to a brachytherapy clinic and had to choose from four treatment options: expectant management (watchful waiting), radical prostatectomy, external beam radiation therapy, and permanent seed brachytherapy.*
Methods: *We analyzed factors that influenced the treatment decisions of 110 consecutive patients with low risk prostate cancer who were referred to a brachytherapy clinic in a hospital in Montreal, Canada. These factors included patient age, marital status, and profession, as well as referral source (a urologist or a radiation oncologist), and distance and driving time from the patient's home to the medical center. Cost was not a factor as the procedure is covered under the Canadian healthcare system.*
Results: *Of the 110 patients, 53 patients (48.2%) chose permanent seed brachytherapy, 33 patients (31.8%) chose expectant management, 12 patients (10.9%) chose external beam radiation therapy, and 10 patients (9.1%) chose radical prostatectomy. Patients who chose brachytherapy were significantly younger than those who chose external beam radiation therapy (p = 0.011). Patients living further away from the hospital than the median distance of 19.85 miles were more likely to choose brachytherapy than expectant management (p = 0.017).*

Key Words: prostate cancer, treatment, decision making, permanent seed brachytherapy (PB)

Introduction

Patients with low risk prostate cancer — stage ≤ T2a; serum prostate-specific antigen (PSA) < 10 ng/ml; Gleason score ≤ 6 — have four treatment options: expectant management (watchful waiting), radical prostatectomy, external beam radiation therapy (EBRT), and permanent seed brachytherapy (PB). Each treatment has its advantages and disadvantages.

The use of PB has gained popularity over the past 2 decades. It presents an interesting alternative to surgery and EBRT. Since it is performed in day surgery and allows a rapid return to daily activities, it appeals to younger patients and those who live far from a hospital center.[1] Other patients are attracted to PB due to a lower risk of impotence with this procedure.[2,3]

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Address correspondence to Dr. Daniel Taussky, Department of Radiation Oncology, CHUM – Hôpital Notre-Dame, 1560 Sherbrooke St. E., Montreal, Quebec H2L 4M1 Canada

Known factors that affect treatment decisions made by patients with low risk prostate cancer include the distance from home to a treatment center, the patient's profession, marital status, race, and comorbidity, as well as the urologist's treatment recommendation and the treatment's potential side effects.[4] Since treatment of low risk prostate cancer is rarely urgent, patients have time to gather information about different treatment options in order to make a well-informed decision.[1] In our study, the influence of cost to the patient was not a factor in the decision process, since the treatment cost is covered under the Canadian healthcare system.

The PB program at the University of Montreal Medical Center (CHUM) began in July 2005, and brachytherapy is performed by one radiation oncologist. CHUM is a tertiary care center with 18 urologists located in Montreal, a city with a population of 1.8 million.[5] The center offers open and laparoscopic radical prostatectomy and EBRT for low risk prostate cancer patients and is one of four centers in the Montreal area that offers radiotherapy for prostate cancer. It is the only center in the city that offers PB, and only one other center in the province, in Quebec City, also offers this procedure.

The aim of this study was to analyze factors influencing treatment choices in patients diagnosed with low risk prostate cancer who were referred to our brachytherapy clinic. The patients had to decide on 1 of 4 treatment options: expectant management, radical prostatectomy, EBRT, and PB. Identifying the characteristics of a "typical" patient who chooses PB might help the decision-making process for future patients.

Methods

We reviewed the charts of all consecutive patients seen by a radiation oncologist in our brachytherapy clinic between November 2006 and June 2007. This consisted of 110 patients. We determined whether the patients were referred by a urologist (in a university medical center or in private practice) or by a radiation oncologist. We also obtained patient demographic data for age, marital status (married or life partner versus none), profession (no specialty training, specialty training, academic, executive, or artist), comorbidity (Charlson score), potency (ability to achieve penetration with or without medication), and voiding symptom severity score (from the International Prostate Symptom Score [IPSS] questionnaire). Distances and driving times from the patients' homes to the medical center were calculated using MapQuest.

Statistical methods

Differences in patient characteristics between different treatment options were tested using the non-parametric Mann-Whitney U test for quantitative variables and, for categorical variables, either the chi-square test or, in the case of cell sizes < 5, the Fisher exact test. Separate multiple logistic regression analyses were used to identify predictors for (a) the most frequently chosen treatment, and (b) the second most frequently chosen treatment. Patients who chose the most frequently chosen treatment were excluded when modeling the probability of choosing the second most frequently chosen treatment. Potential predictors included the patient's age, marital status, distance from home to hospital, driving time from home to hospital, profession, referral source, Charlson comorbidity score, potency, and voiding symptom severity score.

We first constructed a model adjusted for all potential predictors. The final multivariable model included only predictors that were statistically significant ($p < 0.05$ for the two-tailed Wald test). Since the variables "distance from home to hospital" and "driving time to hospital" were highly correlated (Pearson correlation coefficient = 0.84), only the driving distance (in miles) was used in the logistic regression analysis. All analyses were conducted using the SAS 9.0 statistical software package.

Results

Of the 110 patients, 53 patients (48.2%) chose PB, 33 patients (31.8%) chose expectant management, 12 patients (10.9%) chose EBRT, and 10 patients (9.1%) chose radical prostatectomy. Almost half of the patients (42%) were referred by another radiation oncologist, and of these, 49% were referred by a radiation oncologist within our department.

The patients had a mean PSA of 5.8 ng/ml and a median PSA of 5.2 ng/ml (range 1.1-14.0 ng/ml). Of the four patients with a PSA > 10 ng/ml (range 10.9-14.0 ng/ml), one patient chose radical prostatectomy, two patients chose brachytherapy, and one patient chose EBRT.

Most patients (89%) had a Gleason score of 6 or less. Of the 12 patients (11%) who had a Gleason score of 3+4, one patient chose radical prostatectomy, six patients chose brachytherapy, four patients chose EBRT, and one patient chose expectant management. Only three patients had > T2a disease.

Table 1 shows patient characteristics and chosen treatments. Treatment decisions were not significantly influenced by Charlson comorbidity score ($p = 0.58$),

TABLE 1. **Treatment choices and patient characteristics (in %)***

Patient characteristics	All patients	PB	Surgery	EBRT	ExpM	P
Age (years)						**0.003**
<60	29.1	43.8	15.6	3.1	37.5	
60-70	52.7	60.3	8.6	12.1	19.0	
> 70	18.2	20	0	20	60	
Distance from home to hospital (miles)						**0.047**
< median (19.5 miles)	46.4 (51)	35.3 (18)	11.8 (6)	9.8 (5)	43.1 (22)	
> median	53.6	59.3	6.8	11.9	22.0	
Driving time from home to hospital						**0.114**
< median (33 minutes)	44.5	36.7	10.2	10.2	42.9	
> median	55.5	57.4	8.2	11.5	23.0	
Referral by urologist						**0.297**
From a university hospital	48.2	22.7	5.5	2.7	17.6	
From private practice	51.8	25.5	3.6	8.2	14.5	
Referral by another radiation oncologist						**0.865**
Yes	42.7	19.1	4	4.5	17	
No	57.3	29.1	6	6.4	18	
Potency						**0.350**
No intercourse possible	14.3	9.8	22.2	8.3	21.2	
Intercourse possible	85.7	90.2	77.8	91.7	78.8	
IPSS urinary voiding symptom score						**0.108**
≤ 7	72.4	82.0	70.0	50.0	66.7	
> 7	27.6	18.0	30.0	50.0	33.3	

PB = prostate brachytherapy, EBRT= external beam radiotherapy
ExpM = expectant management
IPSS = International Prostate Symptom Score, and Surgery = radical prostatectomy.
*Among 110 patients with low-risk prostate cancer seen in a brachytherapy clinic.

marital status (p = 0.828), or profession (p = 0.693) (not shown).

Table 2 lists the p values for differences in patient characteristics for different treatment choices — for the various possible comparisons of two different treatments. Patients who chose PB were about the same age as patients who opted for radical prostatectomy or expectant management, but they were significantly younger than patients who chose EBRT (p = 0.011). Patients who chose PB lived further from the hospital than those who chose expectant management (p = 0.017). Patients who chose PB rather than radical prostatectomy tended to live farther from the hospital, but this difference was not significant (p = 0.074). Patients with urinary voiding symptoms above the median of 7 were more likely to choose EBRT over brachytherapy, probably partly due to a selection bias, since patients with more urinary symptoms were discouraged from undergoing brachytherapy. Potency did not influence treatment decisions.

Table 3 shows the multiple logistic regression analysis for the likelihood of choosing brachytherapy over other treatments. This analysis identified three significant predictors. Compared to patients younger than 60 years, those older than 70 years were 83% less likely to choose brachytherapy. Compared to patients who lived 19.85 miles or less from the hospital, patients living further away were 2.9 times more likely to choose brachytherapy. Lastly, compared to patients with an IPSS score of 7 or less, those an IPSS score greater than 7 were 71% less likely to choose brachytherapy. None of the analyzed factors was significantly associated with choosing expectant management, radical prostatectomy, or EBRT (data not shown).

TABLE 2. **Differences in patient characteristics for different treatment choices (p values)***

Patient characteristics	PB versus surgery	PB versus EBRT	ExpM versus surgery	ExpM versus EBRT	PB versus ExpM
Continuous variables**					
Age	0.146	0.011[b]	0.090	0.34	0.181
Distance from hospital	0.074[a]	0.787	0.662	0.057	0.0171
Driving time to hospital	0.056[a]	0.813	0.613	0.065	0.0141
Charlson comorbidity score	0.207	0.278	0.148	0.191	0.658
Number of urinary symptoms (from IPSS)	0.465	0.033g	0.433	0.168	0.540
Categorical variables***					
Age	0.3433	0.0517[b]	0.0774[f]	0.1477	0.0011[d]
Marital status	1.0000	0.6826	1.0000	1.0000	0.3858
Distance from hospital	0.0838[a]	0.8005	1.0000	0.1430	0.0102[a]
Driving time to hospital	0.1653	0.9920	1.0000	0.2001	0.0500[e]
Profession	0.7507	0.3185	0.6660	0.5918	0.8567
Referral by a urologist	0.5092	0.2069	0.7484	0.1026[c]	0.5135
Referral by another radiation oncologist	1.0000	0.8962	0.6318	0.6791	0.4068
Charlson comorbidity score	0.4201	0.4811	0.5352	0.6119	0.5774
Potency	0.281	1.0	1.0	0.416	0.203
IPSS urinary voiding symptom score	0.403	0.054[g]	1.0	0.325	0.124

*Among 110 patients with low-risk prostate cancer seen in a brachytherapy clinic.
PB = prostate brachytherapy, EBRT= external-beam radiotherapy, ExpM = expectant management, IPSS = International Prostate Symptom Score, and Surgery = radical prostatectomy.
[a]Patients choosing PB lived further than the mean distance from the hospital.
[b]Patients choosing EBRT were older.
[c]Patients choosing EBRT were more likely to be referred by a urologist in private practice.
[d]Patients choosing PB were younger.
[e]Patients choosing PB had a longer driving time to get to the hospital center.
[f]Patients choosing expectant management were older.
[g]Patients choosing EBRT had a higher urinary symptom score.
** From the Mann-Whitney U test.
*** From the Chi-square test or, when a cell had a value of less than 4, from the Fisher exact test.

TABLE 3. **Likelihood of choosing brachytherapy over other treatment options***

Factor	Odds ratio (95% CI)	p**
Age (years)		
< 60	1.0	
60-70	1.73 (0.67-4.50)	0.26
> 70	0.17 (0.04-0.76)	0.021
Driving distance from home to hospital (miles)		
≤ 19.85 (median)	1.0	
> 19.85	2.94 (1.22-7.09)	0.016
IPSS urinary voiding symptom score		
≤ 7	1.0	
> 7	0.29 (0.09-0.92)	0.035

*Among 110 patients with low-risk prostate cancer seen in a brachytherapy clinic.
**Based on Chi square test. CI = Confidence Interval; IPSS = International Prostate Symptom Score

Discussion

Treatment decisions made by patients with low risk prostate cancer depend on many factors. Patients can choose from EBRT, radical prostatectomy, and PB, which all seem to provide a comparable cure rate at 10 years.[6] Despite recent advances in the primary treatments for localized prostate cancer, no randomized controlled trial to date has proven the superiority of one modality in terms of cancer control. Or patients can choose a noninvasive treatment option: expectant management. Some patients rely completely on recommendations from friends or family when making treatment decisions. Patient characteristics known to influence decision making include their age, race, education, working status, income, marital status, urinary symptoms, and distance from their home to the treatment center.[4,7,8] Other important factors in the decision-making process are the patient's comorbidity[4] and whether he perceives the cancer to be a threat to quality of life or to survival.[9] The influence of friends, neighbors, and family members on decision making is less well studied. The availability of insurance coverage for a specific treatment might be important.

Patients experience a high degree of stress and anxiety during the treatment decision process, so identifying characteristics of a typical patient who chooses a specific treatment could help patients navigate the complex challenge of deciding on a treatment type.[10] Patient preferences for different treatments vary greatly, and any additional information to support treatment decisions can help patients with their decision making process.[11]

Our study looked at decision-making process among patients seen in a Canadian center. Under the Canadian healthcare system all patients have equal access to healthcare at no cost to the patient.

Gwede et al[10] studied patients' treatment decision strategies and cognitive beliefs and reported that patients who chose radical prostatectomy were younger and employed, whereas patients who chose brachytherapy were older and not working. Diefenbach et al[12] found that patients who chose radical prostatectomy were significantly younger than patients who received EBRT or PB. In that study, the most important factor for treatment decision was physician recommendation (51%), followed by advice from friends and family (19%) — which were not examined in the current study. The patient's perception of the seriousness of the disease and his level of distress were also factors in the treatment decision.

Urologists play an important role in helping patients with low risk prostate cancer decide which treatment option to choose, since the patient, with limited medical knowledge, relies on the advice from a medical expert with whom he has developed a trusting relationship.[1,9] A recent study showed that radiation oncologists see brachytherapy as at least as effective as EBRT, while urologists see brachytherapy as slightly more effective than EBRT.[13]

Patients seen in a radiation oncology department represent only a small fraction of patients diagnosed with low risk prostate cancer and are already carefully selected by their referring physicians. It is therefore not very surprising that nearly 50% of patients seen in our clinic opted for brachytherapy, but it is surprising that nearly a third of patients chose expectant management.

Study limitations include the fact that the study did not include a validated questionnaire. Another caveat is that since these data come from a single center, the findings might not apply to other centers.

Most patients referred to our brachytherapy clinic ruled out surgery as a treatment option and were debating between expectant management and a minimally invasive intervention (PB). Interestingly, patients living further away from our center were significantly more likely to choose PB than expectant management. Perhaps patients living further away who agreed to see a physician specializing in brachytherapy had already thoroughly discussed expectant management with their urologist.

Patients who were younger than 70 years old or who lived farther away from our center were significantly more likely to choose PB than another treatment. Age was the only factor that affected the choice between EBRT and PB. Patients with a score of more than 12 on the IPSS urinary voiding symptoms questionnaire were usually not offered PB because of the higher risk of urinary problems after this treatment. Surprisingly, potency did not influence treatment choice, contrary to our expectation that potent patients would be more likely to choose PB. We did not analyze the influence of prostate volume on treatment decisions, and we restricted our analysis to several factors that we thought were the most pertinent. In our clinic, we usually discourage patients from undergoing cytoreductive hormonal therapy for PB and instead advise them to choose another treatment option.

Almost all patients (95%) were French Canadian, so the study was unable to address racial or ethnic differences.

The current study did not show that the patient's profession or marital status impacted on the treatment decision, but the study was limited by the relatively small cohort size as well as a referral bias. A recent

study showed that less educated, married, and older patients were more likely to leave treatment decisions to their physicians, as opposed to being actively involved in the decision-making process.[14] A couple's relationship can have a broad impact on decision making. Married men are more likely to favor quantity of life over quality of life (fewer side effects), while many wives feel that the best treatment is the one with the best chance for success (elimination of cancer).[15]

In conclusion, 80% of these 110 highly selected, low risk prostate cancer patients referred to our specialized clinic for a discussion of PB chose to be treated with expectant management or PB, rather than EBRT or radical prostatectomy. Patients who chose PB lived further from the hospital than patients who opted for expectant management, and they were usually younger than patients who opted for EBRT. □

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