Original Study

A Walking Intervention Among Men With Prostate Cancer: A Pilot Study

Claire H. Pernar,[1] Katja Fall,[2] Jennifer R. Rider,[3] Sarah C. Markt,[1] Hans-Olov Adami,[1,4] Sven-Olof Andersson,[5] Unnur Valdimarsdottir,[1,4,6] Ove Andrén,[5] Lorelei A. Mucci[1]

Abstract

Men diagnosed with prostate cancer have increased risk of disease progression, cardiovascular events, and quality of life impairments. Men with a recent diagnosis randomly assigned to a walking group intervention maintained 10,000 steps per day and experienced improvement in cardiovascular biomarkers compared with usual care. A larger walking group intervention is needed to investigate its potential for improvement in long-term outcomes.

Background: Men diagnosed with prostate cancer have increased risk for disease progression, cardiovascular events, and impairments in quality of life. This pilot study evaluated the feasibility of a randomized walking group intervention to improve quality of life, circulating biomarkers, and morbidity among men with newly diagnosed prostate cancer. **Methods:** Men were recruited at Örebro University Hospital, Sweden, and randomized to an 11-week walking group intervention (n = 21) or usual care (n = 20). The intervention included weekly 1-hour walking group sessions and maintenance of 10,000 steps/day. Outcomes were changes in body composition, clinical factors, biomarkers of cardiovascular health, and quality of life between baseline and end of study. Analysis of covariance was used to compare outcomes in each group adjusted for baseline values. **Results:** All 41 men randomized completed the 11-week trial. Men assigned to the intervention walked on average 10,644 steps/day, and 92% reported missing 2 or fewer sessions. Both groups experienced similar weight loss at 11 weeks. Men in the intervention had a significant adjusted mean change in high-density lipoprotein of 0.14 mmol/L (95% confidence interval [CI], 0.01-0.27; $P = .04$), and suggestive adjusted mean changes in low-density lipoprotein of −0.22 mmol/L (95% CI, −0.47 to 0.03; $P = .08$) and in systolic blood pressure of −8.5 mm Hg (95% CI, −21.2 to 4.2; $P = .18$), compared with the usual care group. **Conclusions:** A walking group intervention among men with recent diagnosis of prostate cancer is feasible and potentially effective in improving cardiovascular health. A larger randomized trial of longer duration is required to elucidate its potential for improvement in longer term outcomes.

Clinical Genitourinary Cancer, Vol. ■, No. ■, ■-■
Keywords: Biomarkers, Cardiovascular health, Exercise, Quality of life, Randomized trial

Introduction

Globally, over 11 million men are living with prostate cancer.[1] Although prostate cancer mortality is the third most common cause of cancer death among men in highly developed regions, the ratio between incidence and mortality is 6:1.[2] Among those diagnosed with localized, well-differentiated tumors, most men die from other causes than prostate cancer, primarily from cardiovascular disease and other cancers.[3,4] Survivors of prostate cancer frequently experience marked impairments in physical quality of life such as urinary and sexual function.[5,6] Moreover, symptoms such as

U.V., O.A., and L.A.M. contributed equally to this work.

[1]Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA
[2]Department of Clinical Epidemiology and Biostatistics, School of Health and Medical Sciences, Örebro University, Örebro, Sweden
[3]Department of Epidemiology, Boston University School of Public Health, Boston, MA
[4]Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden
[5]Department of Urology, School of Health and Medical Sciences, Örebro University, Örebro, Sweden
[6]Center of Public Health Sciences, University of Iceland, Reykjavik, Iceland

Submitted: Mar 1, 2017; Revised: May 18, 2017; Accepted: May 23, 2017

Address for correspondence: Claire H. Pernar, MPH, Harvard T.H. Chan School of Public Health, 677 Huntington Ave, Boston, MA 02115
E-mail contact: cpernar@mail.harvard.edu

1558-7673/$ - see frontmatter
http://dx.doi.org/10.1016/j.clgc.2017.05.022

sleep disruption, depression, fatigue, and anxiety are commonly reported,[5-7] and recent data suggest that emotional stress faced by newly diagnosed men may even cause severe health consequences such as cardiovascular mortality and suicide.[8,9] Men with prostate cancer experience significant morbidity from the cancer itself as well as from treatment, and strategies for mitigating these adverse effects have been proposed, including physical activity.[7,10]

Physical activity has emerged as an effective strategy for improving both physical and emotional quality of life among survivors of cancer diagnosed with several forms of cancer including colon, breast, and prostate cancers.[11-13] Observational cohort studies have linked higher levels of physical activity, including brisk walking, to decreased prostate cancer progression as well as to lower overall and prostate cancer-specific mortality.[12,14,15] However, the implementation of effective strategies to create sustainable behavior change presents unique challenges and requires an evidence-based approach. Findings from a variety of physical activity intervention studies among patients with prostate cancer have emerged, indicating benefits in physical fitness and key quality of life areas, including urinary incontinence,[16,17] fatigue,[10,18-20] and mental health and depression.[19,21,22] These studies often include a variety of high-cost, clinically supervised aerobic or resistance training programs that require considerable learning or adjustment efforts from the patients. It is unclear whether these behavior changes are sustainable long-term among patients with prostate cancer. Walking represents a low-cost and accessible form of physical activity that may be sustainable throughout a patient's life. Only a handful of studies have as yet used walking as an intervention strategy for improving quality of life among patients with prostate cancer, and no randomized study to date has investigated the association between group walking and changes in clinical parameters or biomarkers among patients with prostate cancer.

The motivation for this study was to demonstrate feasibility and effectiveness for eventual scale-up to a larger randomized study to investigate long-term prostate cancer outcomes. Specifically, the objectives of this pilot study were to evaluate the feasibility of recruiting and randomizing men with newly diagnosed prostate cancer to a walking group intervention or usual care, adherence to the intervention, and feasibility of collecting outcome assessments. Furthermore, we aimed to assess the 11-week effects of this physical activity on measures relevant to patients with prostate cancer including clinical factors, such as body composition and blood pressure, physical and emotional quality of life, and cardiovascular biomarkers, such as cholesterol and C-reactive protein (CRP). Our overarching premises for this study are that a cancer diagnosis represents a teachable moment when men are amenable to lifestyle change,[23] that walking represents a physical activity sustainable through life, and that a group environment provides men an opportunity to discuss issues related to their cancer.

Materials and Methods

Study Population

The study base included patients with prostate cancer in the catchment area of Örebro University Hospital in Sweden. The hospital serves all patients in the Örebro Healthcare region, and thus the study is population-based. Eligible men had a histologic diagnosis of prostate cancer without evidence of distant metastases, had completed initial treatment at least 1 month prior to study enrollment, and had a life expectancy of at least 5 years. Additional eligibility criteria included the ability to speak Swedish and be mentally and physically able to complete the questionnaires and clinical exam and to participate in group walking sessions. The study team reviewed 100 medical records of patients diagnosed between January and December 2009 and contacted those who fulfilled the inclusion criteria (n = 83). After contacting each patient to take part in the study, we excluded 14 men deemed unable to participate owing to physical or mental impairment and 28 men who refused to participate. The primary reason for refusal to participate was that the men felt they no longer had a cancer after being treated. In total, 41 men were randomized to the study through a random number generator after completing the baseline questionnaire and clinical assessment in March 2010 (Figure 1). This study was approved by the ethics committee at Örebro University Hospital and received an exemption determination by the institutional review board at the Harvard T.H. Chan School of Public Health. Written informed consent was obtained from all participants. This trial was registered with identifier NCT01696539.

Questionnaire and Clinical Assessments

Prior to randomization, the men completed an 87-item self-report questionnaire at the Department of Urology assessing demographic information, smoking status, alcohol use, and current physical activity. Men also reported on stress (Perceived Stress Scale-4), sleep quality (Karolinska Sleep Questionnaire), anxiety and depression (Hospital Anxiety and Depression Scale), and urinary, bowel, and sexual function using selected questions from the National Prostate Cancer Registry of Sweden questionnaire.[24-27] After completing the questionnaires, the men were seen by a research nurse who conducted a physical examination that included measurement of height (cm) and weight (kg), waist circumference (cm), and blood pressure (systolic and diastolic, mm Hg). A blood specimen was also collected and stored for biomarker studies described below.

At the end of the 11-week intervention, all participants returned to the Örebro University Hospital for group meetings with the

Figure 1 Diagram of Subject Flow Through the Study