available at www.sciencedirect.com
journal homepage: www.europeanurology.com

European Association of Urology

Brief Correspondence

Effects of Nonlinear Aerobic Training on Erectile Dysfunction and Cardiovascular Function Following Radical Prostatectomy for Clinically Localized Prostate Cancer

Lee W. Jones [a,*], *Whitney E. Hornsby* [a], *Stephen J. Freedland* [a], *Amy Lane* [a], *Miranda J. West* [a], *Judd W. Moul* [a], *Michael N. Ferrandino* [a], *Jason D. Allen* [a], *Aarti A. Kenjale* [a], *Samantha M. Thomas* [a], *James E. Herndon II* [a], *Bridget F. Koontz* [a], *June M. Chan* [b], *Michel G. Khouri* [a], *Pamela S. Douglas* [a], *Neil D. Eves* [c]

[a] *Duke University Medical Center, Durham, NC, USA;* [b] *Department of Epidemiology and Biostatistics, University of California San Francisco, San Francisco, CA, USA;* [c] *School of Health and Exercise Sciences, University of British Columbia Okanagan, Kelowna, BC, Canada*

Article info

Article history:
Accepted November 7, 2013
Published online ahead of print on November 22, 2013

Keywords:
Exercise training
Prostate cancer
Efficacy
Exercise capacity
Endothelial function

Abstract

Erectile dysfunction (ED) is a major adverse effect of radical prostatectomy (RP). We conducted a randomized controlled trial to examine the efficacy of aerobic training (AT) compared with usual care (UC) on ED prevalence in 50 men (n = 25 per group) after RP. AT consisted of five walking sessions per week at 55–100% of peak oxygen uptake (VO_{2peak}) for 30–60 min per session following a nonlinear prescription. The primary outcome was change in the prevalence of ED, as measured by the International Index of Erectile Function (IIEF), from baseline to 6 mo. Secondary outcomes were brachial artery flow–mediated dilation (FMD), VO_{2peak}, cardiovascular (CV) risk profile (eg, lipid profile, body composition), and patient-reported outcomes (PROs). The prevalence of ED (IIEF score $\leq$21) decreased by 20% in the AT group and by 24% in the UC group (difference: p = 0.406). There were no significant between-group differences in any erectile function subscale ($p > 0.05$). Significant between-group differences were observed for changes in FMD and VO_{2peak}, favoring AT. There were no group differences in other markers of CV risk profile or PROs. In summary, nonlinear AT does not improve ED in men with localized prostate cancer in the acute period following RP.

Trial registration: Clinicaltrials.gov identifier NCT00620932.

© 2013 European Association of Urology. Published by Elsevier B.V. All rights reserved.

* Corresponding author. Box 3085, Duke Cancer Institute, Durham, NC 27710, USA.
Tel. +1 919 668 6791; Fax: +1 919 681 1282.
E-mail address: lee.w.jones@duke.edu (L.W. Jones).

Radical prostatectomy (RP) is associated with a broad spectrum of adverse toxicities, of which erectile dysfunction (ED) is the most common, with a prevalence as high as 80% [1]. The pathophysiology of ED following RP involves both neuronal and vascular endothelial cell dysfunction, which, in combination, lead to impaired penile tissue oxygenation resulting in smooth muscle apoptosis, fibrosis, and veno-occlusion dysfunction [2]. Aerobic training (AT) leads to a multitude of vascular adaptations, including marked improvements in peripheral artery flow–mediated dilation (FMD) and exercise tolerance (peak oxygen uptake [VO_{2peak}]) [3]. FMD provides a robust measure of vascular endothelial function, whereas VO_{2peak} evaluates the integrative capacity of the cardiopulmonary and musculoskeletal system to deliver and use oxygen to resynthesize ATP; both measures are strong independent predictors of cardiovascular (CV) events [4,5]. AT-induced improvements in FMD and VO_{2peak} occur in conjunction with improved

0302-2838/$ – see back matter © 2013 European Association of Urology. Published by Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.eururo.2013.11.009

CrossMark

Table 1 – Effects on erectile function

Variable	Usual care			Aerobic training			Difference between groups		
	Baseline	Month 6	*p* value†	Baseline	Month 6	*p* value†	Mean change	95% CI	*p* value§
Prevalence of ED*, %	80	56	0.031	80	60	0.063	+4	-20 to 28	0.406
Total IIEF score, mean (SD)	14 (12)	20 (13)	0.041	12 (9)	20 (13)	0.002	+3	−4 to 10	0.384
Erectile function, mean (SD)	4 (4)	6 (5)	0.081	3 (3)	6 (6)	0.006	+2	−2 to 5	0.290
Orgasmic function, mean (SD)	3 (3)	4 (3)	0.029	2 (3)	4 (3)	0.012	0	−2 to 2	0.962
Sexual desire, mean (SD)	4 (2)	4 (2)	0.914	4 (2)	4 (2)	0.025	+1	0–2	0.145
Intercourse satisfaction, mean (SD)	2 (3)	3 (3)	0.019	2 (3)	3 (4)	0.013	0	−2 to 2	1.000
Overall satisfaction, mean (SD)	2 (3)	2 (2)	0.538	2 (2)	3 (2)	0.113	0	0–1	0.480

CI = confidence interval; ED = erectile dysfunction; IIEF = International Index of Erectile Function; SD = standard deviation.
† Paired *t* test *p* value for continuous variables; McNemar test *p* value for categorical variables for change within group from baseline to month 6.
§ The *p* value for δ change between groups from baseline to month 6 using repeated measures ANOVA for continuous variables and the Fisher exact test for categorical variables.
* A total IIEF score <21 indicates ED.

erectile function [6], with FMD being the strongest predictor of improvement in erectile function [6]. Whether AT improves ED following RP has not been investigated. We conducted a two-arm randomized controlled trial to examine the effects of AT compared with recommended usual care (UC) on these outcomes in men with prostate cancer (PCa) following RP.

Full study methods are described in the supplementary online content. In a single-center randomized controlled trial, 50 men with localized (stage I–II) prostate adenocarcinoma following bilateral nerve-sparing RP were randomly allocated to the following groups ($n = 25$ per group): (1) AT or (2) UC. AT consisted of five supervised walking sessions per week, 30–45 min per session, at 55–100% of VO_{2peak} for 6 mo, following a nonlinear prescription approach. Specifically, in nonlinear prescriptions, AT sessions are sequenced in such a fashion that training-induced physiologic stress is continually altered in terms of intensity and duration in conjunction with appropriate rest and recovery sessions to optimize VO_{2peak} adaptation (Supplemental Fig. 1). UC participants were instructed to maintain their usual exercise levels.

The primary end point was the prevalence of ED assessed by the International Index of Erectile Function (IIEF). The IIEF contains five subscales that are summed to obtain the total IIEF score; a score ≤21 indicates ED. Peripheral artery FMD was evaluated using high-resolution B-mode ultrasound, as previously described [7]. VO_{2peak} was assessed using maximal cardiopulmonary exercise testing (CPET) on a motorized treadmill with expired gas analysis as recommended [8]. The Cardiovascular Risk Profile included fasting glucose and lipid profile, while body composition was assessed using air-displacement plethysmography; all assessments were conducted according to established procedures. Patient-reported outcomes (PROs) were assessed using the Functional Assessment of Cancer Therapy–Prostate (to assess quality of life), FACT-fatigue (to assess fatigue), the Center for Epidemiological Studies Depression Scale (to assess depression), the Pittsburgh Sleep Inventory (to assess sleep quality), and the Brief Pain Inventory (to assess pain). Safety was evaluated according to the frequency and severity of adverse events (AEs) observed during CPET procedures and during each supervised AT session.

Full study results are presented in the supplementary online content. Participant characteristics were balanced at baseline (Supplemental Table 1). Of the 50 randomized patients, 46 (92%) and 35 (70%) completed study end point assessments at 6 mo and 12 mo, respectively (Supplemental Fig. 2). No serious AEs were observed during CPET or AT sessions. Mean adherence to supervised sessions and home-based sessions was 83% and 72%, respectively. Thirty-six percent of UC patients were exercising regularly at month 6, compared with 24% at baseline. The ED prevalence decreased in both groups from baseline to 6 mo (Table 1, Fig. 1A) and from baseline to 12 mo (Supplemental Table 2), with no significant differences between groups ($p > 0.05$). Similarly, there were no significant between-group differences in any erectile function subscale (Table 1, Supplemental Table 2). However, in comparison with UC, AT was associated with significant improvements in FMD, expressed as percentage change in peak artery diameter (Fig. 1B, Supplemental Table 3) and VO_{2peak} (Fig. 1C, Supplemental Fig. 3, Supplemental Table 3). There were no significant group differences in changes of other CV risk profile outcomes ($p > 0.05$) (Supplemental Table 4) or PROs ($p > 0.05$) (Supplemental Table 5). There were significant correlations between AT adherence and change in FMD ($r = 0.38$; $p = 0.081$) and VO_{2peak} ($r = 0.57$; $p = 0.003$) but not between AT adherence and any erectile function end points ($p > 0.05$; data not presented).

Our principal finding was that despite robust effects on CV mechanisms, AT did not differentially improve erectile function in the short term or long term after RP compared with recommended UC. This finding is in direct contrast to prior work showing that AT-induced improvements in FMD and VO_{2peak} were associated with a twofold improvement in erectile function in stable heart failure [6]. Given similar mechanistic effects, consideration of potential explanations for our observed null effects is appropriate.

Download English Version:

https://daneshyari.com/en/article/3925154

Download Persian Version:

https://daneshyari.com/article/3925154

Daneshyari.com