

Obesity and Benign Prostatic Hyperplasia: Clinical Connections, Emerging Etiological Paradigms and Future Directions

J. Kellogg Parsons^{*,†}, Aruna V. Sarma, Kevin McVary[‡] and John T. Wei[§]

From the Division of Urologic Oncology, Moores Cancer Center, University of California, San Diego and Section of Surgery, San Diego Veterans Affairs Medical Center (JKP), La Jolla, California, Departments of Epidemiology (AVS) and Urology (AVS, JTW), Ann Arbor, Michigan, and Department of Urology, Northwestern University (KM), Chicago, Illinois

Purpose: Benign prostatic hyperplasia is a highly prevalent disease in older men with substantial adverse effects on public health. Classic etiological paradigms for benign prostatic hyperplasia focus on nonmodifiable risk factors. However, obesity also potentially promotes benign prostatic hyperplasia.

Materials and Methods: We performed a structured, comprehensive literature review to identify studies of obesity, benign prostatic hyperplasia, lower urinary tract symptoms and physical activity.

Results: A preponderance of published evidence suggests strong positive associations of obesity with benign prostatic hyperplasia and lower urinary tract symptoms. This evidence encompasses most established metrics of adiposity, including body mass index, waist circumference and waist-to-hip ratio, and falls under 3 general categories, including prostate volume, clinical benign prostatic hyperplasia and lower urinary tract symptoms. 1) Prior studies consistently showed that increased adiposity is positively associated with radiographically determined prostate volume and enlargement, suggesting that obesity promotes prostate growth. 2) Most studies revealed that obesity increases the risk of clinical benign prostatic hyperplasia by several measures, including the initiation of benign prostatic hyperplasia medical treatment, noncancer prostate surgery, physician diagnosed benign prostatic hyperplasia, histological diagnosis and urinary flow rate. 3) Prior studies demonstrated that obesity increases the risk of lower urinary tract symptoms, as measured by a validated questionnaire. Also, most studies showed that physical activity significantly decreases the risk of benign prostatic hyperplasia.

Conclusions: Obesity markedly increases the risk of benign prostatic hyperplasia. Since physical activity decreases the risk of benign prostatic hyperplasia, these observations support the development of novel prevention strategies and treatment targeted toward adiposity, weight loss and lifestyle.

Key Words: prostate, prostatic hyperplasia, urination disorders, obesity, metabolic syndrome X

BENIGN prostatic hyperplasia is a highly prevalent disease in older men with substantial adverse effects on public health since 3 of 4 men 60 to 69 years old in the United States are affected, 21 to 38 million hours of productivity are lost annually and more than \$1 billion

per year in direct health care expenditures are consumed exclusive of outpatient medication.¹ The primary clinical manifestation of BPH is the LUTS complex. As a result, BPH and LUTS remain inextricably interconnected in the contemporary study of and treat-

Abbreviations and Acronyms

BLSA = Baltimore Longitudinal Study of Aging

BMI = body mass index

BPH = benign prostatic hyperplasia

HPS = Health Professionals Follow-up Study

I-PSS = International Prostate Symptom Score

LUTS = lower urinary tract symptoms

NHANES = National Health and Nutrition Examination Survey

PCPT = Prostate Cancer Prevention Trial

* Correspondence: Division of Urology, University of California-San Diego, 200 West Arbor Dr., No. 8897, San Diego, California 92103-8897 (telephone: 619-543-2630; FAX: 619-543-6573; e-mail: lepark@ucsd.edu).

† Financial interest and/or other relationship with American Medical Systems.

‡ Financial interest and/or other relationship with GlaxoSmithKline, Pfizer, Lilly/ICOS, Sanofi-Aventis, Allergan and National Institute of Diabetes and Digestive and Kidney Diseases.

§ Financial interest and/or other relationship with Sanofi, American Medical Systems, Envirolineering, Gen-Probe and Beckman.

ment for urinary symptoms in older men. LUTS affects 15% to 60% of males older than 40 years and is associated with an increased risk of falls, significantly decreased quality of life, sadness, depression, impaired instrumental activity of daily life and decreased SF-12® scores.²⁻⁵

Classic causal paradigms for BPH concentrated on relatively nonmodifiable etiological stimuli, including sex steroid hormones, genetic predisposition and age related detrusor changes. However recent observations indicate that systemic metabolic disturbances may also contribute substantially to BPH pathogenesis.⁶ These data intimate that many of the metabolic disturbances associated with cardiovascular disease and the lifestyle factors that modulate these disturbances are associated with BPH onset and progression. In this context accumulating evidence suggests that obesity promotes BPH. We reviewed published data on obesity, BPH, LUTS and physical activity.

MATERIALS AND METHODS

We performed a structured, comprehensive literature review to identify studies of obesity, BPH, LUTS and physical activity. We completed separate searches of the MEDLINE® database (January 1966 to April 2009), The Cochrane Library Central Search and the EMBASE™ database (1980 to 2009). Initial search terms were benign prostatic hyperplasia, lower urinary tract symptoms and obesity. Subsequent search terms were physical activity and exercise. To maximize inclusion of the most recent pertinent data we also examined reference sections in published articles, abstracts presented at the annual meeting of the American Urological Association (2002 to 2007) accessed on the American Urological Association website (www.auanet.org) and unpublished data to which we had access.

RESULTS

This review revealed a number of subjective and objective clinical definitions of BPH. Some entailed validated questionnaires for LUTS combined with prostate examination and urinary flow rate, and others entailed medical or surgical treatment, patient reported history, physician diagnosis and histological diagnosis.

Also, obesity is a component of metabolic syndrome, a clinical constellation of metabolic abnormalities that increases the risk of cardiovascular disease. In the several published definitions of metabolic syndrome there is no consensus about which anthropometric measures should be used to define obesity, that is BMI, waist circumference or waist-to-hip ratio.⁷

Overall published evidence supports strong associations of obesity with BPH. This evidence encom-

passes most established metrics of adiposity, including BMI, waist circumference and waist-to-hip ratio, and involves 3 general categories of outcome, that is prostate volume, BPH and LUTS (see [table](#)).

Obesity and Increased Prostate Volume

Prior studies consistently showed that increased adiposity, as determined by most anthropometric measures, is positively associated with ultrasound and magnetic resonance imaging measured prostate volume. The greater the adiposity, the greater the prostate volume. Increased prostate volume is clinically relevant, in that it strongly predicts adverse clinical outcomes associated with BPH, including acute urinary retention and renal failure.^{8,9} Body weight,^{10,11} BMI¹¹⁻¹⁵ and waist circumference^{11,13} were positively associated with prostate volume in multiple study populations. In the BLSA cohort each 1 kg/m² increase in BMI corresponded to a 0.41 cc (95% CI -0.15-0.84) increase in prostate volume (p-trend = 0.06).¹¹

Moreover, obesity is associated with prostate enlargement. In BLSA obese (BMI 35 kg/m² or greater) participants were at 3.5-fold increased risk for prostate enlargement, defined as magnetic resonance imaging determined prostate volume 40 cc or greater, compared to nonobese (BMI less than 25 kg/m²) participants.¹¹ A recent analysis of more than 16,000 radical prostatectomy specimens validated these findings (Parsons et al, unpublished data). Multivariate adjusted analysis revealed that each 1 kg/m² increase in preoperative BMI was associated with a 0.45 gm (95% CI 0.35-0.55) increase in total prostate weight (p-trend <0.001). Moreover, there was a 41% increased risk of prostate enlargement, defined as total prostate weight 40 gm or greater, in obese (BMI 35 kg/m² or greater) compared to nonobese (BMI less than 25 kg/m²) men (OR 1.41, 95% CI 1.01-1.95). These observations suggest that adiposity is linked to prostate growth.

Obesity and BPH

Most studies showed that obesity increases the risk of BPH, as defined by several measures. Of almost 26,000 male participants in HPS those with an obese waist circumference (greater than 109 cm) were 38% (OR 1.38, 95% CI 1.01-1.95) more likely to undergo BPH surgery than those with a nonobese waist circumference (less than 89 cm).¹⁶ In a case-control study of 500 Chinese men those with the highest waist-to-hip ratio were 41% more likely (OR 1.41, 95% CI 1.01-1.95) to undergo BPH surgery than those with the lowest waist-to-hip ratio.¹⁷ Finally, in 5,700 American men participating in the PCPT the incidence of BPH, defined as consistently severe urinary symptoms on the I-PSS, initiation of medical therapy or surgery, increased 10% for each 0.05 increase in the waist-to-hip ratio.¹⁸ Also, a BMI of 30

Download English Version:

<https://daneshyari.com/en/article/3868159>

Download Persian Version:

<https://daneshyari.com/article/3868159>

[Daneshyari.com](https://daneshyari.com)