



Nutrition and benign prostatic hyperplasia

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Purpose of review

Nutrition seems to modify the pathogenesis of benign prostatic hyperplasia (BPH) effect symptomology in men suffering from lower urinary tract symptoms (LUTS). Although there are numerous pharmaceuticals and procedures for these conditions, nutrition may improve outcomes as a primary approach or in tandem with BPH medications or procedures. The purpose of this review is to highlight the benefits of nutrition and dietary supplements in men with BPH and LUTS.

Recent findings

Dietary factors have an impact on metabolic disorders that lead to diabetes and obesity – both of which inversely effect BPH and LUTS. Dietary patterns associated with increased risks include starches and red meats, whereas moderate alcohol intake and polyunsaturated fat and vegetable consumption decrease risks. Dietary supplements of zinc, saw palmetto, and beta-sitosterol in relieving BPH symptoms have had mixed results. Randomized clinical trials of nutritional practices and other lifestyle alterations such as exercise for the prevention or treatment of BPH and LUTS have yet to be performed.

Summary

Nutritional practices may provide for the prevention and treatment of BPH and LUTS while positively affecting other systemic parameters. Whereas there are a few clinical randomized trials for the prevention and treatment of BPH and LUTS, nutritional modifications may have a healthy lifestyle alternative with minimal to no adverse effects.

Keywords

benign prostatic hyperplasia, beta-sitosterol, rye pollen extract, saw palmetto, starch

INTRODUCTION

Genetics, sex steroid hormones, and aging have been known to be the cause of lower urinary tract symptoms (LUTS) associated with benign prostatic hyperplasia (BPH). More recently, epidemiological data suggest the effects of nutritional factors modulating metabolism – including obesity and blood glucose, exercise, and diet – substantially bequeath to the development of these conditions [1]. Although the current research in the relationship between nutritional practices and BPH symptoms are compelling, it is not conclusive as most are epidemiological in design. Randomized trials would be of value to determine the precise nutritional practice best suited for such patients in a clinical setting. Small randomized clinical trials have been performed, however, on a few herbal products, including saw palmetto [2,3^{*}], rye pollen extract [4^{*}], and beta-sitosterol [5], with mixed results.

HIGH-PROTEIN DIET

An 8-year study of 3523 men with BPH cited that total protein intake is positively associated with

BPH, with the association being slightly stronger for animal protein intake than for vegetable protein intake [6].

Therefore at this time, ingesting excess animal protein as a means to increase total protein intake is not recommended. Instead, high-quality, plant-derived and cold water fish-based protein sources in moderate amounts are probably reasonable choices until we know more about the relationship of protein intake and BPH.

FRUITS AND VEGETABLES

Fruits and vegetables contain high levels of substances that can fight inflammation, including

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Curr Opin Urol 2013, 23:38–41

DOI:10.1097/MOU.0b013e32835abd05

KEY POINTS

- Low starch, low animal protein, and higher servings of fruit and vegetables seem to be protective against BPH.
- Whereas some zinc (≤ 100 mg/day) may be protective against BPH and LUTS, amounts of at least 100 mg/day may increase the risk of prostate cancer.
- Dietary supplements that include rye pollen extract (Cernilton) and beta-sitosterol may be helpful for BPH-associated LUTS and nocturia, but newer and larger clinical trials must be conducted to be conclusive.

antioxidants, polyphenols, vitamins, minerals, and fiber. Vegetables appear to have an important role in preventing BPH. In a study – the Prostate Cancer Prevention Trial – 4770 participants were evaluated. The investigators found a significantly lower risk of BPH among men who consumed at least four servings of vegetables daily compared with those who ate less than one serving daily [7].

Plant proteins combined with aerobic exercise may be even more beneficial for prostate health than is protein from animal foods, such as meat, poultry, and eggs. Barnard and Aronson [8] reported that daily aerobic exercise along with a low-fat, high-fiber diet consisting of whole grains, fruits, and vegetables can reduce factors associated with BPH (e.g. estradiol/testosterone ratio, insulin). Many high-fiber plant foods, such as whole grains, lentils, and beans, are also high in protein [8].

LYCOPENE

In a randomized, double-blind, placebo-controlled trial, it was found that lycopene, a component found in tomatoes, may inhibit BPH progression and may ameliorate symptoms in patients at a dose of 15 mg/day for 6 months. Lycopene supplements are safe and well tolerated. Lycopene does not selectively interfere with prostate-specific antigen (PSA) levels, which is important to allow early detection of prostate cancer during long-term supplement intake [9^{***}].

GREEN TEA

Green tea has components that are attributed to potent antioxidants called catechins, known as epigallocatechin-3-gallate (EGCG), which have been shown to destroy certain bacteria and viruses, enhance the immune system, and combat several forms of cancer. EGCG seems to be useful for the

management of BPH and other hormone-related abnormalities [10].

One caution to remember about green tea is that it contains caffeine, although at a much lower level than does coffee, and somewhat less than black tea. Caffeine is a diuretic and can stimulate the bladder, causing an urgent need to urinate. On average, one cup of green tea has 25 mg of caffeine, whereas black tea has nearly twice as much. The decaffeinated version is also available.

ZINC

The human prostate gland contains a higher level of zinc than most other tissues [11].

There seems to be a decrease in zinc levels in plasma and prostate tissue in men with BPH (and prostate cancer) as compared to normal prostate [12].

Zinc has demonstrated to relieve LUTS probably due to its ability to inhibit 5-alpha-reductase [13] and/or by its ability to inhibit prolactin [14]. Prolactin has been shown to increase the uptake of testosterone by the prostate, thereby leading to increased levels of dihydrotestosterone (DHT) by providing more substrate [15].

Studies have indicated that proper zinc status in men may help with BPH as well as prostate cancer as shown by this preclinical study. Kristal *et al.* have shown zinc to have a possible protective role in a randomized trial of 4770 participants. BPH was assessed over 7 years and was defined as medical or surgical treatment or repeated elevation (>14) on the International Prostate Symptom Score questionnaire. Although the association between zinc and BPH in this study is compelling, the Food Frequency Questionnaire performs poorly in assessing associations between diet, nutrition macromolecules and micromolecules, and disease [7].

Excessive consumption of zinc supplement of more than 100 mg per day may significantly increase the risk of advanced prostate cancer [16].

ALCOHOL

Although only beer raises prolactin levels, higher alcohol intake may be associated with BPH. In a 17-year study of 6581 men in Hawaii, it was noted that an alcohol intake of at least 25 oz/month was directly correlated with the diagnosis of BPH [17].

The association was most significant for beer, wine, and sake, and less for distilled spirits. Most other recent studies confirm a protective effect of alcohol towards BPH but higher LUTS. A meta-analysis of 19 published studies, incorporating

120 091 men, observed up to a 35% decreased likelihood of BPH among men who drank daily, but an increased risk of LUTS [18].

VITAMIN D

Kristal *et al.* [7] showed vitamin D supplementation was associated with reduced risk of BPH, but the dosage was imprecise. The association in this 4770-participant trial was observed only among men who used both multivitamins and single vitamin D supplements. There were no associations of supplement use with BPH risk, with the exception of a trend for decreasing BPH risk with increasing dose of supplemental vitamin D. Although this study lacked data on frequency, dose, and duration of vitamin D use, the results are intriguing enough to support further research that will address whether vitamin D alone will have any benefit for BPH [19].

Mechanism of how vitamin D may have a favorable effect on BPH is by attaching the molecule vitamin D receptors on the prostate and bladder, and inhibiting prostate growth, lowering excessive contractility, and reducing inflammation [20].

STARCH

A case-control study of 1369 patients with BPH and 1451 controls demonstrated a direct association between starch consumers and BPH [21]. The main sources of starch in this population were white bread, pasta, and rice.

Starch may be responsible for a glycemic response that is compensated for by an increase in serum insulin and insulin-like growth factor. Elevated insulin-like growth factor levels, possibly mediated by dihydrotestosterone [22], are thought to stimulate the development of BPH. No association was found for sugars from fruit, which have a lower glycemic index, than does bread [22].

SAW PALMETTO

The extracts from the berries of saw palmetto are the most popular herbal products used to treat symptomatic BPH. Saw palmetto is native to Florida, and has been shown to significantly improve the signs and symptoms of BPH in numerous older clinical studies. One examination of 21 randomized controlled trials involving a total of 3139 men (including 18 double-blind trials) demonstrated that men treated with saw palmetto experienced decreased urinary tract symptom scores, less nocturia, better

urinary tract symptom self-rating scores, and peak urine flow improvements compared with men receiving placebo [2]. This analysis also showed that matched up with men receiving the DHT inhibitor finasteride (Proscar), men treated with saw palmetto had similar improvements in urinary tract symptom scores with less adverse effects compared to the group on finasteride [2].

The mechanism of action is related to inhibition of DHT binding to both the cytosolic and nuclear androgen receptors, inhibition of 5-alpha-reductase, and interference with intraprostatic estrogen receptors. As a result of this multitude of effects, most of the results have been excellent in randomized trials.

A randomized, placebo-controlled, dose-escalation trial indicates no benefit from saw palmetto consumption compared to placebo with 369 participants [3^a].

RYE POLLEN EXTRACT (CERNILTON)

Cernilton is a water-soluble pollen fraction phytotherapeutic product whose extract originates from rye grass pollen. One review analyzed the specific effects of Cernilton and suggested that it improved subjective symptoms including nocturia, but no significant improvement in urodynamic measures was observed when compared with placebo. The Cernilton studies are challenged by short duration, low number of participants, and the lack of updated data [4^a].

BETA-SITOSTEROL

Beta-sitosterol is one of the several phytosterols (plant sterols) with chemical structures similar to that of cholesterol. Beta-sitosterol is widely distributed in the plant kingdom and found in pecans, saw palmetto, avocados, and pumpkin seeds. A review of beta-sitosterol studies included four double-blind trials of 519 men, duration of which was between 4 and 26 weeks. Beta-sitosterol improved symptom scores by 35%, peak flow rate improved symptom scores by 35%, peak flow rate by 34%, and reduced postvoid residual volume by 24%. Their long-term effectiveness, safety, and ability to prevent BPH complications are not known [5].

CONCLUSION

In conclusion, nutritional modifications of less meat, simple starches, and more vegetables and fruits contribute substantially to the management of BPH and LUTS. These nutritional patterns may

modulate metabolic pathways that lead to obesity and diabetes – two conditions that contribute to the development of BPH and LUTS. Dietary supplements must be used cautiously. Saw palmetto as a single agent may not help, whereas beta-sitosterol and rye pollen extract may. Newer clinical trials with a larger study population are needed for efficacy of these herbal products to be conclusive. Most of the available data on nutrition as it relates to BPH are observational and should serve primarily as a guide for informing patients on healthy lifestyle interventions. Such lifestyle modifications may assist in weight loss and stabilizing insulin levels, which modulate the effects of BPH and LUTS and have a positive impact on cardiovascular health as a side benefit.

Acknowledgements

None.

Conflicts of interest

G.E. is Chief Scientific Officer of Prostate Research Labs and Chief Medical Officer of XY Wellness, LLC.

REFERENCES AND RECOMMENDED READING

Papers of particular interest, published within the annual period of review, have been highlighted as:

- of special interest
- of outstanding interest

Additional references related to this topic can also be found in the Current World Literature section in this issue (p. 99).

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