IS THERE AN ASSOCIATION BETWEEN PROSTATIC HYPERPLASIA AND DIABETES?

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Prostatic hyperplasia is a common affection in humans. Its incidence is correlated with age. The relationship between diabetes and prostatic hyperplasia has been evaluated in several studies. Some studies suggest the association between the fasting plasma insulin (FPI) levels and growth prostatic volume and suggest the hypothesis that elevated insulin levels may be involved in the occurrence of prostatic hyperplasia. Many other evidence does not identify a correlation between diabetes and the volume of prostate or levels of serum prostate-specific antigen (PSA). Future clinical studies should explore the mechanism by which diabetes can induce prostatic hyperplasia.

Key words: prostatic hyperplasia, type 2 diabetes, older patients.

INTRODUCTION

Prostatic hyperplasia is a common disease in men, and its incidence is associated with age. For subjects aged 40–49 years, prostatic hyperplasia occurs in 2.9% of men while in the age group ≥80 years the prevalence is 69.2%[1]. According to the World Health Organization (WHO), most countries have accepted arbitrary the chronological age of 60 or 65 years as a definittion of older person[2]. The pathogenesis of prostatic hyperplasia is not completely elucidated, but multiple risk factors (demografic, genetic, behavioral and comorbid factors) are probably involved[1, 2].

The possible association between diabetes and prostatic hyperplasia was evaluated by numerous studies. Relationships between insulinaemia and insulin-like growth factors (IGF) levels have been investigated. The results of a study performed by Hammarsten J and Högstedt B on 307 patients with symptoms of the lower urinary tract (LUTS), showed that Fasting Plasma Insulin (FPI) was correlated with the annual growth prostatic hyperplasia rates and suggest that elevated insulin levels may be involved in the hyperplasia of the prostate[3]. The IGF axis can generate the growth of the prostate; the IGF are antiapoptotic and potent mitogens factors[4]. IGF-I is mainly secreted in the liver, its synthesis being stimulated by growth hormone.Several studies showed that IGF-I levels may predict prostate cancer risk of[5–8]. In contrast with their finding, a study performed by Burke JP *et al.* identified a possible association of diabetes with the prostate volume changes or serum PSA level, but this was nonsignificant[9]. The Normative Aging Study about the evolution of hyperplasia of prostate in volunteers found a nonsignificant correlation between diabetes and prostatic hyperplasia[10].

GENERAL CONSIDERATIONS

Evaluation of patients with diabetes and prostatic hyperplasia must include: identification of LUTS, digital rectal examination of prostate as well as assessment of levels of PSA and insulinemia. LUTS can be determined by a questionnaire – "*Symptom Index for Benign Prostatic Hyperplasia*" – developped by the American Urological Association (AUA). The AUA Symptom Index is a sum of 7 questions: "*Over the past month, how often have you had a sensation of not emptying your bladder completely after you finished urinating?*",

"Over the past month, how often have you had to urinate again less than 2 hours after you finished urinating?", *"Over the past month, how often have you found you stopped and started again several times when you urinated?"*, *"Over the past month, how often have you found it difficult to postpone urination?"*, *"Over the past month, how often have you had a weak urinary stream?"*, *"Over the past month, how often have you had to push or strain to begin urination?"*, *"Over the past month, how many times did you most typically get up to urinate* *from the time you went to bed at night until the time you got up in the morning?.* Index scores below 7 reflect mild symptoms, 8–19: moderate symptoms and 20–35 severe symptoms[11]. The prostates volume can be determinened by ultrasonography and calculated as a rotary ellipse. Serum total PSA and insulinemia can be evaluated by electro-chemiluminescence and Enzyme-linked Immuno-sorbent Assay (ELISA) method.

Histopathological aspect of benign hyperplasia and cancer of prostate are show in Figures 1 and 2.
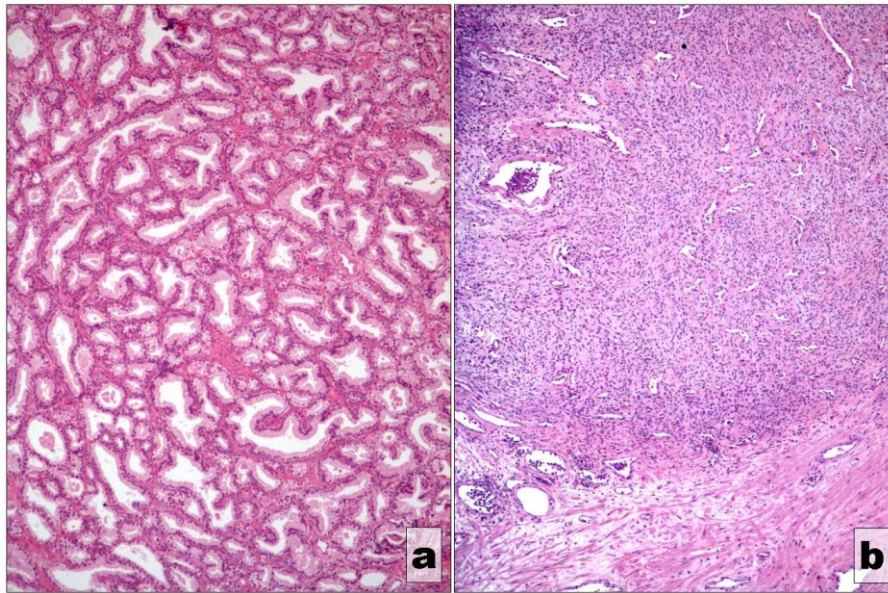

Figure 1. Nodular benign hyperplasia–(a) epithelial proliferation of adenomatous type;
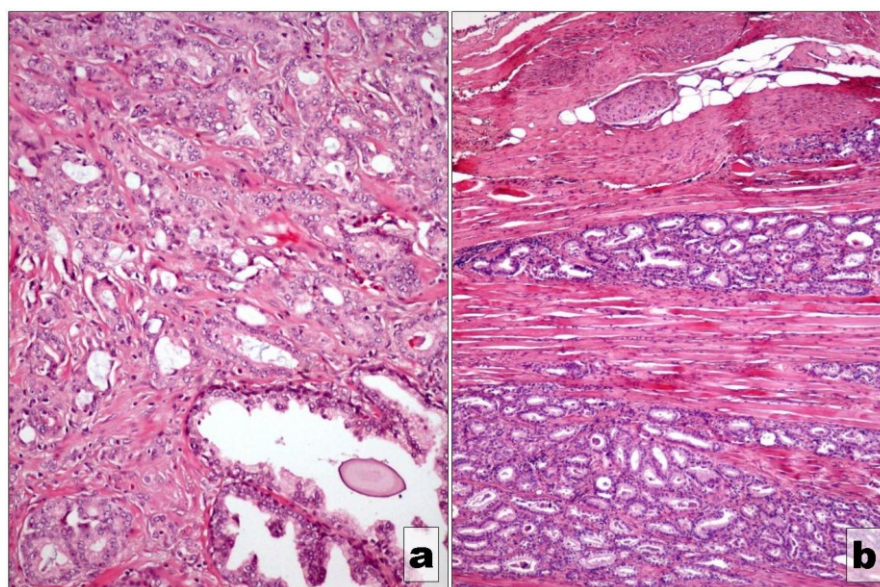(b) stromal fibro-muscular hyperplasia.

Figure 2. Prostate adenocarcinoma–(a) pattern 4B proliferation invasive in an nodular benign hyperplasia area;
(b) pattern 3A proliferation invasive in the prostatic capsule.

DISCUSSIONS

The associations between diabetes and prostatic hyperplasia have not been consistently observed across studies. Diabetes can induce nocturnal polyuria by osmotic diuresis in poorly controlled patients and also diabetes can influence motor and sensory nerves (neuropathic mechanisms)[12–14]. In 2008 Sarma AV *et al* published in Diabetes Care, a study about "Associations Between Diabetes and Clinical Markers of Benign Prostatic Hyperplasia Among Community-Dwelling Black and White Men". 170 men including 6.8% diabetc patients have participated in this study. The study highlighted a positive correlation between diabetes nocturia and LUTS. The study did not reveal a correlation between diabetes and prostatic hyperplasia[15].

Previous epidemiological studies have highlighted that there is an increase of LUTS in parallel with advanced age[16, 17]. LUTS in older men are generally attributed to benign enlargement of the prostate and could be associated with several putative hormonal pathways[18–20]. Some studies or review suggest that obesity can also increase prostatic hyperplasia risk[21–23]. It is known that most patients diagnosed with type 2 diabetes are overweight or obese. Parsons JK and coworkers after a review to identify he correlation between obesity, benign prostatic hyperplasia, LUTS mention that "*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*"[23]. Other investigators have not noticed in the studies conducted the association between anthropometric determinations and the presence or progression of benign prostatic hyperplasia[24].

CONCLUSION

Currently there is no clear proof for an association between diabetes and prostate volume or PSA. Future clinical studies should explore mechanisms linking diabetes and prostatic hyperplasia.

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