Available online at www.sciencedirect.com
ScienceDirect
journal homepage: www.elsevier.com/locate/mjafi

Original Article

Association between components of metabolic syndrome and prostatic enlargement: An Indian perspective

Col P.R. Nandy [a,*], Sabyasachi Saha [b]

[a] Classified Specialist (Surgery) & Urologist, Command Hospital (Eastern Command), Kolkata, India
[b] Resident (Surgery), Command Hospital (Eastern Command), Kolkata, India

ARTICLE INFO

Article history:
Received 10 May 2016
Accepted 12 July 2016
Available online xxx

Keywords:
Benign prostatic hyperplasia
Metabolic syndrome
Lower urinary tract symptoms
Prostate volume

ABSTRACT

Background: To find association between prostate gland volume to components of the metabolic syndrome.

Methods: Cross-sectional, observational study in a tertiary care hospital of the Armed Forces of India. A total of 115 male patients aged 50–65 years attending the Urology OPD between Jan 2014 and July 2015 with lower urinary tract symptoms (LUTS) were included. Men with known malignant disease including carcinoma prostate, those on medical management for BPH and individuals with previous history of surgery related to urinary bladder/prostate were excluded. Blood Pressure (BP), weight in kgs, height, waist and hip circumference to nearest cm were recorded. Body Mass Index (BMI) and Waist/Hip ratio (WHR) were calculated. Fresh serum was analysed for lipid profile and glycaemic levels. The International Diabetes Federation (IDF) – 2005 guideline for metabolic syndrome was used for the diagnosis.

The total prostate volume and the severity of LUTS as per AUA Symptom index were considered as the primary and secondary outcome measure respectively. Statistical software SPSS version 20 was used for analysis. Mean prostate volume was compared with the components of MetS. An alpha level of 5% was considered significant.

Results: The study showed positive association between prostate volume with metabolic syndrome and its four components – raised blood pressure, fasting blood glucose and triglycerides and HDL ≤ 40 mg/dl. No correlation was found with waist circumference.

Conclusion: Our study indicates that metabolic syndrome and its individual components may predispose patients to a higher risk of prostatic enlargement/LUTS.

* *Corresponding author.*
E-mail address: nandypriyaranjan@gmail.com (P.R. Nandy).

http://dx.doi.org/10.1016/j.mjafi.2016.07.005
0377-1237/

Please cite this article in press as: Nandy PR, Saha S. Association between components of metabolic syndrome and prostatic enlargement: An Indian perspective, *Med J Armed Forces India*. (2016), http://dx.doi.org/10.1016/j.mjafi.2016.07.005

Introduction

Amongst the elderly male, Benign prostatic hyperplasia (BPH) is one of the most common diseases. Besides other factors including inflammation, ageing and androgens play an important role in the aetiology of BPH. Although many studies have attributed obesity and increased Body Mass Index (BMI) with BPH, exact relationship is unclear.[1] Metabolic Syndrome (MetS) has become a major public health problem worldwide today. Interest initially arose due to its association with cardiovascular diseases. However, of late, its secondary impact on lower urinary tract symptoms (LUTS) associated with BPH has attracted researchers' attention. Besides being the diabetic capital of the world, India is having an ever increasing number of obese and hypertensive individuals. Due to genetic predisposition, Indians have high prevalence of MetS. Indian studies have shown their prevalence to be as high as 41% in Chennai.[2] Although the relationship between BPH and MetS has been studied in western world since 1998, hardly any study existed highlighting the relationship in pan Indian population.[3–5] The present study was initiated to find association between prostate gland volume to components of the MetS.

Materials and methods

This cross-sectional, observational study was performed on 94 male patients aged 50–65 years, who came to the Urology department between January 2014 and June 2015 with LUTS.

Data from a total of 115 men was collected during the study period. Those men with a history of any malignancy including prostate cancer ($n = 04$); those with incomplete data ($n = 06$); those taking 5$\propto$Reductase Inhibitor (5ARI) medications that decrease prostate volume ($n = 11$) were excluded from the study. Individuals with previous history of surgery related to urinary bladder/prostate were excluded and any endocrinological disorders other than Type-2 Diabetes Mellitus were also excluded. This left 94 men for the study. Patients' medical record, clinical findings and blood sugar levels provided the diagnosis of hypertension and diabetes mellitus. The following measurements were recorded: Blood Pressure (BP) to nearest mm Hg, weight in kgs, height to nearest 0.1 cm, waist and hip circumference to nearest cm. BMI and Waist/Hip ratio (WHR) were calculated. Fresh serum was analysed for lipid profile. International Diabetes Federation (IDF) – 2005 guideline for MetS was used for the diagnosis (Fig. 1). As per the IDF 2005 criteria for detection of MetS among Indian population, waist circumference more than or equal to 90 cm was considered as central obesity.

The total prostate volume was considered the primary outcome measure. The gland was examined by digital rectal examination and volume was measured using ultrasound equipment applying Ellipsoid method.

International prostate Symptom score (IPSS) was used to determine the severity of LUTS which was considered the secondary outcome measure. With the total score running from 0 to 35 points, patients scoring 0 to 7, 8 to 19 and 20 to 35 points were classified as mild, moderate and severely symptomatic respectively.

Prostate biopsy was performed in men with a serum prostate-specific antigen (PSA) concentration more than 4.0 ng/ml as measured by ELISA and/or an abnormal digital rectal examination for the detection of prostate cancer. Statistical software SPSS version 20 was used for Statistical analysis. Mean Prostate Volume across age groups was compared.

Prostate Volume was expressed as Mean and Standard Deviation and compared across BMI, IPS score, waist circumference, BP, Fasting Blood Sugar, Triglyceride and HDL. An alpha level of 5% was taken, i.e. if any p value was less than 0.05, it was considered as significant.

Results

The age of the patients included in this study was between 50 and 65 years. They were stratified into three age groups 50–55, 56– 60 and 61– 65 with 23, 34 and 37 patients respectively. Of the 94 patients presented with LUTS, 31 had moderate and 63 severe symptoms. No one had IPS score <7 (Table 1).

As per the IDF criteria, majority of the patients (85.11%) in our study had central obesity. Further analysis of the data revealed that there was no statistically significant difference in mean prostate volume between patients with central obesity and without central obesity (p value: 0.264).

In our study, 29 patients (30.85%) were found to have serum triglyceride ≥150 mg/dl. Mean prostate volume in patients having raised serum triglyceride was 49.72 ml, which was higher than their counterparts having normal serum triglycerides (mean prostate volume 35.55 ml). The result was statistically significant (p value: 0.000), that is, there is positive association between serum triglyceride and BPH (Table 2).

Serum HDL cholesterol < 40 mg/dl, which is another component of MetS, was found in 36% of cases in this study. And in this case also mean prostate volume was found to be higher among patients with low serum HDL than normal serum HDL level (Table 2).

High blood pressure or evidence of hypertension was found in 35 (37.23%, $n = 94$) patients. Among these hypertensive patients, mean prostate volume was found to be higher than the patients having normal blood pressure (p value 0.000).

In this study, 49 patients (52.13%, $n = 94$) had increased fasting blood glucose or positive history of diabetes mellitus. Patients having deranged serum fasting blood glucose had raised mean prostate volume compared to those with normal serum fasting blood glucose. There was positive correlation between raised serum fasting blood glucose and prostate volume as the result was statistically significant with p value <0.001 (Table 2). In our study, 39 patients were overweight (BMI: 25–29.9), 9 patients were obese (BMI: >30) and the rest

Table 1 – Distribution of cases with respect to IPS scores.

IPS score	No. of patients	Percentage (%)
Mild	00	00.00
Moderate	31	32.98
Severe	63	67.02
Total	94	100

Please cite this article in press as: Nandy PR, Saha S. Association between components of metabolic syndrome and prostatic enlargement: An Indian perspective, *Med J Armed Forces India*. (2016), http://dx.doi.org/10.1016/j.mjafi.2016.07.005