

TESTOSTERONE AND CHRONIC PROSTATITIS/CHRONIC PELVIC PAIN SYNDROME: A PROPENSITY SCORE-MATCHED ANALYSIS

Hypothesis / aims of study

A recent study investigated the role of testosterone in chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS). However, only a few data are available to date and their results are inconsistent. This study evaluated the relationship between total testosterone (TT) and CP/CPPS.

Study design, materials and methods

We conducted a propensity-matched study by identifying men with TT <3.5 ng/mL among a total of 8,336 men in their 40-50s who had participated in a health examination. A control group of men with TT ≥3.5 ng/mL matched for age, metabolic syndrome (MetS), and body mass index (BMI) at 5:1 ratio was selected for comparison. The National Institutes of Health Chronic Prostatitis Symptom Index (NIH-CPSI) was administered. The symptoms were considered mild pain if respondents reported perineal or ejaculatory pain and the pain score was ≥4 but <8, and the symptoms were considered moderate to severe pain if the pain score was ≥8. Lower urinary tract symptoms (LUTS) was evaluated using international prostate symptoms score, uroflowmetry, and postvoid residual urine volume. A chi-squared test, a t-test and logistic regression analyses were used to evaluate the relationship between TT and prostatitis-like symptoms. Propensity score matching was performed using the MatchIt package in R, implementing the suggestions of Ho and colleagues for improving parametric statistical models by preprocessing data using nonparametric matching methods.

Results

After propensity score matching, 948 cases (TT <3.5 ng/mL) and 4740 controls (TT ≥3.5 ng/mL) were included. The mean age (50.6±5.5 vs. 51.1±5.3 years; $P=.005$) and BMI (25.0±2.4 vs. 24.9±2.4 kg/m²; $P=.005$) were significantly greater in the case group (TT <3.5 ng/mL) before propensity-score matching. The ratio of the number of MetS components was also significantly greater in the case group (TT <3.5 ng/mL) before propensity-score matching (Number of MetS components, 0: 14.2% vs. 7.2%; 1: 24.5% vs. 18.8%; 2: 25.4% vs. 25.6%; 3: 20.8% vs. 25.0%; 4: 12.1% vs. 17.7%; 5: 2.9% vs. 5.7%; $P<.001$). Age (51.0±5.4 vs. 51.1±5.3 years; $P=.481$), BMI (25.5±2.4 vs. 25.5±2.4 kg/m²; $P=.805$), and number of MetS components (Number of MetS components, 0: 7.3% vs. 7.2%; 1: 18.9% vs. 18.8%; 2: 25.2% vs. 25.6%; 3: 25.5% vs. 25.0%; 4: 18.5% vs. 17.7%; 5: 4.5% vs. 5.7%; $P=.699$) were evenly dispersed and did not significantly differ after propensity-score matching. Therefore, the propensity-score-matching model was validated. The ratio of mild and moderate to severe prostatitis-like symptoms was higher in the case group (TT <3.5 ng/mL) than in the control group (24.0% vs. 27.4%, $P=.001$). The ratio of moderate to severe prostatitis-like symptoms was also higher in the case group (TT <3.5 ng/mL) than in the control group (6.2% vs. 9.2%, $P=.028$). The pain domain of NIH-CPSI, the QoL and the total NIH-CPSI was also higher in the case group (TT <3.5 ng/mL). The ratio of severe LUTS (12.6% vs. 15.1%, $P=.044$), the maximal flow rate ≤10 mL/sec (3.8% vs. 5.3%, $P=.044$), and the postvoid residual urine volume ≥100 mL (4.0% vs. 5.6%, $P=.035$), which suggest high pressure in the prostate urethra, were higher in the case group (TT <3.5 ng/mL). After adjusting for voided volume during uroflowmetry and total prostate volume, the relationship of TT <3.5 ng/mL with the maximal flow rate ≤10 mL/sec (odds ratio: 1.402, 95% confidence interval: 1.017-1.934, $P=.039$), and the postvoid residual urine volume ≥100 mL (odds ratio: 1.410, 95% confidence interval: 1.031-1.927, $P=.031$) was maintained.

Interpretation of results

Low TT (<3.5 ng/mL) significantly correlated with the presence of prostatitis-like symptoms after propensity score matching. The propensity score suggests a causal inference, and our data suggest that low TT level plays a role in the development of CP/CPPS. Additionally, low TT levels were related to a maximal flow rate <10 mL/sec and a postvoid residual urine volume ≥100 mL in this study, which are indicators of increased prostatic pressure and bladder outlet obstruction. Increased prostatic pressure secondary to low TT could explain the relationship between low TT and prostatitis-like symptoms, given that increased prostate tissue pressure was suggested as a possible etiology of CP/CPPS.

Concluding message

Our propensity-score-matched analysis demonstrated that low TT levels (TT <3.5 ng/mL) significantly correlated with prostatitis-like symptoms in men in their 40-50s. Our data suggest a possible role of testosterone in the development of CP/CPPS. Further investigational and clinical research is needed to confirm our results.

Disclosures

Funding: none **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** National Police Hospital IRB Helsinki: Yes **Informed Consent:** Yes