

Testosterone and metabolic syndrome: A meta-analysis study - Abstract



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Metabolic syndrome (MetS) is often associated with male hypogonadism. Despite the well-known link, the role of testosterone replacement therapy (TRT) in MetS has not been completely clarified.

To systematically analyse the relationship between androgen levels and MetS we performed a review and meta-analyses of available prospective and cross-sectional studies. In addition, a specific meta-analysis on the metabolic effects of TRT in available randomized clinical trials (RCTs) was also performed.

An extensive Medline search was performed including the following words "testosterone," "metabolic syndrome," and "males". Main Outcome Measures. Out of 323 retrieved articles, 302 articles were excluded for different reasons. Among the 20 published studies included, 13, 3, and 4 were cross-sectional, longitudinal, and RCTs, respectively. Another unpublished RCT was retrieved on <http://www.clinicaltrials.gov>.

MetS patients showed significantly lower T plasma levels, as compared with healthy individuals. Similar results were obtained when MetS subjects with and without erectile dysfunction were analyzed separately or when NCEP-ATPIII MetS criteria were compared with other definitions. Meta-regression analysis demonstrated that type 2 diabetes (T2DM) increased the MetS-associated T fall. In a multiple regression model, after adjusting for age and BMI, both T2DM and MetS independently predicted low testosterone (adj. $r = -0.752$; $P < 0.001$ and -0.271 ; $P < 0.05$, respectively). Analysis of longitudinal studies demonstrated that baseline testosterone was significantly lower among patients with incident MetS in comparison with controls (2.17 [-2.41;-1.94] nmol/L; $P < 0.0001$). Combining the results of RCTs, TRT was associated with a significant reduction of fasting plasma glucose, homeostatic model assessment index, triglycerides, and waist circumference. In addition, an increase of high-density lipoprotein cholesterol was also observed.

The meta-analysis of the available cross-sectional data suggests that MetS can be considered an independent association of male hypogonadism. Although only few RCTs have been reported, TRT seems to improve metabolic control, as well as central obesity.

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