Trough serum testosterone predicts the development of polycythemia in hypogonadal men treated for up to 21 years with subcutaneous testosterone pellets

In other words, too much all the time is bad.

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Abstract

Objectives

Testosterone formulations that have more steady-state pharmacokinetics, such as subcutaneously implanted testosterone pellets, may cause less erythrocytosis than i.m. injections of shorter acting androgen esters. We, therefore, sought to define the prevalence, predictors, and proximate basis (role of erythropoietin) for polycythemia (hematocrit >0.50) in hypogonadal men receiving testosterone implants long term.

Design

A cross-sectional study was conducted in an academic andrology center with a longitudinal subgroup analysis.

Patients

A total of 158 hypogonadal men aged 14–84 years (mean age 46.7 years) treated on average for 8 years (range 0–21 years).

Measurements

Trough blood testosterone and hematocrit. Serial serum erythropoietin concentrations were measured in 16 volunteers.

Results

Positive univariate associations between polycythemia (hematocrit >0.50) and log(testosterone) (odds ratio (OR) 24.7, 95% confidence interval (CI): 4.3, 141.2, $P<0.01$) and age (OR 1.1, 95% CI: 1.0, 1.1, $P=0.03$) and a borderline relationship with current smoking (OR 4.2, 95% CI: 0.9, 20.0, $P=0.08$) were unveiled. A sensitivity analysis using alternate definitions of polycythemia was performed to capture all potential covariants. Multivariate regression analysis incorporating all potential covariants disclosed the independent OR of developing polycythemia (after adjusting for smoking and age) for log(testosterone) to be 15.0 (95% CI: 2.5, 90.8). Duration of testosterone therapy did not alter the risk of polycythemia. A direct relationship between testosterone and erythropoietin was observed ($P=0.05$).

Conclusions

Higher trough serum testosterone concentrations but not duration of treatment predict the development of polycythemia in men receiving long-acting depot testosterone treatment.