Creatinine: An Inaccurate Measure of Renal Function in Men with Testosterone-Induced Muscle Hypertrophy

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INTRODUCTION

- Renal function is often estimated using validated study equations and serum creatinine (Cr) as a filtration marker.
- Cystatin C may be used as a more accurate alternative to Cr
  - Found in virtually all tissues and body fluids
  - Low molecular weight and removed by glomerular filtration
  - Avoids limitations related to diet and muscle mass
- Elite athletes are often noted to have an elevated body mass index (BMI)
  - Despite overall favorable level of percent body fat (PBF) and fitness.
  - Due to an increased level of body muscle
- Objective: This study evaluates the relationship between Cr, cystatin C, BMI, and PBF in fitness and elite athlete populations.

METHODS

- Elite athletes (pursuing competition in professional or amateur sporting events) presenting to a men's health tertiary referral center with testosterone-induced muscle hypertrophy
- Cr and cystatin C were plotted for correlation in best fit models for percentage increments of BMI (normal, overweight, and obese) and PBF

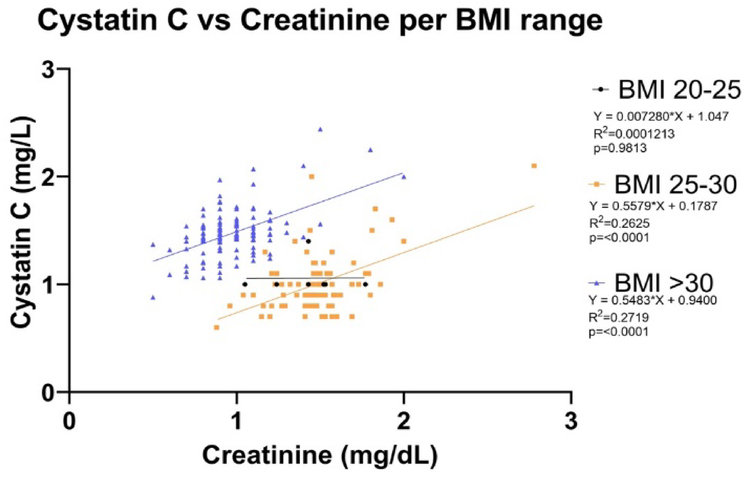
Inclusion Criteria:
- Single Men's Health tertiary clinic
- Elite athletes*
- Testosterone therapy

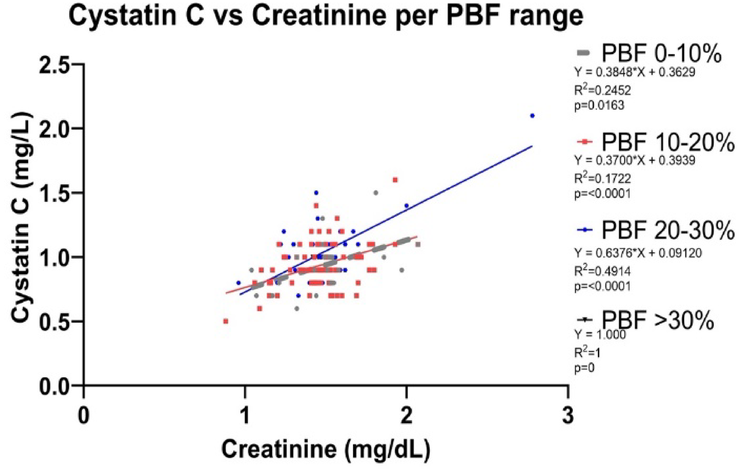
Evaluation:
- Cr
- cystatin C
- BMI**
- PBF**

Data Analysis:
- Cr, cystatin C correlation
- Increments of BMI & PBF
  - "normal"
  - "overweight"
  - "obese"

*Routine hypertrophy-inducing exercise, amateur and professional athletes
**Obtained through bioimpedance testing at time of serum level determinations

RESULTS





RESULTS

- 228 elite athletes were identified and stratified by BMI and PBF
- Majority were "overweight" (n=88) or "obese" (n=129) based on BMI
- No clinically significant correlation between Cr and cystatin C for **normal** BMI
  - Overweight, R^2=0.2625
  - Obese, R^2=0.2719
- Correlation between cystatin C and Cr increased with increase in PBF
  - 10-20%, R2=0.1722
  - 20-30%, R2=0.4914
  - >30%, R2=1.0000

CONCLUSIONS

- Our study affirms that elite athletes maintain an increased BMI and low PBF.
- Cystatin C may demonstrate a more accurate reflection of renal function in these patients, as Cr may be inaccurately elevated.