EVIDENCE FOR THE INTEGRATION OF TOTAL AND FREE TESTOSTERONE IN MANAGEMENT OF PROSTATE CANCER

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1. Introduction and Objectives

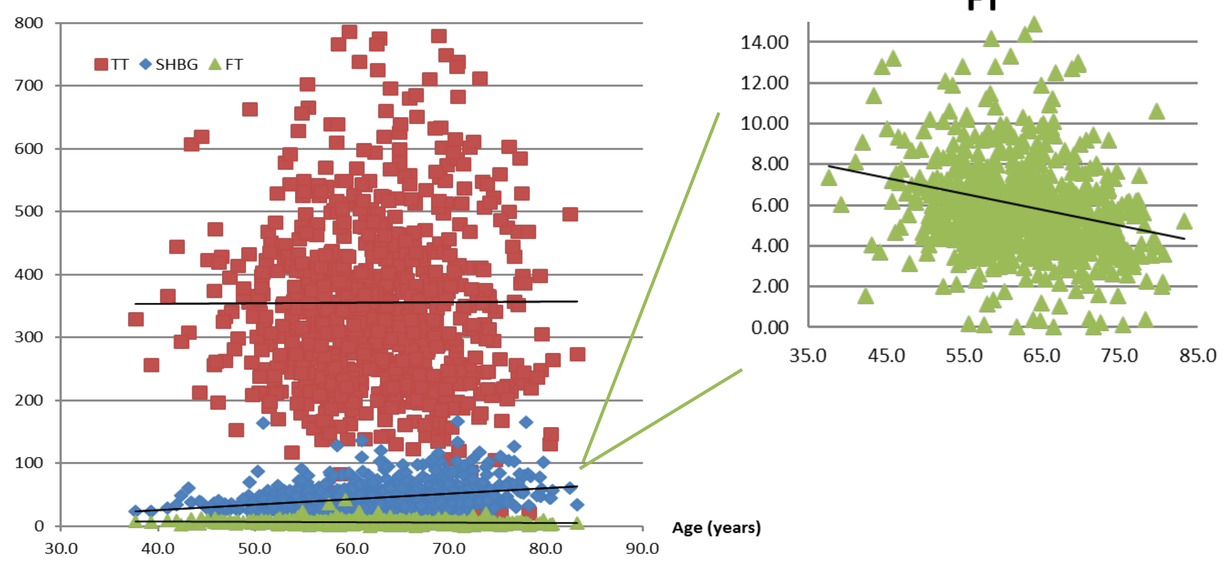
Within the context of prostate cancer (PC), there has been a historic fear of high serum testosterone, a hesitance towards testosterone supplementation, and a resultant lack of systematized testosterone screening. Herein, we seek to investigate the utility of serum total and calculated free testosterone (cFT) in PC management.

2. Materials and Methods

- 830 patients underwent RP, with prospectively-drawn total testosterone (TT), sex hormone binding globulin (SHBG) and calculated free testosterone (cFT).
- Impact of age on TT, cFT, and SHBG was assessed with linear regression modeling and R^2
- Correlation of patients with low cFT with adverse oncologic characteristics (i.e. high-risk Gleason grade 9-10, extraprostatic extension, and seminal vesicle invasion) was assessed with receiver-operator characteristic (ROC) curves.
- Logistic regression was used to assess effect size of preoperative cFT on oncologic characteristics.

3. Age-Stratified Trends of TT, cFT, and SHBG

Figure 1. Effect of age on androgens.



3. Results – Effects of Endogenous cFT on Disease Characteristics, Univariate Analysis

Table 1. Demographic Characteristics of 830 Patients

	Mean	SD
Age (years)	62.7	7.5
BMI (kg/m²)	27.2	3.7
Preoperative PSA (ng/mL)	7.9	6.2
Prostate Volume (mL)	54.7	20.3
Preoperative Total Testosterone (ng/dL)	361.2	167.6
Preoperative SHBG (nmol/L)	46.0	21.7
Preoperative Free Testosterone (ng/dL)	6.1	3.2
	N	**%**
Pathologic Grade		
1 (3+3)	165	20%
2 (3+4)	331	40%
3 (4+3)	190	23%
4 (4+4)	45	5%
5 (9-10)	99	12%
Pathologic Stage		
pT2	549	66%
pT3	270	33%
pT4	11	1%

Table 2a. Gleason Grade Group Prevalence by cFT Quartile

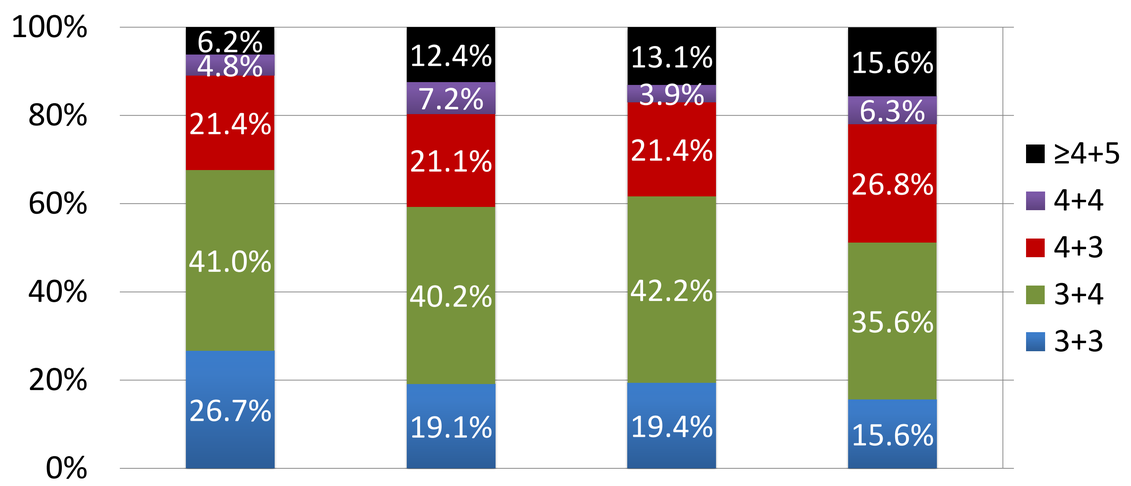
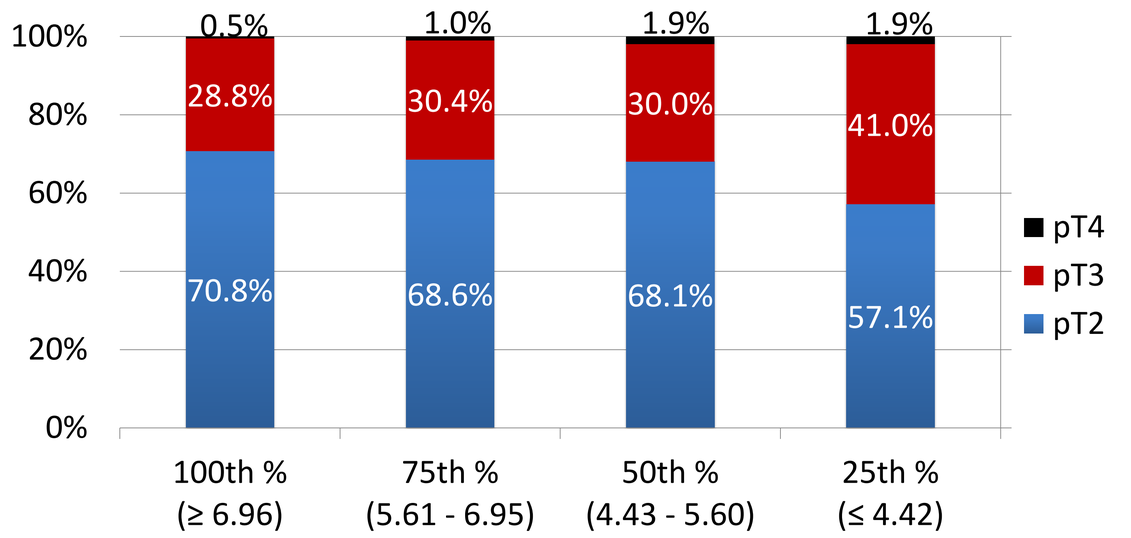


Table 2b. P-stage Prevalence by cFT Quartile



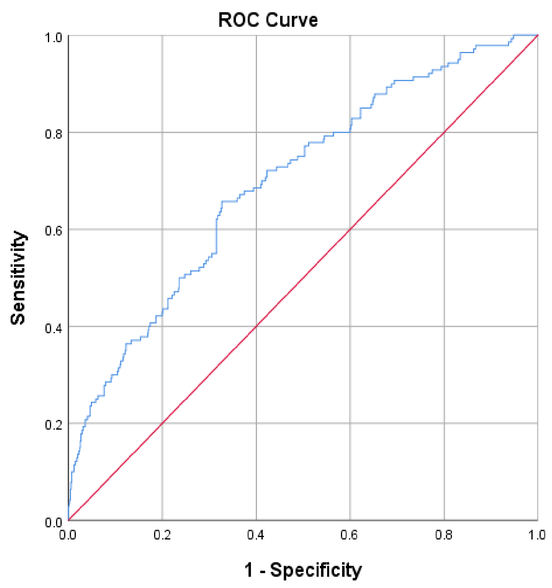
3. Results – Effects of Endogenous cFT on Disease Characteristics, Multivariate Analysis

Table 3. Logistic Regression of cFT as a predictor of high-risk Gleason

						95% CI	
	B	S.E.	Wald	Sig.	OR	Lower	Upper
Free Testosterone	-0.080	0.045	3.190	0.036	0.923	0.846	0.994
Age (cont.)	0.037	0.014	7.158	0.007	1.038	1.010	1.067
Preoperative PSA	0.089	0.015	36.335	<0.001	1.093	1.062	1.124
BMI (cont.)	0.016	0.027	0.351	0.554	1.016	0.964	1.071
Constant	-4.681	1.284	13.284	0.000	0.009		

In multivariate analysis, lower FT was a significant predictor of high-risk score 9-10 (OR: 0.912, 95% CI: 0.836-0.994, p=0.036).

Figure 1. ROC curve of Gleason Grade Group 9-10



In ROC analysis, preoperative FT was an independent predictor of GGG 9-10, with an area under the curve of 0.6988 (p=0.018, 95%CI: 0.381 – 0.489). Of note, age and preoperative PSA were also independent predictors.

5. Conclusion

Low cFT is a risk factor for high grade and high stage PC. These results have implications for the current recommendations for prostate cancer risk analysis and stratification. Free and total testosterone levels should be assessed in all men with prostate cancer.

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