LOW FREE TESTOSTERONE (VS TOTAL) IS AN INDEPENDENT RISK FACTOR FOR AGGRESSIVE PROSTATE CANCER

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Introduction

The role of testosterone in prostate growth and the development of prostate cancer (PC) is a controversial topic. We report the practical implications of total and free testosterone on disease characteristics for men with PC.

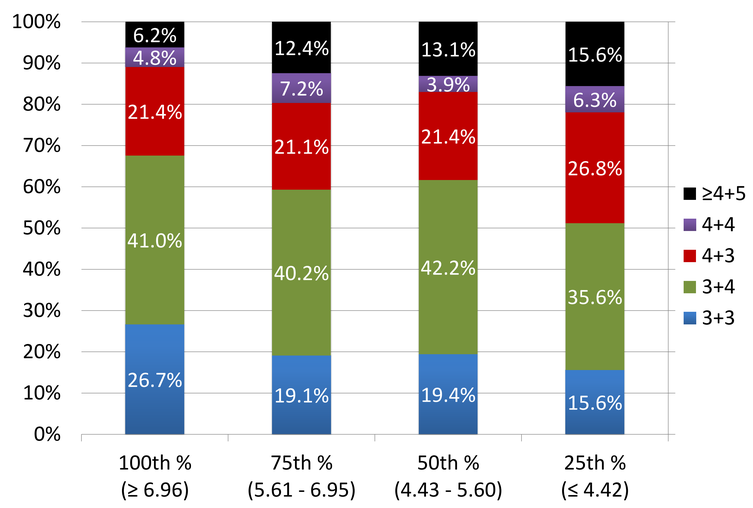
Methods

830 consecutive patients who presented for management of PC had prospectively collected total testosterone (TT), sex hormone binding globulin (SHBG), and free testosterone (FT) values. Univariate and multivariate models were used to assess correlation between TT/SHBG/FT with pathologic stage and grade; ROC curve analysis was used to assess predictive value.

Table 1. Demographic Profile of 830 Patients

	Mean	SD
Age (years)	62.7	7.5
BMI (kg/m²)	27.2	3.7
Adjusted 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	165	20%
2	331	40%
3	190	23%
4	45	5%
5	99	12%
Pathologic Stage		
pT2	549	66%
pT3	270	33%
pT4	11	1%

Figure 1: Gleason Grade Group prevalence by FT Quartile



Patients who had a FT level in the lowest quartile (≤ 4.42 ng/dL) had a higher proportion of Gleason grade group 5 (15.6%) than patients in the highest quartile (≥ 6.96 ng/dL) (6.2%) (p = 0.002).

Figure 2: Stage prevalence by FT Quartile

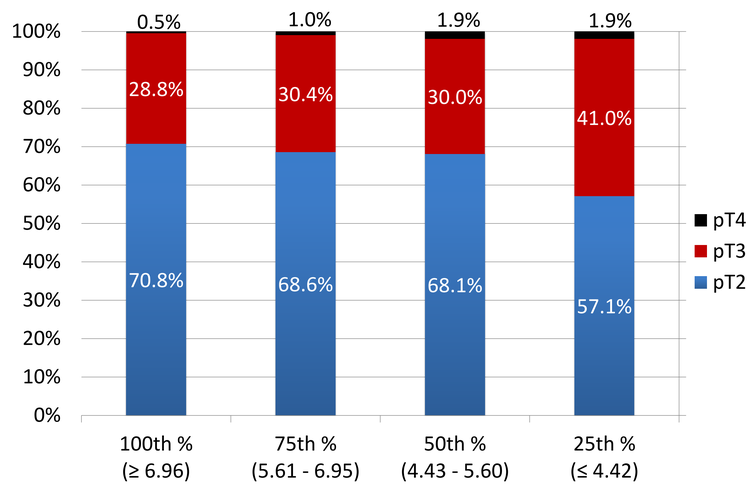


Table 2. Multivariate Analysis

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).

	B	S.E.	Wald	Sig.	OR	95% CI 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
Body Mass Index	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		

Figure 3. ROC Curve of FT as a Predictor for High Grade PC

In ROC analysis, FT was an independent predictor of GGG 9-10, with an area under the curve of 0.435 (p=0.018, 95%CI: 0.381 – 0.489) .

Figure 3A. ROC curve of GGG 9-10, as predicted by FT (AUC=0.435)

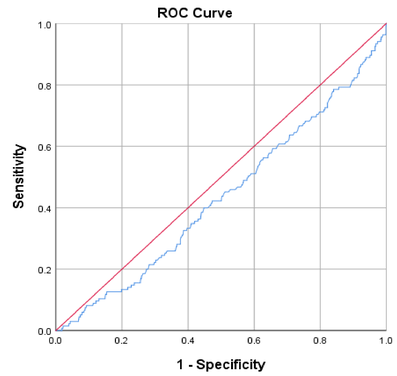
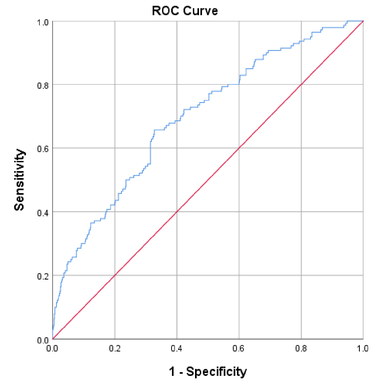


Figure 3B. ROC curve of GGG 9-10, predicted by age, preoperative PSA, and FT (AUC=0.698).



Conclusion

Low FT 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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