The preoperative serum ratio of total prostate specific antigen (PSA) to free testosterone (FT), PSA/FT index ratio, and prostate cancer. Results in 220 patients undergoing radical prostatectomy

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Variables	Cluster	AB	CD	Total
	n	111	109	220
AGE (yrs)	Mean	65,69	65,41	65,55
	SD	6,433	6,077	6,248
	SE	,611	,582	,421
	Min	45	51	45
	Max	78	77	78
	P-value	0,60		
TT (nmol/l)	Mean	18,08	14,71	16,41
	SD	6,417	5,124	6,040
	SE	,609	,491	,407
	Min	7	6	6
	Max	41	34	41
	P-value	<0,0001		
FT (pmol/l)	Mean	37,803	31,014	34,440
	SD	10,0134	10,3743	10,7243
	SE	,9504	,9937	,7230
	Min	17,8	13,7	13,7
	Max	71,9	69,3	71,9
	P-value	<0,0001		
WGT (gr)	Mean	56,896	61,417	59,136
	SD	24,3659	33,7905	29,4433
	SE	2,3146	3,2365	1,9851
	Min	20,0	25,1	20,0
	Max	165,0	225,0	225,0
	P-value	0,89		
PSA (ng/ml)	Mean	4,7629	11,5377	8,1195
	SD	1,73762	8,50192	6,97774
	SE	,16493	,81434	,47044
	Min	1,22	3,40	1,22
	Max	8,93	44,27	44,27
	P-value	<0,0001		
P+ (prop)	Mean	,3163	,3784	,3471
	SD	,19826	,23473	,21883
	SE	,01882	,02248	,01475
	Min	,06	,07	,06
	Max	1,00	1,00	1,00
	P-value	0,06		
V+ (prop)	Mean	,163	,224	,193
	SD	,1296	,1860	,1626
	SE	,0123	,0178	,0110
	Min	,0	,0	,0
	Max	,7	1,0	1,0
	P-value	0,02		

Table 4a.
Statistics of the continuous variables of the patient population (n = 220) stratified according to the PSA/FT index ratio in clusters AB and CD.

Variables	Cluster	A	B	C	D	Total
	n	57	54	55	54	220
AGE (yrs)	Mean	65,70	65,89	65,47	65,35	65,55
	SD	5,958	6,955	5,896	6,496	6,246
	SE	,789	,946	,768	,884	,421
	Min	51	45	55	51	45
	Max	75	78	76	77	78
	P-value	0,960				
TT (nmol/l)	Mean	18,61	17,53	15,50	13,90	16,41
	SD	7,058	5,676	4,328	5,753	6,040
	SE	,935	,772	,584	,783	,407
	Min	6,80	8,40	6,50	5,50	5,50
	Max	40,70	28,60	27,10	33,60	40,70
	P-value	<0,0001				
FT (pmol/l)	Mean	40,616	34,834	31,702	30,314	34,440
	SD	10,5436	8,5527	10,4023	10,3959	10,7243
	SE	1,3965	1,1639	1,4028	1,4147	,7230
	Min	20,9	17,8	14,8	13,7	13,7
	Max	71,9	51,6	69,3	65,4	71,9
	P-value	<0,0001				
WGT (gr)	Mean	52,075	61,984	60,764	62,082	59,136
	SD	18,3438	28,7631	27,1387	39,6911	29,4433
	SE	2,4297	3,9142	3,6594	5,4013	1,9851
	Min	26,0	20,0	25,1	33,0	20,0
	Max	134,0	165,0	129,7	225,0	225,0
	P-value	0,39				
PSA (ng/ml)	Mean	3,9339	5,6380	7,4022	15,7496	8,1195
	SD	1,47578	1,56396	2,75313	10,18556	6,97774
	SE	,19547	,21283	,37123	1,38606	,47044
	Min	1,22	3,15	3,40	4,60	1,22
	Max	7,47	8,93	18,70	44,27	44,27
	P-value	<0,0001				
P+ (prop)	Mean	,3360	,2956	,3276	,4302	,3471
	SD	,20543	,19010	,21992	,23997	,21883
	SE	,02721	,02587	,02965	,03266	,01475
	Min	,06	,06	,07	,07	,06
	Max	1,00	,79	1,00	1,00	1,00
	P-value	0,01				
V+ (prop)	Mean	,174	,151	,177	,272	,193
	SD	,1537	,0981	,1530	,2050	,1626
	SE	,0204	,0133	,0206	,0279	,0110
	Min	0,03	0,01	0,02	0,01	0,01
	Max	0,70	0,45	0,75	1,00	1,00
	P-value	0,001				

Table 4b.
Statistics of the continuous variables of the patient population (n = 220) stratified according to the PSA/FT index ratio in clusters A, B, C and D.

Variables	Cluster	A1	A2	B	C	D1	D2	Total
	n	30	27	54	55	29	25	220
AGE (yrs)	Mean	65,97	65,41	65,69	65,47	65,93	64,68	65,55
	SD	5,792	6,234	6,955	5,696	6,358	6,719	6,246
	SE	1,058	1,200	,946	,768	1,181	1,344	,421
	Min	53	51	45	55	55	51	45
	Max	75	75	78	78	77	75	78
	P-value	0,98						
TT (nmol/l)	Mean	19,63	17,47	17,53	15,50	13,49	14,38	16,41
	SD	7,028	7,046	5,676	4,328	4,558	6,957	6,040
	SE	1,283	1,356	,772	,584	,846	1,391	,407
	Min	12,20	6,80	8,40	6,50	7,30	5,50	5,50
	Max	40,70	39,80	28,60	27,10	26,00	33,80	40,70
	P-value	0,0003						
FT (pmol/l)	Mean	39,840	41,479	34,834	31,702	29,582	31,163	34,440
	SD	10,8374	10,3427	8,5527	10,4023	8,6355	12,2583	10,7243
	SE	1,9786	1,9904	1,1639	1,4026	1,6036	2,4517	,7230
	Min	21,4	20,9	17,8	14,8	13,7	14,6	13,7
	Max	71,9	61,4	51,6	69,3	47,0	65,4	71,9
	P-value	<0,0001						
WGT (gr)	Mean	49,582	54,845	61,984	60,764	65,332	58,311	59,136
	SD	15,9245	20,6584	28,7631	27,1387	41,1722	38,3890	29,4433
	SE	2,9074	3,9757	3,9142	3,6594	7,6455	7,6778	1,9851
	Min	26,0	26,0	20,0	25,1	36,0	33,0	20,0
	Max	93,0	134,0	165,0	129,7	225,0	207,0	225,0
	P-value	0,31						
PSA (ng/ml)	Mean	3,0530	4,9126	5,6380	7,4022	9,7603	22,6976	8,1195
	SD	,97826	1,31660	1,56396	2,75313	2,93156	11,20036	6,97774
	SE	,17860	,25338	,21283	,37123	,54438	2,24007	,47044
	Min	1,22	2,66	3,15	3,40	4,60	6,53	1,22
	Max	5,57	7,47	8,93	16,70	17,50	44,27	44,27
	P-value	<0,0001						
P+ (prop)	Mean	,3563	,3133	,2956	,3276	,3766	,4924	,3471
	SD	,20827	,20373	,19010	,21992	,25080	,21512	,21883
	SE	,03802	,03921	,02587	,02965	,04657	,04302	,01475
	Min	,06	,07	,06	,07	,07	,07	,06
	Max	,83	1,00	,79	1,00	1,00	1,00	1,00
	P-value	0,006						
V+ (prop)	Mean	,165	,185	,151	,177	,210	,343	,193
	SD	,1260	,1815	,0981	,1530	,1617	,2289	,1626
	SE	,0230	,0349	,0133	,0206	,0300	,0458	,0110
	Min	0,03	0,03	0,01	0,02	0,01	0,04	0,01
	Max	0,70	0,70	0,45	0,75	0,80	1,00	1,00
	P-value	0,0008						

Table 4c.
Statistics of the continuous variables of the patient population (n = 220) stratified according to the PSA/FT index ratio in clusters A1, A2, B, C, D1 and D2.

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Table 5.
Simple and multivariate logistic regression models predicting pGS ≥ 7 prostate cancer in the patient population (n = 220).

a) Univariate logistic regression models (UM)

UM	Variable	B	SE	Wald	df	P-value	Exp(B)	95% CI of EXP(B) Inferior	Superior
a1)	AGE (yrs)	0,046	0,038	1,451	1	0,228	1,047	0,972	1,127
a2)	TT (nmol/l)	0,085	0,032	6,814	1	0,009	1,088	1,021	1,160
a3)	FT (pmol/l)	0,028	0,019	2,118	1	0,146	1,028	0,990	1,068
a4)	WGT (gr)	-0,027	0,014	3,899	1	0,048	0,973	0,948	1,000
a5)	PSA (ng/ml)	0,071	0,023	9,732	1	0,002	1,074	1,027	1,123
a6)	P+ (prop)	2,693	0,927	8,428	1	0,004	14,770	2,398	90,960
a7)	V+ (prop)	5,159	1,145	20,290	1	0,000	173,928	18,430	1641,319
a8)	PSA/FT	2,209	0,790	7,827	1	0,005	9,108	1,937	42,786

b) Multivariate logistic regression models (MM)

MM	Variable	B	SE	Wald	df	P-value	Exp(B)	95% CI of EXP(B) Inferior	Superior
b1)	TT (nmol/l)	0,082	0,034	5,951	1	0,015	1,086	1,018	1,160
	PSA (ng/ml)	0,069	0,024	8,419	1	0,004	1,072	1,023	1,123
b2)	TT (nmol/l)	0,085	0,035	5,979	1	0,014	1,088	1,017	1,165
	PSA (ng/ml)	0,063	0,024	6,940	1	0,008	1,066	1,016	1,117
	WGT (gr)	-0,025	0,014	3,280	1	0,070	0,975	0,949	1,002
b3)	TT (nmol/l)	0,088	0,034	6,560	1	0,010	1,092	1,021	1,168
	PSA (ng/ml)	0,056	0,024	5,187	1	0,023	1,057	1,008	1,109
	P+ (prop)	2,365	0,979	5,829	1	0,016	10,640	1,561	72,540
b4)	TT (nmol/l)	0,065	0,035	3,414	1	0,065	1,068	0,996	1,144
	PSA (ng/ml)	0,040	0,027	2,310	1	0,129	1,041	0,988	1,097
	V+ (prop)	4,372	1,237	12,486	1	0,000	79,169	7,006	894,580
b5)	P+ (prop)	0,708	1,184	,358	1	0,550	2,030	0,200	20,656
	V+ (prop)	4,727	1,337	12,507	1	0,000	112,908	8,224	1550,172
b6)	TT (nmol/l)	0,108	0,035	9,737	1	0,002	1,114	1,041	1,193
	PSA/FT	2,210	0,882	6,281	1	0,012	9,118	1,619	51,360
	P+ (prop)	2,179	1,008	4,672	1	0,031	8,840	1,225	63,774

a) Univariate logistic regression models (UM)

LM	Variable	B	SE	Wald	df	P-value	Exp(B)	95% CI of EXP(B) Inferior	Superior
a1)	AGE (yrs)	0,097	0,044	4,901	1	0,027	1,102	1,011	1,200
a2)	TT (nmol/l)	0,067	0,034	3,986	1	0,046	1,069	1,001	1,142
a3)	FT (pmol/l)	0,037	0,020	3,477	1	0,062	1,037	0,998	1,078
a4)	WGT (gr)	-0,024	0,014	3,036	1	0,081	0,977	0,951	1,003
a5)	PSA (ng/ml)	0,113	0,026	19,118	1	0,000	1,120	1,064	1,178
a6)	P+ (prop)	3,875	0,997	15,097	1	0,000	48,166	6,822	340,083
a7)	V+ (prop)	6,097	1,237	24,298	1	0,000	444,523	39,369	5020,471
a8)	PSA/FT	3,359	0,851	15,567	1	0,000	28,765	5,422	152,604

b) Multivariate logistic regression models (MM)

MM	Variable	B	SE	Wald	df	P-value	Exp(B)	95% CI of EXP(B) Inferior	Superior
b1)	AGE (yrs)	0,099	0,045	4,936	1	0,026	1,105	1,012	1,208
	TT (nmol/l)	0,069	0,035	3,992	1	0,046	1,072	1,001	1,147
b2)	AGE (yrs)	0,177	0,058	9,175	1	0,002	1,194	1,066	1,339
	TT (nmol/l)	0,080	0,040	4,150	1	0,042	1,084	1,003	1,171
	PSA (ng/ml)	0,135	0,029	22,335	1	0,000	1,145	1,083	1,211
b3)	AGE (yrs)	0,180	0,062	8,503	1	0,004	1,197	1,061	1,351
	TT (nmol/l)	0,086	0,041	4,289	1	0,038	1,089	1,005	1,182
	PSA (ng/ml)	0,128	0,031	16,711	1	0,000	1,136	1,069	1,208
	P+ (prop)	3,526	1,164	9,180	1	0,002	33,977	3,473	332,431
b4)	AGE (yrs)	0,181	0,066	7,602	1	0,006	1,198	1,054	1,362
	TT (nmol/l)	0,058	0,045	1,659	1	0,198	1,060	0,970	1,159
	PSA (ng/ml)	0,109	0,031	12,685	1	0,000	1,116	1,050	1,185
	P+ (prop)	1,980	1,327	2,225	1	0,136	7,243	0,537	97,663
	V+ (prop)	3,666	1,545	5,632	1	0,018	39,080	1,893	806,728
b5)	AGE (yrs)	0,141	0,052	7,268	1	0,007	1,152	1,039	1,276
	TT (nmol/l)	0,120	0,039	9,519	1	0,002	1,127	1,046	1,216
	PSA/FT	4,432	1,016	19,007	1	0,000	84,060	11,465	616,315
b6)	AGE (yrs)	0,151	0,058	6,844	1	0,009	1,163	1,039	1,302
	TT (nmol/l)	0,081	0,043	3,481	1	0,062	1,084	0,996	1,181
	PSA/FT	3,621	1,007	12,934	1	0,000	37,361	5,194	268,770
	V+ (prop)	5,012	1,344	13,917	1	0,000	150,251	10,794	2091,561
b7)	AGE (yrs)	0,140	0,054	6,696	1	0,010	1,151	1,036	1,280
	TT (nmol/l)	0,123	0,041	9,070	1	0,003	1,131	1,044	1,225
	PSA/FT	4,006	1,112	12,986	1	0,000	54,914	6,215	485,207
	P+ (prop)	3,275	1,148	8,133	1	0,004	26,438	2,786	250,998

Table 6.
Simple and multiple logistic modell predicting pT3b prostate cancer in the patient population (n = 220).

Figure 1.
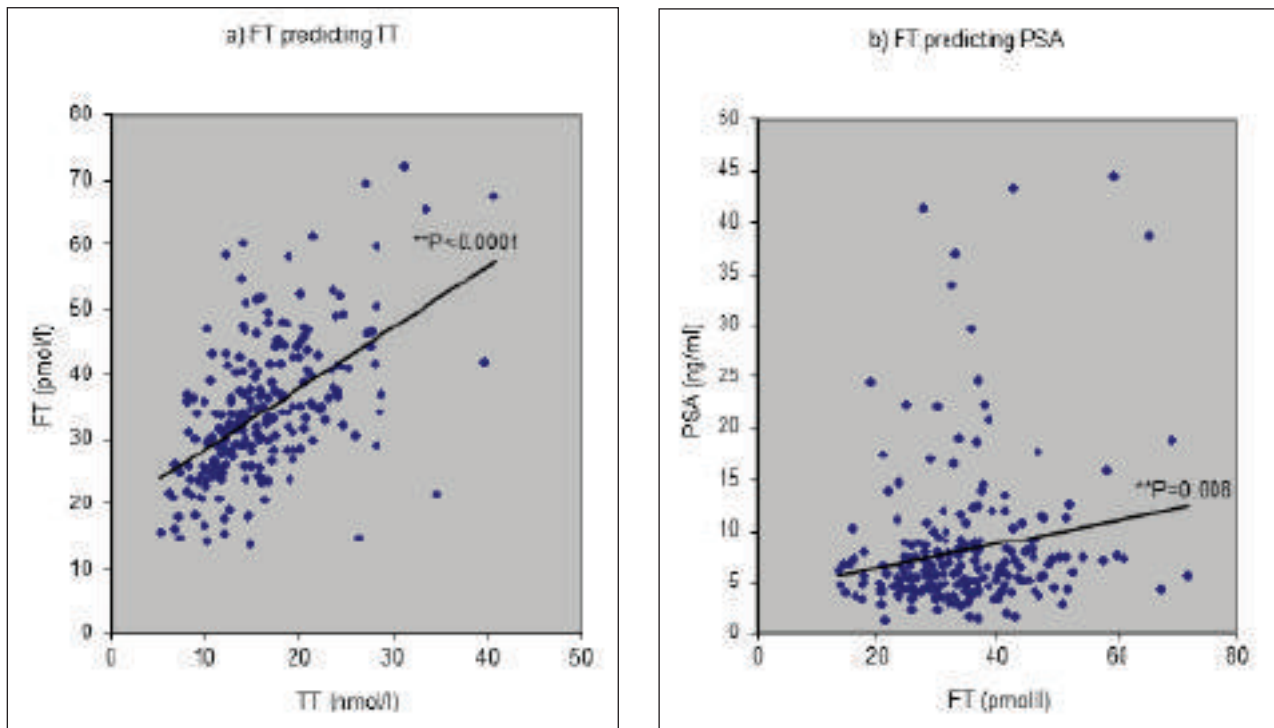*Linear regression of FT predicting TT (a) and PSA (b) in the PCA population (n = 220).*

Figure 2.
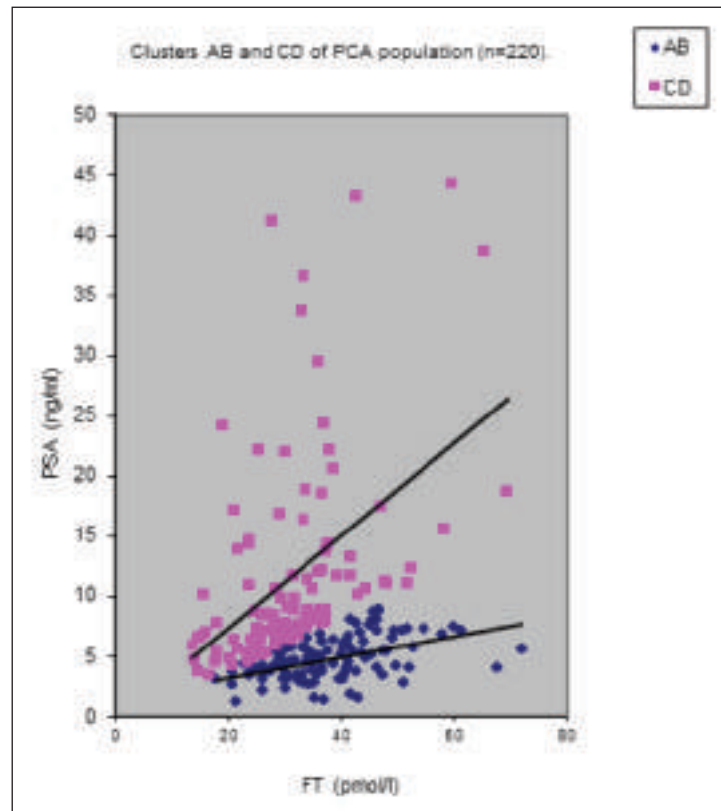*PCA population grouped in 2 clusters, AB and CD, according to the PSA/FT ratio.*

Figure 3.
PCA population grouped in 4 clusters (A, B, C, D)
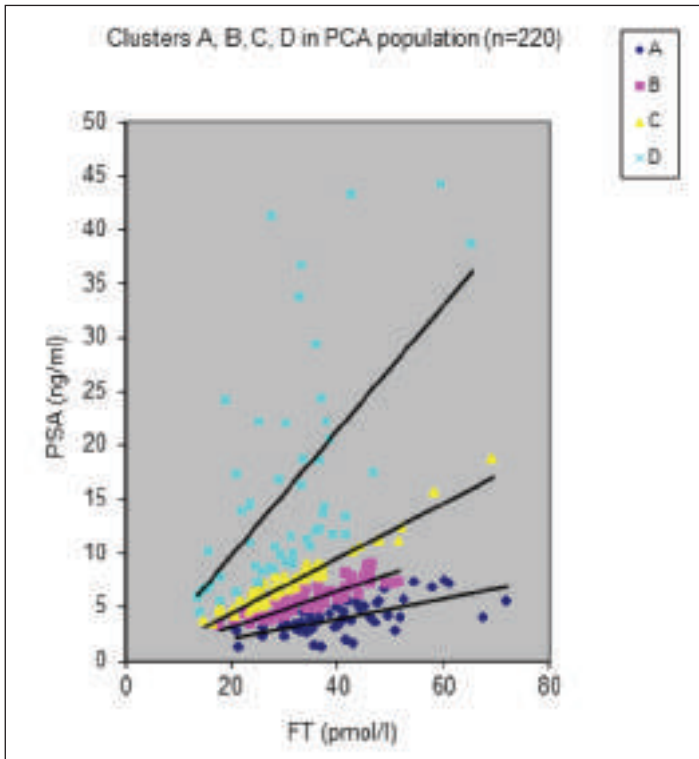*according to the PSA/FT ratio.*

Figure 4.
Subclusters A1- A2 of A (a) and D1-D2 of D in PCA according to the PSA/FT index ratio.