



Clusterin as a predictive marker of positive prostate biopsy

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Aim : Assessment of correlation of serum clusterin level (sCLU) and clusterin density with prostate cancer (PC) detection in prostate biopsy.

Material and methods: Between September 2011 and February 2013 we have performed a total of 381 prostate biopsies. Blood sample was taken in all patients before biopsy and serum was frozen after processing. Patients with active urinary tract infection were excluded. We have recorded age, standard clinical parameters, prostate size, number of cores and the result of biopsy in all patients. Median number of cores was 10 (8-36), and a total of 189 (50.7%) patients had primary biopsy. sCLU was determined by ELISA and values were compared with biopsy results. Clusterin density was defined by dividing the sCLU by the prostate size. Individual parameters and their correlation with the biopsy results were compared by using nonparametric analysis of variance. Several statistical models for the PC detection were tested and their sensitivity and specificity was determined.

Table 1. Study group characteristics (N= 373)

Age	n	%
< 50 years	8	2.1
50 - < 60 years	76	20.4
60 - < 70 years	185	49.6
≥ 70 - < 80 years	104	27.9

Clinical T stage	n	%
T1c	286	76.7
T2	79	21.2
T3-4	8	2.1

PSA levels	n	%
< 4 ng/ml	89	23.9
4- < 10 ng/ml	210	56.3
10-20 ng/ml	48	12.9
> 20 ng/ml	26	6.9

Biopsy GS (n = 167)	n	%
≤6	117	70.1
7	39	23.3
8-9	11	6.6

Biopsy results	n	%
Prostate cancer	167	44.8
BHP	112	30.0
ASAP	44	11.8
HG/LG - PIN	31	8.3
Inflammatory prostatitis	19	5.1

PSA - prostate-specific antigen, GS - Gleason score, BHP - benign prostatic hyperplasia, ASAP - atypical small acinar proliferation, HG/LG - PIN - high/low grade prostatic intraepithelial neoplasia

Table 2. Statistically significant parameters for prediction of cancer in biopsy

	Prostate cancer		No prostate cancer		p-value
	Mean	95% C.I.	Mean	95% C.I.	
Serum clusterin (pmol/μl)	75.04	72.85-77.22	78.49	76.08-80.89	p=0.0054
Clusterin density (pmol/μl/m)	2.46	2.26-2.65	2.07	1.88-2.26	p<0.0001
PSA (ng/ml)	10.18	8.42-11.95	6.65	6.03-7.27	p=0.0067
f/t PSA (%)	14.77	13.71-15.84	17.71	16.77-18.65	p<0.0001
Age	66.7	65.4-67.9	64.7	63.7-65.7	p=0.0066
Prostate volume	38.2	35.2-41.2	49.0	45.8-52.3	p<0.0001
DRE	DRE + 68.60 %	DRE - 31.40 %	DRE + 37.63 %	DRE - 62.37 %	p=0.0002

PSA - prostate-specific antigen, f/t PSA - free-to-total PSA ratio, DRE - digital rectal exam

Fig. 1. Receiver operating curves for prostate cancer prediction (model B includes PSA, DRE, prostate volume and clusterin)

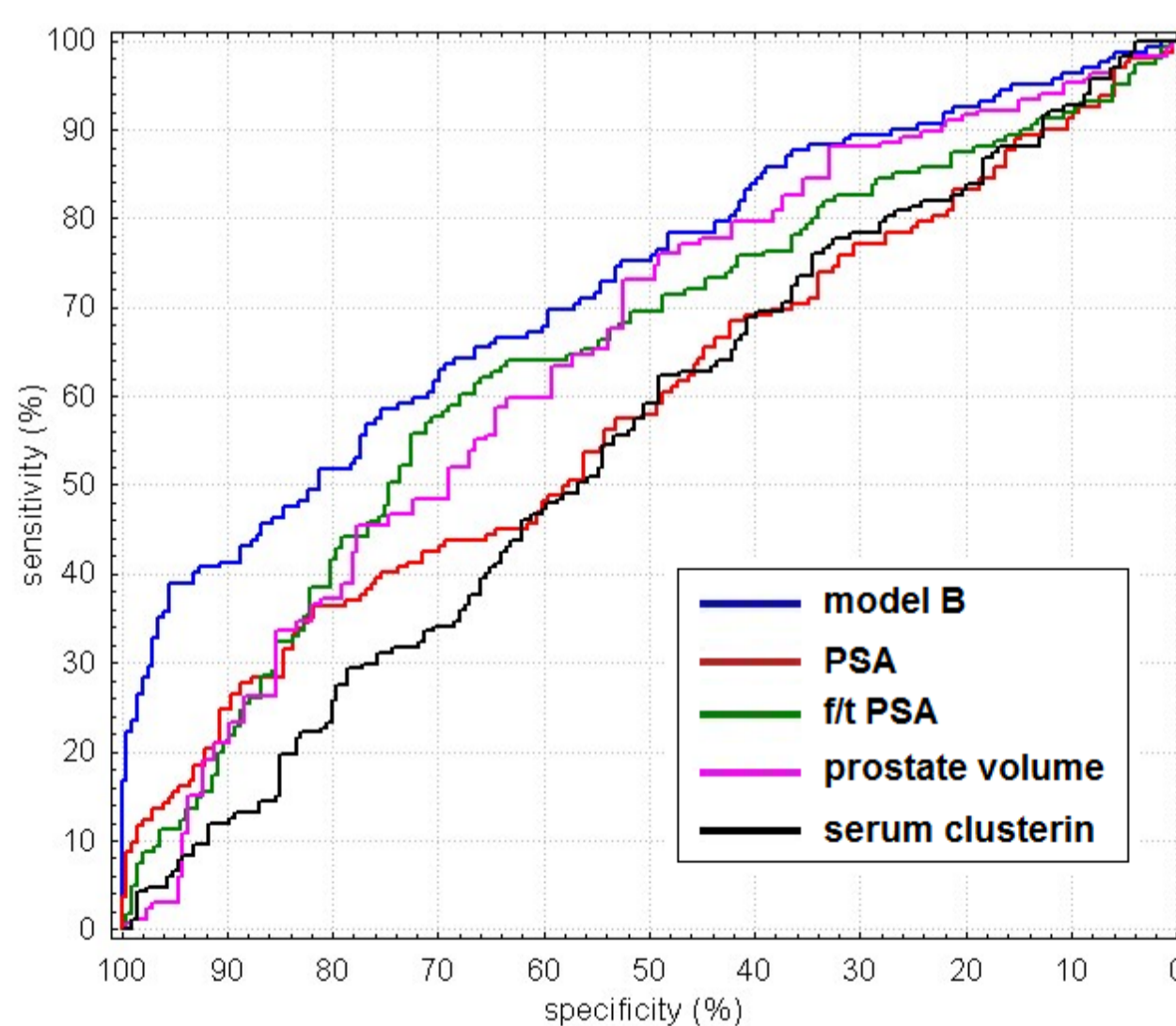
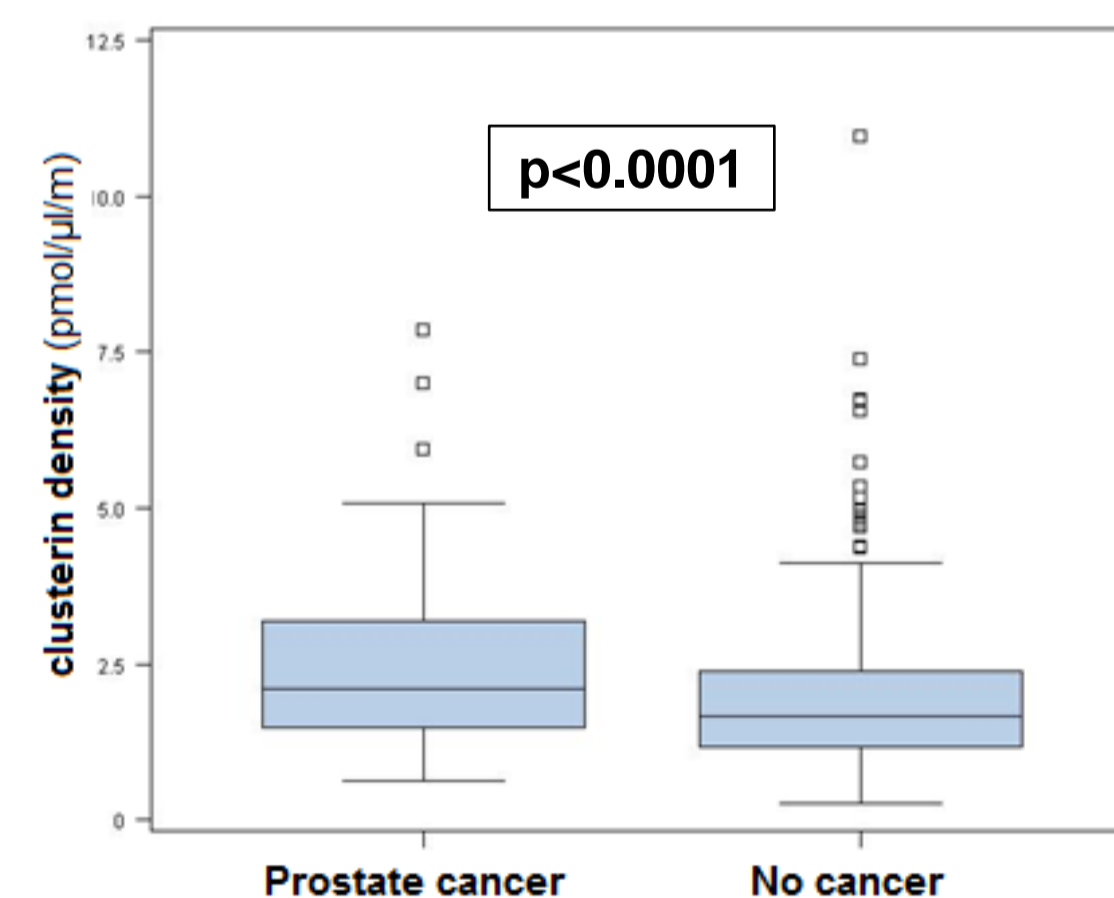


Fig. 2. Difference in clusterin density between patients with prostate cancer and negative prostate biopsy



Results : Median age was 66 (37-85) years, mean PSA 8.21 (0.39-70.8) ng/ml, mean prostate size was 44 (10-200) grams. A total of 167 (44.8%) patients were diagnosed with PC. Patient with positive digital rectal exam (DRE) had 3.62 times higher risk of PC in the biopsy. Statistically significant parameters for PC detection were age (p=0.0066), serum prostate-specific antigen (PSA) (p=0.0067), free to total PSA ratio (p<0.0001), DRE (p=0.0002), prostate size (p<0.0001), sCLU (p=0.0054) and clusterin density (p<0.0001). Clusterin density was relatively higher in patients with positive biopsy, whereas sCLU was lower. In a statistical model were used PSA, DRE, prostate size and sCLU. The model has 80% specificity and 52% sensitivity (AUC=0.723) for the prediction of positive prostate biopsy.

Conclusion : Serum clusterin level and clusterin density in combination with other parameters significantly improves prediction of PC detection.

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