PERFORMANCE OF CCP ASSAY IN AN UPDATED SERIES OF BIOPSY SAMPLES OBTAINED FROM COMMERCIAL TESTING

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BACKGROUND

- The cell cycle progression (CCP) score is a RNA–based marker which has improved the prediction of prostate cancer aggressiveness in nine separate retrospective cohorts.

- Each one–unit increase in CCP score corresponds with approximately a doubling of the risk of the studied event (recurrence or death from prostate cancer).

- In this analysis, we characterized the patient population and CCP score performance in commercial testing.

METHODS

- Formalin fixed, prostate biopsy samples from 8,151 patients were submitted by 1,434 physicians to Myriad Genetic Laboratories for CCP test analysis.

- Patient clinicopathologic data was obtained from the test request form.

- The CCP score was calculated based on RNA expression of 31 cell cycle progression genes normalized to 15 housekeeping genes.

- Patients were sorted into AUA risk categories and assigned a relative classification of cancer aggressiveness based on the CCP score.

RESULTS

- Of the 8,151 samples that contained sufficient carcinoma (>0.5mm linear extent), 7,881 (96.7%) provided quality RNA for analysis.

- The CCP score distribution ranged from −2.9 to 3.8.

- Based on the CCP score, 32.7% of men had a less aggressive cancer and 23.5% of patients had a more aggressive cancer than expected based on clinicopathologic prediction.

Table 1- Clinical/Pathologic Characteristics

CCP Score	n	7881
	mean ± sd	-0.6 ± 0.8
	min-max	(-2.9 to 3.8)
Age at Diagnosis (yrs)	n	7881
	mean ± sd	66.6 ± 8.3
	min-max	(27 to 94)
PSA (ng/mL)	0 - 4	1436 (18.2%)
	4.01 - 10.0	5244 (66.5%)
	>10	1201 (15.2%)
Positive Cores (%)	n	7867
	mean ± sd	29.6 ± 21.6
	min-max	(0 to 100)
Gleason Score	4	1 (0.01%)
	5	11 (0.1%)
	6	4068 (51.6%)
	3+4=7	2461 (31.20%)
	4+3=7	814 (10.3%)
	5+2=7	1 (0.01%)
	8	346 (4.4%)
	9	158 (2.0%)
	10	21 (0.3%)
Clinical Stage	T1a	176 (2.2%)
	T1b	54 (0.7%)
	T1c	5876 (74.6%)
	T2a	971 (12.3%)
	T2b	456 (5.8%)
	T2c	306 (3.9%)
	T3a	32 (0.4%)
	T3b	10 (0.1%)

Figure 1 – Distribution of CCP Scores

*Breaks every 0.4, starting at -3.2. Right side included (i.e., −3.2 < CCP ≤ 2.8). Numbers are too small to appear in the graph.

-3.2 to -2.8	6	-0.8 to -0.4	1613	1.2 to 1.6	81
-2.8 to -2.4	31	-0.4 to 0	1208	1.6 to 2.0	34
-2.4 to -2.0	202	0 to 0.4	784	2.0 to 2.4	21
-2.0 to -1.6	587	0.4 to 0.8	420	2.4 to 2.8	8
-1.6 to -1.2	1111	0.8 to 1.2	199	> 2.8	5
-1.2 to -0.8	1571				

Figure 2 – Gleason Score Stratified by CCP Score

CCP Score Range	6	3+4=7	4+3=7	>7
< - 1	1537 (37.8%)	592 (24.1%)	107 (13.1%)	45 (8.6%)
[-1, 0)	1971 (48.5%)	1270 (51.6%)	383 (47.1%)	151 (28.8%)
[0, 1)	523 (12.9%)	529 (21.5%)	267 (32.8%)	216 (41.1%)
[1, 2)	33 (0.8%)	64 (2.6%)	54 (6.6%)	86 (16.4%)
[2, 3)	3 (0.1%)	5 (0.2%)	3 (0.4%)	25 (4.8%)
>= 3	1 (<0.1%)	1 (<0.1%)	0	2 (0.4%)

Table 2 – Correlation with CCP Score

Variable	Pearson Correlation Coefficient
Patient age at diagnosis	0.20
PSA	0.17
Gleason Score	0.36

Table 3 - Cancer Aggressiveness Based on CCP Scores

AUA Risk Classification	Considerably Less Aggressive	Less Aggressive	Consistent	More Aggressive	Considerably More Aggressive	Totals
Low	86 (2.5%)	1052 (30.1%)	1598 (45.7%)	694 (19.8%)	67 (1.9%)	3497
Intermediate	110 (3.2%)	1004 (29.3%)	1526 (44.5%)	688 (20.1%)	100 (2.9%)	3428
High	43 (4.5%)	282 (29.5%)	327 (34.2%)	234 (24.5%)	70 (7.3%)	956
Total	239 (3.0%)	2338 (29.7%)	3451 (43.8%)	1616 (20.5%)	237 (3.0%)	7881

CONCLUSIONS

- The CCP test can improve risk stratification for men with prostate adenocarcinoma independent of other clinicopathologic variables.

- Fifty-six percent of men tested in the commercial assay were assigned to a different risk category than predicted by their clinicopathologic features.

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