

Abstract 16-5907

Molecular urine cytology – Bladder EpiCheck is a novel molecular diagnostic tool for monitoring of bladder cancer patients

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Introduction and Objectives

- EpiCheck is a novel DNA methylation-based assay for detection of bladder cancer (BC) in voided urine samples
- The test is based on identification of DNA methylation changes associated with BC in a panel of 15 genomic biomarkers
- The assay generates a numerical EpiScore (0-100) reflecting the overall methylation level in the urine sample
- An EpiScore ≥ 60 is considered positive for BC
- The aim of this study was to compare the sensitivity and specificity of the assay to that of cytology in a population of patients with history of BC

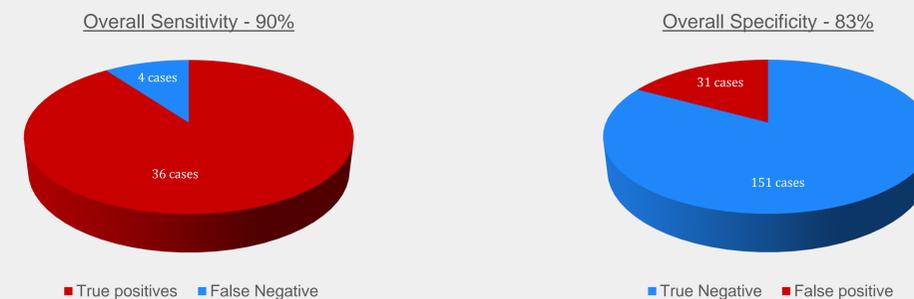
Methods

- Voided urine samples from 222 patients with history of BC undergoing routine surveillance were tested with Bladder EpiCheck. 40/222 patients (18%) had biopsy-proven recurrent BC
- The distribution of stages was: 16-Ta, 13-T1, 3-T2 and 12-CIS
- The distribution of grades was 19-LG, 26-HG
- Cytology results were available in 173 of these samples
- Statistical analysis was performed using the Kolmogorov-Smirnov test

Results

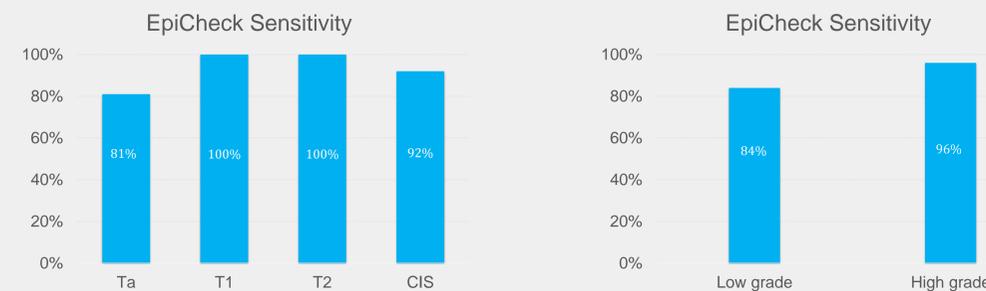
Overall sensitivity and specificity

- EpiCheck showed an overall sensitivity of 90% over specificity of 83%



Sensitivity by Stage and Grade

- EpiCheck sensitivity of the high grade tumors was 95% and of the low grade tumors 84%
- The sensitivity of the different stages and grades is shown below:



Negative Predictive Value

- The negative predictive value for this cohort was 97.4%

Comparison to Cytology

- Cytology results were available in 173 of these cases. Cytology performance was 40% sensitivity and 96% specificity
- 15 of these 173 samples were from patients with tumors. All 6 tumors that were detected by cytology, were detected also by Bladder EpiCheck and the 2 tumors that were missed by Bladder EpiCheck were also missed by cytology. 7 tumors were detected only by Bladder EpiCheck.

EpiScore analysis

- The average EpiScore was 69 and 85 for patients with LG and HG tumors, respectively, hence significantly correlated with tumor grade ($p = 0.006$)
- The average EpiScore per stage was

Stage	Average EpiScore
Ta	68.6
T1	84.4
T2	90.7
CIS	84.4

- Statistical analysis using the Kolmogorov-Smirnov test showed a statistical significant difference between the Ta and T2 EpiScores ($p=0.0077$) and between Ta and CIS ($p=0.0155$)

Conclusion

- Bladder EpiCheck is a sensitive and specific operator-independent assay for the detection of BC in voided urine samples
- In comparison with cytology, Bladder EpiCheck has significantly higher sensitivity with slightly lower specificity
- Our results suggest that Bladder EpiCheck can be used instead of urine cytology in monitoring of BC patients without the risk of missing recurrences