

Utility of CellDetect® to Reduce Indeterminate Urine Cytology Cases

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ABSTRACT

Introduction: High rates of indeterminate diagnoses remain a challenge in urine cytology practice. CellDetect® is a novel stain that discriminates malignant from benign urothelial cells. Early studies showed this stain can accurately identify urothelial carcinoma. Our aim was to determine the feasibility of CellDetect® to reduce indeterminate urine cytology cases.

Methods: ThinPrep slides from a variety of urine samples (32 voided, 5 catheterized, 1 bladder washing, 1 renal pelvis specimen) were prepared with Papanicolaou and CellDetect® stains. The Pap diagnoses were: 1 non-diagnostic, 8 negative, 14 atypical, 10 suspicious and 6 high-grade urothelial carcinoma (HGUC) cases. Based on CellDetect® staining the number of indeterminate diagnoses upgraded, downgraded, or that remain unchanged was evaluated. Follow up tissue diagnoses were recorded.

Results: Due to positive staining in 15 cases (38%), diagnoses were upgraded from non-diagnostic to atypical (1), negative to atypical (2), atypical to HGUC (4) and suspicious to HGUC (8) (Figure 1). In 7 cases (18%) without staining, diagnoses were downgraded from atypical to negative (6) and HGUC to atypical (1). Diagnoses remained unchanged in 17 cases (44%). There were 3 cases where benign urothelial cells were stained, and benign urothelial clusters in 6 cases also stained. There was 1 false negative case where a HGUC with squamous cell differentiation failed to stain.

Conclusions: Based on CellDetect® staining the diagnosis in 22 (56%) urine cytology cases would change. In so doing, ancillary testing helped reduce the number of indeterminate diagnoses, including a decrease in atypical diagnoses by 15% and suspicious cases by 21%, while increasing the number of definitive HGUC diagnoses by 31%. When evaluated together with nuclear morphology false positive staining of benign cells and clusters, and false negative cases with squamous differentiation of HGUC cells, could be identified.

INTRODUCTION

- High rates of indeterminate diagnoses remain a challenge in urine cytology practice.
- CellDetect® is a novel stain that discriminates malignant from benign urothelial cells.
- Early studies showed this stain can accurately identify urothelial carcinoma.
- Our aim was to determine the feasibility of CellDetect® to reduce indeterminate urine cytology cases.

Diagnosis	Non-Diagnostic	Negative	Atypical	Suspicious	HGUC
Pap stain	1 (3%)	8 (20%)	14 (36%)	10 (26%)	6 (15%)
CellDetect®	0 (0%)	11 (28%)	8 (21%)	2 (5%)	18 (46%)

METHODS

- ThinPrep slides from a variety of urine samples (32 voided, 5 catheterized, 1 bladder washing, 1 renal pelvis specimen) were prepared with Pap and CellDetect® stains.
- The Pap diagnoses were: 1 non-diagnostic, 8 negative, 14 atypical, 10 suspicious and 6 HGUC cases.
- Based on CellDetect® results the number of indeterminate diagnoses that were upgraded, downgraded or that remain unchanged was evaluated.
- Available follow up tissue diagnoses were recorded.

RESULTS

- **Table 1** (above) summarizes diagnoses before and after CellDetect® staining.
- Due to positive staining in 15 cases (38%), diagnoses were upgraded from non-diagnostic to atypical (n=1), negative to atypical (n=2), atypical to HGUC (n=4) and suspicious to HGUC (n=8) (Figure 1).
- In 7 of the cases (18%) without staining, diagnoses were downgraded from atypical to negative (n=6) and HGUC to atypical (n=1). Diagnoses remained unchanged in 17 cases (44%).
- There were 3 cases where benign urothelial cells were stained, & benign urothelial clusters in 6 cases also stained.
- There was 1 false negative case where a HGUC with squamous cell differentiation failed to stain.

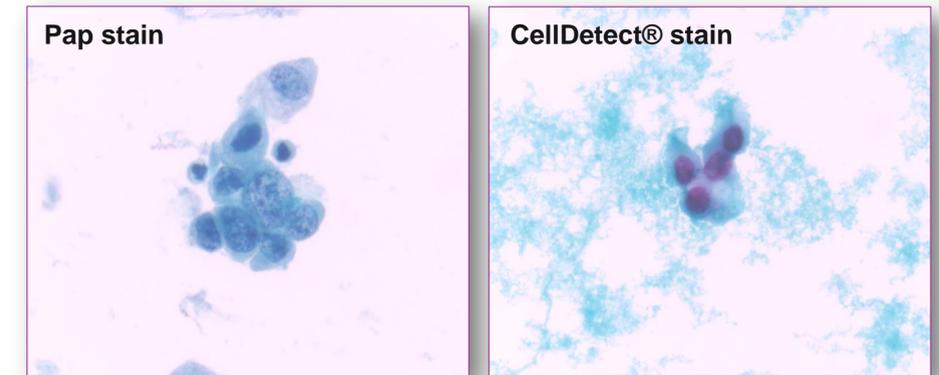


Fig 1. Suspicious for HGUC cluster (Pap & CellDetect® stains)

- For post-CellDetect® HGUC cases, 11 had follow-up biopsies of which 10 (91%) were positive.

CONCLUSIONS

- Based on CellDetect® staining the diagnosis in 22 (56%) urine cytology cases would change.
- In so doing, ancillary testing helped reduce the number of indeterminate diagnoses, including a decrease in atypical diagnoses by 15% and suspicious cases by 21%, while increasing the number of definitive HGUC diagnoses by 31%.
- When evaluated together with nuclear morphology false positive staining of benign cells and clusters, and false negative cases with squamous differentiation of HGUC cells, could be identified.