Evaluation of ThinPrep UroCyte Slide Preparation for Gastrointestinal Cytology Specimens

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Abstract

Cytological gastrointestinal tract cytology using standard slide preparations is known to have high specificity but poor sensitivity for detecting gastrointestinal tract malignancy. Newer methods of slide preparation may permit coupling of cytology with molecular slide-based assays that could improve diagnostic sensitivity.

Design: Slides prepared by a liquid-based cytology using ThinPrep filters (Non-GYN and UroCyte, Cytyc Corporation) were compared by split-sample validation study to compare cellularity, stain quality, and interpretation of slides prepared with the standard method (cytocentrifugation).

Results: UroCyte slides were noted to be superior to the ThinPrep Non-GYN filter and standard preparations, showing improved cellularity and stain quality. Cytologic diagnoses were categorized as negative, atypical, atypical-suspicious for malignancy, or malignant. Statistics were calculated with inclusion and exclusion of atypical categories. Sensitivity, specificity, positive predictive value, and negative predictive value were similar in both groups.

Conclusions: The use of UroCyte for exfoliative gastrointestinal cytology specimens allows for improved slide evaluation and approximately equivalent diagnostic outcomes versus standard cytocentrifuge preparations. Importantly, this methodology allows for ease of evaluation by molecular methods, such as fluorescent in situ hybridization, particularly for esophageal and biliary tract specimens. The use of UroCyte filters for evaluation of gastrointestinal cytology specimens is a valid preparation and simplifies the addition of adjunct molecular testing.

Methods

Split Sample Study
- Fifteen fresh GI samples collected in either Cytolyt, PreservCyt, or saline.
- Samples were split evenly for two slide preparation methods: ThinPrep UroCyte filters and the standard cytocentrifuge preparation
- Slides were examined for diagnostic purposes and scored on a scale of 1 to 3 for overall cellularity and stain quality by a cytopathologist.

Results

Case Selection
GI cytology cases with appropriate clinical follow-up were selected from one year prior to and one year after implementation of the UroCyte slide preparation method by lab computer search.

Cytologic Interpretation
Cytologic diagnoses used were the following categories:
- NMCI (no malignant cells present).
- ATCP or ATCP-R (Atypical cells present, or reactive processes favored).
- ATCP-M (Atypical cells present, suspicious for malignancy).
- MCP (Malignant cells present).

Patient Follow-up
Chart review was done to determine diagnostic pathologic diagnoses made within the following year by biopsy or, rarely, by repeat cytology. A few cases with no additional pathologic information but with no clinical progression of disease in one year were categorized as benign.

Statistical Methods
Statistics for sensitivity and specificity were calculated separately with atypical cases included and excluded, and with atypical and suspicious cases categorized as both positive and negative. Z-test was used to compare independent proportions or percentages. For comparing dependent proportions or percentages, the McNemar exact test was used. Statistical significance was set at the 0.05 level.

JRB Approval
This study was approved by the University of Utah Institutional Review Board, 00025384.

Results, cont.

Historical Cohort Review
GI cytology cases with appropriate clinical follow-up were selected from one year prior to and one year after implementation of the UroCyte slide preparation method by lab computer search.

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Histologic review was done to determine diagnostic pathology diagnoses made within the following year by biopsy or, rarely, by repeat cytology. A few cases with no additional histologic information but with no clinical progression of disease in one year were categorized as benign.

Table 2. Statistical comparison of pre- and post-implementation figures. Only negative predictive value is significantly lower.

Conclusions
- The use of ThinPrep® UroCyte filters for GI cytology samples produces slides with objective improvement in cellularity and stain quality over that of traditional cytocentrifuge preparations. The UroCyte filter preparations are optimized for slide-based molecular tests such as FISH.
- Sensitivity, specificity, and positive predictive value were roughly equivalent for cytologic G1 and UroCyte filter slide preparations, whereas negative predictive values were better before the switch to UroCyte filters.
- We are currently evaluating the same data set with the inclusion of follow-up cytology and chart review in addition to biopsy.

Selected Literature

Sensitiv ity Specificity PPV NPV

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Selected Literature


Statistical Methods
- Many malignant tumors of the upper gastrointestinal (GI) tract are diagnosed via exfoliative cytology (brushings) obtained endoscopically.
- Cytology of GI samples has a high specificity but poor sensitivity for detecting cancer.
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