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ORIGINAL ARTICLE

Pancreatobiliary duct brushing cytopathology: an analysis of the CAP Non-Gynecologic Cytology (NGC) program for pancreatic pathology 2000-2011

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Pancreaticobiliary duct cytology;
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Non-Gyn Cytology;
Educational proficiency testing;
Cytology performance assessment

Introduction The College of American Pathologists (CAP, Northfield, Illinois) monitors performance in cytologic analysis to evaluate the standard of practice and consider strategies for method improvement.
Materials and methods 5700 responses to 97 pancreatobiliary tract brushing slide challenges were collected by the CAP Non-Gynecologic Cytopathology (NGC) Program, between 2000 and 2011. Analysis examined participant agreement with the general diagnostic categories of benign or malignant. Suspicious responses were classified as concordant with slides having a positive general diagnosis. Conventional smears with Pap stain and Romanowsky stain were evaluated in addition to CytoSpin, ThinPrep, and SurePath preparations. A nonlinear mixed model was fit with 3 factors—general diagnosis, participant type, and preparation type.
Results Overall concordance rate was 91.7%. Preparation type and general diagnosis were significantly associated with the concordance rate. The interaction term between these two factors was also statistically significant, with ThinPrep performing marginally better for positive cases and CytoSpin performing better for negative cases. Conventional smears did not perform as well as CytoSpin, ThinPrep, or SurePath.
Conclusions Participants performed well with greater than 90% agreement with the target diagnostic category. There was no significant difference between cytotechnologists and pathologists. Small significant differences were found between preparations types. The statistical differences between concentration techniques may be due to dissimilarities in the quantity of cells and quality of cytomorphology, thus affecting the interpretations by participating laboratories.

Introduction

The American Cancer Society (ASC) projects 59,870 cases of pancreatobiliary cancer for 2015 and 44,260 deaths due to complications of the disease in the United States. The ASC statistics show that pancreatobiliary malignancy accounts for slightly more than 3% of all cancer cases and 6%—7% of cancer deaths. Between 2006 and 2010 the death rate due to pancreatic cancer alone increased by 1.3% per year, in accord with the aging of the population.[1] As practitioners are all too aware, the protected location in the upper rear of the abdomen makes access and early diagnosis of pancreatic neoplasms difficult such that many tumors are advanced at diagnosis, with resultant poor outcomes. In addition, the organ is delicate and responds poorly to manipulation and biopsy. Cytological sampling by duct brushing and fine-needle aspiration are arguably the best current methods available for early assessment of pancreatic lesions.[2-5] The College of American Pathologists (CAP) established Pancreatic Duct Brushing challenges in the CAP Non-Gynecologic Cytopathology (NGC) Education Program to educate and assess competence in pancreatic duct brushing interpretation. The CAP periodically compiles and publishes aggregate statistics of the performance of participants in its programs to evaluate the standard of practice, and to search for areas of weakness that might lead to method improvement or benefit from increased educational emphasis.

Materials and methods

This analysis is based on 5700 biliary tract brushing responses that were evaluated in the CAP NGC Interlaboratory Comparison Program between 2000 and 2011. These responses were based on 97 slides. Five slides were excluded from the analysis as they had fewer than five responses.

The analysis examined diagnostic agreement between program participants and a diagnosis established by the CAP Cytopathology Committee. The diagnosis of the CAP Cytopathology Committee is the reference diagnosis. For the sake of this study the diagnoses were kept in 2 general categories of adenocarcinoma versus negative for malignancy. Suspicious responses were treated as concordant for slides with a positive diagnosis. Reactive cases were joined with normal such that the general diagnostic categories ended up as adenocarcinoma/suspicious for adenocarcinoma (positive) versus normal/reactive (negative).

A nonlinear mixed model was fit using 3 factors: preparation type, reader type, (cytotechnologist/pathologist), and general diagnosis. The interaction terms for these factors were also included in the model. There was no performance trend so year was not included in the model. The model included a repeated-measures component to model the slide factor correlation structure. A significance level of 0.05 was used for this analysis. All analyses were performed with SAS 9.2 Statistical Analytic Software (SAS Institute, Cary, North Carolina).

Prior to inclusion in the program, all glass slides were highly selected to be representative of the diagnostic category. All samples are donated by a cytologist and are validated by 3 cytopathologist members of the CAP Cytopathology Resource Committee. All 3 pathologists must agree to the interpretation of the slides. Samples that are extraordinarily difficult or questionable are excluded.

Results

The overall rate of agreement to the reference diagnosis was 91.7%. There was no significant difference between the