Brush cytology analysis for the diagnosis of esophageal squamous cell carcinoma

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BACKGROUND: Esophageal cancer (EC) is the eight most common malignancies and sixth most frequent cause of cancer mortality worldwide. The great majority of cases are detected as metastatic disease since symptoms are nonspecific. The main strategy for avoiding progression into advanced stages of EC and facilitate the realization of a curative method is the detection of early curable stage. However, no approved method has been developed for esophageal squamous cell carcinoma (ESCC) screening and it is proposed that the use of a combination of criteria may result in effective early detection of EC. Cytology and histopathology combined examination were demonstrated previously to able to diagnose all patients with malignant esophageal mucosal lesions and, mainly due to cytology testing that increased the diagnostic yield from 87% to 100%. Therefore, efforts need to be made, mainly with focus on improvement of the diagnosis or screening of EC in remote areas or developing countries.

HYPOTHESIS: Brushed cytological analysis is a simple component of endoscopic evaluation that can improve diagnostic performance apart from saving histological sample for molecular assays.

METHODS: This study prospective enrolled 123 individuals who underwent diagnostic upper digestive endoscopy for clinically or suspected ESCC or another digestive disorder was conducted in the Barretos Cancer Hospital (HCB) and Medical Clinic Specialties of Barretos from 2013 to 2015, after the signature of the Written Consent Informed approved by the local ethics committee. Patients undergoing any therapy, unfavorable clinical condition for collection biological samples during the endoscopy, diagnosis of adenocarcinoma tumor as well as the volunteers who had difficulty to understanding the research protocol were excluded. Cytological and biopsy specimens were taken by a fiberoptic flexible endoscope. In order to minimize the loss of biological sample, brushes were cut and maintained into preservative fluid. The sample was examined by an experienced observer and classified into: (1) negative for malignancy and squamous intraepithelial lesions (NML); (2) ASC-US: Atypical Squamous Cell Undetermined Significance (we adopted the Bethesda terminology for the presence of atypical cells without determined significance); (3) squamous cell carcinoma and, (4) Inadequate low quality material or scares cellularity) Histological examination was considered as definitive diagnosis of disease. The data were analyzed using the SPSS® program and expressed as frequency and percentage. Chi-square test and Fisher test were used to compare groups.

RESULTS: Concerning results obtained from the histological analysis, the gold standard, patients were divided into two groups: with ESCC (n=70) and without esophageal cancer (n=53). The esophageal cytology testing demonstrated high sensitivity (98.57%) and specificity (96.23%). Both, positive and negative predictive values were similarly high: 97.18% and 98.08%, respectively. For evaluating performance of tests for ESCC diagnosis, histopathology and brush cytology results were compared and showed high accuracy (97.5%), percentage of individuals with the correct test result, and almost perfect agreement (0.95). The results we achieved in this work clearly demonstrated the high efficiency of cytology as a method for esophageal cancer detection.