# Wide Area Transepithelial Sample 3-Dimensional Biopsy Brush With Computer-Assisted Analysis (WATS\textsuperscript{3D}) During ERCP Improves Detection of Biliary Tract Malignancy

Sang H. Kim, M.D., Wallace J. Wang, M.D., Moshe Rubin, M.D., Konika P. Bose, M.D., Anthony J. Nici, M.D., Syed A. Hussain, M.D.

Division of Gastroenterology, New York Hospital Queens / Weill Cornell Medical College

## Introduction

- Malignancy involving the bile duct can be difficult to diagnose due to challenges in obtaining an adequate specimen and variability in histologic and cytologic interpretation.
- For indeterminate strictures or borderline surgical candidates, a tissue diagnosis is paramount in management decisions.
- Standard biliary brush cytologic evaluation is the most commonly used technique, with only modest sensitivity ranging from 18-60% in most series.
- The Wide Area Transepithelial Sample 3-D Biopsy with Computer-Assisted Analysis (WATS\textsuperscript{3D}, EndoCDx, NY) brush has been designed to consistently sample deeper and thicker layers of glandular tissue. WATS\textsuperscript{3D} brush, in conjunction with a computer-assisted analysis, has been shown to increase detection of cancers in the esophagus, mouth and larynx.
- We hypothesized that the WATS\textsuperscript{3D} brushings of the bile duct at ERCP would improve cancer detection rates, compared to conventional brush and analysis.

## Methods

- A retrospective trial was performed on 35 patients with biliary obstruction and abnormal imaging results suspicious for pancreaticobiliary (PB) malignancy from April, 2012 to November, 2012.
- All patients underwent ERCP with tissue sampling of the bile duct, utilizing EndoCDx WATS\textsuperscript{3D} brush and a standard RX brush (Boston Scientific).
- 14 patients also underwent endobiliary forceps biopsy (Boston Scientific).
- Cytology results utilizing the WATS\textsuperscript{3D} brush computer analysis system were compared to standard brush cytology and forceps biopsy.

## Results

- 6 of the 14 patients who had forceps biopsy were found to have malignancy.
- Three out of six were positive for malignancy by WATS\textsuperscript{3D} cytology, two for cytologic atypia, and one was negative, with a positive predictive value of 75%.
- In the standard brush cytology group, all six proven malignancies were negative for either malignancy or atypia.
- Of the eight forceps biopsy negative patients, one WATS\textsuperscript{3D} was positive, three had atypia and five were normal.
- In the 21 patients without forceps biopsies obtained, WATS\textsuperscript{3D} brushings detected two cancers, only one of which was confirmed on standard cytology.

## Conclusion

- In this preliminary study of patients with PB malignancy, WATS\textsuperscript{3D} brushing of the bile duct with computer-assisted analysis proved to have a much higher diagnostic accuracy and positive predictive value than standard brush cytology.
- Additionally, the WATS\textsuperscript{3D} system was able to detect three additional cases of malignancy or atypia that were not detected by forceps biopsy.
- There were no complications utilizing the WATS\textsuperscript{3D} brush in the biliary tree in 35 patients.
- Further studies with a larger cohort of patients will be needed to assess the sensitivity and specificity of this promising diagnostic modality.