Inter-Observer Agreement Among Pathologists Using the WATS Technique: Wide Area Transepithelial Sampling of Barrett's Esophagus Using Computer-Assisted Analysis

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INTRODUCTION

• Patients with Barrett's esophagus (BE) are enrolled in surveillance programs for detection of dysplasia and/or early cancer.

• Histopathologic diagnosis of BE associated dysplasia has poor inter-observer agreement (Kappa values) even amongst experienced GI pathologists.

• Published estimated for kappa values in the reading of dysplasia in BE have varied between 0.36 – 0.78.

• WATS procedure uses minimally invasive brush biopsy technique for acquiring wide area tissue sampling of BE tissue.

OBJECTIVES

To assess inter-observer agreement among pathologists in the diagnosis of BE and dysplasia using the WATS computer-assisted analysis technique.

METHODS

Dataset:

• 149 slides were selected by a pathologist who did not participate in study.

• Study slides included BE with no dysplasia (n=109) and dysplasia (n=40).

Study group:

• Study slides were randomly distributed to four pathologists trained in analysis of WATS samples.

• Each pathologist completed a standardized CRF for each BE slide evaluated, grading them as non-dysplastic, low-grade dysplasia (LGD) or high-grade dysplasia or esophageal adenocarcinoma (HGD/EAC).

Statistical Analysis:

• Analysis was performed using STATA version 10 (College station, TX)

• Using published range of kappa values for histopathological diagnosis, we assumed a minimal level of reliability (pO) of 0.35 and an expected rho value (p1) of 0.55.

• Sample size of 60 slides using 3 reviewers would be sufficient to maintain power of 80% with an alpha 0.05.

• Kappa values were graded based on Landis and Koch scale.
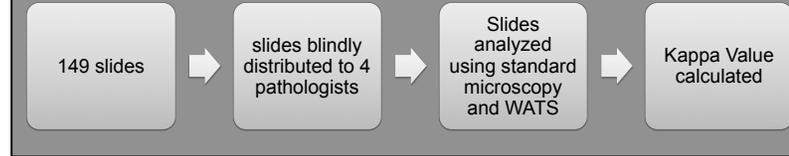
Figure 1 : Study flow chart

149 slides → slides blindly distributed to 4 pathologists → Slides analyzed using standard microscopy and WATS → Kappa Value calculated

Figure 2: WATS sample demonstrating:
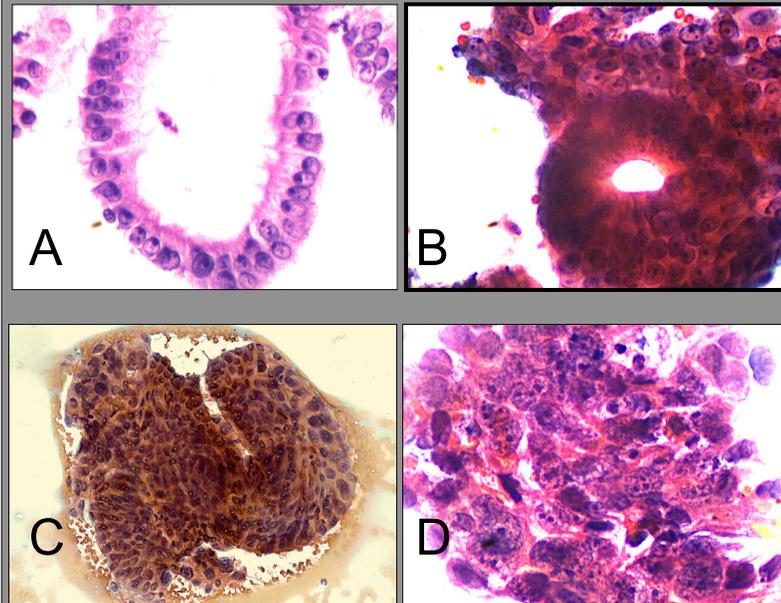## A. NDBE; B. LGD; C & D. HGD

Figure 3 : WATS kit containing
A. WATS brush; B. Glass slides; C. Fixative

Figure 4. Kappa values (Interobserver agreement) among pathologists in the diagnosis of dysplasia and BE using WATS technique

Overall (95% CI)	HGD /EAC (95% CI)	IND / LGD (95% CI)	NDBE (95% CI)
0.86 (0.75-0.97)	0.95 (0.88-0.99)	0.74 (0.61-0.85)	0.88 (0.81-0.94)

RESULTS

• A total 149 BE slides were evaluated in a blinded fashion by 4 pathologists. The slides included: no dysplasia (n=109), LGD and HGD/EAC (n=40).

• Overall mean Kappa value for all three diagnoses for four observers was calculated at 0.86 (95% CI 0.75-0.97)

• The Kappa value (95% CI) for HGD/EAC was 0.95 (0.88-0.99)

• The Kappa value (95% CI) for IND/LGD was 0.74 (0.61-0.85)

• The Kappa value (95% CI) for no dysplasia was 0.88 (0.81-0.94)

CONCLUSIONS:

• The diagnosis of Barrett's esophagus and associated dysplasia using the WATS technique has a very high inter-observer agreement.

• WATS technique appears to be significantly better inter observer rates compared to previously published data using standard histopathology.

• This technology represents a significant improvement over current histopathology assessment.