



# Wide Area Transepithelial Sampling (WATS<sup>3D</sup>) Detects Barrett's Metaplasia Missed by Forceps Biopsies After Ablation of Short and Long Segment Disease

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## BACKGROUND

Barrett's Esophagus (BE) is a pre-malignant condition characterized by goblet cell metaplasia in the tubular esophagus

Radiofrequency ablation (RFA) and liquid nitrogen spray cryotherapy (LN2SC) are used for endoscopic BE ablation

The current standard of care for post ablation surveillance includes 4 quadrant forceps biopsies (FB) at least every 2 centimeters (cm) throughout the original BE segment, even though this leaves a large percentage of tissue unsampled

WATS<sup>3D</sup> is a promising technique that allows for more extensive sampling across a mucosal surface area using a brush device

Prior studies demonstrated the benefit of adjunctive use of WATS<sup>3D</sup> with FB to improve detection of both BE and dysplasia<sup>1,2,3</sup>

Early data also suggest a role for WATS<sup>3D</sup> in surveillance following endoscopic BE ablation<sup>4</sup>

## OBJECTIVE

Evaluate the benefit of WATS<sup>3D</sup> as an adjunctive sampling technique with FB for post-ablation surveillance of both short segment BE (SSBE) and long segment BE (LSBE)

## METHODS

- 40 patients had no evidence of BE on visual inspection with high definition white light or narrow band imaging during follow-up endoscopy after RFA or LN2SC between January 1, 2012 and December 1, 2012
- WATS<sup>3D</sup> brush biopsies were obtained using the standard 2-brush technique, and samples were sent to a central laboratory (CDx Laboratories, Suffern, NY) for analysis using a 3-Dimensional neural network based computer system
- 4 quadrant FB then were obtained every 1 cm following a modified Seattle protocol, and specimens were reviewed by Temple's expert GI pathologist
- Results from both data sets of samples were compared

## PATIENT DEMOGRAPHICS AND FINDINGS

Case	Gender	Age	Original Dysplasia Grade <sup>1</sup>	Original BE Length <sup>2,3</sup>	Ablation Method <sup>4</sup>	FB Results <sup>5</sup>	WATS <sup>3D</sup> Results <sup>5</sup>	
1	F	48	NDBE	COM3	LSBE	RFA	Negative	Negative
2	M	76	LGD	COM1	SSBE	RFA	NDBE	Negative
3	F	48	LGD	COM1	SSBE	RFA	NDBE	NDBE
4	F	55	NDBE	C9M9	LSBE	RFA	Negative	Negative
5	M	80	HGD	COM3	LSBE	RFA	Negative	Negative
6	M	55	HGD	C9M9	LSBE	LN2SC	Negative	NDBE
7	M	64	LGD	COM2	SSBE	RFA	Negative	Negative
8	M	65	HGD	COM5	LSBE	RFA	Negative	NDBE
9	M	68	HGD	C8M8	LSBE	RFA	Negative	Negative
10	F	75	HGD	COM1	SSBE	RFA	Negative	Negative
11	M	42	NDBE	COM1	LSBE	LN2SC	Negative	Negative
12	M	67	NDBE	COM3	LSBE	RFA	NDBE	Negative
13	F	70	HCD	COM5	LSBE	RFA	Negative	Negative
14	M	50	HCD	C4M5	LSBE	RFA	Negative	Negative
15	F	66	Indefinite	COM1	SSBE	RFA	Negative	Negative
16	M	43	Indefinite	COM1	SSBE	RFA	Negative	Negative
17	F	36	NDBE	C4M4	LSBE	LN2SC	Indefinite	Negative
18	M	73	HCD	C2M5	LSBE	RFA	Negative	Negative
19	F	50	LGD	COM1	SSBE	RFA	NDBE	Negative
20	M	71	Indefinite	COM1	SSBE	RFA	Negative	Negative

1. NDBE: Non-dysplastic BE; LGD: Low Grade Dysplasia; HGD: High Grade Dysplasia  
2. Prague Classification Score: C (length in cm of circumferential BE) and M (maximum BE length in cm)  
3. SSBE: Short Segment Barrett's Esophagus; LSBE: Long Segment Barrett's Esophagus  
4. RFA: Radiofrequency Ablation; LN2SC: Liquid Nitrogen Spray Cryotherapy  
5. Negative: No goblet cell metaplasia seen; NDBE: Non-dysplastic BE; BE/Indefinite: BE Indefinite for Dysplasia

Case	Gender	Age	Original Dysplasia Grade <sup>1</sup>	Original BE Length <sup>2,3</sup>	Ablation Method <sup>4</sup>	FB Results <sup>5</sup>	WATS <sup>3D</sup> Results <sup>5</sup>	
21	M	56	NDBE	C6M8	LSBE	RFA	Negative	Negative
22	M	55	HGD	C9M9	LSBE	LN2SC	NDBE	Negative
23	M	75	HGD	COM1	SSBE	RFA	Negative	NDBE
24	M	59	LGD	C1M5	LSBE	RFA	Negative	Negative
25	M	66	HGD	COM3	LSBE	LN2SC	Negative	NDBE
26	F	73	NDBE	COM5	LSBE	RFA	NDBE	Negative
27	M	42	NDBE	COM1	SSBE	LN2SC	Negative	Negative
28	M	52	NDBE	C2M5	LSBE	RFA	Negative	Negative
29	M	80	HGD	COM3	LSBE	RFA	Negative	Negative
30	M	68	HGD	C8M8	LSBE	RFA	Negative	Negative
31	M	65	HGD	COM5	LSBE	RFA	NDBE	Negative
32	F	75	HGD	COM1	SSBE	RFA	Negative	Negative
33	M	67	NDBE	COM3	SSBE	RFA	NDBE	Negative
34	F	70	HCD	COM5	LSBE	RFA	Negative	Negative
35	M	66	HCD	COM1	SSBE	RFA	Negative	Negative
36	M	43	Indefinite	COM1	SSBE	RFA	Negative	Negative
37	M	76	LGD	COM1	SSBE	RFA	NDBE	NDBE
38	M	71	Indefinite	COM1	SSBE	RFA	Indefinite	Negative
39	F	59	NDBE	COM1	SSBE	RFA	Negative	Negative
40	F	73	NDBE	COM5	LSBE	RFA	Negative	Negative

## RESULTS

- The study cohort included 27 males (67.5%) and 13 females (32.5%), with a mean age of 62.5 years
- Prior to ablation, 17 (42.5%) patients had SSBE and 23 (57.5%) had LSBE
- Original dysplasia grades included 17 (42.5%) HGD, 6 (15%) LGD, 5 (12.5%) indefinite for dysplasia and 12 (30%) NDBE
- Agreement in surveillance biopsy diagnosis between FB and WATS<sup>3D</sup> was seen in 27 of 40 cases (67.5%)
- FB detected BE in 11 cases (27.5%) and WATS<sup>3D</sup> detected BE in 6 cases (15%)
- In 4 cases, WATS<sup>3D</sup> identified BE while FB did not, with adjunctive use of WATS<sup>3D</sup> increasing overall BE detection by 36.4% (4/11)
- BE was detected in 7 cases of ablated SSBE and 8 cases of ablated LSBE, using either sampling method
- In prior SSBE cases, BE was detected in 2 cases with both FB and WATS<sup>3D</sup>, 4 with FB alone, and 1 with WATS<sup>3D</sup> alone
- In prior LSBE cases, BE was detected in 5 cases with FB alone and 3 with WATS<sup>3D</sup> alone
- Adjunctive WATS<sup>3D</sup> and FB sampling increased BE yield by 16.7% (1/6) for SSBE cases and 60% (3/5) in LSBE cases

## CONCLUSIONS

WATS<sup>3D</sup> can detect BE missed by FB during post ablation surveillance of SSBE and LSBE

In this study the benefit of adjunctive use of WATS<sup>3D</sup> was greater in patients with ablated LSBE (60%) versus those with ablated SSBE (16.7%)

Adjunctive wide area brush sampling may be of particular benefit after ablation of long segments of Barrett's esophagus due to larger absolute mucosal surface areas unevaluated by FB

Additional studies are needed to determine if WATS<sup>3D</sup> is particularly useful in sampling specific areas such as the esophagogastric junction or tubular esophagus

## REFERENCES

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