



## Endoscopic Eradication Therapy for Barrett's Related Neoplasia

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# Barrett's Esophagus: Definition and Risk Factors

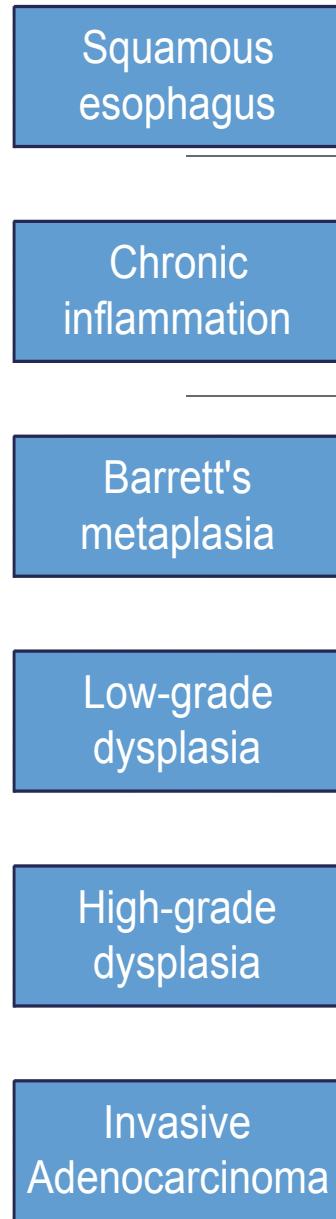
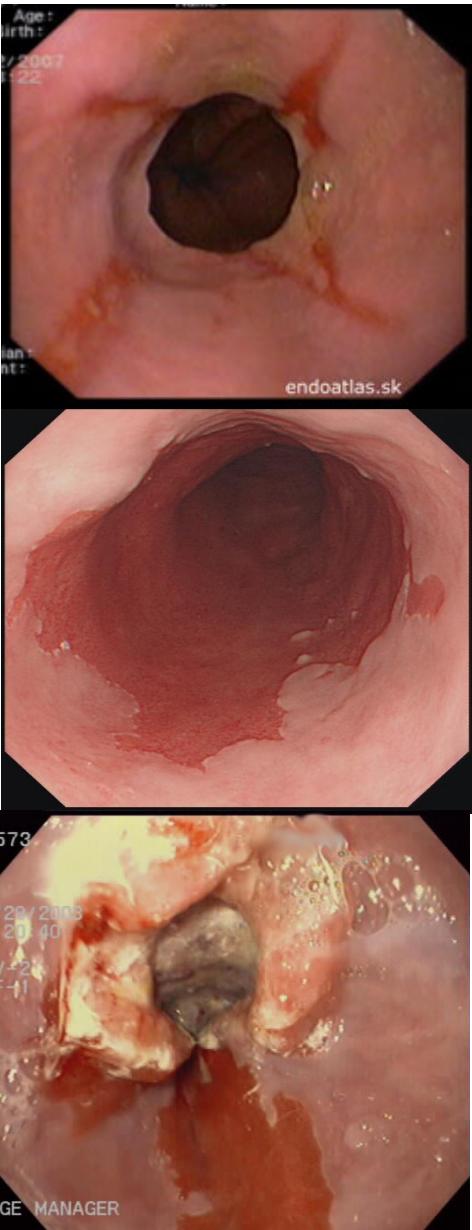
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**Current Definition:** change in the esophageal epithelium of any length that can be recognized at endoscopy and is confirmed to have intestinal metaplasia by biopsy

## **Risk Factors:**

- Increased Age
- Male (1.5-3x higher)
- Caucasian
- GERD (6-10x higher)
- Hiatal Hernia
- Increased Abdominal Adiposity (BMI?)
- Family Hx?

# Evolution of Barrett's



Injury  
Acid & bile reflux  
nitrous oxide

Genetics  
Gender, race,  
? other factors (cox-2)

Accumulate  
Genetic  
Changes

# Why Do We Care about BE?

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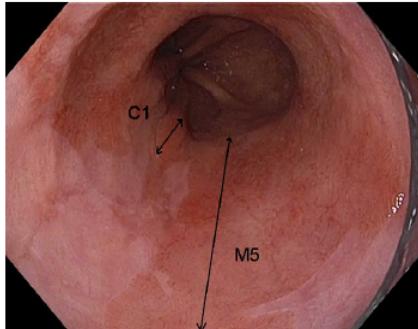
- Patients with BE are at increased risk of developing esophageal adenocarcinoma (EAC)
- The incidence of EAC is rising faster than any other cancer
- Patients with BE have a 30 to 40 fold increased risk of EAC

## Risk of developing EAC:

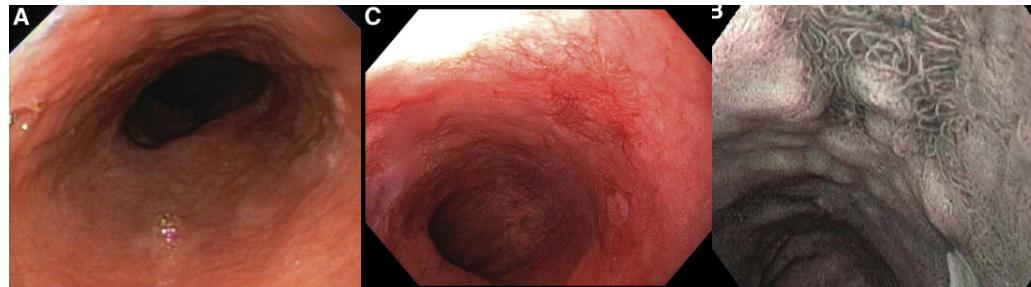
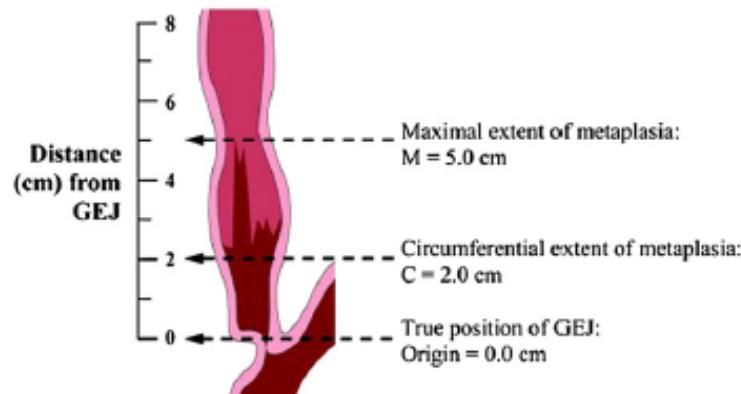
- 0.1-0.5% per year for nondysplastic BE (NDBE)
- 1.8-13% per year for low grade dysplasia (LGD)
- ~5% per year for high grade dysplasia (HGD) though some studies have shown it to be as high as 20%

# Barrett's Esophagus

## If you do nothing else...



- Careful Inspection HD-WLE, NBI
- Irrigation of mucosa prior to inspection (mucomyst, Acetic acid)
- Classification of Disease (Prague Criteria) including DI
- Adequate tissue sampling (Seattle Protocol)



# Barrett's Esophagus: Screening

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- **AGA:** In patients with multiple risk factors associated with EAC (age > 50, male, Caucasian, chronic GERD, hiatal hernia, elevated BMI, intra-abdominal obesity), we suggest screening for Barrett's esophagus (weak recommendation, moderate-quality evidence).
- **ACG:** The use of screening in selective populations at higher risk remains to be established (Grade D recommendation) and therefore should be individualized .
- **ASGE:** An initial screening endoscopy may be appropriate in selected patients with frequent (e.g., several times per week), chronic, long-standing GERD (e.g., > 5 years), especially white males above age 50. If normal, no further screening is recommended.

# Problems with Surveillance

## We need to all look in the mirror...

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- Poor compliance to biopsy protocols
- 2245 surveillance cases from pathology database
  - Adherence rate was 51.2%
  - OR for adherence .14 for 3-5 cm, .06 for 6-8 cm, and .03 for  $\geq 9$  cm
- Worsening compliance with increasing length of BE
- (N=150; 15 sites in the Netherlands)
  - 0-5 cm: 79%
  - 5-10 cm: 50%
  - 10-15 cm: 30%

# Practice Patterns amongst US Gastroenterologists

## Endoscopic management of BE

- Survey of GI's in various practice settings
- 45% response (236/530)
- 10 questions
- Majority (85%) community practice

Only 23% used the Prague Criteria  
Only 37% used advanced imaging of any kind  
NDBE: 86% surveillance, 12% RFA, 3%  
nothing  
LGD: 56% surveillance, 44% RFA  
HGD: 58% referred to tertiary care, 38% EET

- No difference in patterns based on age, type of practice, or duration of practice

# Barrett's Esophagus: Management

Society	High-grade dysplasia	Low-grade dysplasia	No dysplasia
American Gastroenterological Association	Definitive treatment with EMR/ablation or surveillance every 3 months	Repeat EGD in 6 months. If confirmed then endoscopic eradication or yearly surveillance	EGD every 3-5 years or endoscopic eradication for high-risk individuals
American Society of Gastrointestinal Endoscopy	Consider surveillance EGD every 3 months. Consider endoscopic resection or RFA ablation. Consider EUS for local staging and lymphadenopathy.	Repeat EGD in 6 months to confirm LGD. Surveillance EGD every year. Consider endoscopic eradication.	Consider no surveillance. If surveillance is elected, perform EGD every 3 to 5 years. Consider endoscopic eradication in select cases.
American College of Gastroenterologists	Definitive treatment.	Repeat EGD in 6 months. If confirmed then repeat yearly until negative for 2 years	Two EGDs in the first year, then every three years

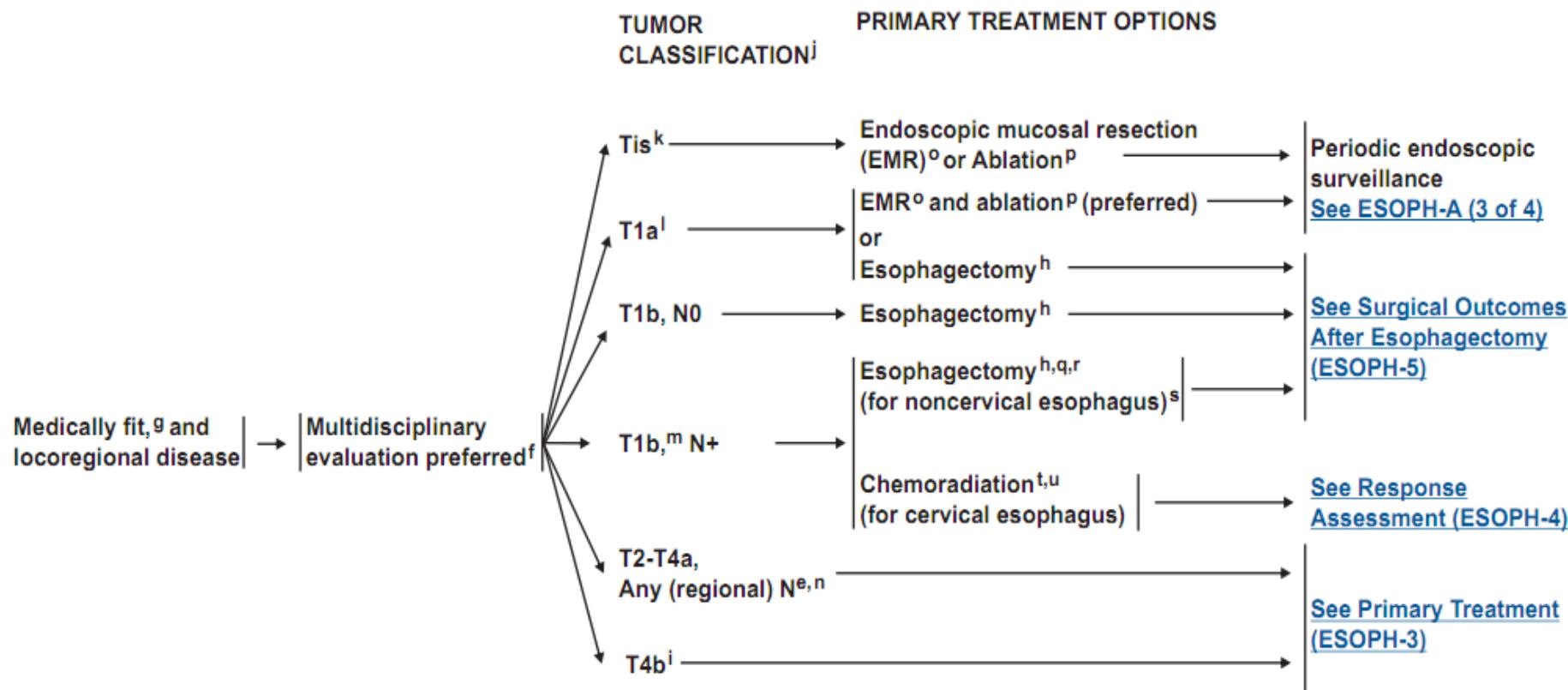
# Barrett's Esophagus: Management

NCCN

National  
Comprehensive  
Cancer  
Network®

## NCCN Guidelines Version 2.2012 Esophageal and Esophagogastric Junction Cancers

[NCCN Guidelines Index](#)  
[Esophageal Table of Contents](#)  
[Discussion](#)



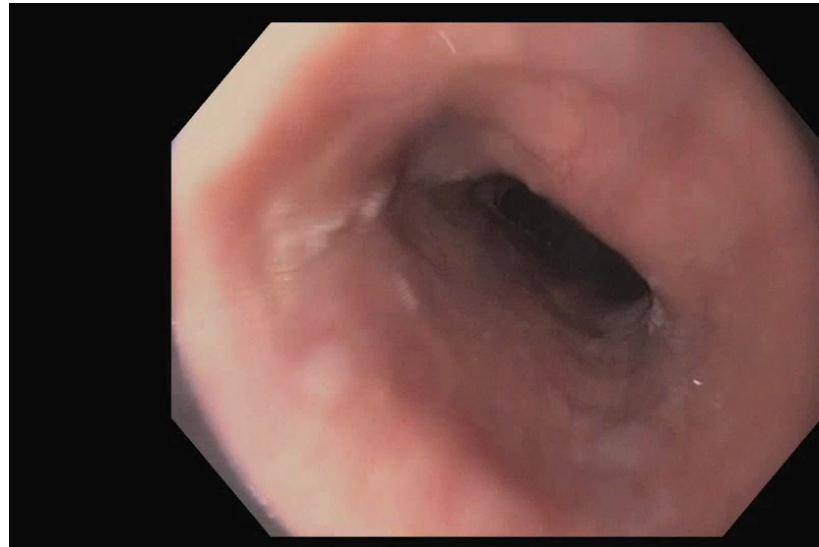
# Endoscopic Therapy: The Terminology

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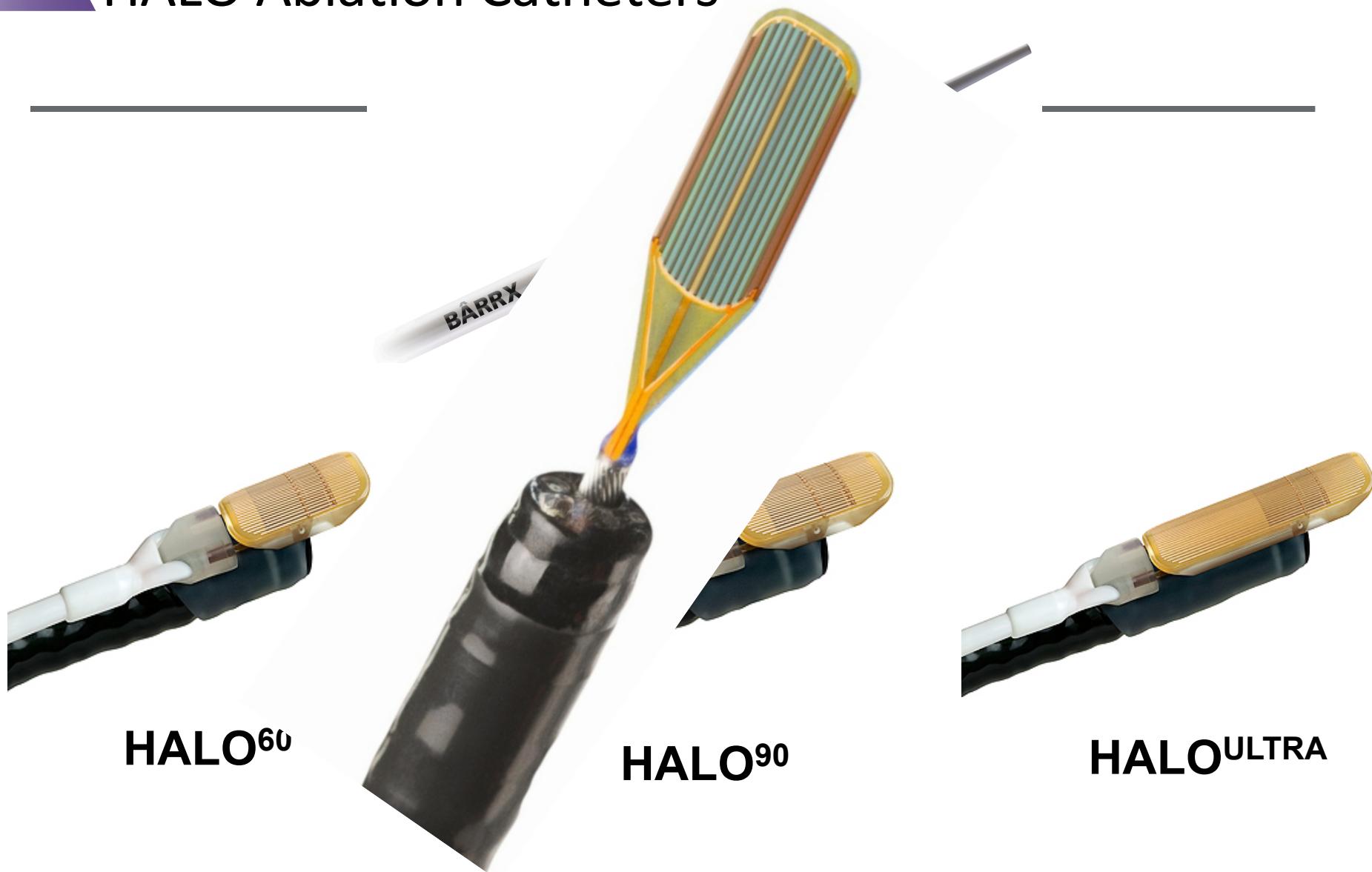
- CE-IM: complete eradication of intestinal metaplasia
- CE-D: complete eradication of dysplasia (indicating still persistent IM)
- Persistence (P-IM, P-D): IM or dysplasia are present on follow up biopsy after EET
- Recurrence (R-IM, R-D): IM or dysplasia recur after two endoscopies with biopsies showing no IM/D.

# EMR Technique

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# HALO Ablation Catheters



# RFA Technique

## The Tools



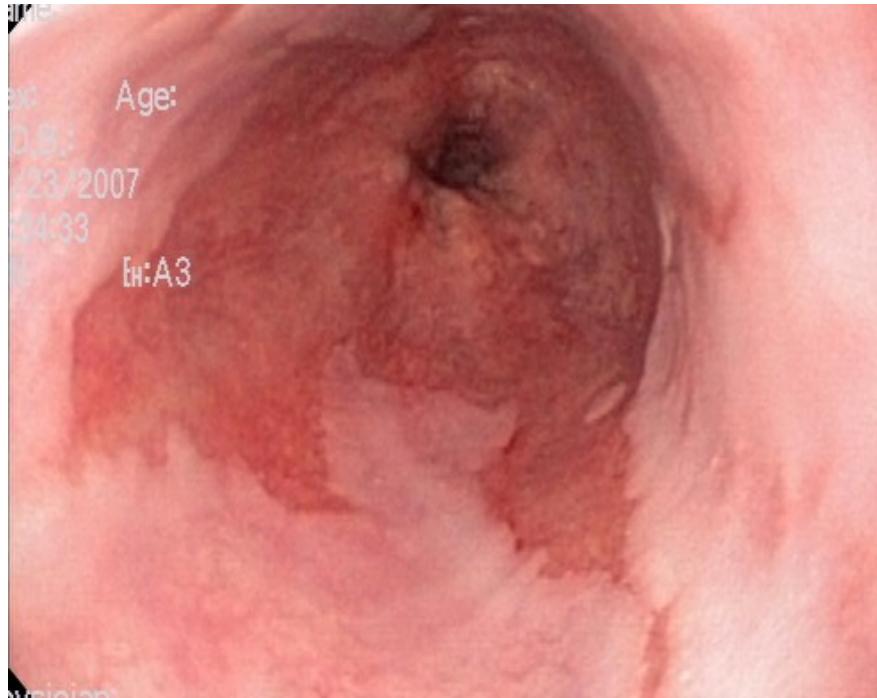
HALO 360

HALO 90



# Before and After Complete Response

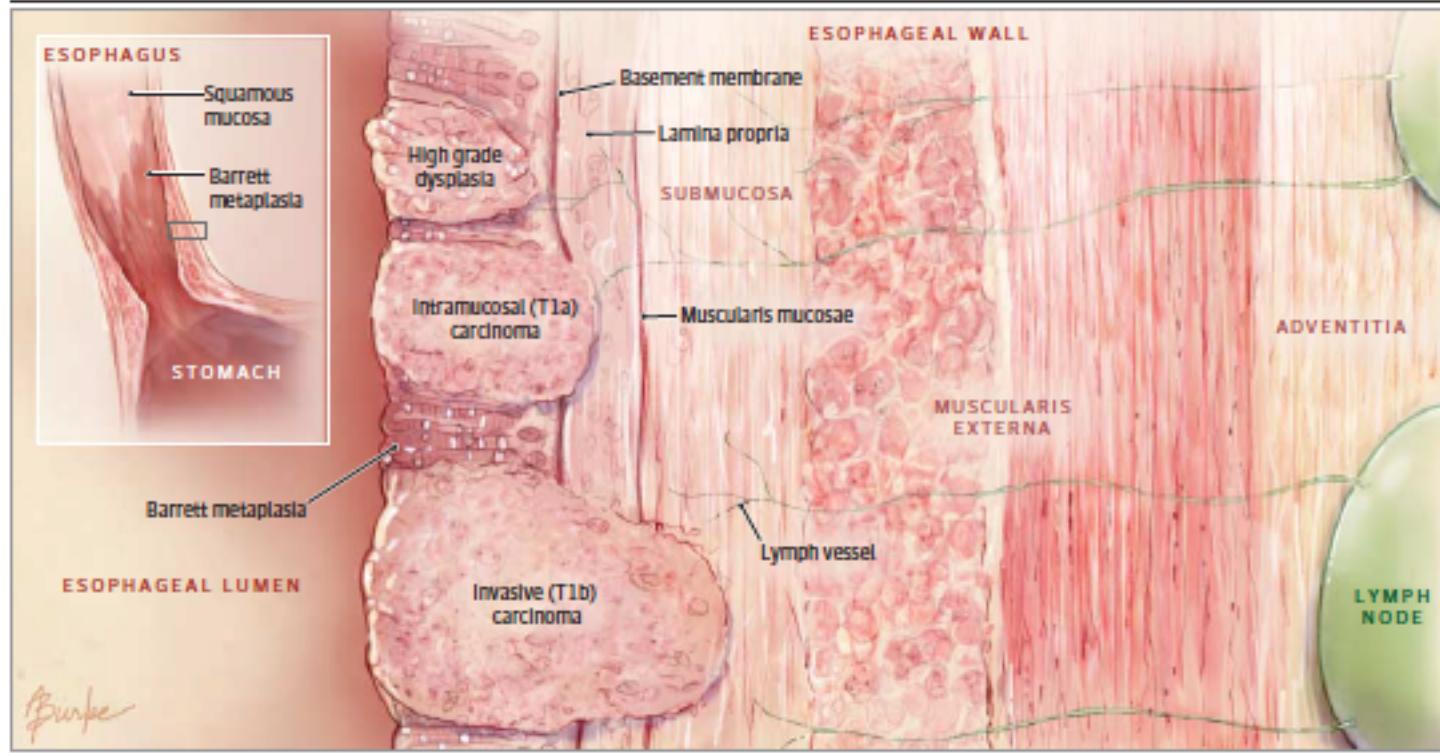
## Yes It really does look this good



# Early Barrett's associated Neoplasia

## Histologic Classification

Figure 3. Schematic of the Esophageal Wall and Grading of Esophageal Neoplasms



# Barrett's associated Neoplasia Surgery vs. EET

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- Meta-analysis comparing Endotherapy to surgery for early neoplasia in Barrett's
- 7 studies with 870 patients (all retrospective)
- Pooled analysis using a random-effects model
- Results
  - Neoplasia Remission Rate: No difference (RR: 0.96; CI, 0.91-1.01)
  - Overall Survival Rate at 1 year: No difference (RR: 0.99; CI, 0.94-1.03)
  - Overall Survival Rate at 5 years: No difference (RR: 1.00; CI, 0.93-1.06)
  - Neoplasia related mortality: No difference (RD: 0; CI, -0.02-0.01)
- Endotherapy had a higher neoplasia recurrence rate (RR: 9.50; CI, 3.26-27.75)
- Endotherapy had fewer overall adverse events (RR: 0.38; CI, 0.20-0.73) and fewer major adverse events
- Caveats: Heterogenous EET group (RFA, PDT, APC, EMR), Retrospective only, minimally invasive esophagectomy not included
- **Conclusion: Endotherapy for early BE associated neoplasia has similar efficacy to surgery with fewer adverse events**

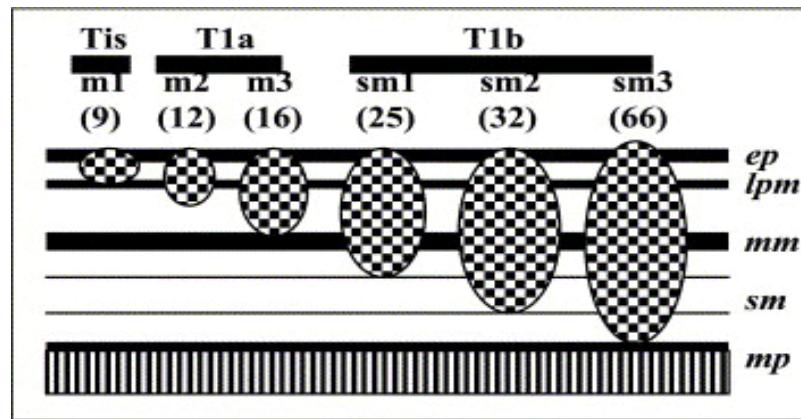
# Staging EMR

- EUS to rule out metastatic lymphadenopathy (Not for HGD)
- EMR for T staging for visible lesions (EUS is less accurate to differentiate between T1a (IMC) or T1b (submucosal) tumors)
- Risk of lymph node metastasis increases with depth of tumor penetration:

sm1: 6%

sm2: 23%

sm3: 58%



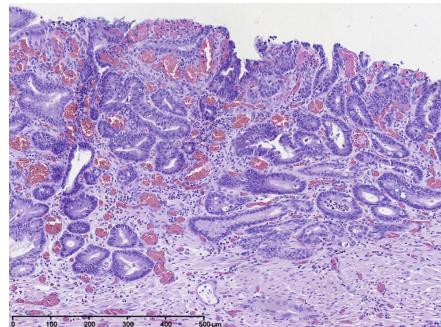
- Patients with invasion into the submucosa should generally be referred for esophagectomy
- EMR generally indicated for shorter segment dysplastic BE, areas of nodularity or mucosal irregularity and superficial T1a/IMC EAC; RFA for flat BE

# EMR: Effectiveness

Author	# patients	Dysplasia	Follow Up	CE-IM	CE-D
Giovanni <i>et al.</i>	21	HGD/EAC	NR	75	NR
Chung <i>et al.</i>	77	HGD/EAC	20	82	95
Peters <i>et al.</i>	37	HGD/EAC	11	89	NR
Larghi <i>et al.</i>	26	HGD/EAC	28	81	NR
Lopes <i>et al.</i>	41	HGD/EAC	31.6	75.6	NR
Pech <i>et al.</i>	279	HGD/EAC	63.6	96.6	NR
Komanduri <i>et al.</i>	60	HGD/EAC	20	88	95

# Durability and Safety of EMR for BE associated Intramucosal Adenocarcinoma

- 1000 patients with intramucosal adenocarcinoma (mAC) in the setting of BE
- Single center experience over 15 years (excluded submucosal invasion or LGD/HGD)
- Included APC, PDT, and EMR
- 96.3% achieved CR with a mean follow-up period of 56.6 months (+/- 33.4mos)
- Surgery was needed in 3.6%
- 14.5% developed recurrent malignancy or metachronous lesions.
  - Endoscopic re-treatment successful in 93.8%
- Complications: 1.5% (all managed conservatively)
- Conclusions: EET is highly safe and effective for mAC with excellent durability and should be the standard of care



# Efficacy of EMR prior to RFA for HGD

TABLE 3. Efficacy outcomes

Outcome	EMR before RFA	RFA only	P value
Intention to treat			
n	50	98	
CED	47 (94.0)	81 (82.7)	.06
CEIM	44 (88.0)	76 (77.6)	.13
Total treatment sessions, mean (SD)	3.5 (1.6)	2.8 (1.7)	.02
RFA treatment sessions, mean (SD)	2.5 (1.5)	2.8 (1.6)	.28
Per protocol			
n	48	84	
CED	47 (97.9)	81 (96.4)	.63
CEIM	44 (91.7)	76 (90.5)	.82
Total treatment sessions, mean (SD)	3.5 (1.6)	2.8 (1.5)	.008
RFA treatment sessions, mean (SD)	2.5 (1.5)	2.7 (1.4)	.44

ED, Complete eradication of dysplasia; CEIM, complete eradication of intestinal metaplasia; RFA, radiofrequency ablation.

# EMR: Safety

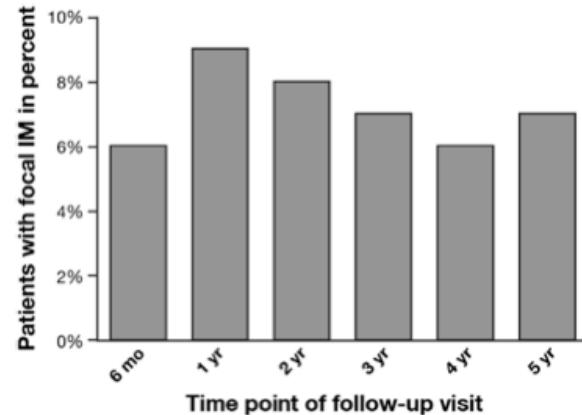
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- Bleeding – 5% (3% acute, 2% delayed)
- Stricture – 37-48%
- Perforation – 0-5%

# Durability of EMR/RFA

What did our parents say about doing it right the first time?

- Bergman et al., 54 patients: EMR followed by RFA
- HGD/IMC
- Biopsies of Cardia and SCJ
- 5 year f/u: At 5 years did EMR of neosquamous
- 90% CR-IM, 0.08% buried glands (bx only, not on EMR)
  
- Conclusion: RFA is effective and durable for BE neoplasia



# Risk Factors for Recurrence after EMR

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- Larger lesion diameter (>2 cm)
- Long-segment BE
- Piecemeal resection
- Lack of adjunctive ablative therapy
- Multifocal neoplasia
- Presence of residual dysplasia

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# LGD in BE: Overdiagnosed and Underestimated

147 pts with LGD in 6 community hospitals from 2000-2006:  
Endoscopic biopsy slides reviewed by 2 expert pathologists:

<u>Confirmed LGD (15%)</u>	<u>ND/Indefinite (85%)</u>
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<u>HGD/Ca:</u>	85% (109 months)	4.6% (107 months)*
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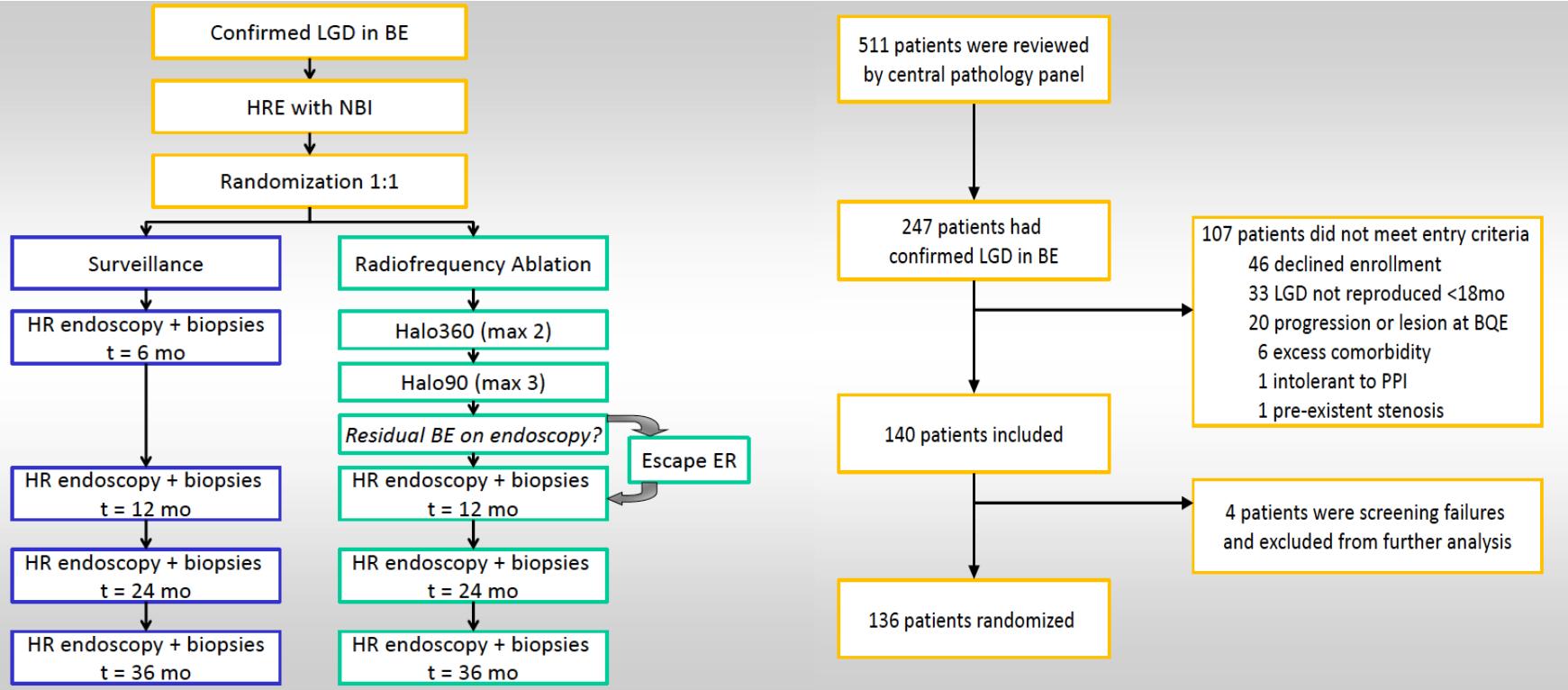
<u>Progression rate:</u>	13.4% /pt/year	0.49%/pt/year
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\* $p < 0.001$

Conclusion: Consider eradication of LGD with RFA. There may never be a true understanding of its natural history

Curvers, et al. Am J Gastroenterol 2010;105:1523-30.

# SURF Trial



# RFA Timeline

## It is a commitment



- Your patients should be aware of this timeline. On average they will spend the next 6-8 months with you
- At least one clinic visit and a minimum of 3 endoscopic procedures
- This is not a one and done

# SURF Trial

## Progression to EAC

	RFA n=68	Surveillance n=68	p-value
Progression to HGD/EAC	1 (1%)	17 (25%)	<0.001
Progression to EAC	1 (1%)	6 (9%)	0.026

## Complete eradication of IM

	RFA	Surveillance
<b>Treatment outcome</b>		
Early discontinuation	1/68	
CE-LGD	94% (63/67)	--
CE-IM	90% (60/67)	--
<b>Follow-up</b>		
Persistent CE-LGD	100% (63/63)	29% (20/68)
Persistent CE-IM	95% (57/60)	0% (0/68)

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# Rationale for RFA in select high risk patients with NDBE

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- Surveillance is ineffective
- Inter-observer variation of pathology interpretation, lack of adherence to surveillance protocol, biopsy sampling error with surveillance
- Natural history of BE is unpredictable
- Cost-effective
- Quality of life
- RFA is an effective, durable and safe treatment option

# Rationale for RFA in select high risk patients with NDBE

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- Poor compliance to biopsy protocols: 2245 surveillance cases from pathology database
  - Adherence rate was 51.2%
  - OR for adherence .14 for 3-5 cm, .06 for 6-8 cm, and .03 for  $\geq 9$  cm
- Worsening compliance with increasing length of BE: (N=150; 15 sites in the Netherlands)
  - 0-5 cm: 79%
  - 5-10 cm: 50%
  - 10-15 cm: 30%
- Corley study:
  - 38 deaths from EAC + BE in case group, 101 control group
  - Surveillance within 3 yrs:
    - Not associated with decreased risk from CA (OR 0.99 [.36-2.75])
    - Fatal cases received surveillance 55.3% of time; controls: 60.4%
- Natural history of BE is unknown/unpredictable
  - 1376 patients, 618 with NDBE, 53% of those who progressed to HGD or EAC had two initial endoscopies that showed only NDBE

Abrams JA, Clin Gastroenterol Hepatol 2009;7(7):736-42.  
Curvers WL Eur J Gastroenterol Hepatol 2008; 20(7):601-7  
Corley et al Gastro 145(2), Aug 2013  
Sharma et al. Clin Gastroenterol Hepatol. 2006;4:566-572.

## “Efficacy, Durability and Safety of Radiofrequency Ablation for Nondysplastic BE at a University Referral Center”

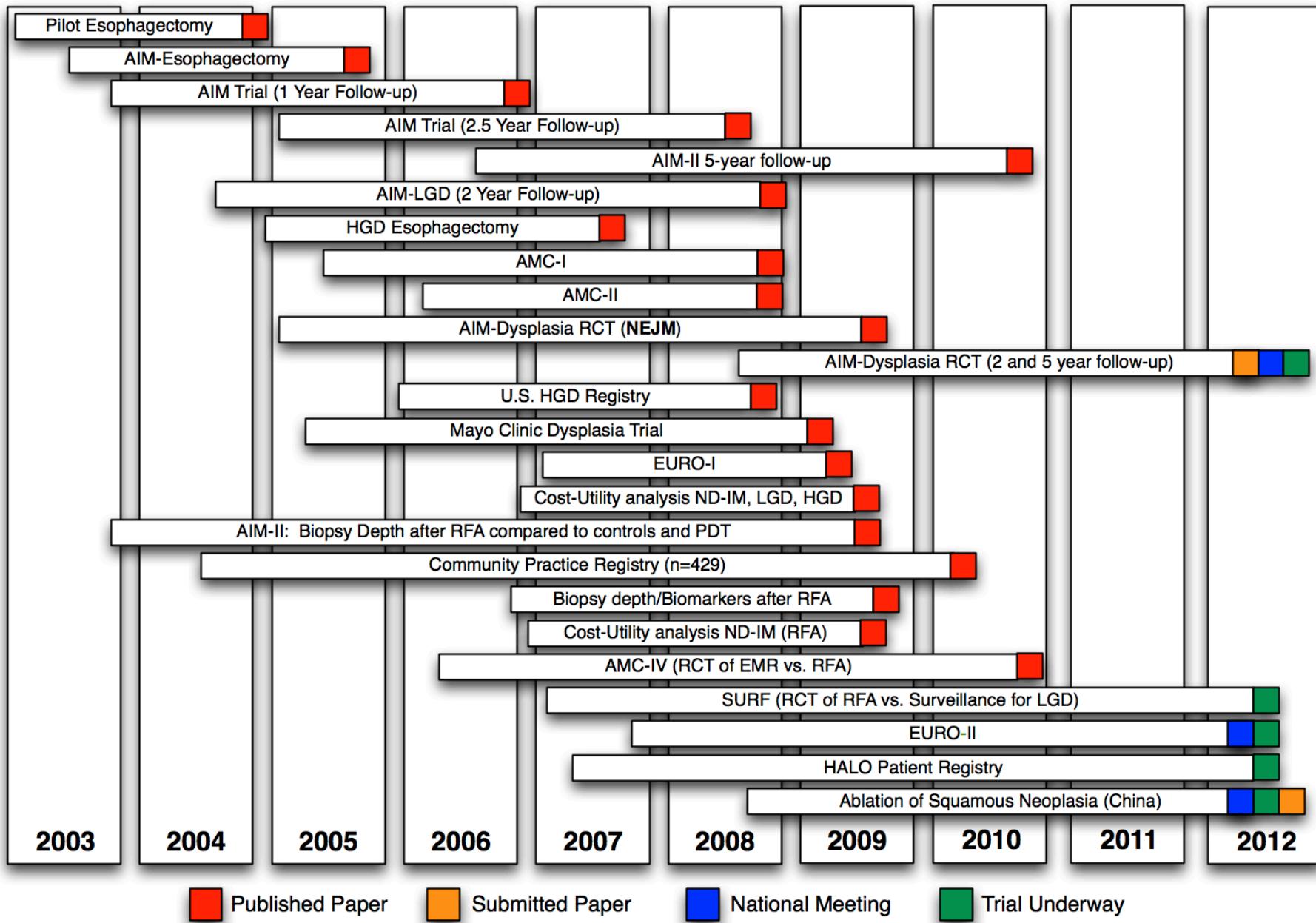
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55 patients prospectively recruited who were deemed to be at higher risk due to:

- 1) Age < 50
  - 2) Long-segment disease (> 3 cm)
  - 3) Family history of dysplastic BE or EAC
- Primary endpoints: CE-IM, durability of CE-IM
  - 37 patients with LSBE (67%), 9 under age 50 (16%) and 9 (16%) with FMHx of BE or EAC
  - **CE-IM in 95% of patients**
  - **Durability at 1,2 and 3 years of 93%, 90% and 89%**
  
  - Complication rate of 3.6% (one minor bleeding, one focal stricture)
  - CE-IM and durability were independent of age, gender, BMI, BE segment length and number of RFA sessions
  - RFA for select high risk patients with NDBE is safe, effective and durable up to 3 years

# Clinical Trial Timeline

## Studies Assessing the HALO<sup>90</sup> and HALO<sup>360</sup> Ablation Systems



# RFA: Effectiveness

**Table 1 Published outcomes of radiofrequency ablation**

Author	Number of patients	Dysplasia <sup>a</sup>	Average follow-up (months)	CRIM (%) <sup>b</sup>	CRD (%) <sup>c</sup>
Sharma et al. [2]	63	LGD/HGD	24	79	89
Pouw et al. [3]	24	HGD/EC	22	88	95
Velanovich [4]	66	LGD/HGD	12	93	NA
Shaheen et al. [5**]	84	LGD/HGD	12	77	86
Eldaif et al. [6]	27	ND/LGD	2	100	NA
Vassiliou et al. [7]	25	ND/LGD/HGD/EC	20	78.50	NA
Ganz et al. [8]	142	HGD	12	54.3	80.4
Gondrie et al. [9]	12	LGD/HGD	14	100	NA
Fleischer et al. [10] <sup>d</sup>	70	ND	30	98	NA
Hernandez et al. [11]	10	ND/LGD/HGD	12	70	NA
Sharma et al. [12]	10	ND/LGD	24	90	100
Gondrie et al. [13]	11	ND	14	100	NA
Sharma et al. [14]	100	ND	12	70	NA
Roorda et al. [15]	13	ND/LGD/HGD	12	46	71
Komanduri et al.	186	ND/LGD/HGD/EC	20	92	96

Sharma et al. Am J Gastroenterol 2009  
 Pouw et al Clin Gastroenterol Hepatol 2010  
 Velanovich et al. Surg Endosc 2009  
 Shaheen et al. N Engl J Med 2009  
 Eldaif et al. Ann Thorac Surg 2009  
 Vassiliou et al. Surg Endosc 2010  
 Ganz et al. Gastrointest Endosc 2008

Gondrie et al. Endoscopy 2008  
 Fleischer et al. Gastrointest Endosc 2008  
 Hernandez et al. Endoscopy 2008  
 Sharma et al. Endoscopy 2008  
 Gondrie et al. Endoscopy 2008  
 Sharma et al. Gastrointest Endosc 2007  
 Roorda et al. Dis Esophagus 2007

# RFA: Safety

**Table 2 Published side-effect profile of radiofrequency ablation**

Author	Number of patients	Average follow-up (months)	Strictures	Perforations	Chest pain	Bleeding	Hospitalizations	Subsquamous Barrett's esophagus
Sharma et al. [2]	63	24	1 (2%)	0 (0%)	NA	1 (2%)	0 (0%)	0 (0%)
Pouw et al. [3]	24	22	1 (4%)	1 (4%)	1 (4%)	1 (4%)	0 (0%)	0 (0%)
Velanovich [4]	66	12	4 (6%)	0 (0%)	NA	0 (0%)	0 (0%)	NA
Shaheen et al. [5**]	84	12	5 (6%)	0 (0%)	2 (2%)	1 (1%)	2 (2%)	<sup>a</sup>
Eldaif et al. [6]	27	2	0 (0%)	0 (0%)	NA	NA	NA	0 (0%)
Vassiliou et al. [7]	25	20	2 (8%)	0 (0%)	2 (8%)	1 (4%)	0 (0%)	0 (0%)
Ganz et al. [8]	142	12	1 (1%)	0 (0%)	NA	NA	NA	0 (0%)
Gondrie et al. [9]	12	14	1 (8%)	0 (0%)	NA	0 (0%)	0 (0%)	0 (0%)
Fleischer et al. [10] <sup>b</sup>	70	30	0 (0%)	0 (0%)	12 (17%)	1 (1%)	0 (0%)	0 (0%)
Hernandez et al. [11]	10	12	0 (0%)	0 (0%)	NA	0 (0%)	0 (0%)	1 (10%) <sup>c</sup>
Sharma et al. [12]	10	24	0 (0%)	0 (0%)	N/A	1 (10%)	1 (10%)	0 (0%)
Gondrie et al. [13]	11	14	0 (0%)	0 (0%)	NA	0 (0%)	0 (0%)	0 (0%)
Sharma et al. [14]	100	12	0 (0%)	0 (0%)	12 (12%)	1 (1%)	0 (0%)	0 (0%)
Roorda et al. [15]	13	12	0 (0%)	0 (0%)	3 (23%)	0 (0%)	0 (0%)	0 (0%)
Komanduri et al.	186	20	4 (2.2%)	0 (0%)	NA	10 (4%)	NA	0 (0%)

Sharma et al. Am J Gastroenterol 2009  
 Pouw et al Clin Gastroenterol Hepatol 2010  
 Velanovich et al. Surg Endosc 2009  
 Shaheen et al. N Engl J Med 2009  
 Eldaif et al. Ann Thorac Surg 2009  
 Vassiliou et al. Surg Endosc 2010  
 Ganz et al. Gastrointest Endosc 2008

Gondrie et al. Endoscopy 2008  
 Fleischer et al. Gastrointest Endosc 2008  
 Hernandez et al. Endoscopy 2008  
 Sharma et al. Endoscopy 2008  
 Gondrie et al. Endoscopy 2008  
 Sharma et al. Gastrointest Endosc 2007  
 Roorda et al. Dis Esophagus 2007

# RFA

## Subsquamous IM “Buried Barrett’s”

	<b>RFA (n=59)</b>	<b>Sham (n=30)</b>
12 month Fragments (total, mean per pt)	1,896 (32.1)	985 (32.8)
Subjects displaying SSIM [n (%)]	4 (6.8%)	18 (60.0%)*
Fragments displaying SSIM [n (%)]	4 (0.2%)	57 (5.8%)*

Fisher's Exact test \*p<0.05

### AIM Dysplasia Trial: Assessment of Buried Glands

- 12 month endpoint
  - RFA: 4 SSIM fragments (0.2%) in 4 patients (6.8%)
  - Sham: 57 SSIM fragments (5.8%) in 18 patients (60%)
- SSIM is a native finding of patients prior to ablative intervention
- RFA significantly reduces the prevalence of SSIM versus baseline prevalence and versus prevalence within sham group

# The Buzz about Buried Glands

## What is the reality?

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- 18 published reports of 9/1004 cases with **RFA**
- If you follow proper technique this is not a significant concern
- If you are not ablating due to this concern, you probably should turn in your scope
- Be wary of studies that utilize heterogenous comparison (lumping of PDT and RFA)

# Let's Talk about strictures

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- Data has ranged from: 1-10%
- My personal rate: 0.7% (2/254)
- Risk Factors
  - EMR (I have had 1 stricture in over 200 cases) with or without RFA
  - Long Segment RFA
  - Overtreatment (Overlap, aggressive use of focal device)
  - Reflux Burden



# Is RFA Safe?

## Can we put this to rest, please...

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- Perforation? 0.01% (1/10000 cases)
  - Remember: Therapeutic Colonoscopy (1/1000)
- Bleeding: 0.02%
- Stricture: 0.18%

# Durability

## Systematic Review

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- Shaheen et al., reviewed 18 studies of 3802 patients for efficacy
  - 6 studies of 540 patients reporting durability
  - 1 RCT, 10 prospective cohort, 9 retrospective
  - 91% CR-D, 78% CR-IM
  - 13% recurrence of IM, 0.2% progression to cancer
  - Complications: 5% Strictures
- 
- Conclusion: RFA results in CR-D and CR-IM in high proportion of patients with few recurrences and low rate of adverse events

# EET: Recurrence

R-IM = 13%

Author	# Patients	Median f/u	R-D	R-IM
Fleischer <i>et al.</i> (AIM-II)	50	48	NR	8
Pouw <i>et al.</i> (European MC)	24	22	NR	17
Shaheen <i>et al.</i> (AIM-D)	106	12	15	17
Gupta <i>et al.</i> (U.S. MC)	592	24	22	33
Haidry <i>et al.</i> (U.K. Halo)	335	19	6	9
Shaheen <i>et al.</i> (U.S. RFA)	5522	26	21	28
Komanduri <i>et al.</i>	186	20	1.6	3.7

# Risk Factors for Recurrence/Persistence

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## Persistence:

- 1) Long segment BE
- 2) Large hiatal hernia
- 3) Incomplete healing between treatment sessions
- 4) Female sex
- 5) Need for multiple treatment sessions
- 6) Persistently abnormal acidic or weakly acidic reflux

## Recurrence: U.S. RFA Registry (5522 patients)

- 1) Advanced age ( $p=0.0002$ )
- 2) Longer BE segment ( $p=0.01$ )
- 3) Pre-treatment fundoplication ( $p=0.03$ )
- 4) Dysplastic BE ( $p=0.047$ )
- 5) More treatment sessions ( $p=0.009$ )

- Pilot study of RFA combined with antireflux surgery, 80% achieved CE-IM with only one ablation

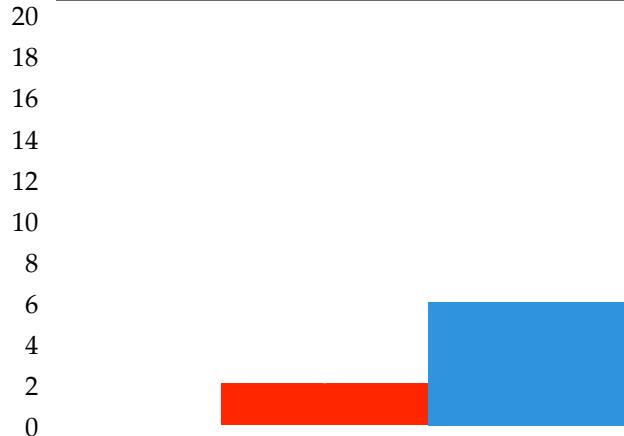
## “Increased Risk for Persistent IM in Patients with BE and Uncontrolled Reflux Exposure before RFA”

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- 37 patients underwent HRM and 24-hour impedance-pH monitoring before ablation therapy
- 22 patients achieved eradication of all IM in fewer than 3 ablation sessions (CR)
- 15 patients required 3 or more ablations owing to persistent IM or D (ICR)
- Weakly acidic reflux events (52 vs. 29.5, p=.03) and total reflux events (60.0 vs. 35.5, p=0.03) more common in ICR vs. CR
- Uncontrolled reflux, irrespective of acidity, predisposes BE patients to an incomplete RFA response
- Highlights the idea that RFA does not address the underlying pathophysiology of BE, which is abnormal reflux

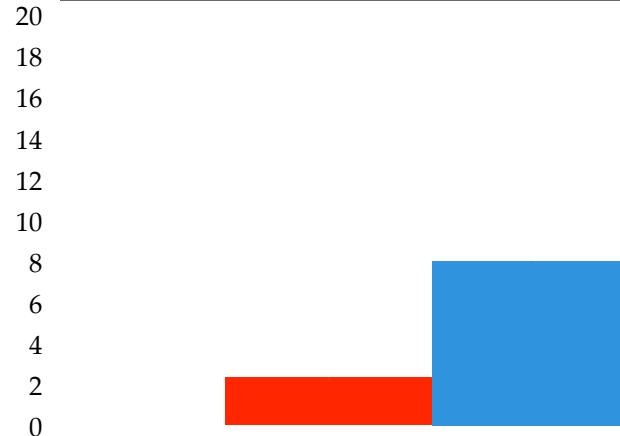
## %acid contact time

P: 0.22



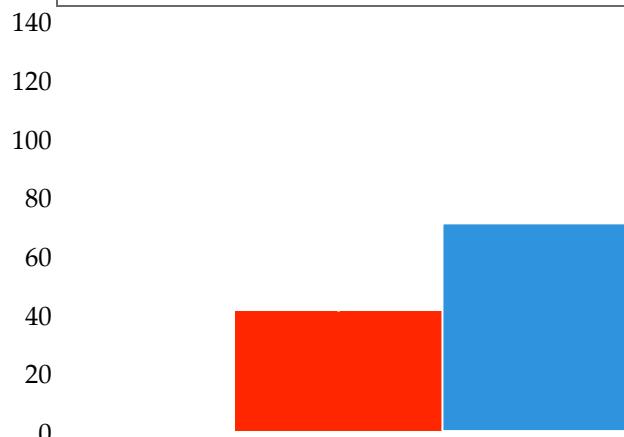
## Non acid reflux events

P=0.03



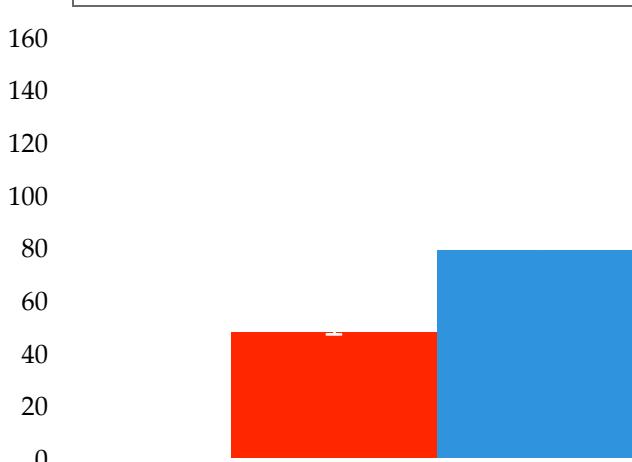
## Weakly acid reflux events

P= 0.04



## Total reflux events

P= 0.04



Complete Responders



Incomplete Responders

# “Recurrence of Intestinal Metaplasia is Rare Following EET of BE Coupled with Effective Reflux Control:

## A Single Center Prospective Durability Study”

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- 186 patients prospectively recruited for EET
- EET included a formalized anti-reflux protocol:
  - 1) BID PPI
  - 2) 24-hour impedance-pH testing for: erosive esophagitis during EET or inability to achieve CE-IM after 3 RFA sessions
- CE-IM achieved in 92%, CE-D 96%
- R-IM in 3.7%, R-D in 1.6%
- Only significant predictor for R-IM was referral for impedance-pH testing ( $p=0.04$ , OR: 8.4 (8.2-10.4))
- 15 incomplete responders achieved CE-IM in 24 +/- 18 months but required further anti-reflux measures

# “Recurrence of Intestinal Metaplasia is Rare Following EET of BE Coupled with Effective Reflux Control: A Single Center Prospective Durability Study”

Characteristic	(N=15)
CE-IM (n, %)	15 (100)
Mean time to CE-IM (months (SD)	24 (18)
R-IM (n, %)	1 (6.6)
Median F/u (months (SD)	14 (10)
Mean BE length (cm (SD)	8.8 (4.7)
Hiatal Hernia (n, %)	15 (100)
Abnormal Reflux Parameter	
Abnormal Ph (n, %)	6 (40)
Erosive esophagitis (n, %)	8 (53)
None identified (n, %)	1 (7)
Anti-reflux measures	
Fundoplication (n, %)	7( 47)
Increase in PPI Dose (n, %)	8 (53)

# What happens after CR-IM?

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- Meet with every patient
- Discuss results of ablation and long term acid suppression
- HGD: After CR-IM, bx at 1 year (6mos later), 1.5 yrs, 2yrs, then increase to q yearly
- LGD: After CR-IM, bx at 1 year (6 mos later), 2 years, then q 3 years
- NDBE: After CR-IM, bx at 1 year, then q 3 years



# Cost-Effectiveness

## Look all directions before you cross this street

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- Markov Model for RFA
- Surveillance + surgery if cancer
- Surveillance + RFA for HGD
- Initial RFA followed by surveillance
- HGD: Initial RFA most cost effective
- LGD: Cost effective for confirmed LGD
- NDBE: May not be cost-effective
- Limitations: Assumptions of CR-IM, complication rates, and recurrence rates are significantly higher than what we see in expert centers.

## The Myths:

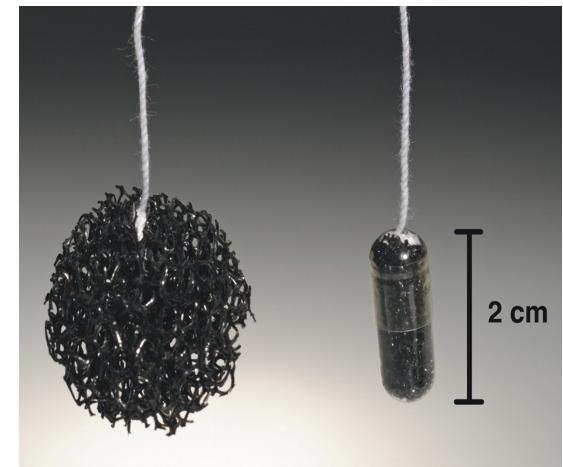
- RFA is not safe, the “experts” tell me I will get buried glands and strictures
- RFA is not durable
- RFA is for high-grade dysplasia only
- RFA is experimental only for non-dysplastic disease

## The Reality:

- RFA is safe
- Risk of buried glands and strictures is negligible with proper technique
- RFA cannot be limited to academic centers if we are to reach our goals
- RFA is durable with 5 year CR-IM at 90%
- RFA is an effective option for HGD, LGD, and select patients with NDBE (supported by AGA and ASGE guidelines)

# Are there ways to improve Barrett's Screening?

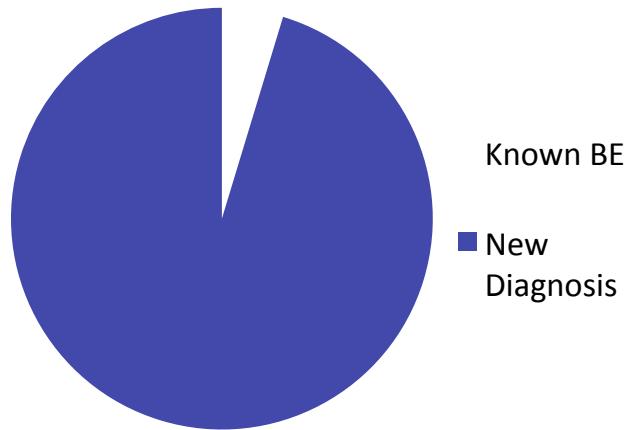
- Cytosponge
- 504 patients
- 99% successfully swallowed the sponge
- Compared to EGD
  - Sensitivity: 73% (90% if at least 2cm)
  - Specificity: 93%
- The cytosponge is a very promising tool that may allow for more widespread screening for BE



# Unsedated Transnasal Endoscopy New Screening Tool?

- Multicenter Prospective Cross-sectional study of 426 patients between 40-85 (mean age:: 55)
- Mean procedural time: 3.7 min
- 30% claimed GERD sx and 69% on PPI or H2
- 34% erosive esophagitis, 4% Barrett's (38% esoph finding)
- No AE
- Unsedated TNE feasible, safe, and well tolerated screening method for primary care population

# What Proportion of Subjects Undergoing Esophagectomy For BE Cancer Have Previously Diagnosed BE? We are missing the forest



- Review of 752 surgical series
- 1502 patients
- Only 4.7% were known to have BE prior to resection
- Current paradigm is not optimal to identify appropriate patients for endoscopic interventions

# Endoscopic Eradication Therapy

## 2014 Barrett's Algorithm

