

Minimally Invasive and Novel Therapeutics (M.I.N.T.) in Foregut Disease  
September 29th -October 1st 2022

Antireflux mucosal ablation and antireflux  
mucosectomy: Hype or Hope for GERD

Enrique Rodriguez de Santiago, FESGE  
ESGE green endoscopy WG

Hospital Universitario Ramon y Cajal, Madrid, Spain



## Conflict of interest statement

I herewith declare anything that may potentially be viewed as a conflict of interest during the past three years such as paid or unpaid consultancies, business interests or sources of honoraria payments:

***Olympus: speaker fee and educational activities***

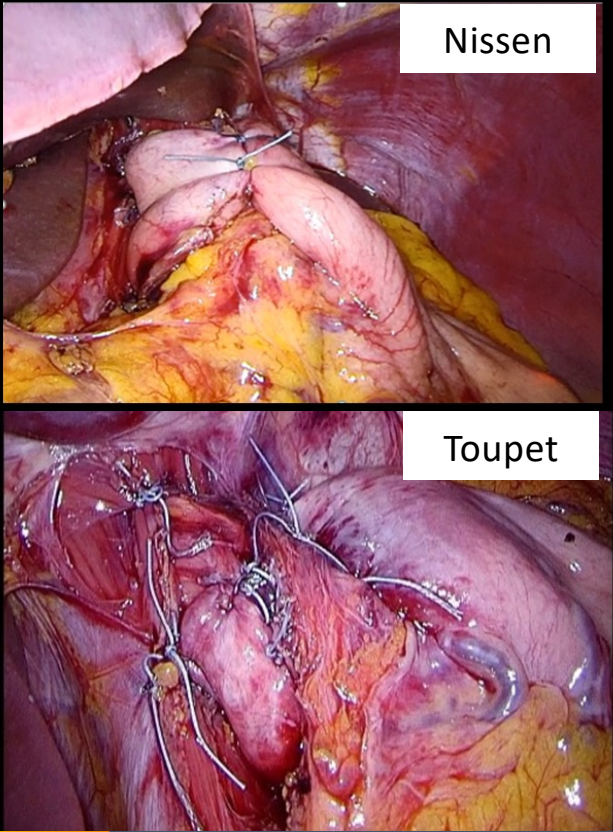
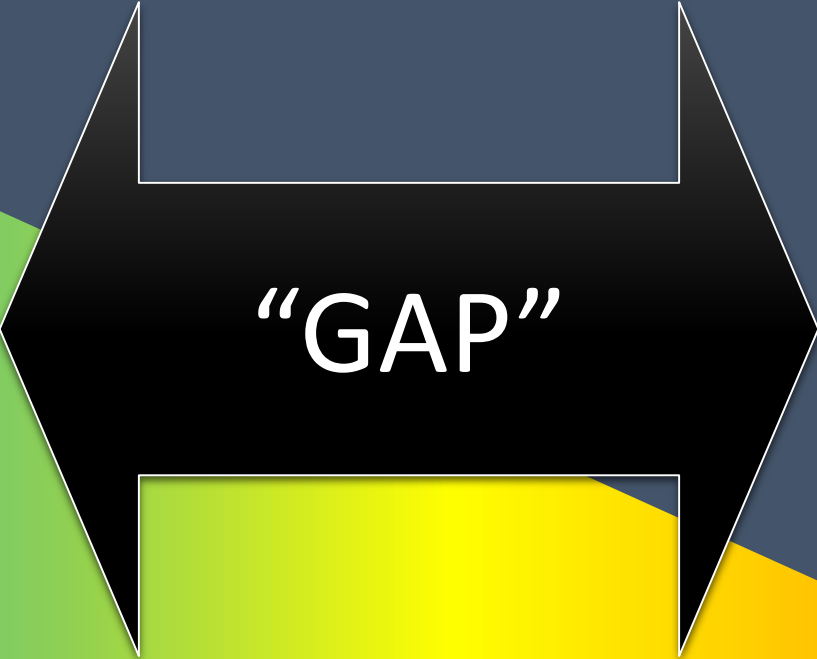
***Norgine: registration fee for educational activities***

***Casen: registration fee for educational activities***

# Endoscopic treatment for GERD



Anti-acid  
medications



Conventional  
Surgery



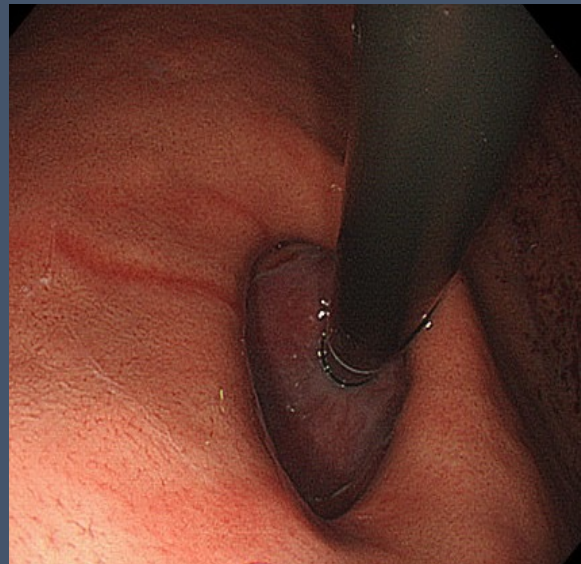
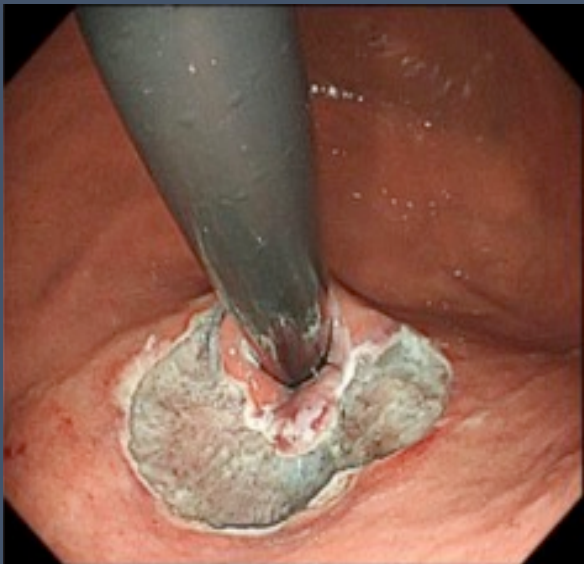
Non-invasive

Invasive

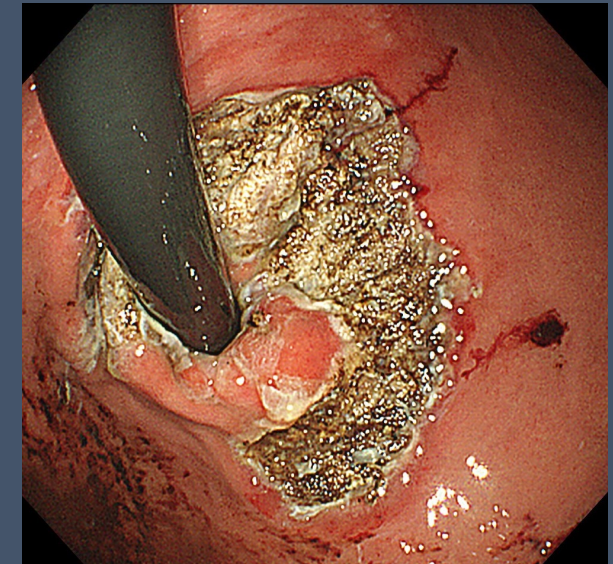


 Antireflux mucosectomy (ARMS) and antireflux mucosal ablation (ARMA)

ARMS

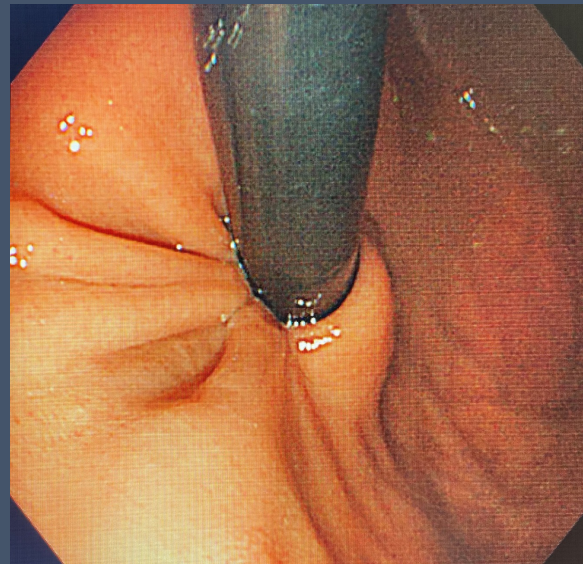
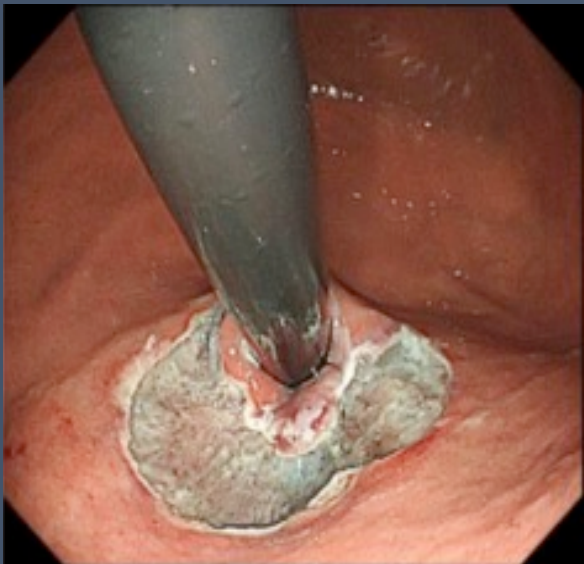


ARMA

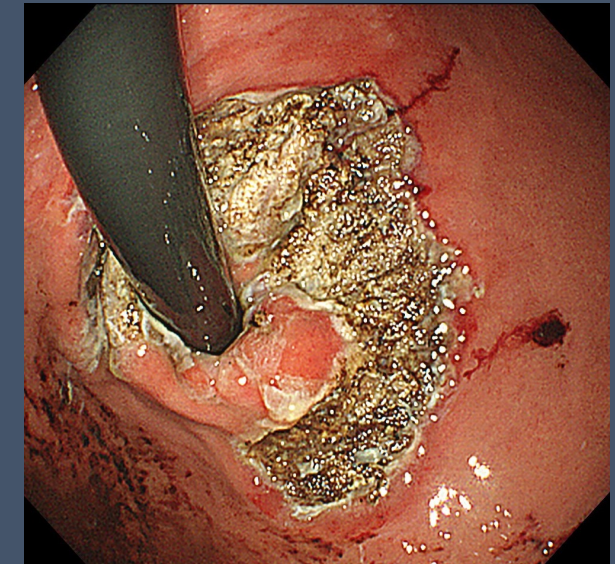


 Antireflux mucosectomy (ARMS) and antireflux mucosal ablation (ARMA)

ARMS



ARMA





# IDEAL ENDOSCOPIC GERD THERAPY

**Effective**

**Simple**

**Safe**

**Cheap**

**Rescue surgery**





# ARMS AND ARMA??

Effective

Simple

Safe

Cheap

Rescue surgery





# ARMS AND ARMA??

## Antireflux mucosectomy (ARMS) and antireflux mucosal ablation (ARMA) for gastroesophageal reflux disease: a systematic review and meta-analysis

OPEN  
ACCESS



Authors

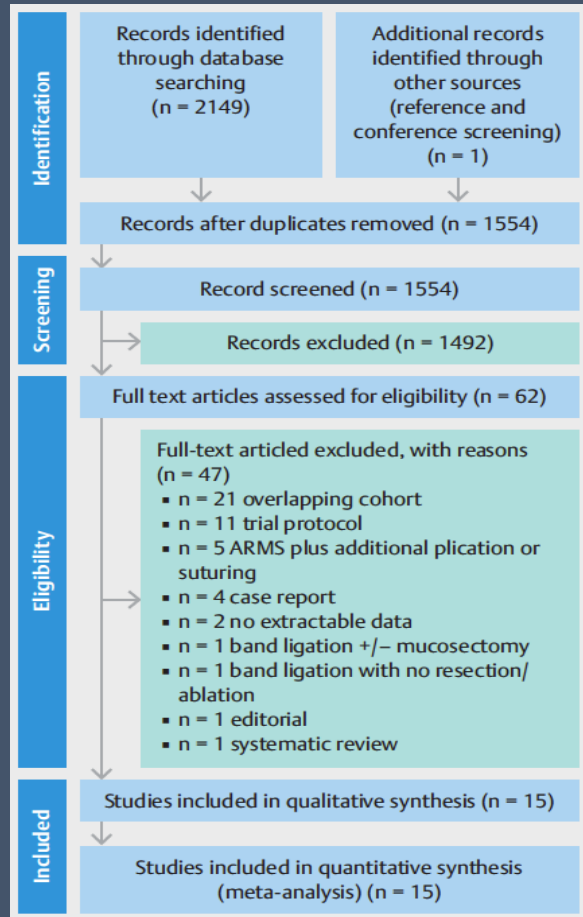
Enrique Rodríguez de Santiago<sup>\*·1</sup>, Carlos Teruel Sanchez-Vegazo<sup>\*·1</sup>, Beatriz Peñas<sup>1</sup>, Yuto Shimamura<sup>2</sup>, Mayo Tanabe<sup>2</sup>, Noelia Álvarez-Díaz<sup>3</sup>, Sofía Parejo<sup>1</sup>, Sumi Kazuya<sup>2</sup>, Natalia Marcos-Carrasco<sup>1</sup>, Enrique Vazquez-Sequeiros<sup>1</sup>, Haruhiro Inoue<sup>2</sup>, Agustín Albillos<sup>1</sup>







# POPULATION



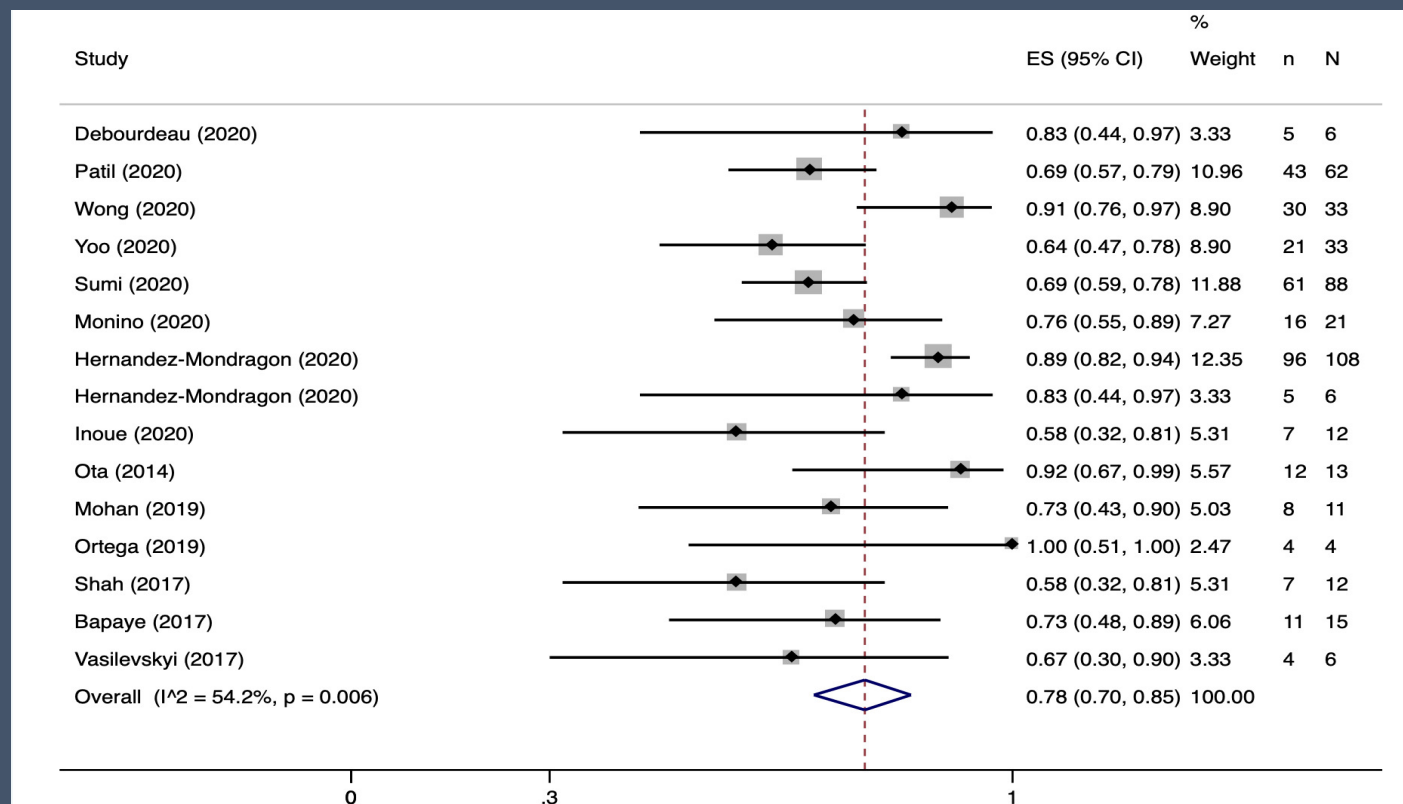
- 15 non-randomized studies:
- N = 461:
  - ARMS, n = 331
  - ARMA, n = 130





# CLINICAL SUCCESS

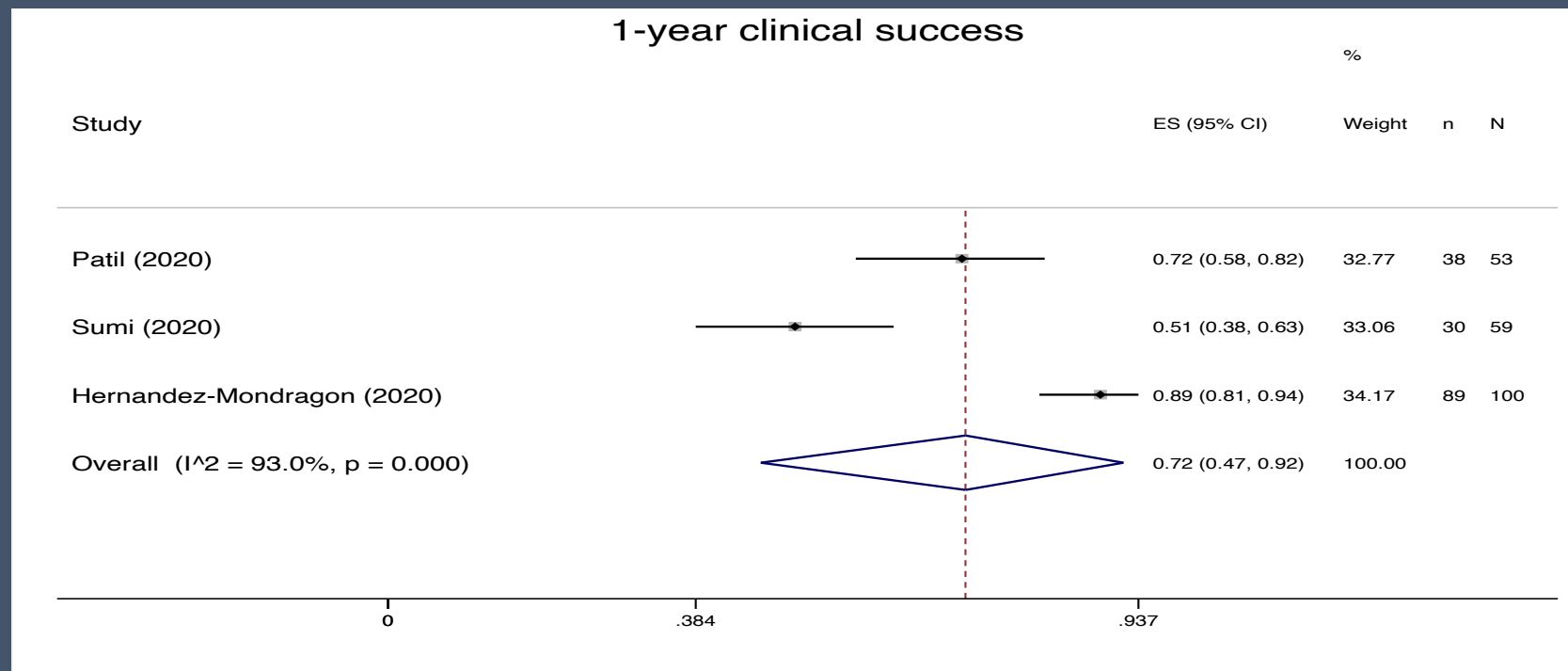
Short-term ( $\leq 6$  months) = 78%





# CLINICAL SUCCESS

**1-year = 72%**





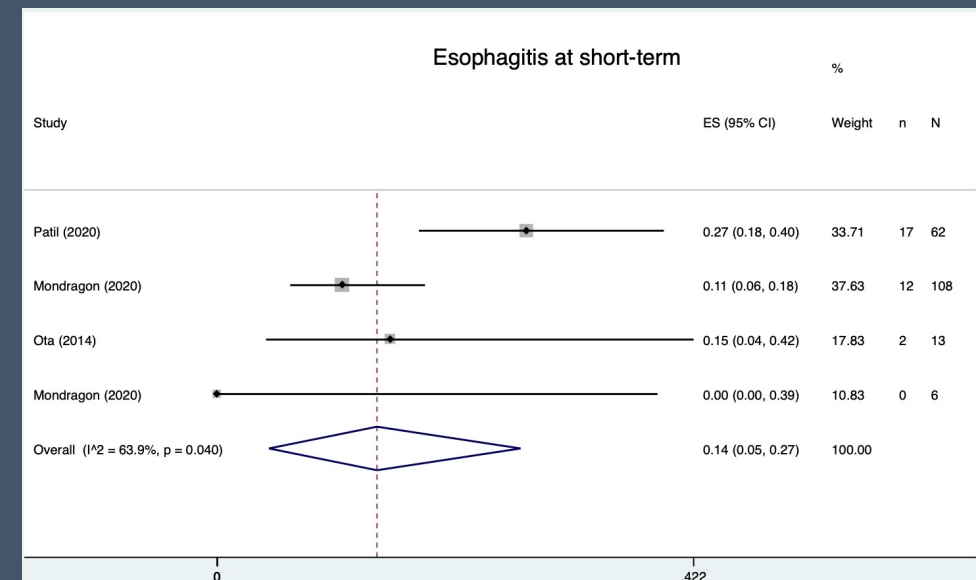
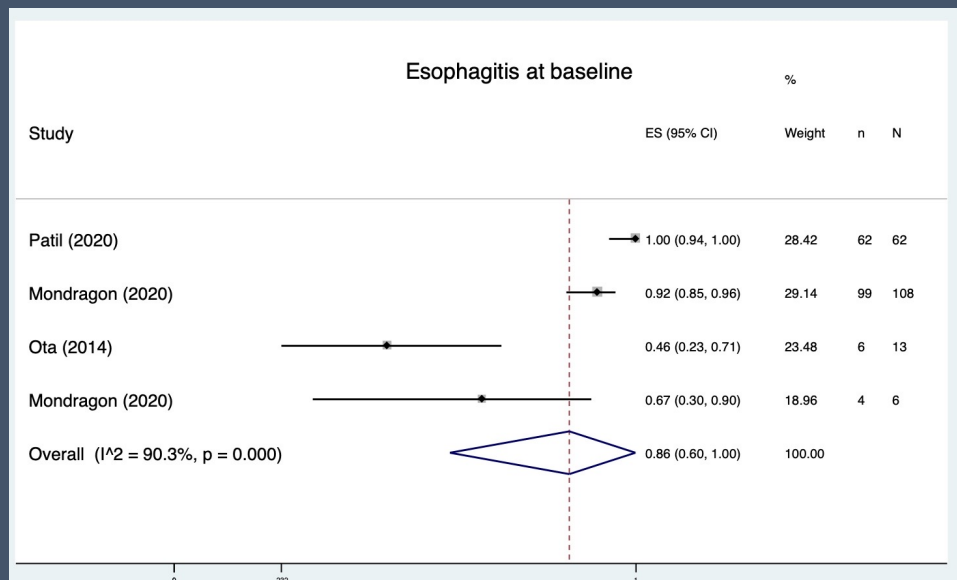
# CLINICAL SUCCESS

## Significant improvement in esophagitis at endoscopy

86%



14%

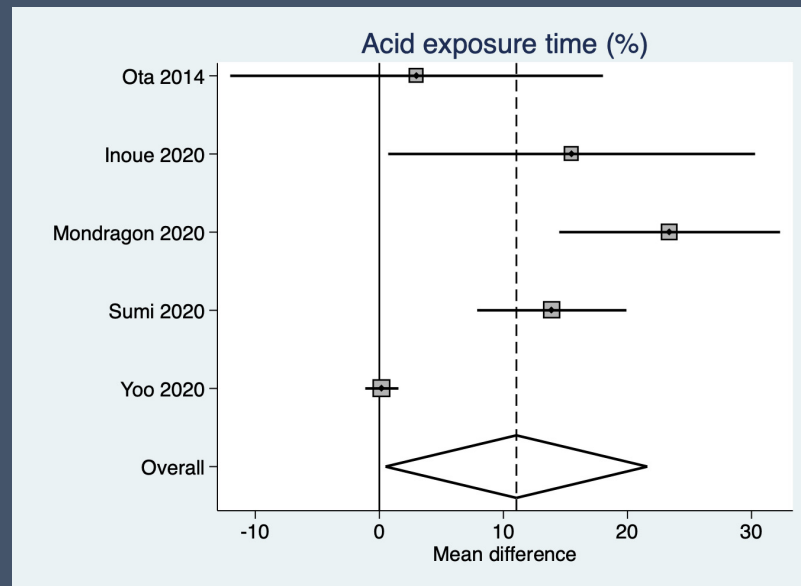




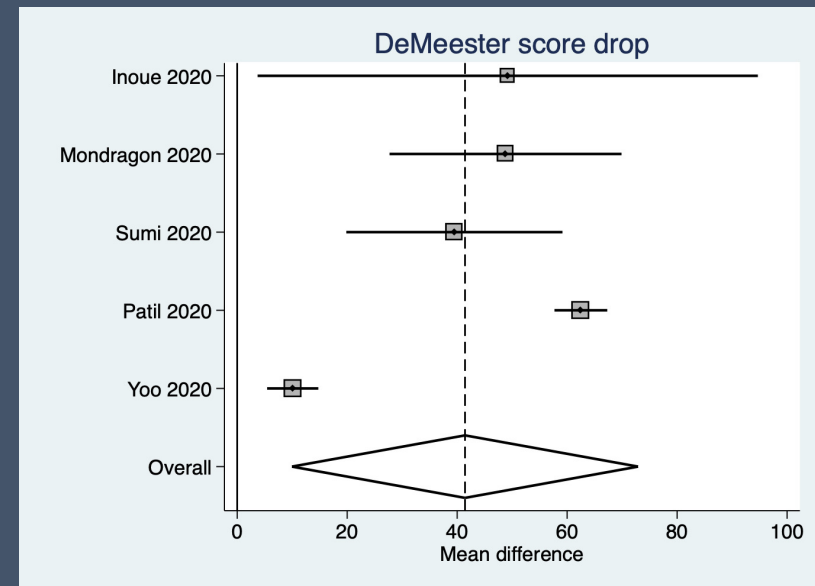
# CLINICAL SUCCESS

## Significant reduction AET% and DeMeester score

Mean difference = 12%



Mean difference = 40%





# IDEAL ENDOSCOPIC GERD THERAPY

Effective



Simple

Safe

Cheap

Rescue surgery





# IDEAL ENDOSCOPIC GERD THERAPY

Effective



Simple

Safe

Cheap

Rescue surgery





## ARMS AND ARMA

**Technical success = 100% (CI 95% 100% - 100%)**





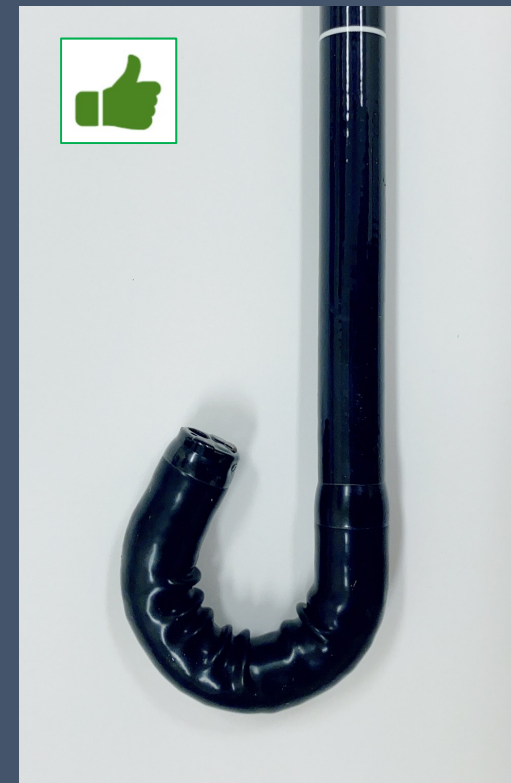


# KEY TECHNICAL TIPS

HOW TO?



## Good retroflexion





## KEY TECHNICAL TIPS

HOW TO?



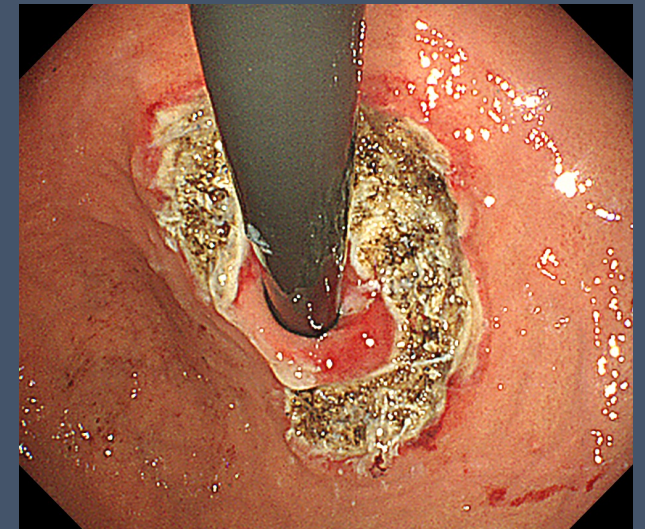
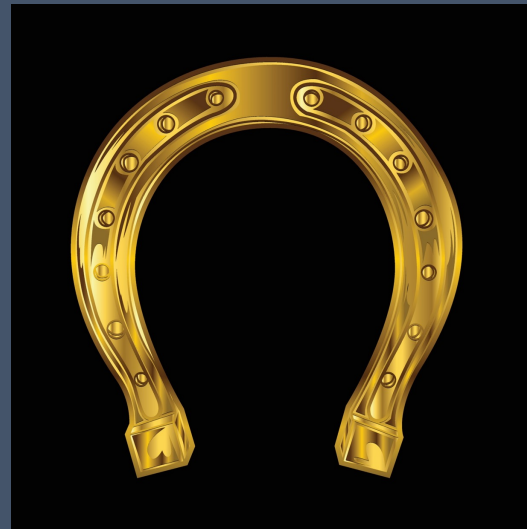
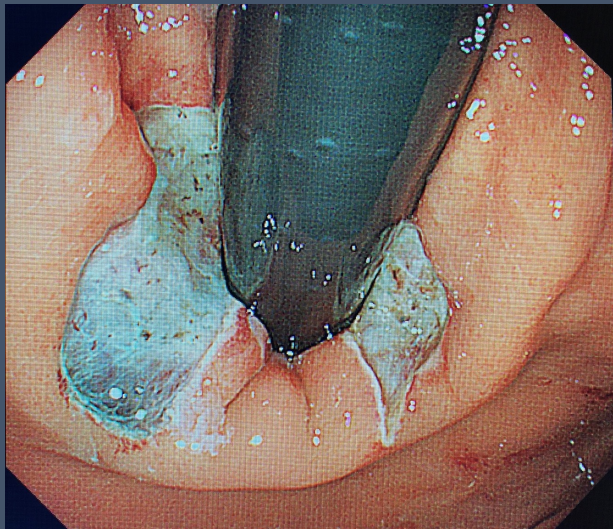
**Consider using a cap**





## KEY TECHNICAL TIPS

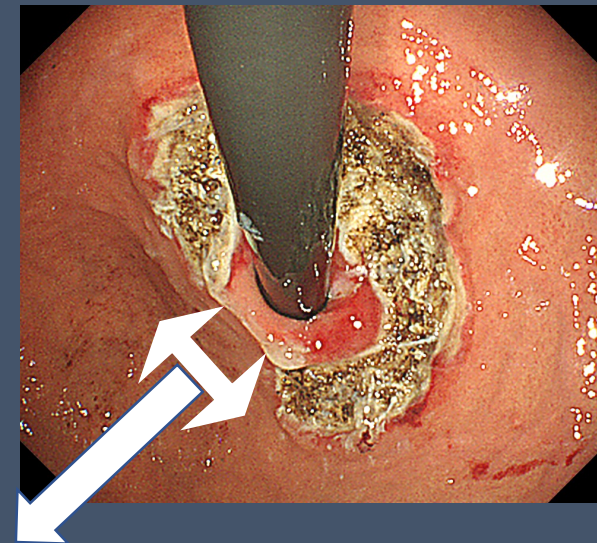
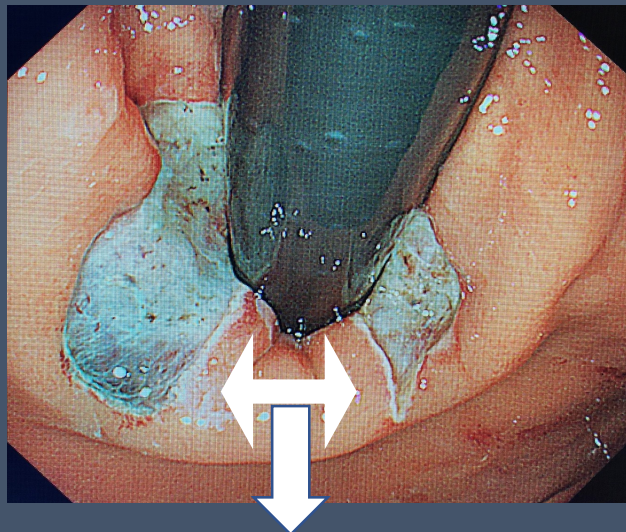
**Horse-shoe shape: 270° - 320°**





## KEY TECHNICAL TIPS

**Spare the Z line and 1 - 1.5 cm at the greater curvature**



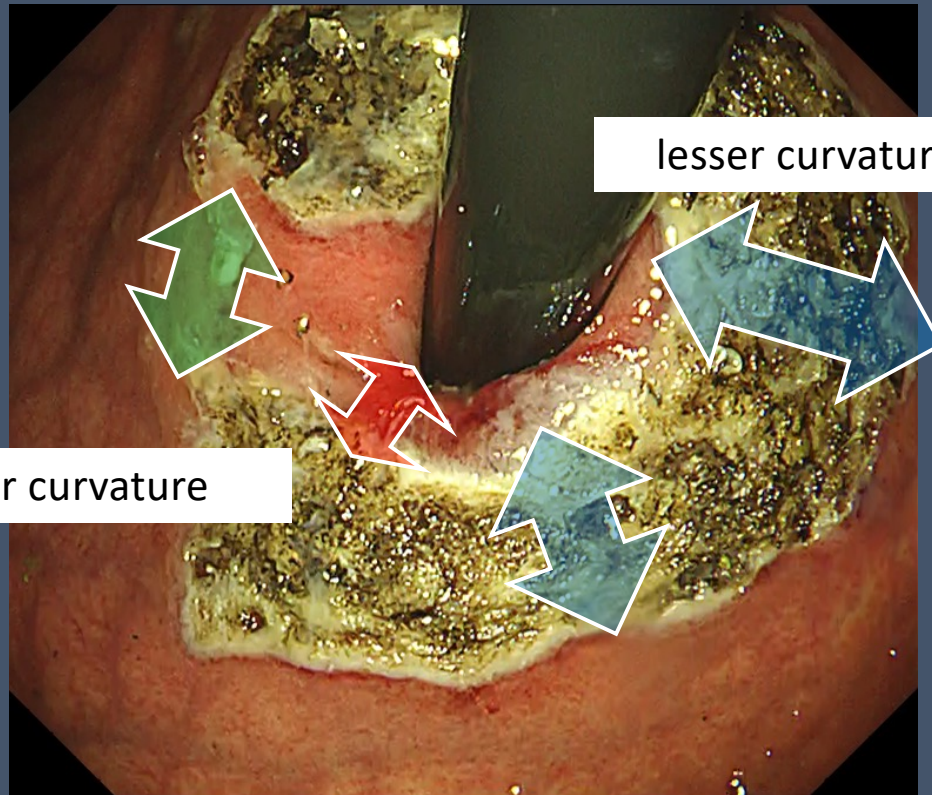
1 scope width of healthy mucosa at the greater curvature



# ANTIREFLUX MUCOSAL ABLATION (ARMA)



# ARMA design



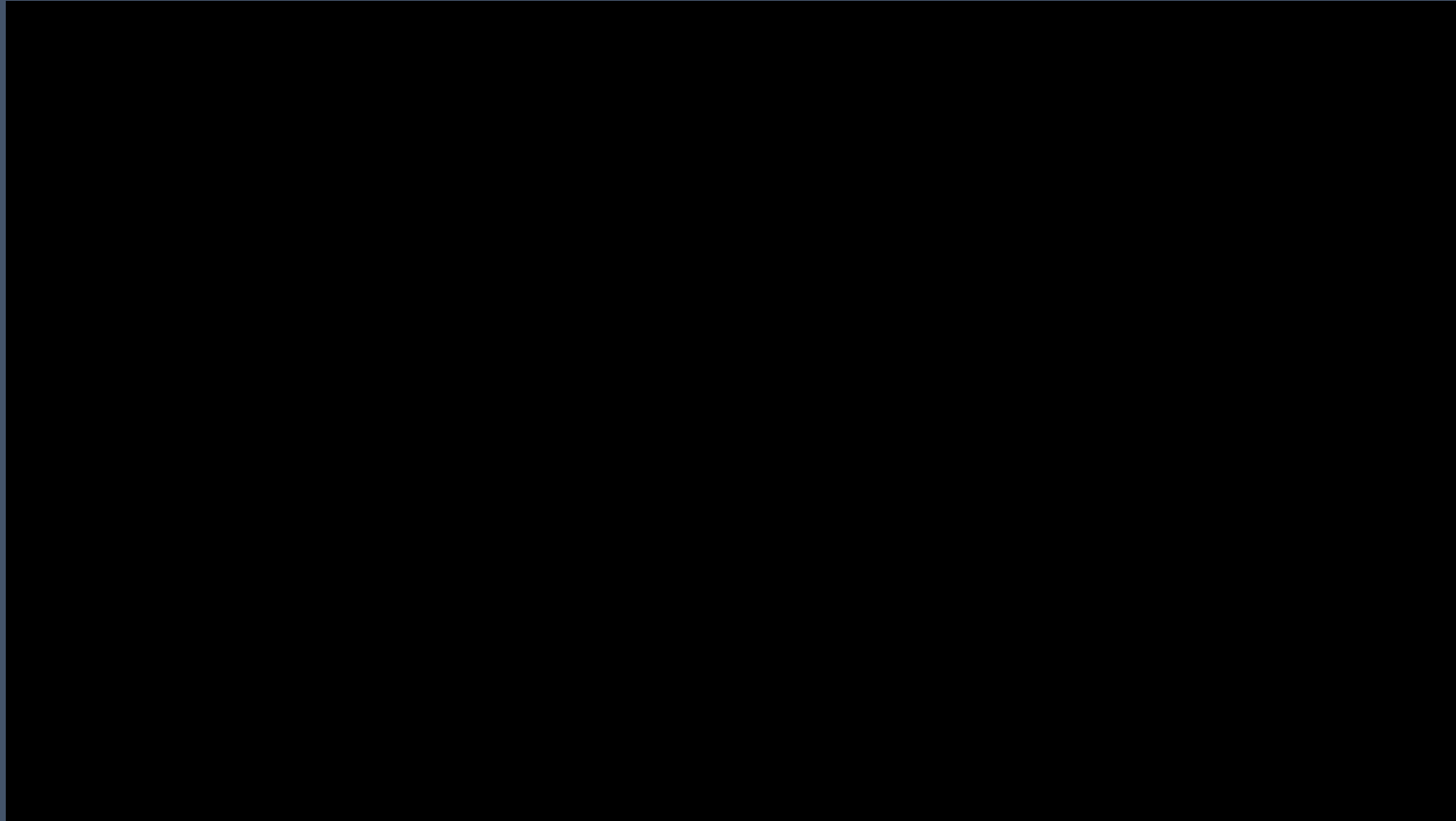
Preserve at least 1cm of mucosa  
at the greater curvature.

Keep approximately  
1 cm away from the Z line.

Ablate in horse-shoe shape with width of  
approximately 1-2cm



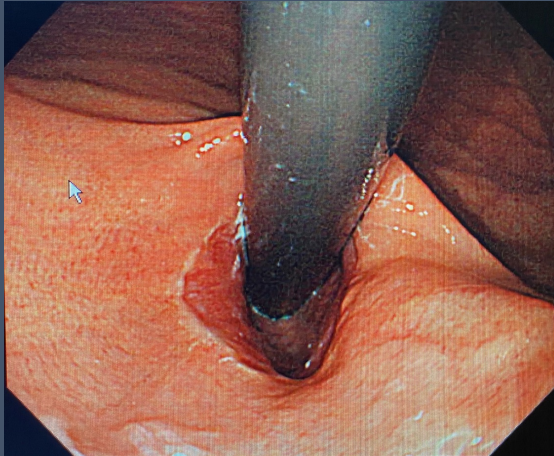
# ANTIREFLUX MUCOSECTOMY (ARMS)



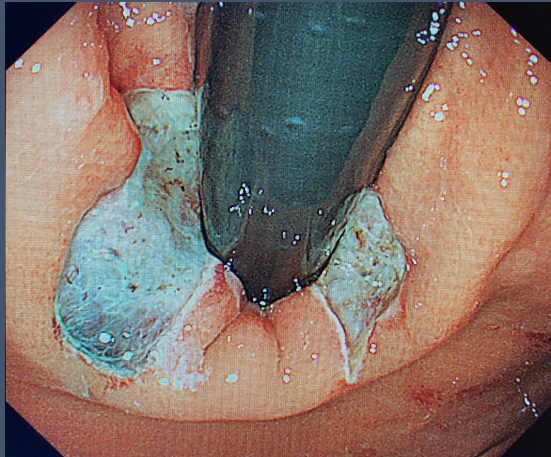


# ARMS AND ARMA

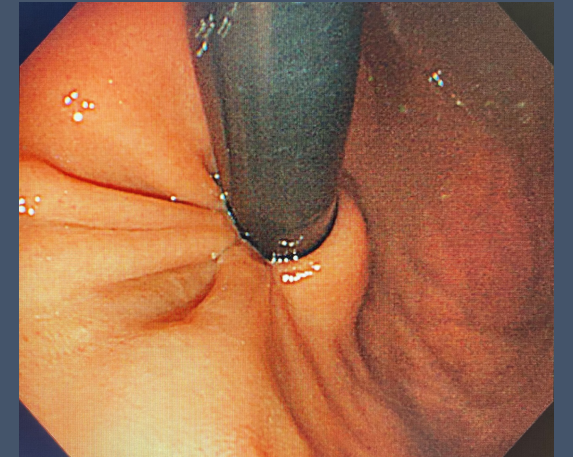
Before ARMS



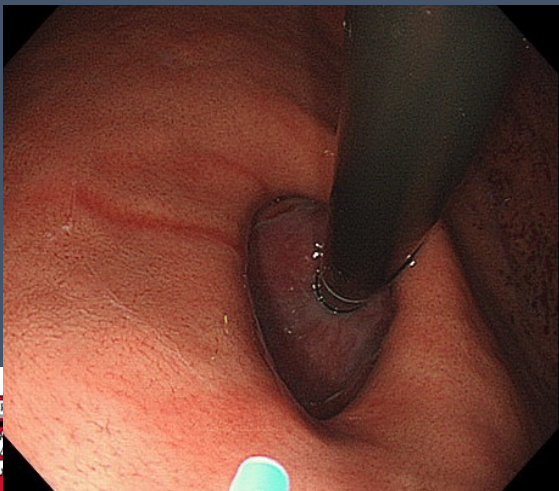
ARMS



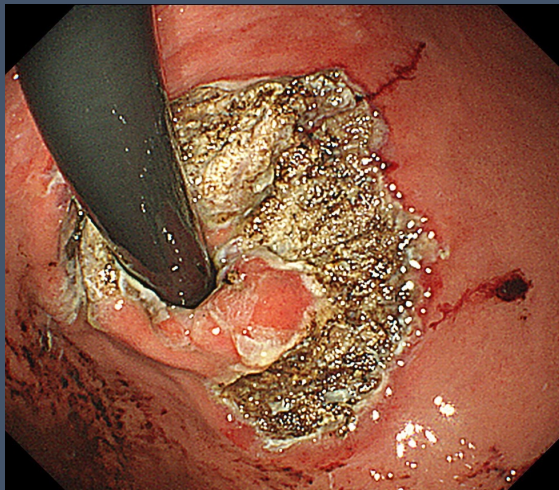
After 1 month



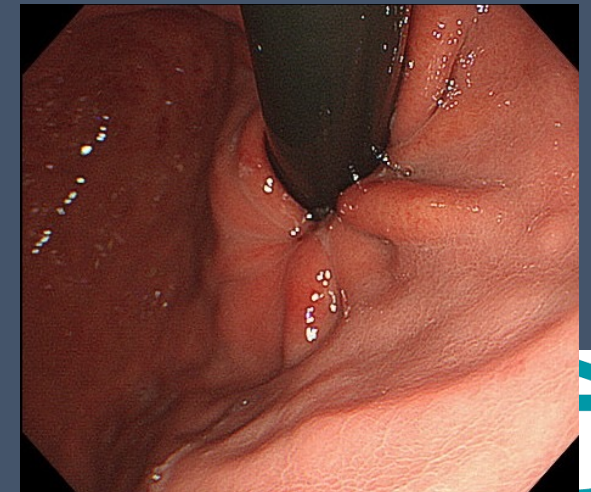
Before ARMA



ARMA



After 1 month







# IDEAL ENDOSCOPIC GERD THERAPY

Effective



Simple



Safe

Cheap

Rescue surgery





# IDEAL ENDOSCOPIC GERD THERAPY

Effective



Simple



Safe

Cheap

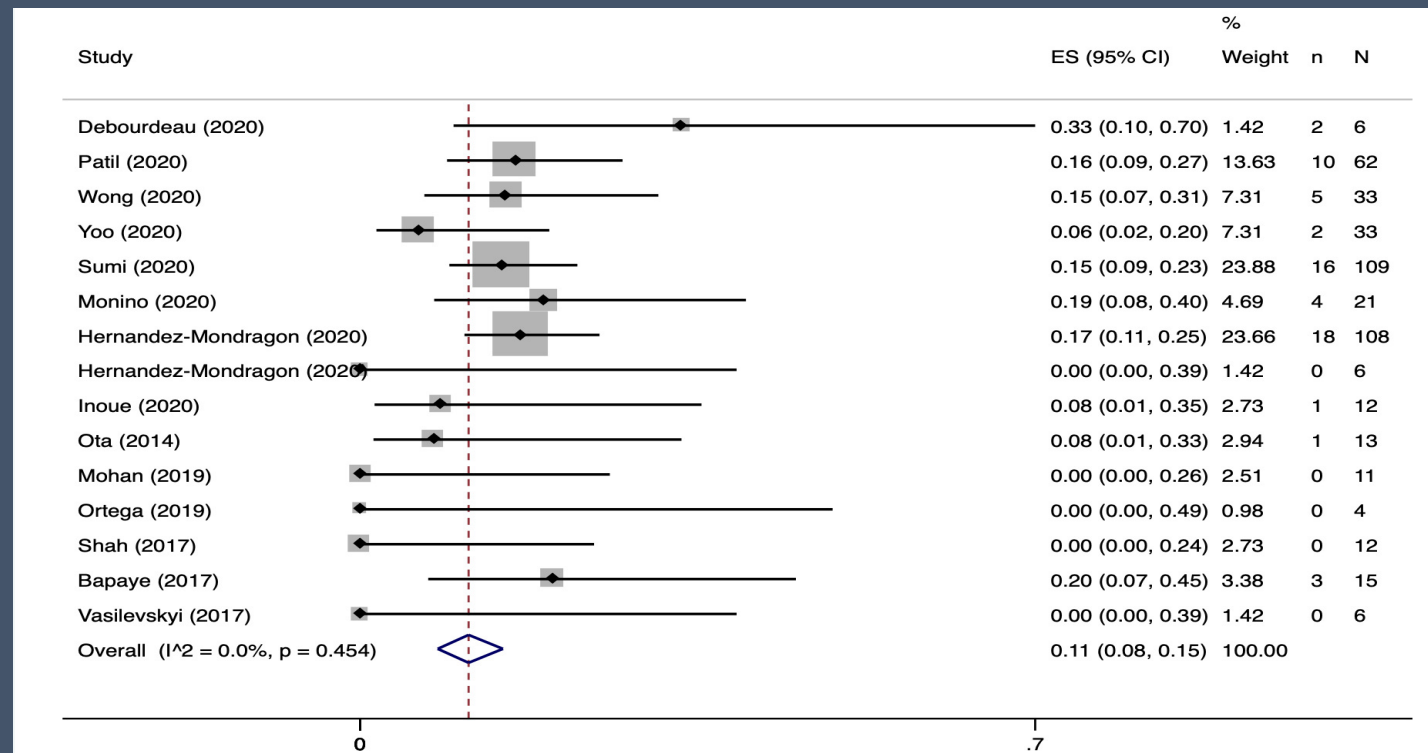
Rescue surgery





# SAFETY

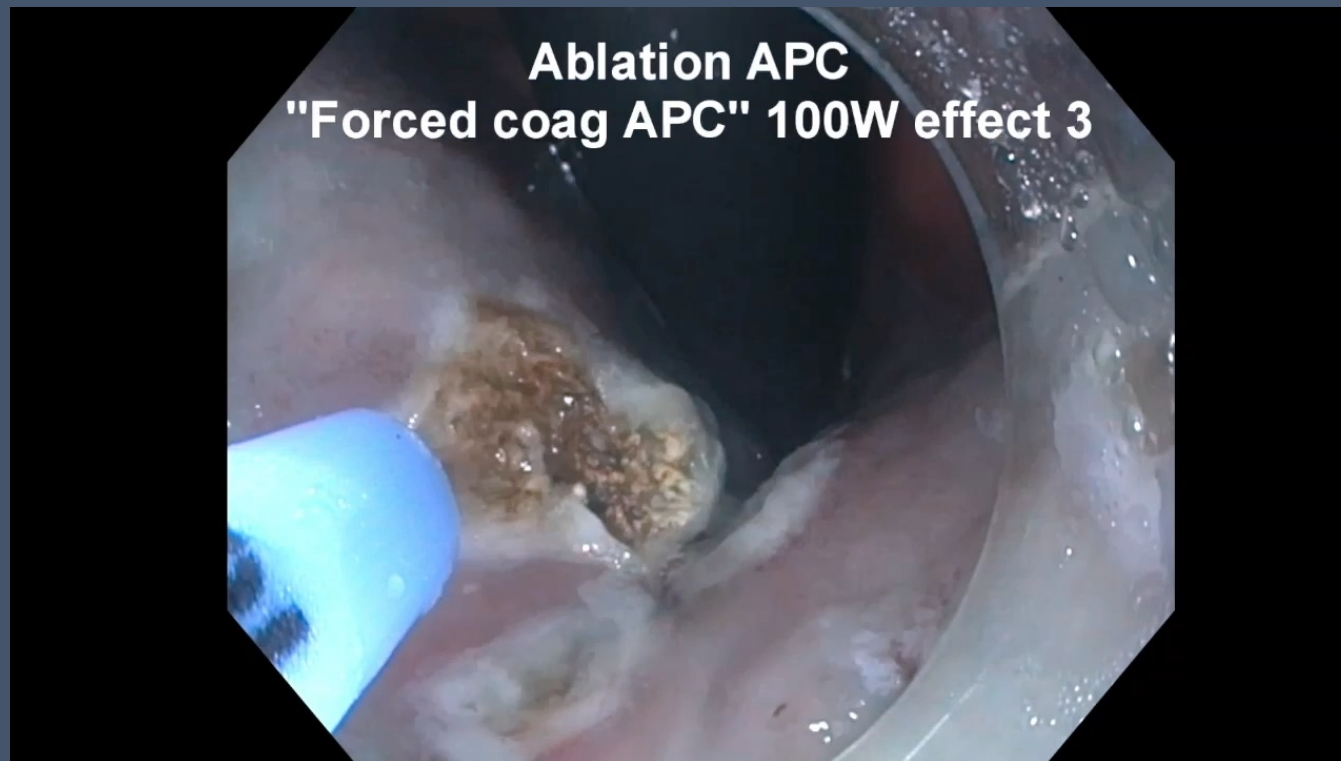
**Adverse events = 11%**





## SAFETY

**Dysphagia = 7% (CI 95%: 8% - 11%)**



**Good response to dilation**

**12 - 13.5 mm!**





# SAFETY

**Adverse events = 11% (CI 95%: 8% - 15%)**

**Bleeding**

2%

**Mortality**

0%

**Perforation**

1%

**Not reported for ARMA**





# IDEAL ENDOSCOPIC GERD THERAPY

Effective



Simple



Safe



Cheap

Rescue surgery





# IDEAL ENDOSCOPIC GERD THERAPY

**No need of add-on devices**



**No need for general anesthesia**

**Ambulatory procedure**





# IDEAL ENDOSCOPIC GERD THERAPY

Effective



Simple



Safe



Cheap



Rescue surgery



*Monino. Endosc Int Open. 2020*

*Hernández Mondragón OV. Gastrointest Endosc.2020*







## LIMITATIONS

No large RCTs

Heterogenous GERD population

Limited to patients without hiatal hernia (< 2 cm)

No long-term follow-up





## LIMITATIONS

### ARMS and ARMA are not included in guidelines

#### RECOMMENDATION

ESGE recommends against the use of antireflux mucosectomy (ARMS) in routine clinical practice in the treatment of GERD because of the lack of data and its potential complications.

Strong recommendation, low quality evidence, level of agreement 100%.





## FUTURE

**Standardize and refine the technique**

**Identify the best candidates**

**Randomized controlled trials**





FUTURE

## Randomized controlled trials





## Randomised controlled trials

### ARMA in PPI dependant GERD

ClinicalTrials.gov Identifier: NCT04711655

Recruitment Status ⓘ : Recruiting

First Posted ⓘ : January 15, 2021

Last Update Posted ⓘ : September 8, 2021

See [Contacts and Locations](#)

**STAY  
TUNED!**

### ARMA vs ARMS

ClinicalTrials.gov Identifier: NCT05422404

Recruitment Status ⓘ : Not yet recruiting

First Posted ⓘ : June 16, 2022

Last Update Posted ⓘ : June 16, 2022

ClinicalTrials.gov Identifier: NCT04036942

Recruitment Status ⓘ : Recruiting

First Posted ⓘ : July 30, 2019

Last Update Posted ⓘ : July 22, 2022





## CONCLUSIONS

1. Nonrandomized studies indicate that ARMS and ARMA are feasible, safe, and effective for patients with GERD without hiatal hernia.
2. ARMS and ARMA will likely become a reality for some patients with GERD, but results from RCTs with long-term follow-up are still needed.





# GREEN ENDOSCOPY

Online education reduce CO2 emission



1000 kg = 2.200  
pounds CO2





## Online education reduce CO2 emission

Position Statement

 Thieme

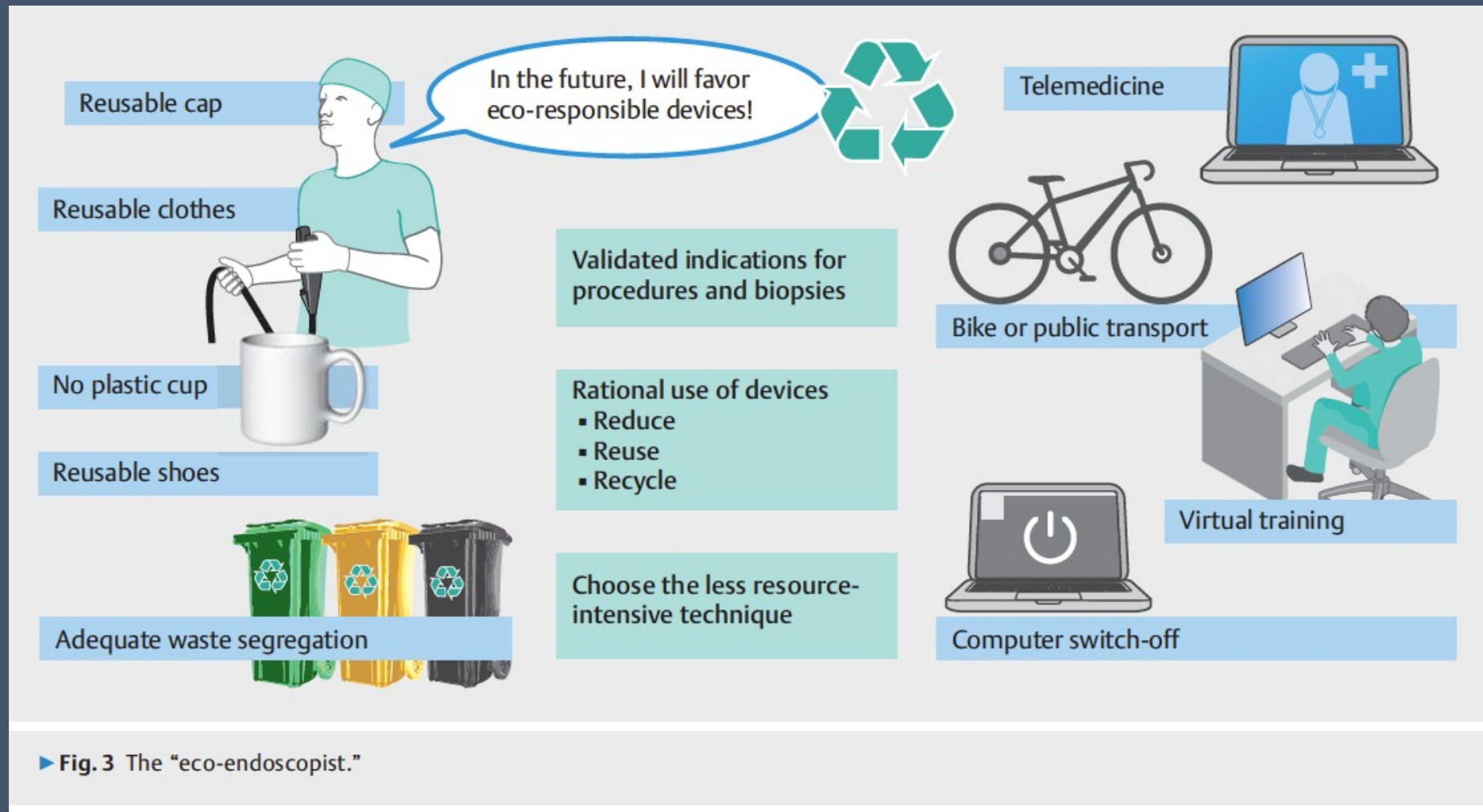
**Reducing the environmental footprint of gastrointestinal endoscopy: European Society of Gastrointestinal Endoscopy (ESGE) and European Society of Gastroenterology and Endoscopy Nurses and Associates (ESGENA) Position Statement**







# BECOME AN “ECO-ENDOSCOPIST”



► Fig. 3 The “eco-endoscopist.”

