Radiofrequency ablation of Barrett’s Esophagus and Dysplasia

Dr Biagio Solìto
Pathogenesis of Barrett’s Esophagus

- Squamous esophagus
- Chronic inflammation
- Barrett's metaplasia
- Low-grade dysplasia
- High-grade dysplasia
- Invasive Adenocarcinoma

Accumulate Genetic Changes

Injury Acid & bile reflux nitrous oxide
Genetics, Gender, race, ? other factors (cox-2)

Ong CA, et al. World J Gastroenterol, 2010
Esophageal Cancer Prevalence and 5-years Survival

Pohl, J Natl Cancer Inst, 2005

(Early) Esophageal Cancer: Therapy

Esophagectomy has been the traditional therapy for High-Grade Dysplasia and Intramucosal Adenocarcinoma

Operative Morbidity and Mortality rates:
- 2 – 7 % (High volume centers)
- >20% (Low volume Hospitals)
- Older age, co-morbidities

(Early) Esophageal Cancer: Therapy

**Surgery**
- Radiotherapy
- Chemiotherapy

**Alternative endoscopic therapies:**
- (EMR) Endoscopic Mucosal Resection
- (ESD) Endoscopic Submucosal Dissection
- (RFA) Radiofrequency Ablation
- (APC) Argon Plasma Coagulation
- (PDT) Photodynamic Therapy (light-sensitizing drug and laser)
- (CT) Cryotherapy (liquid nitrogen)

New endoscopic approaches allow treatment of early lesions with esophageal preservation
Risk of nodal involvement in early esophageal cancer

Barrett’s tissue ~500µm
RFA Depth 500-1,000 µm
PDT – APC - Cryo Depth (?)
EMR Depth
Surgical Depth

LN Metastases

<table>
<thead>
<tr>
<th>Depth</th>
<th>Risk</th>
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<tbody>
<tr>
<td>M</td>
<td>0</td>
</tr>
<tr>
<td>MM</td>
<td>2%</td>
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<tr>
<td>SM</td>
<td>10%</td>
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<tr>
<td>MP</td>
<td>15%</td>
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<td>35%</td>
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<td>45%</td>
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Gastrointest Endosc 2003;58:S3-S43
Barrx™ Radiofrequency Ablation System
Advanced Rf Ablation Technology for Treating Barrett’s Esophagus

Barrx™ Ultra Long RFA Focal Catheter
Barrx™ Channel RFA Endoscopic Catheter
Barrx™ 360 RFA Balloon Catheter
Barrx™ 360 Soft Sizing Balloon
Barrx™ 60 RFA Focal Catheter
Barrx™ 90 RFA Focal Catheter

Barrx™ Flex Generator
• Controls depth of energy delivery, reducing risk of stricture formation.

• Maximizes effectiveness without significant injury to the underlying tissue and allows for the re-growth of healthy tissue.

• Controlled application of energy uniformly removes the epithelium, reducing potential for buried glands and improving patient tolerability.
CR-IM and CR-D were achieved in 92% and 93% of patients, respectively.
New RFA applications

(GAVE) Gastric Antral Vascular Ectasia

Radiation Proctitis

Images Courtesy of Jose Nieto, DO, Borland-Groover Clinic, Jacksonville, FL

Gross, Gastrointest Endosc, 2008
Zhou, Therap Adv Gastroenterol, 2009
Conclusions

The use of radiofrequency ablation (RFA) for eradication of Barrett’s esophagus (BE) has shown promising results in trials conducted at either academic centers or community hospitals.

It has been proved how RFA reduces the risk of neoplastic progression in dysplastic BE and achieves a durable response.

In a multicenter registry conducted at four Italian centers, the observed safety and efficacy outcomes associated with RFA for Barrett’s esophagus are comparable to those previously reported in multicenter trials.

Patients with ADK seem to respond better to the RFA treatment.

More data need to be collected prospectively from more sites to confirm the preliminary outcomes and assess durability and disease progression.
New Technologies Improve Diagnosis in Diseases of Esophagus

Prof. Santino Marchi
Dott. Nicola de Bortoli
BACKGROUND

DISEASES OF THE ESOPHAGUS:
• Heartburn is one of the most frequent symptom (65%) in patients referring for gastrointestinal consultations

• It is an easy clinical diagnosis but...
  • 90% of patients with heartburn are treated
  • 55% of patients with heartburn improve their symptoms
  • 21% of patients had a diagnosis

• UP & COMING ESOPHAGEAL DISEASES:
  • Eosinophilic Esophagitis
  • Achalasia
  • Primary Motor Disorder of the Esophagus
GASTROESOPHAGEAL REFLUX DISEASE

• pH-parameters
  – % time pH<4 (total, upright, recumbent)

• Impedance-parameters
  – Number of reflux episodes (acid, weakly acidic, weakly alkaline)

• Symptom association
  – SI and/or SAP

• **Baseline Impedance**
• **PSPW**
Post-reflux swallow-induced peristaltic waves (PSPW) are frequent in functional heartburn

The PSPW index is defined as the number of refluxes followed within 30 s by a swallow-induced peristaltic wave divided by the number of total refluxes to obtain a parameter representing the efficacy of chemical clearance.

**NOCTURNAL BASELINE IMPEDANCE LEVELS**

- Channel: 3cm
- During overnight rest at 1 am, 2 am and 3 am
- 30-min time window (excluding swallowing, reflux and pH drops)
Impedance-pH reflux patterns can differentiate non-erosive reflux disease from functional heartburn patients

Edoardo Savarino · Patrizia Zentilin · Radu Tutuian · Daniel Pohl · Lorenzo Gemignani · Alberto Malesci · Vincenzo Savarino

Esophageal baseline impedance levels in patients with pathophysiological characteristics of functional heartburn

N. De Bortoli, * L. Martinucci, * E. Savarino, † P. Piaggi, ‡ M. Bellini, * A. Antonelli, § V. Savarino, ¶ M. Frazzoni * & S. Marchi *

**Diagnostic Accuracy**

- **50%** pH-metry alone
- **74%** MII-pH 24-h
- **89%** MII-pH -baseline and PSPW
ABNORMAL MOTILITY OF THE ESOPHAGUS
(Eosinophilic Esophagitis; Achalasia; Primary Motor Disorder of the Esophagus)

STANDARD ESOPHAGEAL MANOMETRY

HIGH RESOLUTION MANOMETRY

Landscape plot

Pressure Topography Plot

8 CHANNELS
## Subtypes of Achalasia

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Type I</th>
<th>Type II</th>
<th>Type III</th>
<th>All Types</th>
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<tbody>
<tr>
<td></td>
<td>Classic</td>
<td>compression</td>
<td>Spasm</td>
<td>Types</td>
</tr>
<tr>
<td>Botulinum toxin</td>
<td>0% (0/2)</td>
<td>86% (6/7)</td>
<td>22% (2/9)</td>
<td>39% (7/18)</td>
</tr>
<tr>
<td>Pneumatic dilation</td>
<td>38% (3/8)</td>
<td>73% (19/26)</td>
<td>0% (0/11)</td>
<td>53% (24/45)</td>
</tr>
<tr>
<td>Heller Myotomy</td>
<td>67% (4/6)</td>
<td>100% (13/13)</td>
<td>0% (0/1)</td>
<td>85% (17/20)</td>
</tr>
<tr>
<td>All (any) interventions</td>
<td>44% (7/16)</td>
<td>83% (38/46)</td>
<td>9% (2/21)</td>
<td>56% (47/83)</td>
</tr>
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</table>

### Esophageal Dilation
- Poor response to botox
- Better response to any therapy
- Very little dilation

### Predominant Chest Pain
- Poor response to any therapy
- Myotomy may provide some relief

### Improvement of Diagnosis: 45%

### Esophagogastric Junction Outflow Obstruction

### Improvement of Diagnosis: 100%

### Eosinophilic Esophagitis

### Improvement of Diagnosis: 70%

Clinical pre-diagnosis that requires histopathological confirmation

**Rapid contractions with normal latency**
- Rapid contraction with ≥ 20% of swallows
- DL > 4.5 s
CONCLUSIONS

• New technologies improve our knowledges in esophageal diseases and especially improve our diagnostic power
• Baseline impedance value and PSPW will be considered in the new Classification of GERD
• High Resolution Manometry took us a lot of new informations about esophageal physiology and pathophysiology.
• It will be used to re-evaluate (re-write) the classifications of motor esophageal diseases.
“A fundamental rule in new technology says that whatever can be done will be done.” Adrew Groves

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