Endoscopic Resection of Early Upper GI Malignancies

McGill Upper GI Cancer Symposium
October 13, 2018

Lorenzo Ferri MD PhD
Professor of Surgery and Oncology
McGill University
Endoscopic Resection of Early Esophageal Cancer

299 Pts
116 EMR / 183 ESD
Sapporo, Japan

Takahashi 2009
Squamous Cell Carcinoma

1000 Pts
All EMR
Germany

Pech 2014
Intramucosal Adenocarcinoma
Two Main Approaches

Endoscopic Mucosal Resection  
Endoscopic Submucosal Dissection
EMR

• Technically Facile

• Standard Endoscopic Equipment

• Submucosal Injection?
EMR is great for small lesions
But what if it’s larger than 1 cm?
<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>En Bloc</th>
<th>Local Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manner &amp; Ell</td>
<td>43</td>
<td>59%</td>
<td>29%</td>
</tr>
<tr>
<td>Kawaguchi</td>
<td>266</td>
<td>N/A</td>
<td>35%</td>
</tr>
<tr>
<td>Mitsunaga</td>
<td>296</td>
<td>N/A</td>
<td>18%</td>
</tr>
<tr>
<td>Yahagi - EMR</td>
<td>100</td>
<td>55%</td>
<td>13%</td>
</tr>
<tr>
<td>Yahagi - ESD</td>
<td>487</td>
<td>95%</td>
<td>0.2%</td>
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</table>
Endoscopic Submucosal Dissection

3 cm
ESD - Location

• Stomach – in endoscopy suite
  – 45 - 60 minutes

• Esophagus – in OR
  – 90 minutes
ESD - Location

- Stomach – in endoscopy suite
  - 45 - 60 minutes

- Esophagus – in OR
  - 90 minutes
Additional Equipment

- Standard single channel irrigating gastroscope
- Distal Cap
- Needle Knives
  - ERCP needle knife
  - IT-2
  - Dual Knife
- Coag Grasper
- Endoscopic Clips
Generator

- **ERBE VIO 300D**

- **Markings:**
  - APC

- **Precut:**
  - DRY CUT, 50W, Effect4 (Needle knife)

- **Circumferential incision:**
  - ENDO CUT Q, cut duration 3, cut interval 2, Effect2

- **Submucosal dissection:**
  - SWIFT COAG 100W, Effect 5

- **Hemostasis:**
  - SOFT COAG 100W, Effect6 (Hot biopsy)
Mark out the Margins
Submucosal Injection

- Glycerol – 10%
- Voluven (Tetrastarch)
- Saline

Add Epinephrine and Methylene Blue
Endoscopic Submucosal Dissection
Endoscopic Submucosal Dissection
Size Limitation?

Avoid Circumferential Resection > 3cm
ESD Complications - Bleeding

Post Procedure Bleeding = (3%) ESD
During Procedure Bleeding = 100%!!!
Use clips, epi injection, APC, Coag Grasper, Hemospray
ESD Complications - Perforation

uT1N0 SCC – mid esophagus

Perforation = 2/35 (5%) Esophageal ESD – all repaired endoscopically
Endoscopic Submucososal Dissection

Pathology
- Margin Status
  - circumferential/deep
- Grade
- Size
- Lymphovascular Invasion
- Depth
  - $T1a/T1b$ (SM1/2/3)
### Risk of Occult Lymph Node Metastasis

<table>
<thead>
<tr>
<th>Depth</th>
<th>Mucosal cancer</th>
<th>Submucosal cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No ulceration</td>
<td>Ulceration</td>
</tr>
<tr>
<td></td>
<td>≤ 20 mm</td>
<td>≤ 30 mm</td>
</tr>
<tr>
<td></td>
<td>&gt; 20 mm</td>
<td>&gt; 30 mm</td>
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</tbody>
</table>

- **Differentiated**
- **Undifferentiated**

**Legend**
- **Absolute indications for EMR or ESD**
- **Expanded indications for ESD**
- **Consider surgery**
- **Surgery (Gastrectomy and lymph node dissection)**

*Gastric Cancer 2017*

**Indications Based on Risk of LN Metastasis**
- “Absolute EMR/ESD” Indications <1%
- “Non Curative” EMR/ESD = 5-20%
Lymph Node Metastasis in Esophageal Cancer is High

Rate of LN Mets in Resected T1a ADC

<table>
<thead>
<tr>
<th>Study</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Barbour 2010</td>
<td>0%</td>
</tr>
<tr>
<td>Sepesi 2010</td>
<td>0%</td>
</tr>
<tr>
<td>Moss 2011</td>
<td>0%</td>
</tr>
<tr>
<td>Rice 1998</td>
<td>3%</td>
</tr>
<tr>
<td>Gockel DDW 2009</td>
<td>7%</td>
</tr>
<tr>
<td>Pennathur 2009</td>
<td>7%</td>
</tr>
<tr>
<td>Altorki 2008</td>
<td>7%</td>
</tr>
</tbody>
</table>

Lymphatic channels in Lamina Propria

Tom Rice, Clev Clinic
Predicting Lymph Node Metastases in Early Esophageal Adenocarcinoma Using a Simple Scoring System

Lawrence Lee, MD, MSc, Ulrich Ronellenfitsch, MD, PhD, Wayne L Hofstetter, MD, FACS, Gail Darling, MD, FACS, Timo Gaiser, MD, Christiane Lippert, MD, Sebastien Gilbert, MD, FACS, Andrew J Seely, MD, PhD, FACS, David S Mulder, MD, FACS, Lorenzo E Ferri, MD, PhD, FACS

Metastatic Lymph Nodes

258 pts with pT1 ADC – McGill/Ottawa/Toronto/Mannheim/MD Anderson

Scoring Nomogram

<table>
<thead>
<tr>
<th>Variable</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>+1 per cm</td>
</tr>
<tr>
<td>Depth</td>
<td></td>
</tr>
<tr>
<td>T1a</td>
<td>+0</td>
</tr>
<tr>
<td>T1b</td>
<td>+2</td>
</tr>
<tr>
<td>Differentiation</td>
<td></td>
</tr>
<tr>
<td>Well</td>
<td>+0</td>
</tr>
<tr>
<td>Moderate</td>
<td>+2</td>
</tr>
<tr>
<td>Poor</td>
<td>+2</td>
</tr>
<tr>
<td>Lymphovascular invasion</td>
<td>+4</td>
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<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Risk of LNM</th>
<th>Points</th>
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<tbody>
<tr>
<td>Low</td>
<td>1% - 4%</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Moderate</td>
<td>7 – 10%</td>
<td>2 - 3</td>
</tr>
<tr>
<td>High</td>
<td>&gt;17%</td>
<td>4+</td>
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</table>
Application of the Scoring Nomogram

pT1b, 1 cm Well Diff, LVI-, R0

Risk of Occult LN Metastasis
Score = 3
Risk = 7-10%

Good PS

Poor PS

Surveillance Q3Months
Putting it all together

**HYBRID APPROACH**

*Resect* Nodules/Early Cancer

*Ablate* Flat Barrett’s Esophagus

67 y.o M, C0M5 (>50% circumference)

Multifocal HGD + foci of invasive carcinoma
pT1a (M3), 1 cm, well diff, no LVI, R0 (for cancer)

Risk of LN metastasis = 1%

Lee et al, JACS 2013
Not all patients with Early Esophageal Neoplasia are amenable to endoscopic treatment

- Ultra-long BE (*EURO-II trial – 12 cm??*)
- Extensive nodular esophagus
- Patient factors preclude repeated RFA
Not all patients with Early Esophageal Neoplasia are amenable to endoscopic treatment

• Post Endoscopic Resection
  – Positive deep margins
  – Negative deep margins with high risk of LN metastasis
Difficult Situations

• Proximal Lesions –
  – Difficult to maintain Insufflation
  – Use overtube

• Circumferential Tumors –
  – 100% circumference
    • Less than 3 cm
    • Prefer to do sequential
  – 75% circumference
    • Any length
Esophagectomy for Barretts Early Neoplasia
McGill Experience

- 2005-2017
  - 650 esophagectomies
  - 47 for HGD/pT1a/pT1b
    - Laparoscopic 45/47 (2 Transhiatal)
      - pT1b with positive deep margins – 6 patients
      - pT1b negative margins but high risk of LN metastasis – 2 patients
      - Barrett’s with HGD – ultra long BE +/- multi focal nodules
      - uT1b or T2 on EUS
Endoscopic Submucosal Dissection for Esophageal Adenocarcinoma: A North American Perspective

Philippe Bouchard\textsuperscript{1}, Jonathan Cools-Lartigue\textsuperscript{1}, Jonathan Spicer\textsuperscript{1,2}, Carmen L. Mueller\textsuperscript{1,2}, Lorenzo E. Ferri\textsuperscript{1,2}

\textsuperscript{1}McGill University, Montreal, QC, Canada
\textsuperscript{2}Division of Thoracic Surgery, McGill University

DDW Chicago, May 6-9\textsuperscript{th} 2017
ESD for Barrett’s Neoplasia
McGill Experience

• 27 ESD for Early Barrett’s Esophageal Neoplasia
  – Nodular HGD - 2
  – IMC - 4
  – Invasive Adenocarcinoma - 21

• En bloc Resection 25/27 (93%)
  – R0 – 18/27 (67%)
  – R1 - 9/27 (33%)
<table>
<thead>
<tr>
<th>Procedure time (Minutes)</th>
<th>Mean [IQR]</th>
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<tbody>
<tr>
<td></td>
<td>80 [50]</td>
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<table>
<thead>
<tr>
<th>Length of stay (Days)</th>
<th>Mean [IQR]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 [1]</td>
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<table>
<thead>
<tr>
<th>Early Complication</th>
<th></th>
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<tbody>
<tr>
<td>Perforation</td>
<td>2</td>
</tr>
<tr>
<td>Major Bleeding</td>
<td>0</td>
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<table>
<thead>
<tr>
<th>Late Complication</th>
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<tbody>
<tr>
<td>Major Bleeding</td>
<td>0</td>
</tr>
<tr>
<td>Stricture</td>
<td>0</td>
</tr>
<tr>
<td>Recurrence of</td>
<td>1</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td></td>
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McGILL UNIVERSITY
DEPARTMENT OF SURGERY
54 y.o M - T1a SCC upper third
Endoscopic Resection – ESD

Endoscopic Submucosal Dissection

More technically challenging than EMR
Endo-Therapy accessories for ESD

- Needle
- Knife
- Hook
- Knife
- IT Knife
- Flex Knife

IT knife

Dual knife

Hook knife

Needle knife
Mucosal Incision

- Start distal –
  - define distal margin
- ERCP needle knife –
  - Continue with IT-2
Submucosal Dissection

- Short Distal Attachment Cap
- IT-2 knife
Is this a Curative Resection?

Low Risk of OCCULT Lymph Node Metastasis

Negative (Deep) Margins