Device-assisted Enteroscopy:

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Disclosures:

• Consultant – Olympus USA
• Grant support- Olympus USA
Small bowel imaging:

• CT-enterography

• MR-enterography

• Barium studies
2001
Video Capsule Endoscopy (VCE)

2001
Double Balloon Enteroscopy (DBE)

2007
Single Balloon Enteroscopy (SBE)

2008
Spiral Enteroscopy (SE)
Indications for deep enteroscopy:

- Small bowel bleeding
- Small bowel polyps and tumors
- Foreign body retrieval
- Histological confirmation
- Tattooing & laparoscopy
- Small bowel stricture
- Altered anatomy endoscopy
Double balloon enteroscopy:

- Devised by Yamamoto in 2001
- First procedure to offer true deep enteroscopy
- Learning curve
- Time consuming
- Pan-enteroscopy in a sub-group of patients
- Therapy possible consistently
- Fuji platform
Single balloon enteroscopy:

• Similar to DBE in many ways
• Depth of insertion not as good as DBE
• Complete enteroscopy less commonly achieved
• Olympus platform
Spiral enteroscopy:

- Fuji DBE or Olympus SBE scope
- Faster
- Quicker learning curve
- Stable platform
- Antegrade enteroscopy
- Retrograde insertion
- Pan-enteroscopy rarely achieved
- Curtain rod pleating
<table>
<thead>
<tr>
<th>Author</th>
<th>Study Design</th>
<th>Patients (#)</th>
<th>Enteroscopy (# patients)</th>
<th>Deepest Insertion avg (cm)</th>
<th>Average Total Time (min)</th>
<th>Diagnostic Yield (%)</th>
<th>Complete Enteroscopy</th>
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<tbody>
<tr>
<td>May et al 2011</td>
<td>P, R, C</td>
<td>10</td>
<td>SE</td>
<td>250*</td>
<td>43*</td>
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<td></td>
<td></td>
<td></td>
<td>DBE</td>
<td>310*</td>
<td>65*</td>
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<tr>
<td>Messer et al 2013</td>
<td>P, R</td>
<td>26</td>
<td>A-SE</td>
<td>268.46*</td>
<td>43.4*</td>
<td>69</td>
<td>12/13 (92%)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>A-SE</td>
<td>78.46*</td>
<td>51.92*</td>
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<td></td>
<td></td>
<td>A-DBE</td>
<td>346.15*</td>
<td>59.6*</td>
<td>46</td>
<td>1/13 (8%)</td>
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<td>R-DBE</td>
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<td>76.08*</td>
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<td>Rahmi et al 2013</td>
<td>P, Non-R</td>
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<td>75</td>
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<td>Despott et al 2015</td>
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<td>54</td>
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P: Prospective  
R: Randomized  
C: Cross-over  
T: Tandem  
*Statistically significant values
## Enteroscopy duration:

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<thead>
<tr>
<th>Author</th>
<th>Patients (#)</th>
<th>Enteroscopy</th>
<th>Average Time (min)</th>
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<td>Domagk et al 2011</td>
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<td>May et al 2011</td>
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<td>Messer et al 2013</td>
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<td>R-SE</td>
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<tr>
<td>Despott et al 2015</td>
<td>15</td>
<td>SE</td>
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A-SBE: antegrade single balloon enteroscopy  
R-SBE: retrograde single balloon enteroscopy  
A-DBE: antegrade double balloon enteroscopy  
R-DBE: retrograde double balloon enteroscopy
<table>
<thead>
<tr>
<th>Author</th>
<th>Device</th>
<th>Country/Region</th>
<th>Total (%)</th>
<th>Bidirectional (%)</th>
<th>Antegrade (%)</th>
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<tr>
<td>May et al 2010</td>
<td>SBE</td>
<td>Germany</td>
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<td>Gerson 2009</td>
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<td>Germany</td>
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</tbody>
</table>
Setting up:

- VCE, CT-enterography, MR-enterography
- Upper 2/3 and lower 1/3
- Spirus/ DBE from above
- DBE from below
Discussion points:

• Where am I?
• How far can one go?
• 250-300 cm from above
• 120-200 cm from below
• Adhesions
Case 1

- 57 year old female
- Crohn’s disease s/p ileal resection
- Admitted with hematochezia; EGD and colonoscopy unrevealing
- VCE performed; retained at small bowel stricture
- Patient started on prednisone
- KUB: capsule present at 4 weeks
Case 2

- 48 year old woman with PJS
- Previous hx bowel resection
- Recurrence of abdominal pain
- VCE: multiple large polyps in the mid-small bowel
Case 3

- 44 year old Female
- Previous cholecystectomy, complicated by biliary stricture; underwent Roux-en-Y:hepaticojejunostomy
- Presents with RUQ pain, nausea
- TB 5.3, AP 556, AST 81, ALT 53
- CT shown
- Attempt to reach the anastomosis using “push” technique and pediatric colonoscope unsuccessful
Case 4:

- 70 year old man presents to UMass ER
- 3 days of worsening abdominal pain
- Upper abdominal tenderness
- No fever, WBC normal
- CT-scan
- Surgical consult
Case 5:

- 72 year old lady with renal impairment and GI bleeding
- 10 units transfused
- EGD and colonoscopy-negative
- VCE- active mid-jejunal bleeding
• 27 cases done
• Complete enteroscopy in all cases
• All under one hour
• Last 3 cases complete antegrade unidirectional enteroscopy, mouth to cecum at 18, 22 and 20 minutes
MOTORIZED SPIRAL ENTEROSCOPY: A NEW TECHNIQUE FOR ONE-STAGE COMPLETE ENTEROSCOPY

Edward Belkin, MD; Kanishka Bhattacharya, MD; Elizabeth A. Odstrcil, MD; David R. Cave MD, PhD; Peter V. Draganov, MD; Daniel C. DeMarco, MD
Motorized Spiral Enteroscope
<table>
<thead>
<tr>
<th>Subject #</th>
<th>Age</th>
<th>Sex</th>
<th>Indication(s)</th>
<th>BMI</th>
<th>ASA</th>
<th>Insertion Time (min)</th>
<th>Total Procedure Time (min)</th>
<th>Point of Deepest Insertion</th>
<th>Complications</th>
<th>Final Diagnosis</th>
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<tbody>
<tr>
<td>1</td>
<td>24</td>
<td>M</td>
<td>Abdominal Pain; VCE: ulcerated mucosa</td>
<td>40</td>
<td>III</td>
<td>33</td>
<td>41</td>
<td>Distal Jejunum</td>
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<td>None</td>
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<tr>
<td>2</td>
<td>22</td>
<td>M</td>
<td>CT scan finding of intussusception</td>
<td>21</td>
<td>II</td>
<td>32</td>
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<td>Cecum</td>
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<td>None</td>
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<tr>
<td>3</td>
<td>61</td>
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<td>GI Bleeding; VCE: AVM</td>
<td>27</td>
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<td>94</td>
<td>Cecum</td>
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<tr>
<td>4</td>
<td>58</td>
<td>F</td>
<td>Iron Deficiency Anemia; VCE finding of AVM</td>
<td>23</td>
<td>II</td>
<td>47</td>
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<td>6</td>
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<td>M</td>
<td>GI Bleeding</td>
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<td>III</td>
<td>59</td>
<td>78</td>
<td>Cecum</td>
<td>Bleeding Meckel's diverticulum</td>
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<tr>
<td>7</td>
<td>29</td>
<td>M</td>
<td>Suspected Crohn's; VCE: bleeding AVM and small polyp</td>
<td>28</td>
<td>II</td>
<td>49</td>
<td>72</td>
<td>Cecum</td>
<td>None</td>
<td>Crohn's, Inflammatory polyp</td>
</tr>
</tbody>
</table>
European Novel Motorized Spiral Enteroscopy Trial:

- Enrolled: N = 58 (of 132)
- Female 21, Male 37, mean age 62 (20-92)
- Unidirectional pan-enteroscopy 6
- Diagnostic yield 86% (50/58)
- Adverse events 12% (7/58)- mucosal lesion, hypotension, bradycardia, epigastric pain, parotitis.
Take home points:

- Complete enteroscopy
- Have I got to where I needed to be?
- Tattoo - raise bleb with saline and then tattoo
- Did I solve the problem?
- Use CO2
- Deep sedation or general anesthesia