The 4th annual Schultz Lecture

Interventional endoscopy and Surgeons: The future of surgery is *Flexible!*

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Observation

Surgery is evolving away from a tactile craft to a visual (image guided), computer augmented one

- Orthopedics
- Urology
- Neurosurgery
- GYN
- Vascular
- General/GI
Observation 2

- Minimally Invasive is how the public wants it...
“Surgery, gaining much from the general advancement of knowledge will be rendered both knifeless and bloodless…”

John Hunter, London 1762
The laparoscopic revolution...
“The greatest medical advances of the 20th century include:

• Anesthesia
• blood typing/ transfusion
• surgical nutrition
• organ transplant
• cardiac bypass
• laparoscopic surgery

James Thompson, MD
presidential address,
Bulletin of the ACS; 1/2000
By 2005, every general/GI surgery had been performed with a minimally invasive, laparoscopic approach...
Observation 3

- Flexible endoscopy is continuing to evolve into an increasingly surgical tool...
Advanced endoluminal GI surgeries:

• Mucosal ablation
• Partial thickness resection
• Full thickness resection
• Perforation repair/treatment
• Stenting
• Antireflux surgery
• Bariatric surgery
Flexible endoscopic instrumentation

• Snares
• Clips
• Stents
• Endoloops
• Argon beam
• RFA
• Retrieval baskets
• Bipolar vessel sealing
• FNA needles
• Ultrasound
• staplers
Observation 4

• Much of GI surgery as practiced now is disappearing…
Surgery  Endoscopy

- Large colon polyps
- Common duct explorations
- GI bleeding
- Esophageal varix surgery
- Bile duct and foregut/hindgut palliative surgery
- Open Zenkers excision
- Pancreatic pseudocyst drainage
- Iatrogenic perforation repair
- Transthoracic repair esophageal perforation
- Esophageal exclusions
- Esophagectomy for HGD Barretts
- Early gastric cancers
- Pancreatic necrosectomy
Stents for perforations
<table>
<thead>
<tr>
<th>Operative</th>
<th>Non-operative</th>
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<tbody>
<tr>
<td>Debride and drain</td>
<td>Clips</td>
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<tr>
<td>Primary closure</td>
<td>Stent</td>
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<tr>
<td>Exclusion</td>
<td>Clip + stent</td>
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<tr>
<td>Esophagectomy</td>
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<tr>
<td>Subsequent surgery</td>
<td>Subsequent surgery</td>
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<tr>
<td>Hospital stay</td>
<td>Hospital stay</td>
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<td>19</td>
<td>8.5</td>
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Barrx RF ablation
Complete Response after HALO³⁶⁰
mucosectomy
Extended mucosectomy (ESD)
Treatment of Barretts HGD
Under current development…

- Full thickness GI excision
- Local cancer diagnosis and treatment
- Ablation of GI premalignacies and cancers in the whole GI tract
- Bariatric surgery
- Intrathoracic / intrabdominal node harvests
- Antireflux surgery
Endoscopic bariatric procedures
Intra-abdominal/intrathoracic EUS/node biopsy

Fritscher-Ravens GIE 2006
...at this rate, this could be bad for surgery
Endoscopy and surgeons – what happened?
In 1929 one of the first surgical endoscopists publishes his findings from a series of 4,000 rigid upper endoscopies for peptic complaints.
History of Endoscopy

- 1853 – “Endoscope” coined
- 1868 – Gastroscopy
- 1881 – Esophagoscope
- 1957 – Fiberscope
- 1959 – colonic polypectomy
- 1968 – ERCP
- 1985 – PEG tubes
- 1986 – Varices banding
Zetka’s summation of surgeons and endoscopy:

- Flexible endoscopy was developed by and belonged to surgeons in the 70’s…
- A sub-group of GI physicians in the late 70’s advocated a specialty of medical endoscopists…
- Surgeons by and large were uninterested in this “diagnostic” modality feeling it was “distant from their tactile skill set and feeling their market hold to be invulnerable”
- GI ran with it and it reconfigured their medical specialty into an interventional endoscopic one…
“In response to their turf losses to these competitors (medication, IR and endoscopists) general surgeons were forced to change their orientation to the scope technology. To protect their livelihoods in an increasingly uncertain environment, surgeons embraced the endoscope during the 80’s and staked claims over its operative applications… [but] Surgeons, by and large, could not wedge their way into the endoscopy markets that gastroenterologists had already developed.”

Zetka JR, 2003
Observation 5:

• NOTES is a very important and perhaps critical development for surgery…
The true importance of NOTES…

- NOTES has shaken surgeons and industry out of their laparoscopic induced coma.
- NOTES may be even less invasive and better care for patients.
- NOTES may be the entrée needed for surgeons to resume a leadership role in interventional flexible endoscopy.
Endoscopes are an old technology

1982 Videoscope
DDES

Boston Scientific
Olympus EndoSamurai
Anubiscope: Storz
The NOTES Toolbox

Dissection
Articulating Hook

Dissection
Articulating Needle Knife

Dissection
Articulating Hook

Dissection
Articulating Grasper

Manipulation
Articulating Grasper

Ligation
Flex Clip Applier

Tissue Sampling
Articulating Biopsy Forceps

Specimen Retrieval
Articulating Specimen Bag

Cutting
Flexible Scissors

ACCESS
NOTES Trocar and Rotary Veress Needle

Hemostasis
Bela Bipolar Forceps

Dissection
Oscar Marylands

Closure/Suturing
TAS

Adaptation of laparoscopic tools to a smaller, flexible, platform

Ethicon

- 18 patients: 12 female, 3 male
- Age 39 – (26 – 66)
- BMI 33 – (25 – 37)
- 10 - Biliary cholic with stones
- 3 – biliary dyskinesia
- 2 – acute cholecystitis
Results:

• 1 patient 3 ports, 1 patient 2 ports, 3 patients 1 port + Berci needle, 5 Berci needle only, 8 no assist (true NOTES)

• Mean time = 4.1 hr (145 – 310 min)

• Intraoperative Complications:
  – 1 pharyngeal laceration
  – 2 positive leak tests with oversew
  – 1 gastric wall bleed
  – 2 stone spillage
1 return to OR POD 1 for pain
3 numb tongue
3 post op nausea
Length of stay:
- 15 patients 24 hr stay,
- 1 patient home same day,
- 2 pt 48 hr stay
Max Pain score

<table>
<thead>
<tr>
<th>NOTES</th>
<th>vs</th>
<th>lap Chole</th>
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<tbody>
<tr>
<td>RR</td>
<td>6.0</td>
<td>6.5</td>
</tr>
<tr>
<td>6 hr</td>
<td>5.5</td>
<td>4.2</td>
</tr>
<tr>
<td>24 hr (pharynx)</td>
<td>4.0</td>
<td>5.0</td>
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9 patients report minimal or no abdominal pain
Long term FU

- **2 weeks:** no complications, pain score = 0
- **1 year** (9 patients):
  - no complaints, GRQOL = baseline
  - EGD – normal
  - 9 satisfied or very satisfied
  - 9 “would recommend to friends or family”
Observation: cholecystectomy is not the “killer app” for NOTES…
POEM procedure

- DDW 2008
- 4 cases
- ESD technique
Per-oral endoscopic myotomy (POEM) for consecutive 43 cases of esophageal achalasia]

- Mixed motility disorders
- 2 reoperative
- 3 sigmoid esophagus
- Minimal complications
Portland Experience

• IRB approval 9/2010
• Pure achalasia
• HRM, QOL, timed barium swallow
• 1st case Sept 27, 2010
• Currently 10 cases
Circular myotomy
• Operative time = 128 min (118 – 180)
• 1 mucosal perforation stomach
• 24 hour hospital stay
• Dysphagia symptom score 3.6 – 1.6
• No pain medications at discharge
Prediction

• In 3 years laparoscopic Heller myotomy will no longer be the “gold standard”
Transcervical esophageal mobilization

- Sentinel node
- Cancer staging
- Tumor resections
- Esophageal mobilization
“Transrectal colectomy may be the one of the best applications for \textit{NOTES}…”

- Large access for multiple instruments
- Can use rigid and flexible access
- No opening of uninvolved organs
  - Site of colotomy can be the site of the anastomosis
- Saves the patient a major incision and multiple large ports
The true importance of NOTES…

• This may be our “second chance” in the practice of flexible endoscopy.
  – General/GI surgeons can replicate the history of cardiac surgery and ignore interventional techniques.
  – Or follow the lead of vascular surgery and aortic stenting
To future GI surgeons:

• “Embrace the scope!”
Thank you
The 4th annual Schultz Lecture
1/31/2011