The Future of Minimally Invasive Surgery

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The future of all Surgery is Minimally Invasive Surgery
Future Directions

• Technology based
  – NOTES
  – Endoluminal
  – Computer assisted Surgery
• Increase understanding of Physiology and Wound Healing
• Imaging
• Training
• Disease Management
• Early Detection
• Functional organ replacement
NOTES: What are we talking about?

- Natural Orifice
- Hybrid
- Single Port
- e NOTES
- SPA
- LESS
- YADA YADA
Access Routes

- Trans-vesical
- Trans-vaginal
- Trans-colonic
- Trans-gastric
Endoluminal Surgery

- Natural Orifice Endoluminal Surgery
- Significant part of Urology and ENT
- Emerging importance in general surgery
- Gastrointestinal malignancies
- Full thickness resection
- Gastroesophageal Reflux
- Traditional Flexible Endoscope as the Platform
Notes update

NOSCAR 2013
US Experience

- 83 US pts in trial data being collected NOSCAR
- UCSD 114 cases, 25 poems, 20+ TV choley
- Yale
  - 78 TV chole, 24 Appy, 6 ventral hernia
- NW poems, 12 TV choleys
- MGH 7 transanal, 4 TV choley
- OSU 150 diagnostic, (80 no LS, 70 LS assisted)
- Oregon, 23 TG choley, 100POEM
- Baystate, 19 TV choley
South America, NOSLA

- 7 Transgastric choley, abandoned
- Current state is decreased application
- 320 tv choley since 2007
- Now only 21 in last year,
- Almost all choley, some TV appy and sleeve
- Instrumentation is limited and access has decreased

- Ferreres, NOSCAR July 2013
Euro NOTES

- 250 poem (+500%)
- 100tg choley
- 4500 TV choley (German, Austria, swiss) (+66%)
- 200 TA colon (+1000%)

- Zornig TV vs LS choley 200pts
  - Only advantage is cosmesis
German Registry: Bulian 2013

- 2411 TV choley
- TV appy 169
- 145 TV choley
- DGAV NOTES Registry
Asian Update

• Limited TV work
• POEM, STER, EFTR
• 900 POEM
• Multiple ESD for submucosal tumores
• 143 pts Li QL, GIE 2013
The Age of Robots
The promise and peril of thinking machines
1999
In Vivo Minirobot

Robot during insertion

Incision in stomach wall

Electrical power/signal tether

Magnetic handle outside the patient

In vivo robot

Insulflated Abdominal Cavity
Advanced Imaging: Today

• Near Infrared Fluorescence Cholangiography (NIRF-C)
• Real time imaging using fluorescence
• 800nm visualization
• Enabled via high resolution combined white light and laser light source
• Video camera with NIR capability
• Optimize for resolution and ease of use
Bile Duct Injuries

- Still a significant incidence
- X-ray Fluoroscopy cholangiography
- Data in prevention remains unclear
- Recent editorial imploring mandatory cholangiography
- Not widely practiced, time, $$, low yield
- Real time imaging enhancement might improve safety, assuming it was used
NIRF-C

• High resolution video system
• Light source with integrated low output red laser
• Optimized light cables and scopes
• Camera head switch
• System optimized for background light and color and resolution
New Technology in Surgery

• Needs careful investigation
• Improved pt care is the goal
• Instrumentation is lacking and remains the slowest area of improvement
• "Spinoffs" may the only benefit
• Reasonable area to initiate research.
• Human work acceptable with rigorous review
Future MIS: Benefits

• Public and physician awareness of the value of Minimally Invasive (or Incisionless) therapeutic interventions.
• Technical and technologic advancements that will spread throughout the medical specialties
• Improved patient outcomes.