Minimally Invasive Endocrine Surgery

How far have we come?
Introduction

• Minimally invasive surgery describes a field of surgery that crosses all traditional disciplines. It is not a discipline into itself but more a philosophy of surgery, a way of thinking. Succinctly put, it is the ability to perform traditional surgical procedures in a novel way, often using miniaturized high-tech imaging system, to minimize the trauma of surgical exposure.
Evolution of Endoscopic Surgery

• Laparoscopic cholecystectomy- 1987-88
  – Mouret, Dubois, and Perissat (France)
  – Mckernan, Reddick, Olsen (USA)

• Two types of surgeons
  – Laparoscopic surgeons- Whose waiting lists are becoming longer
  – Non-laparoscopic surgeons- Whose patients are becoming fewer and fewer
Introduction

- During last 10 years laparoscopic surgery has turned the surgical world upside down.
- Modern video technology has allowed us to perform sophisticated operations through small holes.
- In operating rooms around the world, the lights have gone out, and surgeons are operating in the dark.
Endoscopic Surgery: Ideal for Endocrine Surgery?

• Minimally invasive videoscopic approach to endocrine tumors is appealing in a view of the fact that the conventional approach seems out of proportion compared to small size of tumors.
Nevertheless, endocrine surgeons may not be exposed to laparoscopic work such as cholecystectomy or hernia repair. They may be not, therefore, have obtained basic lap skills.
“One of the best ways of predicting the future is to invent it. This is the century which, if you have a good vision, you can actually build it.”

-Alan Kay
Introduction- MIES

• Laparoscopic adrenalectomy
  – 1992, Gagner et al
  – 600 cases reported till late 1997

• Minimally invasive neck surgery/ Video assisted neck surgery/ Endoscopic neck surgery/ Videoscopic cervical surgery
MIES- Advantages

- Smaller scar
- Less Pain
- Shorter Hospital Stay
- Quicker Recovery
- Special Circumstances-
  - Cushing’s Syndrome
  - VATS
Lap. Adrenalectomy

• Similarities between Lap adrenalectomy and cholecystectomy
  – Avoid upper abdominal Incision
  – Ablative procedures
  – Do not require any reconstruction- e.g Anastomosis
  – Benefit from clarity and magnification (anatomically dangerous regions)
  – Both benign disease
  – Involve small, readily extractable specimens
Lap. Adrenalectomy

• Who should perform adrenalectomy?
  – Surgeons experienced in the overall management of adrenal disease and extensive experience in open adrenal surgery

Thompsen N, Arch Surg 131:465, 1996
Endoscopic Neck Surgery

• Thyroid endoscopic approach appears feasible but difficult. Besides the cosmetic advantage, image magnification permits an excellent view of nervous and vascular structures and parathyroid glands.
Endoscopic Neck Surgery

- Parathyroidectomy is, after thyroidectomy, the most commonly performed endocrine surgical procedure. Development of excellent preoperative localization techniques have allowed unilateral neck exploration or an endoscopic approach that has made possible even more improved exploration and visualization through optical magnification.
MIES- Islet cell tumors of Pancreas

- Annual incidence low (1/200,000)
  - Insulinoma: 1/1 million, Gastrinoma: 1/2 million
- Diagnosis easy, but tumors difficult to localize
- Lap. Ultrasonography probe
  - 10 mm diameter, 7.5 MHz probe
- Advantages- avoid large incision to remove a small, benign tumors (90% insulinomas, 30% gastrinomas)

Gagner et al. Surgery 120:1051, 1996
Video-Assisted Thoracoscopic Surgery
MIES- SGPGIMS

• We started in January, 1997
• Performed the first laparoscopic adrenalectomy with the help of GI surgeons
• Preparation
  – Training of Nurses
  – Training of Senior Residents
  – Training of faculty
• Overseas Collaboration
Training Courses- International

• European institute of Tele-surgery, Strasburg, France
• University of Pisa, Pisa Italy
• Mount Sinai Medical Center, New york
• Prince of Wales Hospital, Hong Kong
MIES- SGPGIMS

• Establishment of Animal Laboratory
• International Workshop, 1999
  – Live cases by International Faculty
  – Hands on training
• VATS Workshop, 1999
• Establishment of Video-library
• National Workshop, November, 2000
MIES- SGPGIMS

• Problems
  – Lack of dedicated equipment
  – Paucity of suitable cases
MIES- SGPGIMS Data

• Total minimal endoscopic surgery cases done January, 1997-November, 2000 n= 26
MIES- SGPGIMS Data

- Thyroidectomy (n=10)
- Parathyroidectomy (n=4)
- laparoscopic Adrenalectomy (n=7)
- VATS
  - Thymectomy n=3
  - Thoracoscopic biopsy n=2
- Laparoscopic Oopherectomy n=5
- Laparoscopic varicocoel ligation n=1
MIES- Thyroidectomy

- Indication: <4 cm nodule
- Pre-operative work-up includes ultrasound
- Total endoscopic
- Gas Less (endoscopic assisted)
MIES thyroidectomy

- Gas less thyroidectomy n=10
- Total Endoscopic n=1
- Size Maximum-6cm
- Operating time:
- Blood loss: Minimal (<25 ml)
MIES thyroidectomy

• Conversion to open n=1 (lobe diffusely enlarged)
• Complication: Tracheal fistula n=1
• Hospital stay 2 days (median)
• Pain Killers: one day (median)
• Cosmesis: Excellent except one
MIES- Parathyroidectomy

- Parathyroidectomy under LA
  - Chapuis et al. World J Surg 16:570, 1992
- Radioguided Parathyroidectomy
- Endoscopic Parathyroidectomy
  - Gas less (endoscopic assited)
  - Totally endoscopic
MIES Parathyroidectomy

- Gas less Parathyroidectomy n=3
- Totally endoscopic n=1
- Conversion to open n=1 (ass. thyroid nodule)
- Complication: Nil
- Hospital stay: Prolonged because of hypocalcemia
- Pain Killers: one day (median)
- Cosmesis: Excellent
MIES- Adrenalectomy

- Which laparoscopic adrenalectomy technique?
  - Videoscopic transabdominal anterior
  - Videoscopic transabdominal lateral- Gagner et al
  - Videoscopic extraperitoneal lateral
  - Videoscopic extraperitoneal Posterior
MIES- Adrenalectomy

• Who should undergo lap adrenalectomy?
  – Conn’s adenoma,
  – benign cushing’s syndrome,
  – virilizing tumors,
  – Small pheochromocytoma,
  – Incidentalomas (incidence 1.3% population)
MIES- Adrenalectomy

- Contraindication
  - Invasive adrenal cancer
  - Size >10 cm (relative)
  - C/I for lap. Surgery
# MIES- Adrenalectomy Outcomes - selected experiences

<table>
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<tr>
<th>Study</th>
<th>No.</th>
<th>OR time</th>
<th>Converted (%)</th>
<th>Complications No.</th>
<th>Complications %</th>
<th>Length of Stay (days)</th>
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<td>226</td>
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<td><strong>Total</strong></td>
<td>256</td>
<td>176</td>
<td><strong>10(4)</strong></td>
<td><strong>20</strong></td>
<td><strong>8</strong></td>
<td><strong>2.7</strong></td>
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laparoscopic Adrenalectomy

- Indication:
  - Conn’s adenoma  n= 3
  - Cushing’ adenoma n=1
  - Pheochromocytoma n=1
    - (cystic pheochromocytoma 12 cm)
  - Incidentaloma n=2

- Operation Time: 4 hours (Median)
Lap. Adrenalectomy

- Conversion n=2, Pheochromocytoma
  - (splenic injury, Shortage of CO2)
- Complication: Nil
- Hospital stay: 4 days (median)
- Pain killers: two days (median)
- Cosmesis: Excellent
VATS

• Thymectomy n=3
• Mediastinal Biopsy n=2
• Open conversion n=1 (Ectopic ACTH syndrome)
• Mysthenia gravis n=3
• Time duration 600, 390, 165 minutes
• Median stay: 6 days
Present Status

• Lack of equipment
  – Endoscopic surgery
  – Endoscopic Neck surgery

• Establishment of General Anaesthesia facility in animal lab
MIS: The next frontier

- Laparoscopic surgery is merely a transition state between open surgery and truly noninvasive surgery
  - Endo Organ Surgery
  - Radio-guided Surgery
  - Surgical Robotics
  - Application of outcome analysis
Conclusion

- The joining of special skills in laparoscopy with specialized endocrine surgery in centers with a relatively high volume of endocrine surgery is the key to success.
- It is time for endocrine surgeons to become fully aware of this irreversible evolution so the specialization they have created within general surgery, and to which does not elude them.
• The greatest challenge facing the MIS during the next decade is to ensure quality.

• Therefore it is the responsibility of the surgical educators to impart competence (not just exposure) in MIS to their residents and registrars.