Basics of Laparoscopy

Dr Madhuri Vidyashankar
Gynaec Endoscopic Surgeon
Milann Fertility Centre, Bangalore
Minimal access surgery is a marriage of modern technology and surgical innovation that aims to accomplish surgical therapeutic goals with minimum somatic and psychological trauma.
Patient selection
Contraindications

- Haemodynamically unstable patient
- Class IV cardiac disease
- Intestinal obstruction with distended bowel
- Pregnancy > 5 months gestation (surgeon capability)
- Lack of surgeons familiarity with laparoscopy
Patient Preparation

- Bowel preparation - Empties the small intestine.
- Facilitating vision and manoeuvrability.
- Severe endometriosis, major adhesiolysis.
OR setup
Laparoscopy Equipments
Laparoscopes

Function – Diagnostic/operative
Diameter - 1.8mm to 12mm
Angle – 0 degree/30 degree
Magnification
Laparoscope/hysteroscope
STORZ ENDOSCOPY

**HOPKINS® Straight Forward Telescope 0°,**
enlarged view, diameter 10 mm, length 33 cm,
**autoclavable.**
Fiber optic light transmission incorporated.
Color code: green.

**HOPKINS® Forward-Oblique Telescope 30°,**
enlarged view, diameter 10 mm, length 33 cm,
**autoclavable.**
Fiber optic light transmission incorporated.
Color code: red.

**HOPKINS® Telescope 45°,**
enlarged view, diameter 10 mm, length 33 cm,
**autoclavable.**
Fiber optic light transmission incorporated.
Color code: black.
Light source

- Good illumination is essential
- Halogen - 250 Watts
  300-400 hrs, yellow light
- Halide - 150 hrs
- Xenon – 125, 175, 300 Watts
  1000 hrs, white light
- Light cables – fluid light cable
  fibre optic light cord
Halogen -150
Xenon Light Source
Camera Unit

- Basis – solid state silicon computer chip or
- (Basic unit) charge coupled device (CCD)
- Silicon element – 1 pixel unit
- Image resolution – depends on number of pixels
- Single chip camera, three chip camera, High definition (HD) digital cameras
- HD-1080 lines of resolution
HD Camera
Single Chip Camera
Distension Media

- CO2, N2O, Air, Helium
- CO2 – Advantages
  - Rapidly soluble
  - does not support combustion
- Disadvantages
  - carbonic acid - shoulder pain
  - hypercarbia
- N2O – Local anesthesia/Conscious sedation
  - support combustion
Insufflation Systems

- Insufflation optimises visualisation
- Components: Insufflator, filtered tubing, centralised or gas tanks
- Electronic pneumoflator (insufflator) fully automatic
  - pressures – preset
  - gas lost - automatically replaced
  - flow rates – up to 15L/min
- Gasless laparoscopy - Mechanical lifting arm
Insufflator
Electrosurgical Generators

- High frequency electric energy
- 1000V to 3000V Range
- Faradic effect <1,000,000 cycles/sec
- Isolated ground circuitry system
- Return electrode monitoring system
Instruments - display
Patient Position
Basics of electrosurgery - Electrosurgical Unit
Monopolar circuit

- Current from Electrosurgical Unit
- Active Electrode
- High Current Density
- Low Current Density
- Return Electrode
- Current to Electrosurgical Unit
Monopolar circuit
Bipolar circuit

Electrosurgical Unit

Current Flow

Tissue between tips of forceps
Bipolar circuit

play animation
Patient Plate
Patient Plate
Patient Return Electrodes
Ideal Return Electrode Contact with Current Dispersion

play animation
Entry techniques – veeres entry

Deep and Superficial Vessels of the Anterior Wall

Inferior ("Deep") Epigastric Artery

Superficial Epigastric Artery

Superficial Cricumflex Iliac Artery

0 5 10 cm
Anatomic Landmarks

• Umbilicus: at the level of L3 and L4
• Abdominal aorta: bifurcation L4 and L5
Steps of veree’s insertion
Intra Peritoneal Testing

- Low opening pressure (<10 mmHg)
- Hanging drop test
- Injection & aspiration of saline
- Uniform distention
- Loss of liver dullness
Anterior abdominal wall anatomy

- Ligamentum teres (obliterated umbilical vein)
- Rectus sheath
- Ext. colique, int. colique & transversus aponeurosis
- Arcuate line
- Obliterated umbilical arteries
- Round ligaments
- Uterus

Diagram features:
- Bladder
- Lateral inguinal, medial inguinal & supravesical fossae
- Cut edge of peritoneum
- Testicular a. v. & genitofemoral n.
- Ext. iliac a. & v.
- Umbilical a.
- Ductus deferens
Anterior abdominal wall anatomy
Primary trocar placement
Ancillary trocar placement

Trocar inserted at selected site

Left inferior epigastic vessels

MR. GADIR
Special Entry Techniques
Left upper quadrant (palmer’s point)

- Suspected or known periumbilical adhesions
- Umbilical hernia
- Failed 3 insufflation attempts at umbilicus
# Laparoscopic entry systems

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<th>BLIND NON VISUAL ENTRY</th>
<th>VISUAL ENTRY</th>
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<td>Gasless Laparoscopy</td>
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Open access

- Alternative to veress needle technique
- No evidence - superior or inferior to veress needle
Single port access
Surgical smoke

- Surgical smoke is created when tissue is heated.
- Contains toxic gases and vapors such as benzene, hydrogen cyanide, formaldehyde, bioaerosols, dead and live cellular materia.
Surgical Smoke
Smoke Evacuation Devices

Smoke evacuation devices can now be attached directly to a standard electrosurgical pencil.
Removal of trocars
COMPLICATIONS OF ENTRY TECHNIQUES.

• 50% Of the complications of laparoscopy happen at ENTRY!!
• serious trauma to major vessels and bowel especially with closed entry (Veres needle insertion followed by blind trocar).
Principles of Laparoscopic Suturing
Barbed suture for suturing
Needle holders

- Self Riding Jaw
- Curved Jaw TC
- Straight Jaw TC
- Parrot Jaw TC
- 1/2 Tooth
AVAILABLE MORCELLATORS

X-TRACT
MORCELLEX
ROTOCUT G1
WISAP-MAXI
HYSTERO MORCELLATOR
ROTOCUT G1

- Reusable. Commonly used.
- Weighs 1060 grams.
- Oblique trocar sleeve end - Apple peel effect.
- Activation - Foot pedal Morcellates 28.8 grams/min
- 500-1200rpm

Energy sources in laparoscopy.

- Conventional Bipolar electrosurgery
- Ultrasonic Energy (Harmonic)
- Vessel sealing devices
Bipolar Electrosurgery

Primary advantage of Bipolar electrosurgery
- current path is very localised
- universally available, cheap

Limitations:
- Lateral thermal spread
  Arteries(2.0-3.5mm)
  Veins(4.0-6.0mm)
- Unreliable hemostasis
  not a true vessel sealing
Ultrasonic Energy

HARMONIC SCALPEL

An ultrasonically activated device that provides mechanical energy to cut & coagulate.

• H2 bonds are ruptured leading to a denatured protein coagulum upto 2mm without significant dessication or charring.
Ligasure (Valley Lab)

LigaSureTMV
- Seal width: 4.63mm
- Average thermal spread: 1.5mm

LigaSureTM Atlas
- Seal width: 2 - 4mm
- Average thermal spread: 2mm
Enseal Tissue sealing devices

Patented temperature controlled energy delivery
Tissue temperature- maintained up to 100°C

• I-Blade design- high compression

• Minimal lateral thermal spread(1mm)

• Minimal char or smoke

• Rapid seals
"Tell me and I forget, teach me and I may remember, involve me and I learn."

- Benjamin Franklin
THANK U