LAPAROSCOPIC SURGERY

Dr Mohammad Nofal
Consultant minimally invasive and surgery
Associate Prof –university of mutah

SHORT HISTORY

- 1982 Semm performed first Laparoscopic Appendicectomy.
- 1987 Mouret performed first Laparoscopic Cholecystectomy.
- 1992 First UK Laparoscopic Training centre established.

LAPAROSCOPIC SURGERY

"KEYHOLE SURGERY"

MINIMALLY INVASIVE SURGERY

MINIMAL ACCESS SURGERY

What operations can we do laparoscopically?

Diagnosis	Operation
Crohn's Disease	Bowel resection
Diverticulitis	Bowel resection
Rectal Prolapse	Repair of Prolapse
Benign renal disease	Nephrectomy
Gastric Obstruction	Bypass
Some Splenic disorders	Spleenectomy

What operations can we do Laparoscopically

Diagnosis	Operation
Gallstone	Cholecystectomy
Appendicitis	Appendicectomy
Hernia	Hernia repair
Adhesions	Division of adhesions
Perforated ulcer	Closure of perforation
Hiatus Hernia	Hiatus hernia repair.

What operations can we do Laparoscopically

Diagnosis	Operation
Colorectal carcinoma	Anterior resection/ APR
Caecal carcinoma	Right Hemicolectomy
Colonic carcinoma	Left/Sigmoid Colectomy
Gastric carcinoma	Gastrectomy
Oesophageal carcinoma	Oesophagogastrectomy

The list is endless!!!

Principle Differences between Laparoscopic and Open Surgery

FOR THE PATIENT

- Post operative pain related to size of incision- smaller incisions =less pain.
- Less Handling of intestines results in little or no disturbance of normal function.
- Avoidance of the trauma of abdominal wall injury by the incision allows rapid return to normal activity
- No incision allows early return to more strenuous activities: driving, lifting, sport etc.

Principle Differences between laparoscopic and open surgery

FOR THE HOSPITAL

- Initial capital costs to establish laparoscopic surgery
- Reduced overall costs by shortening of hospital stay e.g. cholecystectomy reduced from 5 to 1 day,

Principle Differences between laparoscopic and open surgery

For the Surgeon

- Magnified view often better than obtained via an incision allows precise dissection.
- Decrease (but not absent) tactile response
- Two dimensional (flat screen) view.
- Usually (but not always) shorter operating time
- Need to develop entirely different operating technique
- Adaptation of principles of open surgery to laparoscopic surgery.

Benefits of laparoscpy

- 1. Cosmetically better
- 2. Pain and analgesia requirement less
- 3. Decreased operative trauma
- 4. Faster recovery
- 5. Early discharge
- 6. Better visualization
- 7. Magnified view of structures
- 8. Less ileus
- 9. Less chances of wound infection
- 10. Few post operative adhesions
- 11. Less chances of incisional hernia

CONTRAINDICATIONS

- Uncorrectable coagulopathy
- Frozen abdomen
- Intestinal obstruction with massive abdominal distension
- Haemorragic shock
- Severe cardiac dysfunction (class IV)
- Refuse conversion into open

RELATIVE CONTRAINDICATIONS

- Inability to tolerate GA
- Abdominal sepsis/ peritonitis
- Multiple previous abdominal operations
- Severe COPD
- Late pregnancy

COMPLICATIONS

- ACCESS related
- • Major vascular injury •
- GI injury • Bladder injury • CO2 embolism • Abdominal wall haemorrhage
- POST INSERTIONAL COMPLICATIONS
  GI perforations (acute or delayed)
  Laceration & bleeding from solid organs
  Abdominal wall hernia

Limitations

- 1. Two- dimentional representation
- 2. Learning curve
- 3. No tactile sensations
- 4. Hand eye co-ordination
- 5. Cost of setting up

Different scopies

1- Laparoscopy: rigid scope through a metal sheath in the peritoneal cavity

2- Thorocoscopy: rigid scope with a small incision in the chest for access to the thoracic cavity

3-Endoluminal endoscopy: Upper GI

Lower GI

Cystoscopy

Bronchoscopy

Arthroscopy

Instruments

- Redesign of instruments for laparoscopic use.
- Instruments for open surgery in general 6 – 10” in length built around a box joint.
- Laparoscopic instruments in general 15 – 18” in length with an articulated connecting rod between handles and scissor blades, jaws etc.

Equipment Necessary for MAS

Camera

Light Source

Insufflator

TV Monitor

Telescopes

Light Guide Cable

Apart from the insufflator the system will work better if all the components are from the same company as one piece talks to another

CAMERA

- These can be single chip or 3 chip.
- CHIP: thois is also called a charged coupled device in short, CCD.
- These are flat silicone wafers with a matrix, a grid of minute image sensors called pixels.
- White balance commonly used

Optics

- • ROD LENS SYSTEM -Small lenses interspresed with large distance of air -Diameter of lens 1-5.5 mm
- FIBER OPTIC CABLES: Composed of innercore of glass of high Resistive Index (RI) & a fused sheathing of low RI Incoherent bundles have random arrangement of fibers at either end Coherent bundles – orderly arrangement of fibers
- • LIGHT SOURCES Xenon bulb (1000 hrs) – produces white light & less heat (commonly used- better) Halogen bulb (300-400 hrs) – produces yellow light & more heat

Light Source

- Halogen or Xenon, cold light but beware can still burn holes in drapes esp. disposable and burn patient's skin if left on the abdomen.
- Brightest to darkest measured in units of decibels.

- White balance by making sure white is correct then all the colours through the spectrum are correct.

Insufflator

- CO_2 because this has the same refractive index as air, so doesn't distort the image and is non combustible.
- Intraabdominal pressure run between 10 and 18 mmhg.

.

INSUFFLATORS

- Automatic -Pressure regulated high flow
- -Monitor intra-abdominal pressure which is usually set at 12- 15 mmHg
- -Alarm sound or pressure release valves when pressure limit is exceeded
- -Flow rate of 8-10 litres /min
- High flow insufflators are used for obesity surgery

pneumoperitoneum

- -Required to create working space
- Gases used : O_2 ,CO_2 , N_2O, Ne, Ar (newer)
- CO_2 -commonly used
- Advantages : Does not support combustion or explosion , Rapidly absorbed, Rapidly soluble -

- PNEUMOPERITONEUM- CO_2 can cause Respiratory acidosis
- Hypercarbia
- Tachycardia,
- Increased vascular resistance
- Increased BP, & myocardial O_2 demand Cardiac arrhythmias – Bradycardia Sudden hypotension
- May also cause: • Subcutaneous emphysema • Venous thrombosis • Pneumothorax

PRESSURE EFFECTS

- Vasovagal attack – due to stretching of peritoneum - due to pressure on IVC - Venous engorgement with endothelial damage of lower limb veins -DVT
- - risk of barotrauma -Atelectasis -Hypoxia

ABDOMINAL ACCESS INSTRUMENTS

- 1. Open Technique Hasson cannula- obtains pneumoperitoneum by open technique
- 2. Closed technique - Veress needle (Janos Veress -1938 in Hungary)
- • VERESS NEEDLE -Obtains pneumoperitoneum by closed technique – Spring loaded obturator needle
- Drawbacks: Preperitoneal placement, Injury to vessels, Injury to bowel
- • TROCARS SHEATH- Reusable & Disposable

TV Monitors

- Usually a 20” screen..
- You can use a standard TV but it must be run through an isolated transformer.
- Horizontal resolution is the number of vertical lines.
- Vertical resolution is the number of horizontal lines
- More lines of resolution, better detail of picture.

Telescopes

- Come in varying sizes, laparoscopes usually 5mm or 10mm.
- Diagnostic 3mm scope available but not in general use in this hospital.
- Made up of a rod and lens system.
- Bundles of fibres, incoherent carry light and coherent carry image.
- Wide range of angles available 0 and 30 degree are fairly standard.

Light guide Cables

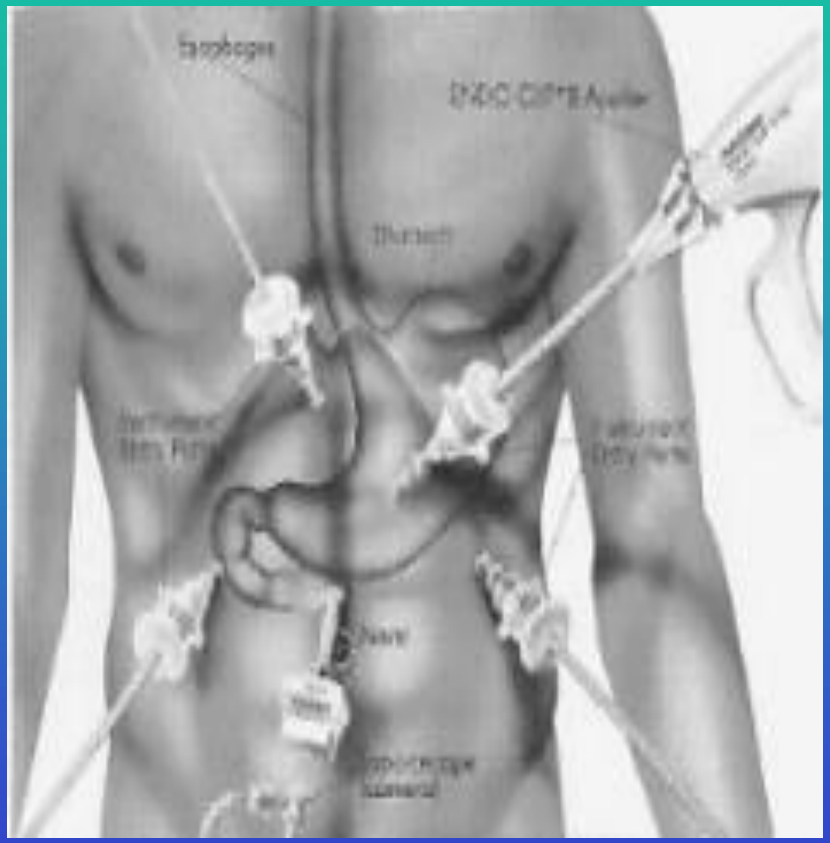
- Different diameters
- Fibre light cable

Instrumentation

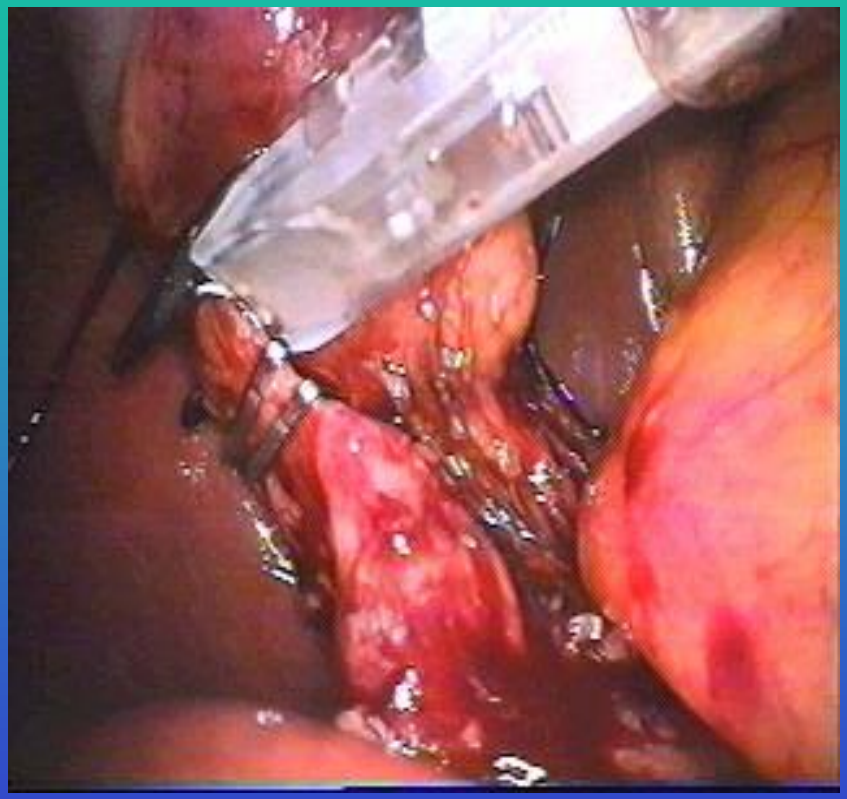
- SINGLE USE: breaking the Law if you reuse it on another patient.
- Reusable take apart.

- Ports 5 , 10 12and 15mm are the most common, make sure the right trocar is in port and is it sharp.

Equipment

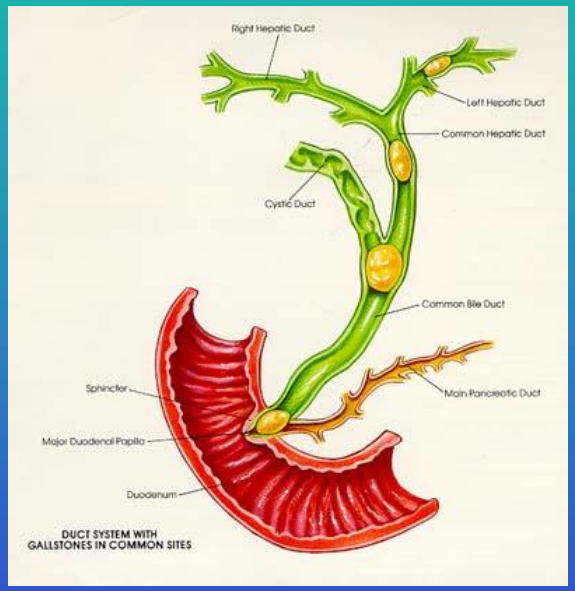


Cholecsyectomy

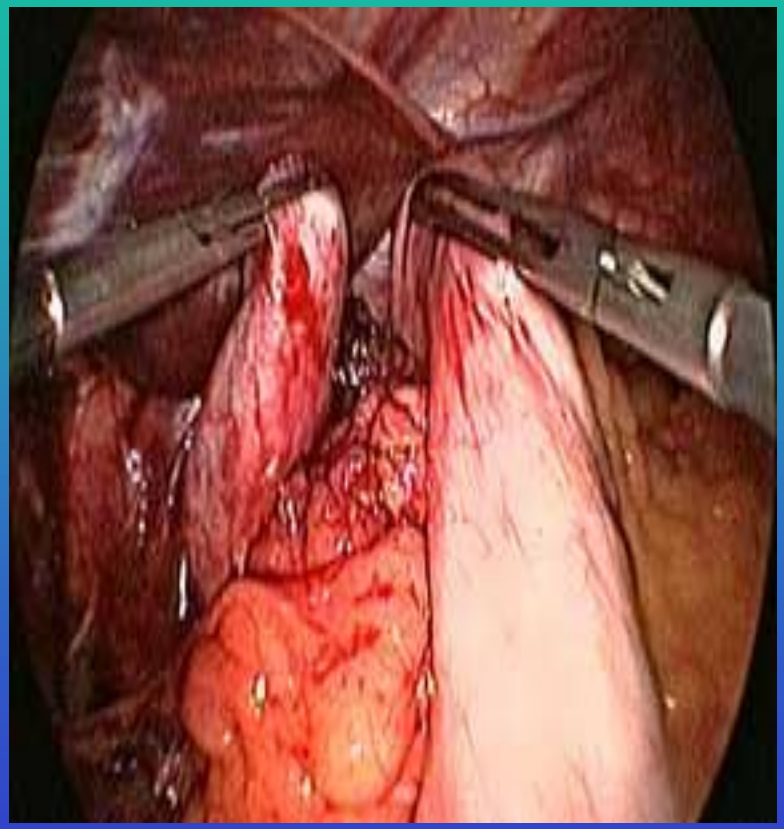


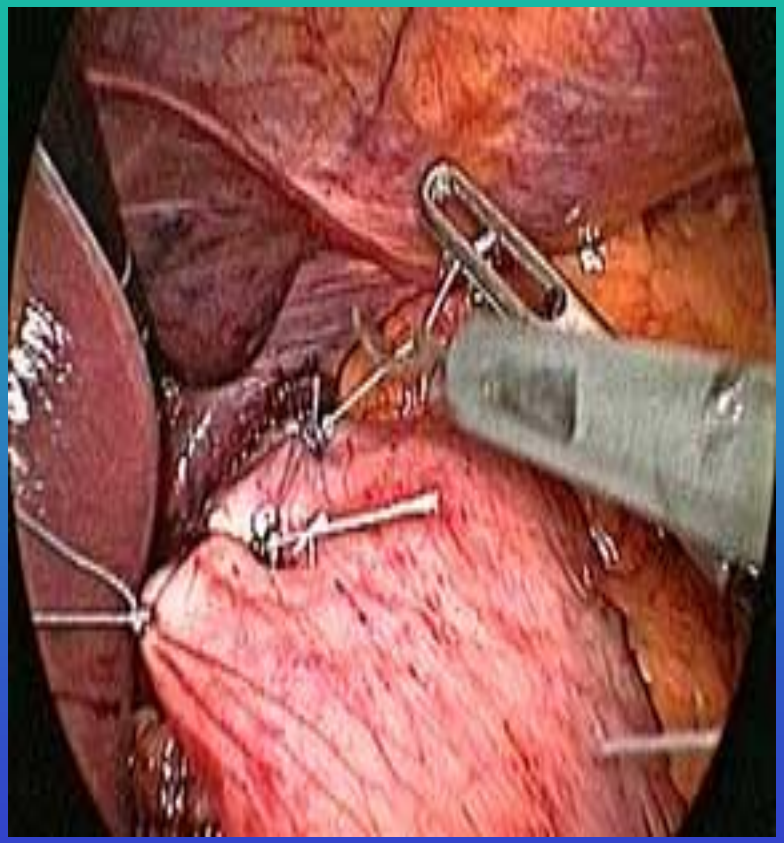
Exploration of CBD

- Performed laparoscopically
- same time as cholecystectomy
- Alternative ERCP

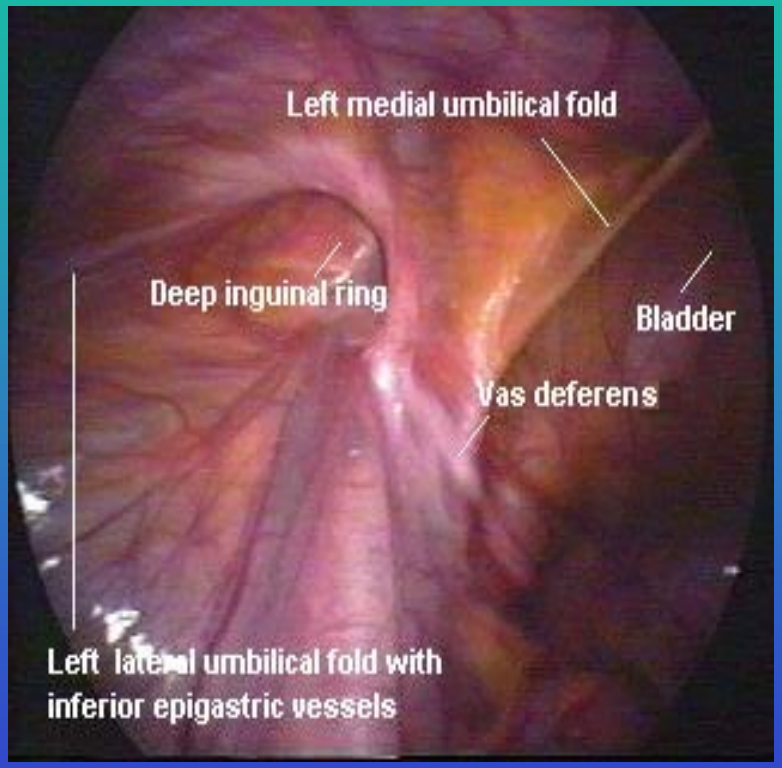


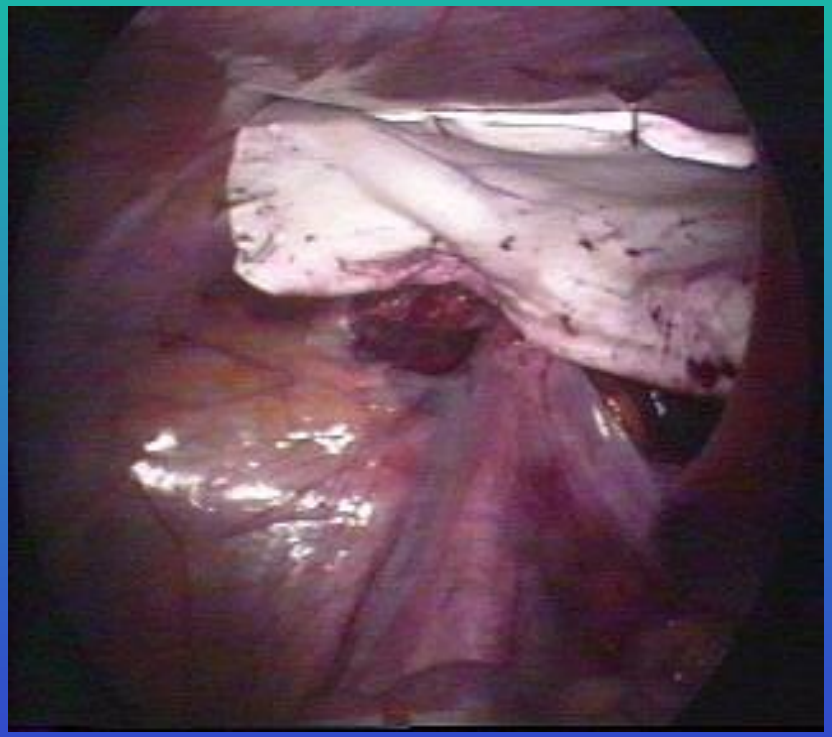
Nissen Fundoplication





Inguinal Hernia Repair





Appendicectomy