

LAPAROSCOPIC SURGERY

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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

Crohn's Disease

Diverticulitis

Rectal Prolapse

Benign renal disease

Gastric Obstruction

Some Splenic disorders

Operation

Bowel resection

Bowel resection

Repair of Prolapse

Nephrectomy

Bypass

Splenectomy

What operations can we do Laparoscopically

Diagnosis

Gallstone

Appendicitis

Hernia

Adhesions

Perforated ulcer

Hiatus Hernia

Operation

Cholecystectomy

Appendicectomy

Hernia repair

Division of adhesions

Closure of perforation

Hiatus hernia repair.

What operations can we do Laparoscopically

Diagnosis

Colorectal carcinoma

Caecal carcinoma

Colonic carcinoma

Gastric carcinoma

Oesophageal carcinoma

Operation

Anterior resection/ APR

Right Hemicolectomy

Left/Sigmoid Colectomy

Gastrectomy

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 laparoscopy

- 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
- Haemorrhagic shock
- Severe cardiac dysfunction (class IV)
- Refuse conversion to open

RELATIVE CONTRAINDICATIONS

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

COMPLICATIONS

- ACCESS related ...palmer point
- • 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- dimensional representation
- 2. Learning curve
- 3. decrease tactile sensations
- 4. Hand eye co-ordination
- 5. Cost of setting up

Types of scopes

- Different scopes
 - 1- Laparoscopy: rigid scope through a metal sheath in the peritoneal cavity
 - 2- Thoracoscopy: 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
- 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: this 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 interspersed 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

Insufflator

- CO₂ 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.
- Use disposable filter and tubing for each patient.
- High flow insufflators (35 litres) output determined by size of outlet.
- Ensure you know how to change a cylinder and where they are stored.

INSUFFLATORS

- Automatic -Pressure regulated high flow
- -Monitor intra-abdominal pressure which is usually set at 12- 18 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 : O₂ ,CO₂ , N₂O, Ne, Ar (newer)
- CO₂ -commonly used
- Advantages : Does not support combustion or explosion , Rapidly absorbed, Rapidly soluble -
Disadvantage : Not readily available initially –
now is available
- Hypercarbia

- PNEUMOPERITONEUM- CO₂ can cause Respiratory acidosis
- Hypercarbia
- Tachycardia,
- Increased vascular resistance
- Increased BP, & myocardial O₂ 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.
- All laparoscopes are autoclavable and can go thru steris, no ultrasonic bath.

Light guide Cables

- Different diameters
- Fibre light cable

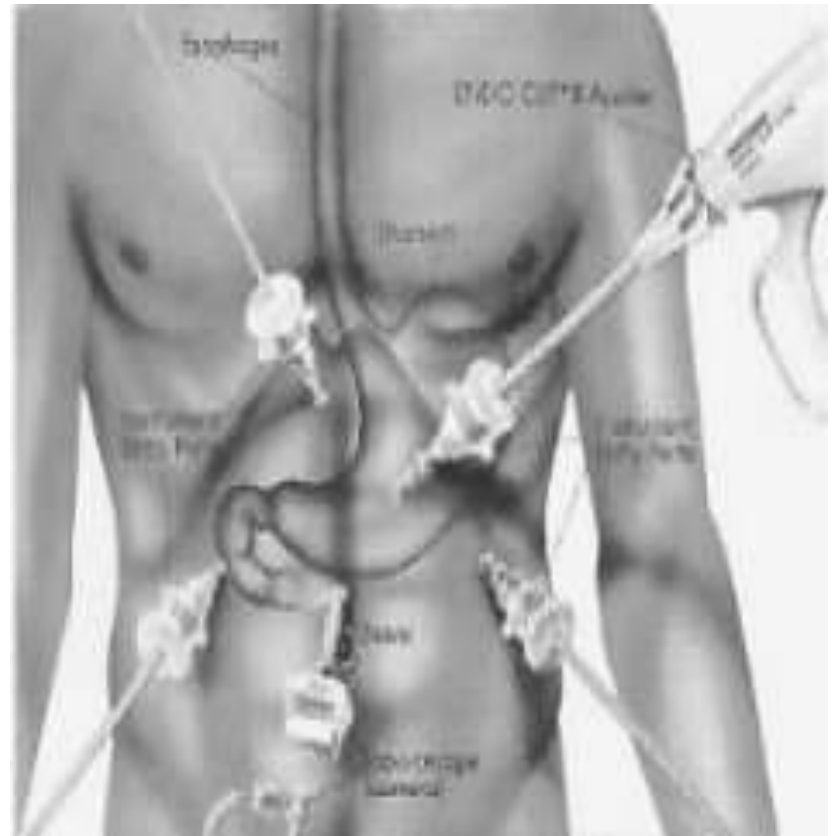
Instrumentation

- SINGLE USE: breaking the Law if you reuse it on another patient.
- Reusable take apart.
- Need an ultrasonic washer to effectively clean them, not for telescopes.
- Ports 5 , 10 12and 15mm are the most common, make sure the right trocar is in port and is it sharp.

Key points

- No fluid overload
- Eating and Drinking ASAP
- Out of bed ASAP
- IV fluids D/C as patients need to be thirsty to drink!
- Urinary Catheter out, then they have to walk to bathroom !
- Avoid morphine analgesia, slows down gut and induces sleep.

Equipment

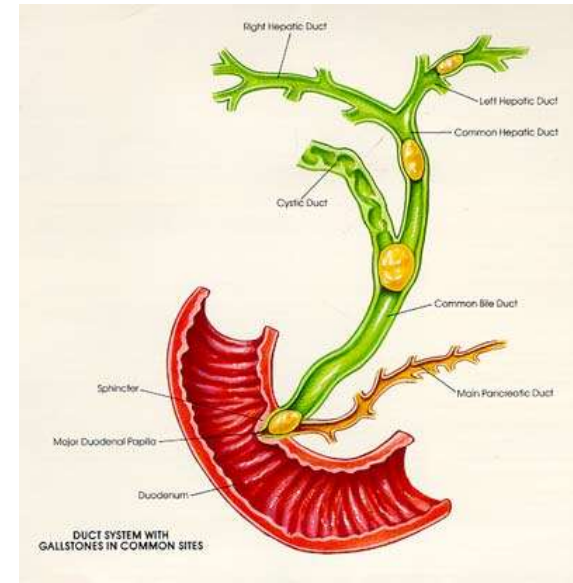


Cholecystectomy

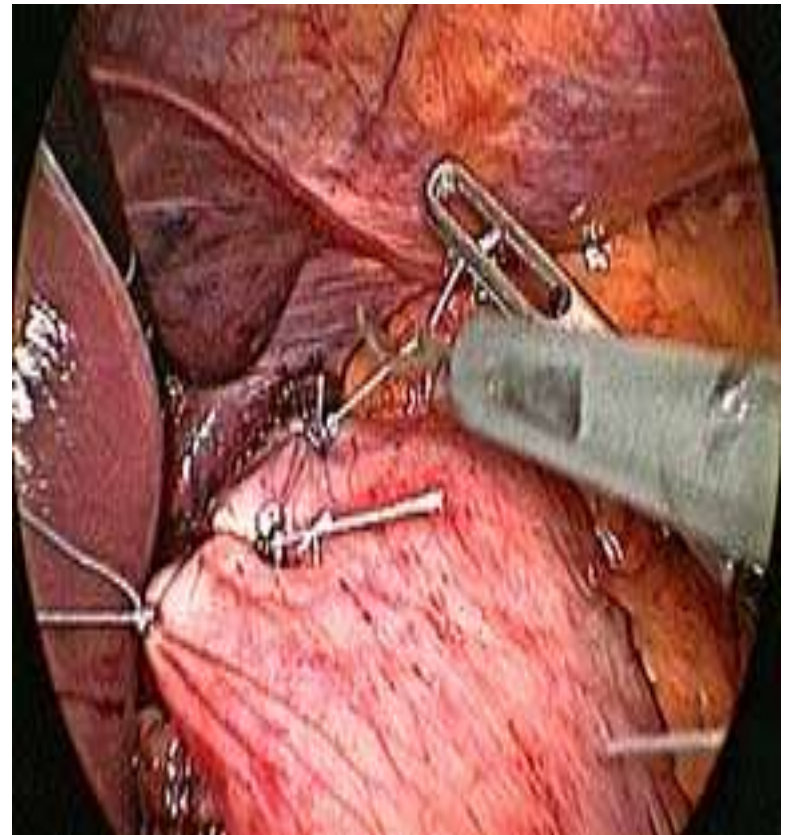
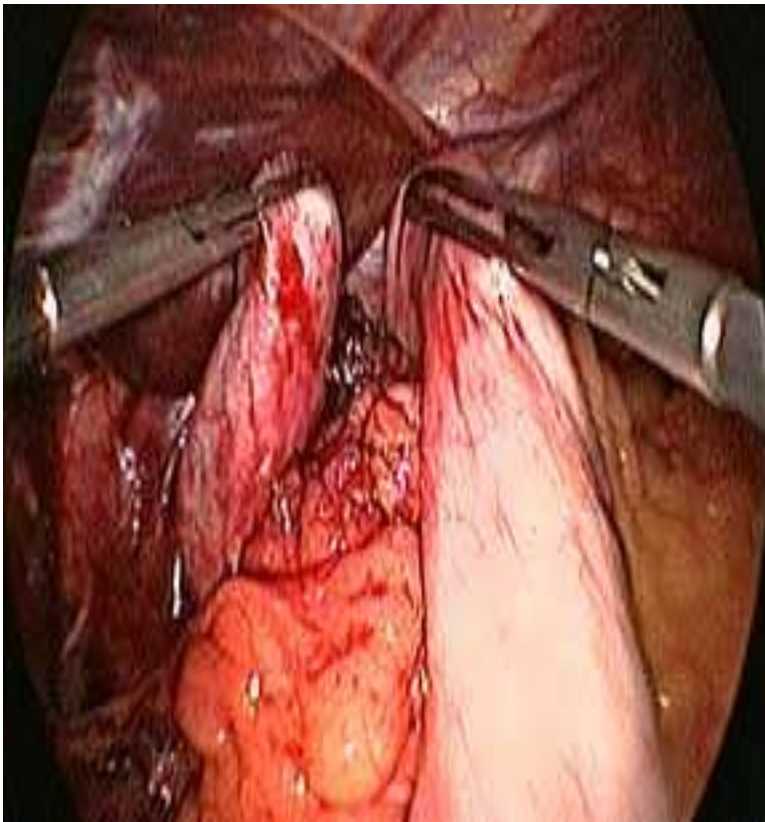


Exploration of CBD

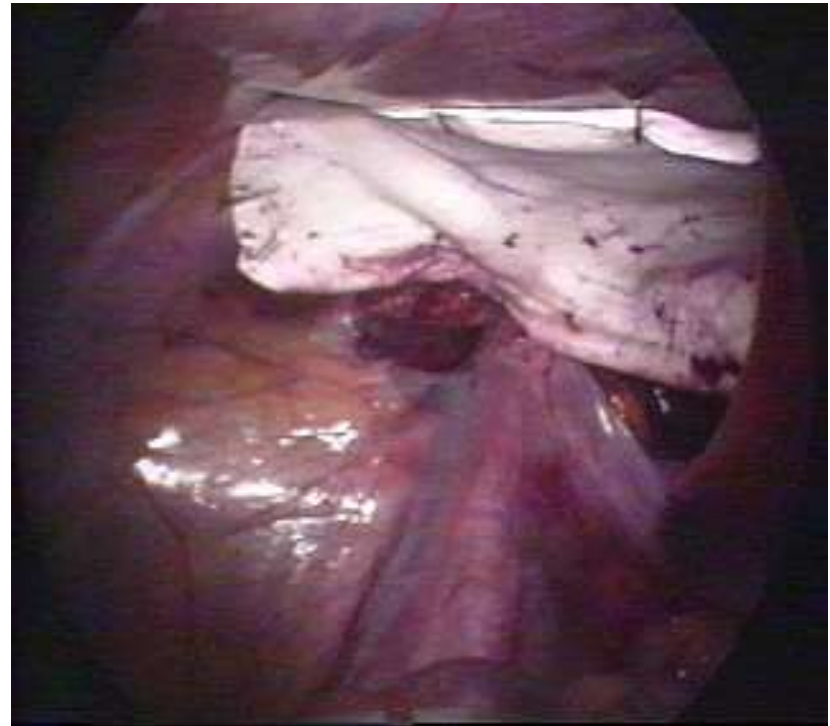
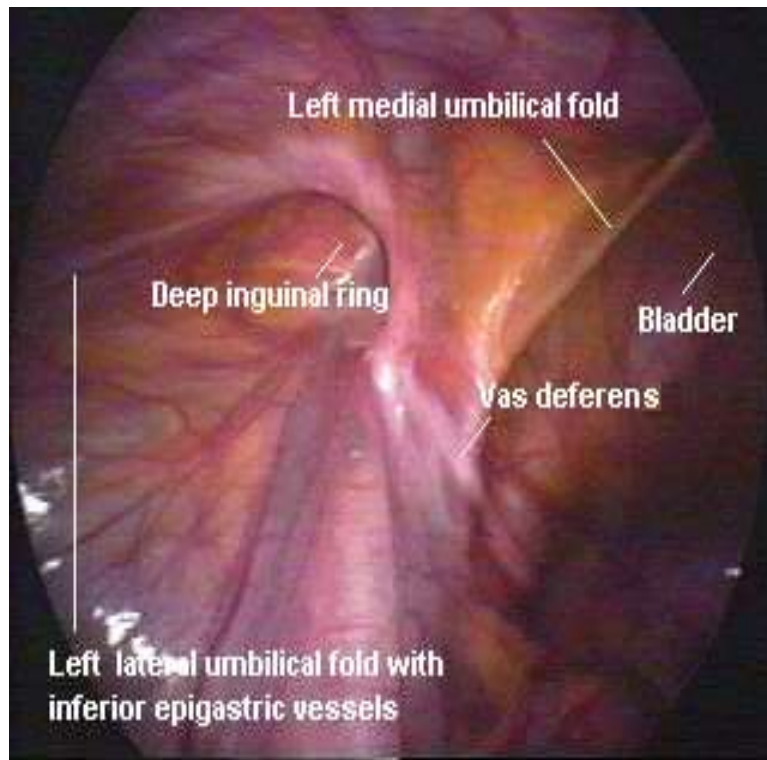
- Performed laparoscopically
- same time as cholecystectomy
- Alternative ERCP



Nissen Fundoplication



Inguinal Hernia Repair



Appendicectomy

