

## Laparoscopy in General Surgery Courses

### *Template for a course curriculum (syllabus)*

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#### **Course title**

*"Basic laparoscopic training course"*

#### **Rationale**

Surgery constitutes a major part of any health service. In the last few decades, "endoscopic surgery" has evolved dramatically to the extent that it is considered now a crucial element of most surgical specialties. This is really the case regarding laparoscopic procedures in general surgery.

These laparoscopic (minimally invasive) procedures were proved to have fewer complications than the competing conventional surgical procedures. That is to say, patients will have less pain, earlier recovery, shorter convalescence, earlier return to usual activities and better cosmeses.

However, all these advantages can only be achieved if the operating surgeon is specifically well trained on these procedures. On the contrary, untrained surgeons performing laparoscopic surgery often cause complications, sometimes potentially fatal, with all the related negative impacts on the patients, the society and even the surgical profession.

Consequently, surgeons who intend to perform laparoscopic surgery should attend a specific training course for "basic laparoscopic surgery" which enables them to take their first steps in their laparoscopic careers in their own working places under guidance from experts in the field with acceptable results namely the least possible complications and the utmost benefits to the patients.

This course should provide a thorough knowledge of history, techniques and instrumentations related to laparoscopy. Additionally, indications, contraindications, complications, patient preparation, postoperative care and anesthesia for laparoscopy should be covered. Specific detailed information about laparoscopic cholecystectomy is also needed.

Laparoscopic surgery entails the use of very complex psychomotor skills. Skill acquisition, not to say competency, require repeated practice and feedback. Although many principles of open surgery may apply, performing laparoscopic procedures requires special skills. The role of laparoscopic abdominal simulator with integrated animal organs appears to be essential in acquisition of most of these skills as an intermediate stage before the live OR training. After the course, the candidate is required to continue his training process in his own working place under close supervision from a field expert to gain the best possible outcome.

#### **Course goal (s)**

*The goal of this course is to train participants to competently perform basic laparoscopic surgical procedure whether diagnostic or therapeutic with the maximum possible benefit and the least possible harm to the patient.*

#### **Participant learning objectives**

*By the end of this course, participants should be able to:*

- 1. Know the important milestones in the history of laparoscopy.*
- 2. Describe the basic surgical techniques in laparoscopic procedure.*

3. Correctly identify laparoscopic instruments and their uses.
4. List the indications and contraindications of laparoscopic surgery.
5. Know how to perform safe laparoscopy and avoid complications.
6. Appreciate the concept of "conversion to open surgery" not to be seen as a complication.
7. give an overview of anesthetic procedures suitable for use with laparoscopy.
8. List the steps of laparoscopic cholecystectomy
9. Properly perform pneumoperitoneum.
10. Properly insert trocars.
11. properly manipulate intraabdominal structures with laparoscopic instruments under monitoring by laparoscopic camera.
12. Perform traction, sharp dissection, blunt dissection, Diathermy coagulation and cutting, clipping, drain insertion, organ extraction and camera holding.
13. Perform the simple extracorporeal laparoscopic knot and have an idea about intracorporeal laparoscopic suturing and knotting.
14. Perform laparoscopic cholecystectomy in a special "laparoscopic simulator" with integrated animal organs (pig liver and gall bladder).
15. Assist in live laparoscopic procedures in the OR.
16. Check the needed instruments before starting the laparoscopic procedure.

#### Course prerequisites

Resident / assistant lecturer / specialist in general surgery.  
At least one year of experience in surgical practice

#### Course logistics (e.g., location, length and dates of course)

#### Location

- Didactic part will be given in the lecture room in Assiut Medical School Educational development center (AMEDC), main faculty building, and 5th floor, Corridor B.

- *Orientation about instruments and simulated practice will take place at the skill lab in Assiut University Center for Endoscopic Surgery Training (AUCEST), main faculty building, 5<sup>th</sup> floor, Corridor B.*
- *Training on live patients will take place at the Major OR sector in the main building of Assiut University Hospital, 2<sup>nd</sup> floor.*
- *The didactic sessions will take 8 hours divided on the first three days.*
- *Orientation about the instruments and simulated practice for 10 hours divided on the first three days.*
- *Live training in the OR will take place on the 4<sup>th</sup> day (6 hours).*

#### *Length*

#### *Description of teaching/training methods to be used*

- *The didactic part will be in the form of interactive presentations.*
- *The practical part will consist of*
  1. *Demonstration of instruments*
  2. *Training on performing laparoscopy on simulators (Laparoscopic abdominal simulator with possible integrated animal organs)*

#### *Description or list of instructional materials to be used*

- *Didactic: PowerPoint presentations, lecture handouts*
  - *Practical skills: videotapes, CDs, laparoscopic abdominal simulator with possible integrated animal organs, learning guides*
  - *Live training: live demonstration and supervised performance of procedures according to the learning guide*
- Description of assignments in summary form*
- Prior reading of the steps of the procedures that will be performed live is required. The candidate will be formatively assessed before embarking on the procedure.*

#### *Learner assessment*

*Knowledge is measured using a pretest/posttest that is in the form of MCQ, true/false, matching and short answer questions*

*Formative assessment of knowledge about the procedures will be done in the theatre before embarking on the procedure.*

*Skills will be assessed by direct observation of participant performance using a checklist*

### ***Participant attendance criteria***

*Participants are required to attend all the didactic sessions and simulated practice before being allowed to attend the live training.*

### ***Acknowledgement***

*We would like to express our appreciation to Dr. Mohammad Fathallah for his sincere help in preparing this curriculum.*

### ***Basic Laparoscopy Courses For postgraduates***

#### ***History and evolution***

- *Laparoscopic surgery has been practiced over 80 years.*
- *Laparoscopic surgery continues to expand its horizons and embrace new technology*
- *Hippocrates 460-375 BC rectoscope*
- *Bozzini 1806 urethroscope then cystoscope*
- *Peritoneoscopy -celioscopy*
- *Palmer in 1954*

#### ***Steps of basic diagnostic laparoscopy***

*Operating Room(Generous-Arranged-)Equipped  
Operating table(Narrow-Allen stirrups -Arms-Trendelenburg)*

*Indication and contraindication*

*Position and preparation*

*Team*

*Basic instruments*

*Optics = vision*

*Anesthesia*

*Pneumoperitoneum*

*Laparoscope insertion*

*Inspection*

*Closure*

*Postoperative care*

*Complications*

*Reporting*

### *Indication for diagnostic laparoscopy*

*1. Infertility. This is one of the most common indications for diagnostic laparoscopy.*

*Structural abnormalities of the uterus, including congenital developmental abnormalities (such as a bicornuate or unicornuate uterus), and fibroids.*

*Endometriosis*

*Fallopian tube occlusion. A diagnostic laparoscopy may clarify the diagnosis and treatment prior to reconstructive surgery.*

*2. Chronic pelvic pain.*

*3. Chronic Pelvic Inflammatory Disease (PID)*

*4. Pelvic mass.*

### *Indications for an urgent diagnostic laparoscopy*

*1. Acute Pelvic Inflammatory Disease.*

*2. Ectopic Pregnancy.*

*3. Torsion of a tube or ovary..*

### *Contra-indications to laparoscopy*

#### *a-Absolute contraindications*

- 1. A large abdominal mass such as a fibroid or ovarian cyst*
- 2. An irreducible external hernia. A laparoscopy in this situation could enlarge the hernia sac and make the condition worse.*
- 3. Hypovolemic shock.*

4. *Medical problems such as cardio-respiratory failure, obstructive airway disease, or a recent myocardial infarction.*
5. *An inexperienced surgeon or a lack of proper equipment.*

### ***B-Relative contraindications***

1. *Multiple prior abdominal incisions*
2. *Morbid obesity.*
3. *Local skin infections may require that the locations for the abdominal incisions be altered.*
4. *Generalized peritonitis*
5. *Intestinal obstruction or ileus. This is a relative contraindication because of the increased risk of bowel perforation upon entry of the Veress" needle or trocars.*
6. *Coincidental medical conditions such as ischemic heart disease, blood dyscrasias or coagulopathies.*

#### ***Position and preparation***

##### ***•Position***

##### ***Lithotomy position***

##### ***Horizontal***

##### ***Uterine manipulator and canula (chromotubation)***

##### ***Empty bladder***

- ***Preparation***

***Abdomen, vagina and perineum cleansed and draped***

##### ***Shaving***

- ***EUA(Examination Under Anesthesia)***

### ***Team***

***Surgeon***

***Assistant***

***Scrub nurse***

***Circulating nurse***

***Anesthesiologist***

#### ***Basic instruments***

***Operating room, table and team***

***Video monitor***

***Video camera***

***Light source and cable***

***Veress needle***

***Insufflator***

***Trocar and canula***

***Laparoscope(10mm or 5mm)***

***Uterine manipulator.***

***Laparoscopic scissors.***

***•Atraumatic grasping forceps.***

***Smooth forceps designed for grasping the tubes.***

***Bipolar electrocoagulator.***

### Optics = vision

- Video monitor
- Video camera
- Fiber optic cable
- Light source (Halogen or Xenon)
- Telescope (laparoscope)

### WHAT TYPE OF ANESTHESIA IS USED?

#### Local

#### General

General anesthesia is preferred for laparoscopy as it provides adequate muscle relaxation and assisted respiration

### Pneumoperitonum

(instillation of gas into the peritoneal cavity)

Abdominal entry is the most dangerous part of laparoscopic procedures

Verress needle (not Verres)

infra umbilical (intra umbilical)

spring mechanism

Inner & outer sleeve

short and long

### Verress needle insertion

- Towards uterus (forgives)
- Away from vessels (do not forgive)
- angle 45

### Abdominal entry alternatives

- Open laparoscopy (Hasson)
- Direct trocar insertion
- Towel clip elevator
- No elevation z technique

### Gases

#### Room air

- CO<sub>2</sub> (carbonic acid pain)
- NO inert
- Gasless laparoscopy

### Steps of Pneumoperitonum

1. Step 1: Elevating the Anterior Abdominal Wall
2. Step 2: The Incision
3. Step 3: Inserting the Veress Needle
4. Step 4: Initiating the Insufflation

Tests to confirm the proper position of the Veress needle.

- Hanging drop test.
- Injection and aspiration of fluid through the Veress needle \*
- An unimpeded arc of rotation of the needle to detect anterior abdominal wall adhesions
- loss of liver dullness early in insufflation \*

- *Sound of air entering Veress needle with elevation of the abdominal wall*
- *Free flow of gas through the Veress needle*
- *Observation of the fluctuation of pressure gauge needle with inspiratory and expiratory diaphragmatic motions*

### Laparoflator

- *Should start by low rate*
- *IAP should not exceed 20 mmHg*
- *Monitor*
- *Intrabdominal pressure mmHG*
- *Gas flow L/m*
- *Gas amount liver dullness*

### TROCAR INSERTION

*Successful insertion of the trocar depends on:*

*An adequate skin incision,*

*an instrument in good working condition*

*Proper orientation of the trocar*

*appropriate insertion force*

*Control over depth of insertion of the instrument*

*What is laparoscope*

*A laparoscope is a telescope designed for medical use. It is connected to a high intensity light and a high resolution television camera so that the surgeon can see what is inside of patients. The laparoscope is put into the abdominal cavity through a hollow tube (trocar) and the image of inside of abdomen is seen on the television screen.*

1. *Size 10mm or 5mm*  
*Angle-- zero (HEAD ON), 30, 45, 70.*

*Inspection*

*Upper abdomen*

*Uterus, tubes and ovaries*

*Uterosacral ligaments*

*Pelvic peritoneum*

*Chromotubatin*