FLS

Module 1: Preoperative Considerations

* Equipment
	+ Disposable
	+ Non-Disposable
	+ Reposable – combination disposable/non-disposable
	+ Laparoscopes:
		- Diameter 2-10mm
		- Length 30-45cm
		- Degree
			* 0 degree – most appropriate for small areas (deep in the pelvis, high in the mediastinum)
		- Hopkins Rod-lense system:
			* Decreasing light available as scope angle and scope length increase and as scope diameter decreases (ex: 5mm 30 degree scope emits less light than a 10mm 0 degree scope)
			* Susceptible to damage during use and cleaning
		- Newer scopes do not require capture/return of light, so resulting image and photos are brighter
	+ Gas Supply
		- Most commonly used: Carbon Dioxide (inexpensive, readily available, does not support combustion)
		- Alternatives: Nitrous oxide, helium
	+ Suction Devices
	+ Video Tower
		- Light source
			* 300W Xenon lamp
		- Camera control unit
		- Video monitor (may be separate from cart)
		- Insufflator
	+ Emerging Technology
	+ Troubleshooting
		- Checklists (Preop, intraop, troubleshooting guide)
		- Check that insufflator tank is full
* Energy Sources
	+ Electrosurgery
		- Current density = current /area
		- Monopolar current
			* Cutting
				+ Heats tissue quickly so that cell water is converted to steam, causing the cell to explode 🡪 maximum tissue damage with minimum coagulation
				+ Unmodulated (continuous) waveform with low voltage

 

* + - * Coagulation
				+ Rapid surface heating with superficial eschar formation and shallow depth of necrosis (fulguration)
				+ Intermittent waveform with high voltage



* + - * Blended
				+ Mixes cutting and coag



* + - * Hazards:
				+ Current Diversion: Current follows the path of least resistance 🡪 risk of inadvertent tissue injury
				+ Capacitive Coupling: Transfer of current from an active electrode, through its insulation, to a passive electrode (occurs when using a metal trocar with a plastic screw anchor, which prevents the trocar from draining its charge)
				+ Direct coupling: Active electrode contacts the metal portion of an instrument or the laparoscope, resulting in thermal injury
				+ Narrow return circuit: Current is allowed to pass through ligated tissue, increasing current density 🡪 delayed perofration
		- Bipolar current
			* Lower energy requirement than monopolar
			* Less lateral spread
			* Hazards:
				+ Inadvertent thermal injury of adjacent organs
				+ Inadvertent cutting of patent vessels before adequate sealing
				+ Improper device function if metal is contained within the jaws (ex: clips, staples)
		- Tissue coagulation:
			* Tissue heating = current density ^2
			* Protein denaturation occurs at 60 degrees C, as tissue cools, bonds reform in a haphazard fashion 🡪 coagulation
			* As tissue temperature rises, water evaporates 🡪 desiccation
			* Increasing desiccation leads to increasing impedance 🡪 current stops flowing due to high resistance
			* Fibrous binding between dehydrated, denatured cells of vessel endothelium 🡪 coagulation
		- Ultrasonic energy
			* Piezoelectric Transducer
			* Active blade: 50k Hz with excursion of 25-100 microns
			* Lower power settings 🡪 Increased hemostasis
			* Higher poser settings 🡪 Increased cutting
* Operating Room Set Up (\*\*PREoperative check list)
	+ Patient Positioning
	+ Video-endoscopic equipment
	+ Ancillary Equipment
	+ Personnel
		- Ergonomics
			* Elbows 30 degrees from the waist
			* Elbows flexed 60-120 degrees
			* Thumbs slightly pronated and straight
* Patient Selection criteria
	+ ASA Classifications
		- 1 No organic, physiologic, biochemical or psychiatric disturbance
		- 2 Mild to moderate systemic disease, due either to surgical condition or a concomitant disease
		- 3 Severe systemic disease that limits the patient’s activity and may or may not be related to the reason for surgery
		- 4 Severe systemic disturbances that markedly limit the patient, and are life-threatening with or without surgery
		- 5 Moribund patient who has little chance for survival but is submitted to surgery as a last resort (resuscitative effort)
	+ ASA Class 4 or 5 not appropriate for laparoscopic surgery
	+ Thin and Obese patients
		- Typical lengths for trocars in obese patients > 100 mm
	+ Contraindications
		- Absolute (laparoscopy is likely to worsen the pt’s condition)
			* Inability to tolerate laparotomy
			* Hypovolemic shock
			* Lack of appropriate surgical training and/or experience
			* Lack of appropriate institutional support
		- Relative (risk/benefit)
			* Inability to tolerate general anesthesia
			* Long-standing peritonitis (increase risk of injury and limit operative exposure)
			* Large abdominal or pelvic mass
			* Massive incarcerated ventral and inguinal hernias
			* Severe cardiopulmonary disease
		- Disease specific
			* Cholecystectomy
				+ Gallbladder cancer
				+ Portal hypertension
				+ Cirrhosis
				+ Acute cholecystitis
				+ Mirizzi syndrome
			* Appendectomy
				+ Phlegmon
				+ Large abscess
			* Colon Resection
				+ Large fixed mass
				+ Dense pelvic adhesions
				+ Massive bowel dilation
				+ T4 tumors
			* Emergency Laparoscopy
				+ Long standing peritonitis
				+ Hemodynamic instability partially correctable with resuscitation
				+ Massive bowel dilation
			* Pelvic Laparoscopy
				+ Large, fixed masses
				+ Inability to tolerate Trendelenberg
			* Foregut Procedures
				+ Previous gastric operation, especially at GE junction
				+ Hepato-splenomegaly
			* Laparoscopic anti-reflux surgery
				+ Esophageal shortening
				+ Epithelial dysplasia
				+ Previous gastric surgery, especially operations at the GE junction
				+ Liver enlargement
				+ Large hiatal hernias
			* Hernia repair
				+ Large, chronically incarcerated hernias
				+ Acutely incarcerated hernias requiring bowel resection
				+ Need for removal of large prosthetics
				+ Need for skin graft removal or large scar revision
		- Commonly MISTAKEN as contraindications:
			* Diaphragm injury
			* GI bleed
			* Perforated viscus
			* Bowel obstruction
			* Abdominal trauma
				+ Should be used only when there are no immediately life-threatening injuries and the pt does not have an uncorrectable hemodynamic instability
				+ Most useful for detecting intraperitoneal, visceral, or diaphragmatic injury
				+ Thoracoscopy can be used in pts with chest injuries
			* Intrauterine/ectopic pregnancy
			* Obesity
			* COPD
			* Renal insufficiency

**MODULE 1 SCRIPT**

**Module 1 – Preoperative Considerations:**
Before performing laparoscopy, it is essential to have an understanding of the basic equipment and operating room setup used in these advanced procedures. In addition, knowledge of energy sources used in laparoscopic surgery will ensure the safety of patients and operators. Finally, surgeons should be familiar with patient selection criteria used to evaluate candidates for laparoscopic surgery. Please select a topic to continue.

**Module 1 – Preoperative Considerations 🡪 Laparoscopic Equipment:**
In laparoscopic surgery, it is of paramount importance that the clinician knows how the equipment functions and have the ability to detect imperfections and correct them. Developing these skills will lead to a safe, smooth and expeditious procedure. It is also important that instruments be cleaned in a specific manner and properly stored. Please review each topic. When you are done, please take the interactive review.

**Module 1 – Preoperative considerations 🡪 Laparoscopic Equipment 🡪 Equipment Table:**

1. This section will review the basic equipment used in laparoscopic surgery.
2. Many of the instruments described will be available in reusable and disposable formats, or a combination of the two, so called reposable. While individual manufacturers will taut advantages in sterility, availability, efficiency, and cost, it is up to the individual surgeon to assess all these factors when making purchasing decisions.
3. Many sizes of laparoscopes are available with both a diameter and length being variable. Diameter ranges from 2 mm to 10 mm and length varies from 30 cm to 45 cm. Most rely on the Hopkins rod lens system to transmit light from the light source to the operative field, then capture the reflected light and transmit it through the scope and camera coupler to a light sensitive imaging chip in the camera head. This type of system has decreasing light available for image capture as the scope angle and length increases and the scope diameter decreases. For example, a 5 mm 30-degree rod lens or optical scope admits less light than a 10 mm 0-degree scope for the same length and scope angle. Additionally, the susceptibility to damage of rod lens scopes increases as length increases and diameter decreases. Damage can occur during cleaning and processing or during use if too much torque is applied. Some newer laparoscopes do not use the Hopkins rod lens system and include the video imaging chip on the end of the laparoscope, eliminating the need for light to travel back through the scope to capture the image. These newer devices may include a flexible tip and generally produce a brighter image. Both varieties of scopes are available with high definition image capture chips but must have a high definition monitor to take full advantage of this capability.
4. While zero-degree laparoscopes are commonly used in many procedures, they are most useful when working in a small area directly in line with the scope and working ports such as deep in the pelvis or high in the mediastinum. Angled laparoscopes, such as 30 or 45 degrees, offers much more versatility than 0-degree laparoscopes. Some 0-degree scopes, however, have a flexible tip, offering even more versatility. The skill required to effectively use the laparoscope increases as the versatility increases. Practice with angled scopes outside of the operating room will improve efficiency while using them in the operating room.
5. It will be necessary to have a basic set of standard open instruments to open and close the laparoscopic port sites. A variety of scalpel blades, handles, toothed, and non-toothed forceps, s-shaped, send, and army navy type retractors on the field, as well as needle holders to assist in opening and closing the laparoscopic wounds. Additionally, a standard open surgical set should be available in the event that conversion to open surgery is required.
6. When using a rod-lens laparoscope, a dark or blurry image may occasionally occur. The surgeon can check the fiber optics by holding the lens end of the laparoscope to the light, looking into the light cord attachment. Small black areas will be seen if there are damaged fibers. The lens side of the laparoscope should also be inspected for obvious damage. Additionally, a clouded image could be the result of moisture from the eyepiece from the sterilization process that is captured between the scope and the camera. This could be dried with a gauze pad.
7. During a laparoscopic procedure, due to the temperature discrepancy and humidity between the OR and the peritoneal cavity, fogging of the video image may occur. There are a number of methods for keeping the laparoscope defogged during surgery. These include the use of chemical agents applied after the laparoscope has been cleaned and carefully wiped with a lint-free cloth. A chemical defogging agent should be allowed to dry for a few seconds before reinserting through the port. Additionally, if too much defogging agent is used than is firmly wiped off with gauze pad, the image will remain foggy. Alternatively, the laparoscope may be immersed in hot water, kept in an insulated bottle or electronically heated bath.
8. The image may also become compromised by blood or fluid collecting on the lens of the laparoscope. It is important that the surgeon consistently maintain a clear image to minimize the risk of inadvertent tissue injury. Methods to clean a smudged laparoscope lens include gently wiping the tip of the scope on clean tissue such as the liver of loop of bowel or removing the scope and cleaning with hot water and/or a gauze pad. It is usually also necessary to clean the mechanical seal of the port at the same time to avoid smudging the scope immediately upon reinsertion. Some newer ports do not use a mechanical seal to maintain pneumoperitoneum, thus would not require manual cleaning.

**Module 1 – Preoperative Considerations 🡪 Energy Sources:**

**Module 1 – Preoperative Considerations 🡪 Energy Sources 🡪 Electrocautery:**

1. The surgeon has two basic choices of instruments for the delivery of radiofrequency electricity to tissue: monopolar instruments, and bipolar instruments.
2. With monopolar units, a circuit consists of the electrical surgical unit (ESU), which converts low frequency current from the wall source to a high frequency current, an active electrode, such as the metallic portion of the laparoscopic instrument, the tissue that the current passes through, and the dispersive electrode that is connected to the generator.
3. Tissue coagulation occurs as a result of tissue heating. As the temperature is raised over 60 degrees C, protein denaturation occurs. As the tissue cools, these bonds are reformed in a haphazard fashion, which is manifested as tissue coagulation. In addition, as tissue temperature rises, water is also evaporated, producing desiccation. As desiccation increases, tissue impedance increases until complete desiccation occurs and current stops flowing due to very high resistance. Clinical observation shows that the tissue turns brown and proceeds to bubble and steam. Hemostasis is achieved as a result of fibrous binding between dehydrated, denatured cells of vessel endothelium.
4. Tissue heating is dependent upon current density. The current density is defined as the amount of current flowing through a cross sectional area of tissue. Current density is directly proportional to applied power and inversely proportional to tissue resistance. Additionally, it is inversely proportional to the square of the area of tissue through which the current must travel. The smaller the contact area, the greater the current density, the faster the heating. The tip of the active electrode is small, thus contacting a small area of tissue will generate a high current density. Conversely, the large area of tissue contact by the dispersive electrode makes for a low current density and minimal heating. The dispersive electrode should not be bent or placed on hairy skin, bony prominence, or scars, all of which may cause a decrease in the contact surface area and increase the risk of burn to the patient.
5. For monopolar instruments, the electrosurgical generator has three basic modes of operation; cutting, coagulation, or blended. It is often assumed that the name of the waveform will determine the clinical effect produced. In reality, other factors related to how the electrode is used, will influence the actual tissue effect and misconceptions can lead to serious errors in electrosurgical technique.
6. In cutting mode, the goal is to heat the tissue quickly so that the cell water is converted to steam, causing the cell to explode. Heat is dissipated in the steam with minimal lateral thermal tissue damage but poor thermal coagulation. This is accomplished by applying an unmodulated waveform with relative low voltage. During normal operation, a series of electrical sparks between the active electrode and tissue creates a steam bubble, which produces the sensation of flowing through tissue with little resistance. In order to achieve vaporation, the electrode should not be allowed to contact tissue directly. Surgeons should familiarize themselves with specific tissue effects associated with each of the waveforms used.
7. Coagulation mode results in rapid surface heating with superficial S scar formation and shallow depth of necrosis. This is known as fulguration. This is accompanied by having an intermittent waveform that is present with relatively high voltage. Significant cutting does not occur because heat is more widely dispersed. This is also a noncontact mode and relies on sparking between electrode and tissue.
8. The blend option mixes cutting and coagulation wave forms. Many electrosurgical generators have multiple blend modes where the extent of the modulation is varied, allowing the surgeon greater control over the desired tissue effect.
9. In contrast to open surgery, where the electrode in the abdominal viscera are all within the surgeon’s view, the use of monopolar instrumentation in the laparoscopic environment has several potential hazards. The central theme is current diversion. This occurs when current, following the path of least resistance, passes through unintentional pathways.
10. Any time a surgeon utilizes monopolar instruments, there is a risk for inadvertent tissue injury. While a risk cannot be completely eliminated, observing the precautions listed here will minimize these risks.
11. Capacitive coupling involves transfer of current from an active electrode, through its insulation, to a passive electrode. In other words, there must be two conductors separated by an insulator for this to occur. The electrodes are metal conductors, such as the metal portion of a laparoscopic instrument, or metal access port, and there can be greater than 40% of the available power transferred to the passive electrode. The passive electrode that can store the charge is also known as the capacitor. Capacitive coupling, therefore, occurs when the charge in the active electrode is stored in the passive electrode. This charge of the capacitor to adjacent tissue may result in burn. If the capacitor is in constant contact with tissue, this energy will return to the ground plate through the tissue without consequence because of the inability of the capacitor to store the charge.
12. Capacitive coupling may also occur when the laparoscopic instrument applying the monopolar current comes into contact with either the tip of shaft of another insulated laparoscopic instrument. This is particularly dangerous if the electrically passive instrument is not in constant contact with tissue thus allowing this passive instrument to store energy. This stored energy will completely discharge the next time the metal portion of the instrument contacts tissue. One example is an L-shaped tip on a monopolar instrument contacting the shaft of a grasper that is inadvertently not in contact with tissue, thus allowing the grasper to act as a capacitor and store energy. If the grasper is then used to manipulate tissue, the stored energy will discharge upon tissue contact, causing an inadvertent tissue injury.
13. Unintended direct coupling may occur when the active electrode comes into contact with other metal instruments, cannulas, or the laparoscope. If the active electrode contacts the metal portion of a grasper holding a bowel, a thermal injury is likely. If the active electrode contacts a metal laparoscope, injury to tissue adjacent to the laparoscope may occur out of the field of view.
14. A final, dangerous condition may occur when current is allowed to pass through ligated tissue. This will increase the local current density in a logarithmic fashion and unintended excessive tissue heating may result. An example is applying a monopolar instrument to the end of a structure that has been ligated, such as an appendiceal stump. The laws of physics dictate that excessive heating may occur at the ligature, resulting in delayed perforation, or appendiceal stump blowout.
15. When using bipolar instrumentation, tissue to be treated is placed directly between two electrodes so that current flows only through the tissue contiguous with both electrodes, eliminating the need for dispersive electrodes and in general, decreasing the hazards of stray current. Current flow is through a much smaller volume of tissue, unlike the high resistance circuit present when monopolar instrumentation is used, so it is important to decrease the output of the electrosurgical generator compared to monopolar instrument current settings. This lower energy requirement is shown to produce less lateral tissue damage and necrosis, compared to monopolar electrosurgery. Bipolar energy devices can be disposable or reusable and are available with a variety of instrumentation.
16. Recent advances in bipolar electrosurgery technology have allowed development of tissue sealing devices capable of sealing vessels up to 7 mm in diameter. These instruments use a computer to control energy delivery and tissue heating by measuring the tissue impedance of grasped tissue or using nanotechnology jaw sensors. This controlled energy delivery, in combination with high pressure from grasping the tissue, results in denaturation of collagen within the tissue or vessel wall, and the creation of a permanent seal. Since lower energy is used, there is less lateral thermal spread. Many devices also have a cutting blade incorporated within the device to divide the tissue after sealing.
17. There are two main potential hazards when using advanced bipolar devices. Despite the reduced lateral thermal spread, inadvertent damage to adjacent organs can occur. Every effort should be made to avoid activating the device in close proximity to adjacent organs. Next, if the instrument has an integrated cutting blade and this cuts the tissue or vessel prior to adequate sealing, bleeding can occur. Surgeons should make sure to complete the entire activation cycle for their particular device prior to cutting. It should also be noted that these devices will not work properly if metal is within the jaws, including surgical staples.

**Module 1 – Preoperative Considerations 🡪 Energy Sources 🡪 Ultrasonic Coagulation:**

1. Ultrasonic dissection relies of mechanical energy to produce its effects. The tissue heating is generated by converting electrical energy into high frequency, ultrasonic vibration, utilizing a piezoelectric transducer. The connection between the piezoelectric transducer and the handpiece requires a specific amount of torque. A torque wrench should be used for this purpose and is supplied by the manufacturer of the device. This vibration seals and divides tissue when the metal probe at the instrument’s tip is in contact with the tissue. There are a variety of probe and handle configurations available with both disposable and reusable designs.
2. The most commonly used configuration is the shears, which consists of a vibrating jaw, or blade, and a passive jaw. The passive jaw acts as a backstop to trap tissue against the active blade. Minimal, if any heat, is conferred to the outside of the passive jaw. However, the outside of the active blade remains unprotected and may inadvertently injure tissue that comes into contact with it during or immediately after use.
3. The transducer vibrates the metal instrument tip at approximately 50,000x per second or 50,000 hertz with an excursion of 25-100 microns depending on the power setting and manufacturer. A laparoscopic extender with a variety of exchangeable probe configurations carries the energy to the tissue. Lower power settings result in relatively more hemostasis and higher power settings result in relatively more cutting. The power settings are controlled by the surgeon using a hand control or foot pedal.

**Module 1 – Preoperative Considerations 🡪 Operating Room Setup:**

It is essential that all equipment and personnel are arranged in a safe an expeditious manner when performing laparoscopy. Patient positioning and monitor setup may vary by institution, surgeon preference, and procedure.

**Module 1 – Preoperative Considerations 🡪 Operating Room Setup 🡪 Patient Positioning:**

IV poles or other equipment should not interfere with the operating table during the course of the operation. One should anticipate changes in position of the table when placing items close to the operating table. If x-rays are to be taken during the operation, make sure the table is appropriate for this purpose and in the proper position for the C-arm or x-ray plate to fit under the table or patient respectively. The patient should be positioned properly, according to the procedure and all appropriate precautions should be taken to avoid neuromuscular injury. It is important to adjust the positioning equipment to the individual patient and not force the patient to contort into a rigid piece of positioning equipment.

**Module 1 – Preoperative Considerations 🡪 Operating Room Setup 🡪 Video-Endoscopic Equipment:**

The monitor should be placed at or slightly below eye level to decrease neck strain. If the monitor height cannot be adjusted, consider standing on step stools and raising the table to the appropriate height to avoid neck extension. The video monitor should be positioned so that the operative field will be between the surgeon and assistants and the monitors. Make sure there is enough cable length for additional monitors to allow for flexibility of positioning. The insufflator should be in a location to allow the surgeon and assistants to view insufflator settings throughout the procedure. Some integrated systems have a separate monitor that displays the insufflator settings in a convenient location or that display insufflator settings on primary video monitor, giving flexibility for placement of the insufflator itself. The settings of other ancillary devices may also be displayed on these monitors. Other equipment such as ultrasound machines, x-ray equipment, secondary video towers for colnodelcoscopy and coagulation devices should be placed in a position to allow access to the sterile field. Any lines traveling between the field and the ancillary equipment should not hinder the ability of the operating personnel from changing positions. Additionally, any special sterile drapes and covers should be present, as well as the necessary radiation protection when appropriate. This type of ancillary equipment should be checked for proper function prior to beginning the procedure.

**Module 1 – Preoperative Considerations 🡪 Operating Room Setup 🡪 Personnel:**

The surgeon should generally stand on the opposite side of the anticipated operative field to allow the best ergonomic working position. Working in an ergonomically advantageous position will minimize muscle strain and fatigue and maximize the surgeon’s ability to perform fine motor movements for longer periods of time. The ideal ergonomic position is with the arms at a 30-degree angle from the trunk and the elbows flexed between 60 and 120 degrees and the wrists slightly pronated, thumbs up and straight, both radial-ulnar axis and flexion-extension axis are no more than 2-3 degrees of either access. Standing on step stools may help achieve this ergonomically superior working position. The assistant should generally be opposite the surgeon but the same principles to monitor and arm positions apply. This may necessitate the surgeon and the assistant stand on the same side of the table. Proper positioning of the arm boards may facilitate this. The scrub tech or nurse should be positioned to allow visualization of the monitor, as well as easy access to the instrument table and patient.

**Module 1 – Preoperative Considerations 🡪 Patient Selection/Preoperative Assessment:**

This section will discuss issues related to the preoperative decision making and patient preparation that are fundamental to achieving beneficial outcomes in laparoscopic procedures.

**Module 1 – Preoperative Considerations 🡪 Patient Selection/Preoperative Assessment 🡪 Patient Selection Criteria:**

1. A recent history and physical, as well as any changes in a patient’s condition since the last exam, should be documented. Obtaining details of the past medical history, such as prior abdominal surgeries, it is important to establish the indications and dates of treatment. It is also helpful to know the exact placement of any radiation therapy portals from previous procedures. The presence of a hip prosthesis is important for determining the best position for the patient on the operating room table and to be aware of possible pelvic fibrosis related to the prosthesis. It is important to be aware of significant cardiopulmonary conditions due to the physiologic changes that occur with a pneumoperitoneum and general anesthesia. In addition, the surgeon should check for prior deep venous thrombosis, coagulation disorders, and anesthesia complications that may have occurred in previous surgeries.
2. If the patient is taking steroids or other immunosuppressant drugs, healing may be delayed. Additionally, strestosteroids may need to be provided perioperatively if the patient has been on therapy for a significant period of time. Any pulmonary or cardiac medications are important to continue throughout the perioperative period. Anticoagulants, such as warfarin, should be discontinued at least 3 days prior to elective surgery. The reason for anticoagulation is important to ascertain and one should consult with the prescribing physician regarding the perioperative plan for anticoagulation. There is no proof that non-steroidal anti-inflammatory medication, including aspirin, need to be discontinued prior to safely proceeding with laparoscopic surgery. Additionally, some non-prescription dietary supplements may also cause platelet dysfunction and their use preoperatively should be at the discretion of the surgeon. A routine check should be performed to ensure that the patient is not allergic to medications, such as local anesthetics and iodine-based skin preparations.
3. Physical examination should include a check of vital signs, a chest and cardiac exam relative to the use of anesthesia, and a thorough abdominal exam focusing on procedure related issues such as scars, organomegaly, hernias, and masses.
4. The most recent patient data that are appropriate for the procedure such as radiologic imaging, laboratory test values, and EKG readout should be assessed prior to the procedure.
5. Every patient is assigned an American Society of Anesthesiologist physical status classification prior to the administration of anesthesia. ASA 4 and ASA 5 patients may not be appropriate candidates for laparoscopic surgery because their marginal cardiopulmonary reserve is often unable to tolerate the physiological changes caused by pneumoperitoneum; for example, decreased venous return and diaphragmatic excursion, and the need for hyperventilation.

Module 1 – Preoperative Considerations 🡪 Patient Selection/Preoperative Assessment 🡪 Patient Preparation:

1. It is important to set aside time during the initial consultation for patient education. During this meeting, the clinician should discuss the risks and benefits for the option for care. Regarding the procedure, the discussion should include preoperative preparation, appropriate details of the procedure, the possibility of conversion to open surgery, anticipated post operative course, and duration of recovery. Additionally, it is important to explicitly establish the goals of the procedure and align these goals with both the patient and surgeon.
2. Standards for informed consent are the same for open procedures and include providing enough appropriate information to the patient about the condition, the proposed treatment and alternatives, as well as the risks and expected benefits. Specifically, for laparoscopy, the likely requirement for general anesthesia and the possibility of the need to convert to open surgery should also be discussed. One should not embark on a laparoscopic procedure for the sake of laparoscopy. Rather, the patient’s condition should be the primary driving force in the decision to operate or not.
3. Discussion with the patient should be more of a dialogue than a monologue and give the patient time to understand what is being considered. Face to face time is essential to establish trust and effective communication.
4. It is important to go over the details of the procedure with the patient in a manner the patient can understand. Many physicians present the patient with a preprinted booklet of information, both before and after the procedure for easy reference. Some physicians also offer the patient the opportunity to watch a short video pertaining to the specific surgical procedure involved. Discussing post operative instructions may also be helpful in helping the patient understand what to expect in the post operative period.
5. Both SAGES and FACS publish patient education materials related to laparoscopic surgery in multiple languages on their respective websites.

Module 1 – Preoperative Considerations 🡪 Patient Selection/Preoperative Assessment 🡪 Thin and Obese Patients:

1. While obesity was commonly thought to be a contraindication to laparoscopy, experience has shown that a laparoscopic approach can actually improve operative exposure in many circumstances.
2. Obese patients can be challenging to establish initial access and place subsequent trocars. The use of longer trocars that are placed perpendicular to the abdominal wall can be helpful. Secondary trocar placement can be difficult to accurately assess with finger palpation of the abdominal wall and placement of a spinal needle first can help define the intraperitoneal penetration point. Typical lengths for trocars in obese patients are greater than 100 mm.
3. In thin or muscular patients, the aortoiliac vessels may be in close proximity to the anterior abdominal wall. Techniques to avoid injury include elevating the abdominal wall and/or placing the Veress needle away from the midline near the costal margin or utilizing an open approach or optical trocar for direct visualization. The same techniques can also be helpful in establishing a pneumoperitoneum in patients with previous abdominal surgery.

Module 1 – Preoperative Considerations 🡪 Patient Selection/Preoperative Assessment 🡪 Contraindications to Laparoscopic Surgery:

1. Contraindications to laparoscopy can be either absolute or relative. There are also contraindications specific to certain procedures and disease states. As extensive experience is gathered, some of the earlier absolute prescriptions against performing a procedure become less constraining and are left to the discretion of the operating surgeon. Each patient must be evaluated on an individual basis. Please review each type of contraindication.
2. Absolute contraindications are those likely to worsen the patient’s condition by using a laparoscopic approach. All of the absolute contraindications for any operation also apply to laparoscopic surgery, such as inability to tolerate laparotomy. Absolute contraindications specific to laparoscopic surgery include the inability to resuscitate a patient in hypovolemic shock, lack of proper training or experience for the proposed procedure, lack of appropriate facilities to provide periprocedural care.
3. Relative contraindications present a range of risk benefit ratios dictated by each individual patient. Inability to tolerate general anesthesia is a contraindication if the laparoscopic procedure cannot be performed under local anesthesia, with or without mild sedation. Long standing peritonitis may increase the risk of injury during initial trocar insertion and limit operative exposure. Large abdominal or pelvic masses may interfere with exposure of the operative site. Massive, chronically incarcerated ventral and inguinal hernias represent a significant technical challenge to reduce the hernia contents and may be associated with a loss of peritoneal space, limiting the use of laparoscopy. Additionally, severe pulmonary edema, severe cardiac disease, or intolerance to proper positioning must be considered as relative contraindications. Local knowledge and expertise play a role in determining the use of laparoscopy under these circumstances.
4. There are several situations that should be known preoperatively in order to minimize the risk associated with the laparoscopic approach. Presence of a visceral arterial aneurysm may increase the risk of inadvertent vascular injury. Scars from previous abdominal surgery may not be easily visible on the skin but still present the risk of intraperitoneal adhesions. Veress needle insertion should never occur too close to previous incisions. A history of peritonitis also predicts a higher likelihood of extensive adhesions and risk of enterotomy. Umbilical abnormalities such as a mass, existing hernia, or history of an umbilical or ventral hernia repair should alert the surgeon to avoid blind techniques of initial access at the umbilicus. Obtaining a good history of previous laparoscopic ventral hernia repair is of particular importance as there may be little or no evidence of scars indicating the size of the prosthetic. The surgeon should never attempt blind initial trocar or Veress needle placement through a previously placed prosthetic. The presence of hepatosplenomegaly may increase the risk of injury with trocar or Veress needle insertion, or compromise exposure of the operative field. The presence of hepatic cirrhosis should alert the surgeon to potentially increased risk of hemorrhage and increased risk of post operative ascites leakage from the laparoscopic wound. Attempts at controlling the ascites with medical therapy should be done before elective operations. The presence of an intestinal obstruction with extensive bowel distension can limit the extent of visualization and increase the risk of enterotomy with trocar insertion and bowel manipulation with laparoscopic instruments. While laparoscopy has been shown to be safe in pregnancy, special precautions should be taken to avoid injury to the gravid uterus as well as enhance the safety of the operation in terms of physiology and operative exposure. Likewise, a thin body habitus may also require caution as there is less space between intraabdominal organs and the anterior abdominal wall prior to insufflation. This is particularly important when blindly inserting the Veress needle or initial trocar.
5. Just as each patient must be evaluated individually, each procedure has its specific indications and relative contraindications. Consideration for an open approach should be given for the scenarios listed on the screen. A comprehensive assessment should be made based on the experience of the surgeon, the entire operating room team, and the institutional capabilities for appropriate pre and post operative care.
6. Please review the list on this page and the following page so that you are familiar with the procedure specific relative contraindications.
7. Conditions commonly mistaken as contraindications to laparoscopy include diaphragm injury, GI bleed, perforated viscus, bowel obstruction, abdominal trauma, intrauterine/ectopic pregnancy, obesity, COPD, and renal insufficiency. Careful surgical assessment is required when performing laparoscopy under these conditions. Furthermore, local levels of expertise in the entire operating team will play a role in the decision-making process.
8. In general, laparoscopy should be used in trauma patients only when there are no immediately life-threatening injuries present and the patient does not have an uncorrectable hemodynamic instability. Laparoscopy is most useful in abdominal trauma for detecting intraperitoneal, visceral or diaphragmatic injury after penetrating wounds. A laparoscopic approach can be used for both diagnostic and therapeutic purposes and should only be accomplished by a surgical team that is appropriately trained and experienced. A diagnostic laparoscopy would be expected to reduce the number of non-therapeutic laparotomies. Thoracoscopy may also be used with success in patients with chest injuries.
9. Abdominal surgery may be necessary for a variety of reasons in pregnant patients. A laparoscopic approach for both the diagnosis and treatment of ectopic pregnancy has been widely used but should be performed only for patients who do not have uncorrectable hemodynamic instability. A laparoscopic approach for other issues can be safely employed in all trimesters of pregnancy with minimal morbidity to both the mother and the fetus. Special precautions when performing laparotomy on pregnant patients should include tailoring initial access based on fundal height, utilizing a left lateral recumbent position, and lowering insufflation pressure, but not at the expense of compromising operative exposure. In addition, fetal heart monitoring should be performed both pre and post operatively.
10. Patients presenting with peritonitis that require operation may be approached laparoscopically. The laparoscopy may be diagnostic and facilitate an open or laparoscopic assisted approach or the condition may be treated laparoscopically. Patients with long standing peritonitis are more likely to have dense inflammatory reactions that would require and open approach.
11. Patients presenting bowel obstruction that require operation may be approached laparoscopically. The laparoscopy may be diagnostic and facilitate an open or laparoscopic assisted approach or the condition may be treated laparoscopically. Initial trocar insertion should be done under direct vision to minimize risk of bowel injury. This is especially true of small bowel obstruction. During a laparoscopic approach for a small bowel obstruction, it is important to identify the transition point by following the small bowel from the distal decompressed loops of bowel to avoid handling distended bowel. For acute large bowel obstruction, usually, only a proximal diverting ostomy is amenable to a laparoscopic approach in the emergency setting.