IAGE

JEEWAN MALA HOSPITAL

TRADITION OF TRUST AND CARE SINCE 1920

IAGE Bulletin

2015-17

Theme:

“Endoscopy for all with Safety & Economical Consideration”

Dedicated Issue:

Basic Principles of Laparoscopy

Published from:

Jeewan Mala Hospital, 67/1, New Rohtak Rd, Block 65, Karol Bagh, New Delhi, Delhi 110 005

Tel.: 011-47774141 • M.: 09212526855 • jmh.cme@gmail.com

IAGE Office Bearers 2015-2017


Dr Rajendra Sankpal
President


Dr Rishma Pai
Hon. Secretary General


Dr Prakash Trivedi
Immediate Past President


Dr Nandita Palshetkar
Vice President


Dr Sunita Tandulwadkar
Hon. Jt. Secretary


Dr Krishnakumar Subramaniam
Hon. Treasurer


Dr Sudha Tandon


Dr Atul Ganatra


Dr Pritesh Naik


Dr Niranjan Chavan


Dr Sujal Munshi


Dr Pragnesh Shah

Members


Dr Bhaskar Pal


Dr Pratik Tambe

Dr Meenu Agarwal


Dr Sujata Kar


Dr Vidya Bhat


Dr Malvika Sabharwal

Members

Dr Prakash Patil


Dr Mahendra Borse

Dr Rajat Mohanty


Dr Tushar Kar

Members

Publisher/Printer/Editor
Dr Malvika Sabharwal on behalf of Indian Association of Gynaecological Endoscopists (IAGE).

Printed at
Process & Spot C-112/3, Naraina Industrial Area, Phase-1, New Delhi 110 028

Published from
Jeewan Mala Hospital, 67/1, New Rohtak Road, Block 65
Karol Bagh, New Delhi 110 005

IAGE Secretariat
406, H - Wing, Palm Court Complex
Link Road, Malad (West)
Mumbai - 400 064
Tel.: 022-28812716 • M.: 9821338665
Email: rajendrasankpal@gmail.com

Contents

President's Message

Dear Colleagues

As the President of Indian Association of Gynecological Endoscopists (IAGE) it is my honour to write a message for this newsletter.

Along with the scientific information on a particular subjects in Gynecological endoscopy News letter is a medium to communicate with the valuable members about the work IAGE office is putting up and the scientific activities carried out by the board of IAGE & the information about the future events & activities.

The theme for the next two years is "Endoscopy for all with safety & economical consideration". Sticking with the theme we would like to dedicate the upcoming newsletters based on the theme topics which are of prime importance in day to day practice. The reader will find practical solution to a particular scenario in their endoscopy practice.Dr Malvika Sabharwal being very keen, sincere & enthusiastic academician along with Dr Abhishek Chandawarkar have put forward lot of efforts behind this newsletter. I am sure our members will find this newsletter a useful reference tool in their practice.

After successful organisation of academic events & workshops in Delhi, Bhopal & Nagpur our office has planned exciting scientific events in different parts of India which are enlisted in this newsletter. Reader will also find glances of the organised activities of IAGE in the past six months.

On behalf of the managing committee I sincerely appreciate the efforts of Dr Malvika Sabharwal & Dr Abhishek Chandawarkar for bringing out this beautiful newsletter.

With best wishes

Dr Rajendra Sankpal
President IAGE

From Hon. General Secretary’s Desk

“The strength of the team is each member. The strength of each member is the team”. -Phil Jackson

It is a privilege and pleasure for me to be appointed as the Secretary General of the Indian Association of Gynaecological Endoscopists (IAGE). It is a rapidly growing organization of dedicated, focused and enthusiastic gynaecologists all with a love and passion for endoscopy.

It is an actively expanding and exciting field and we as an organization are committed to advancing its role in India. We will be training young doctors and improving the skills of those who are already practicing endoscopy. We plan to have many training programmes including hands on sessions, updates with CME’s and Conferences, liaisons with international bodies in order to advance learning and techniques and exchange ideas and thoughts.

Our new team is very dynamic and enthusiastic. Yet we have a long way to go and a lot to achieve.

We look forward to active participation from all of you in order to achieve our goals. Please encourage your gynaecologist and endoscopist friends to become members of the IAGE.

“Team work makes the dream work”. -Bang Gae

Dr Rishma Dhillon Pai
Hon. Secretary - Indian Association of Gynaecological Endoscopists (IAGE)
Vice President - Indian Society for Assisted Reproduction (ISAR)
President (Elect) 2017 – FOGSI
Board Member –World Endometriosis Society (WES)

From Editor's Desk

Dear Friends,

Warm wishes from the Editorial Team of IAGE 2015-17. At the outset, I would like to thank our dynamic IAGE president who has entrusted me to work in this capacity. With all humility we embark on this challenging but exciting journey for the next 24 months. IAGE is an association of highly passionate endoscopic gynecologists. The dedication in their work and the extent of research results in excellence and helps develop newer, safer and more effective techniques. IAGE provides the right platform for the propagation of new concepts and techniques and welcomes new talent. It is through such forums gynecologists take informed decisions in treatment protocols and make evidence based medicine more acceptable.

With an aim to promote gynae – endoscopy we have planned 4 newsletters for IAGE in 2015-17. We begin our nascent innings with the first issue on "Basic principles of laparoscopy." This theme has always been relevant and close to my heart as Jeewan mala hospital has been a pioneer in laparoscopy since 1992. Through the 1st issue we endeavor to lay down the basics of minimal access approach for the neophyte, advanced surgical trainee and the practicing surgeon. Keeping in mind the rapid advancements of the technology of endoscopic equipment, our aim, through this news bulletin would be to make things easier for the gynecologist not only in following the correct, most effective clinical protocols but also to choose the most appropriate medical equipment. Our intent would be to simplify and concise everything in these 4 issues.

I would like to extend my sincere gratitude to all the authors for their contributions.

With this, on behalf of the Editorial team, I would like to wish happy reading and a happy new year to all of you.

"For the things we have to learn before we can do them, we learn by doing them." -Aristotle

"Begin, be bold, and venture to be wise." -Horace

Dr Malvika Sabharwal
Padmashree Awarded by President of India
Editor, IAGE 2015-17
Jeewan Mala Hospital, New Delhi.
President Elect DGES 2016
Vice President, AOGD Endoscopy Society
M.: 09810116293
Email: drmalvika@jmh.in

Dr Abhishek Chandavarkar
Co-Editor

Dr Shivani Sabharwal
Co-Editor

Dr Parul Aggarwal
Co-Editor

Laparoscopic Pelvic Anatomy

Dr Niranjan Chavan
MD, FICOG , FCPS, DGO, DFP, Diploma in Endoscopy (USA)
Professor, LTMMC and LTMGH, Sion, Mumbai
Member, Executive Committee, IAGE

Laparoscopic surgery enables us to enjoy an extremely accurate and detailed view of the living tissues. Knowledge of pelvic and abdominal anatomy is essential for all pelvic surgeons and is crucial for successful surgical outcome. With the availability of high quality endoscopes and laparoscopic dissection techniques, pelvic anatomy is magnified, with particular benefit in the pelvic retroperitoneum.

Pelvic peritoneum

It is best visualised in the Trendelenburg position, with the loops of bowel fallen back above the promontory and uterus in anteversion. External uterine manipulation with a uterine manipulator or Hegar'sdilator, is an essential for mobilisation of the uterus. It helps expose the various sides of the uterus, provides easier access to the vesico-uterine and recto-uterine (Douglas) pouches, with their subjacent septums, and access to the lateral retroperitoneal spaces level with the broad ligaments.

The lateral endoscopic view of the pelvic cavity allows visualisation of the uterine adnexa in greater detail, along with the broad ligament whose anterior leaf is lifted in the middle by the round ligament which extends from the uterine horn and deep inguinal ring. The suspensory ligament of the ovary crosses over the line of the external iliac vessels.

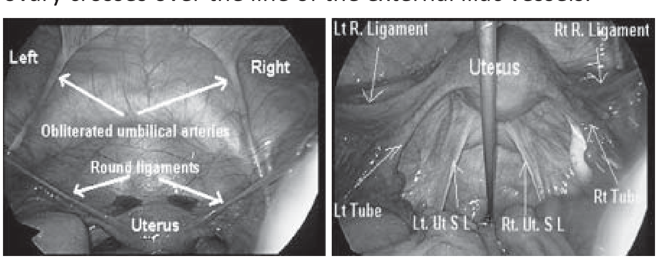


Figure 1:

Inferior epigastric vessels

They originate from the external iliac vessels in the femoral arch area below the round ligament, run up the anterior abdominal wall laterally to the umbilical artery and go behind the rectus abdominis muscles level. The lateral edge of the rectus abdominis muscle is used as a landmark when inserting the lateral trocars. This avoids any damage to these vessels, since they run along the posterior surface of this muscle above the pelvis. For a pelvic approach, the lateral trocars are placed adjacent to the antero-superior iliac spine laterally to these vessels. They are most often visible during laparoscopy either directly through the peritoneum, or in the lateral umbilical fold which is seen lateral to the umbilical artery.

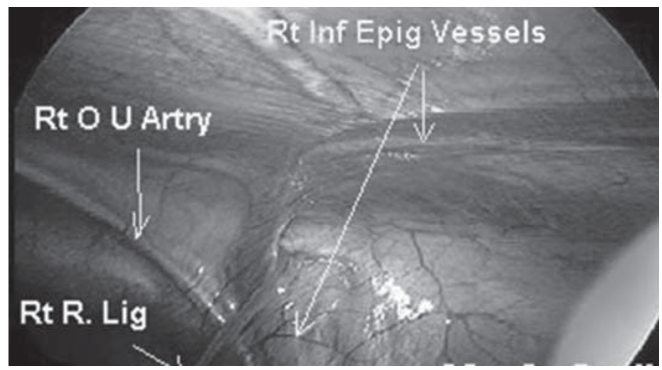


Figure 2: Laparoscopic view of the Inferior Epigastric vessels

Pelvic Ureter

Three parts are described successively by endoscopy: a parietal and retroligamentary part, from its entry into the pelvis until the point where it crosses the uterine artery, an intraligamentary part between the parametrium and paracervix, and a retrovesical part before it joins the bladder. Only the parietal and retroligamentary section can be viewed transperitoneally, where it can be identified due to its peristaltic movements. It lies against

the lateral pelvic peritoneum and consequently remains in a superficial position relative to the various internal iliac vessels. It enters the pelvis, crosses over the origin of the external iliac artery and then runs above the internal iliac artery to move inwards from the umbilical artery and run medially relative to the origin of the uterine artery before crossing it. It must be paid particular attention during any procedure involving haemostasis of the ovarian and/or uterine pedicles, and also during conservative treatment of adnexal lesions with a pathological peritoneum (endometriosis), which may alter its anatomical relationships.

The ureter leaves the surgeon's field of vision as soon as it goes under the parametrium, from where it becomes intraligamentary. From then on it is covered by the proximal parametrium and the vesico-uterine ligament. Dissection of the intraligamentary and retrovesicalureter should be envisaged mainly in a context of total hysterectomy. It consists of creating a tunnel inwards from the ureter, in contact with its adventitious sheath. The roof of this tunnel,corresponding to the parametrium with the uterine artery then the vesicouterine ligament, iscoagulated then sectioned progressively, always inwards from the ureter. This ureteralsegment is thus freed right up to the bladder

Identifying the pelvic ureter

This is indispensable for most pelvic gynaecological surgical procedures. While the uretercan be palpated in order to identify it in open abdominal surgery, with laparoscopic surgerythe only possibility relies on direct vision by the surgeon. The parietal and intraligamentaryportion are usually identified by transperitoneal vision. Its peristaltic movements at this pointwill help it stand out from the adjacent vascular structures. If this identification is difficultand if the indication so requires, as in case of a pathological peritoneum, the search mustcontinue retroperitoneally, after incision of the broad ligament located between the pointwhere the suspensory ligament of the ovary emerges in the pelvis and the line of the externaliliac vessels.

The parietal and retroligamentary portions of the ureter are seen medial to the suspensoryligament of the ovary, in the ovarian fossa. In thin patients, it may be possible to see throughthe peritoneum of this fossa the first collateral branches of the anterior trunk of the internaliliac artery (hypogastric artery), to which the ureter lies laterally; this anterior trunk consistsof: the umbilical, uterine and vaginal arteries. It must be remembered that it is more difficultto view the ureter on the left side due to the presence of the sigmoid colon and rectum. It is sometimes necessary to detach the recto-sigmoid junction level with the external iliac vessels.

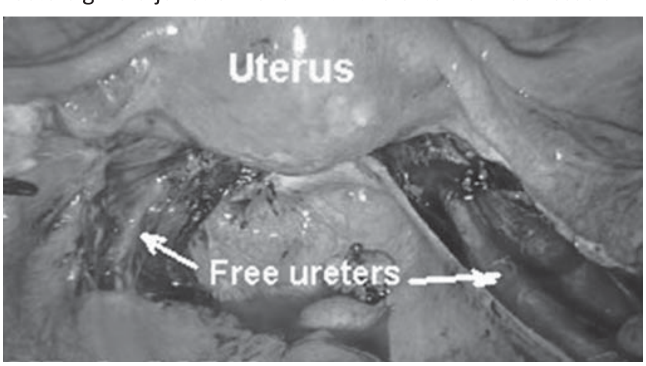


Figure 3: Pelvic ureter visualised laparoscopically after dissection

Promontory

Situated at the upper limit of the pelvis, the promontory is most often approached to the rightof the sigmoid. Laparoscopic exposure of the promontory and sacral concavity can be madeeasier by transparietal fixation of the peri-sigmoid and peri-rectal fatty tissue in the lefthypochondrium. In the midline, the median sacral vessels are located subperitoneally alongwith the common prevertebral ligament. They are generally preserved during laparoscopicpromonto-fixation, with the prosthesis fixed to the right side of the ligament. Laterally to theright lies the homolateral iliac artery, the iliac bifurcation and the ureter crossing the origin ofthe external iliac artery. The iliac venous junction is located lower and slightly lateral relativeto the bifurcation of the aorta.

Left common iliac vein is a potentially dangerous vein during dissection of the promontorybecause it is so close, and because it is not always easy to locate. This is due in part to thepressure of the pneumoperitoneum which tends to flatten its peritoneal relief, more so inobese patients. Apart from anatomical variations, there could be sacralisation of thepromontory which link it even closer to the promontory and increase the caution requiredduring dissection.

Pelvic Retroperitoneum

The connective tissue space between the pelvic peritoneum and abdominal walls is of primeimportance as it is crossed by the ureter, the vessels, lymphatic system and autonomicnervous system to and from the pelvic viscera. Its functional organisation is provided bydense connective structures, the visceral ligaments and visceral and parietal fascias, leavingareas of looser connective tissue in contact with the viscera and abdominal walls which canbe cleaved surgically, i.e. spaces and septums: medially vesico-uterine, vesico-vaginal, rectovaginalseptums and the retropubic (Cave of Retzius), rectorectal and presacral spaces; laterally, two matching and symmetrical spaces: the paravesical and pararectalfossae. Thesevarious spaces communicate with each other at their ends. The visceral ligaments seen are:

sagittally the vesico-uterine ligaments and uterosacral ligaments; laterally, the parametrium,paracervix, lateral ligament of the bladder (formerly the external pillars of the bladder), andthe lateral ligament of the rectum. The lateral ligaments carry the terminal branches of theanterior trunk of the internal iliac artery. The sagittal ligaments contain autonomic nervoussystem nerves along part of their course. They are of great importance surgically. These arenot ligaments in the strictly anatomical sense, but areas where the connective tissues are moredense, exchanging fibres with each other and prolonged by the fascias at their ends. Incontact with the lateral abdominal wall, the parametrium, paracervix and lateral ligament ofthe bladder form a perfectly continuous insertion, making it difficult to tell them apart. The vesico-uterine ligament, parametrium (anterior expansion) and lateral ligament of the bladderalso form a continuous insertion. The ureter remains the essential landmark whendistinguishing between these structures. The parametrium carries the uterine artery and islocated above the ureter, while the paracervix carries the vaginal artery or arteries and islocated below the ureter, as is the lateral ligament of the bladder which carries the superiorvesical artery.

The dissecting effect of the peritoneum can be seen right from the peritoneal incision phasewhen the C02 infiltrates beneath the peritoneum held under traction, and detaches it.

Subsequently as the various pelvic spaces are approached, the gas always travels along thecleavage planes. This effect can be seen due to the creation of bubbles caused by the gasexpanding the connective tissues which originally filled these virtual spaces.

Vesicouterine and vesicovaginalseptums

These arise in the supravaginal part of the posterior surface of the bladder, anterior vaginaand bladder trigone. They finish at the bottom in the dense connection between urethra andvagina. Their lateral limits are formed by the vesicouterine ligaments. Access is gained viathe vesicouterine pouch after using the manipulator to push the uterus towards thepromontory. During dissection, the vesicouterine ligaments are sectioned level with theiranterolateralcervico-vaginal insertions in order to remain well away from the ureters that runthrough their posterolateral portions.

Rectovaginal septum

This separates the posterior vagina from the rectum and is accessed via the rectouterine pouchbetween the vaginal insertions of the uterosacral ligaments. There are two levels fordissection depending on the type of indication: during excision surgery (deep endometriosis,total hysterectomy), it is necessary to dissect the vagina from the rectum and uterosacralligaments; during reparative surgery (promontory fixation), dissection can be taken laterallyas far as the levatorani muscles with respect to their puborectal and pubococcygeal portions.

Retropubic cave of Retzius

This space is filled with fatty tissue and is located between the pubis anteriorly and thebladder posteriorly. It is accessed through the anterior abdominal wall. The peritonealincision is started on the midline (median umbilical fold) between the bulge of the symphysisand the midline operating trocar. It is continued in each direction as far as the umbilicalarteries (median umbilical fold). In order to enter the space, the umbilicovesical fascia has tobe crossed, below which run the two umbilical arteries to the front of the bladder. One of thepossible errors is to dissect too close to the peritoneum without going above this fascia, witha consequential risk of bladder injury.

Autonomic Nerves

In the upper part of the fossa, about 2cm below the ureter, the hypogastric nerve runs alongthe lateral surface of the rectum.

It then travels through thedorsolateral part of the uterosacral ligament prior to its anastomosis with the pelvicsplanchnic nerves at the inferior hypogastric plexus, from where efferent branches of theautonomic nervous system are distributed to the pelvic viscera. There is a risk of damagingthe hypogastric nerve during extensive resection of these ligaments.

Origin of the uterine artery

The uterine artery arises from the anterior division of the internal iliac artery,Various techniques can be used to reach it. The most simpleconsists of moving down along the umbilical artery to its point of origin. It is also possible tofollow the retroligamentaryureter, after first locating it in the broad ligament, to the pointwhere it crosses the uterine artery.

Umbilical artery

This is the essential anatomical landmark when approaching the paravesicalfossa, and alsowhen searching for the origin of the uterine artery. If it is difficult to locate in the broadligament, traction must be applied to it at the anterior abdominal wall so that it protrudeslower down.

References

1. Kamina P. Anatomieopératoire Gynécologieet Obstétrique. Maloine, 2000.
2. Querleu 0, Narducci F, Poulard V et al. Modified radical vaginal hysterectomy with orwithout laparoscopic nerve sparing. GynecolOncol. 2005.
3. Possov ER M, QuAkernack J, Chiantera V. The LANN technique to reducepostoperative functional morbidity in laparoscopic radical pelvic surgery.1Am CollSurg.2005..
4. Sakuragi N, Tooo Y, Kuoo M et al. A systematic nerve-sparing radical hysterectomy technique in invasive cervical cancer for preserving postsurgical bladder function.Gynecol Cancer. 2005.
5. Yabuki Y, Sasaki H, Hatakeyama N, Murakami G. Discrepancies between classicand modern gynecologie surgery on pelvic connective tissue structure: Am 1 Obstet Gynecol.
6. Gadir A. Laparoscopic and Hysteroscopic Minimal access Surgery in ReproductiveMedicine and Surgery. 2003.

Electro Surgery Made Easy

Dr Shivani Sabharwal
MS & Advanced Endoscopy Fellow
Senior Consultant Obs and Gynae
Jeewan Mala Hospital and Apollo Spectra, Karol Bagh, Delhi

Principles of Electro Surgery

Understanding the science and principles of electricity is an important step in using this technology properly and eliminating potential hazards possibly encountered in surgical practice.

In our understanding of electro cautery, we need to know basic physics.

Current = Flow of electrons during a period of time, measured in amperes

Circuit = Pathway for the uninterrupted flow of electrons

Voltage = Force pushing current through the resistance, measured in volts

Impedance/ resistance to the flow of current, measured in ohms

Often "electrocautery" is used to describe electrosurgery. Electrocautery refers to direct current (electrons flowing in one direction), whereas electrosurgery uses alternating current at radiofrequency levels. During electrocautery, current does not enter the patient's body. Only the heated wire comes in contact with tissue. In electrosurgery, the patient is included in the circuit and current enters the patient's body.

The circuit is composed of the ***generator, active electrode, patient, and patient return electrode***. The patient's tissue provides the resistance, producing heat as the electrons overcome the resistance.

In endosurgery, the **Generator** converts electricity to high frequency waveforms and creates the voltage for the flow of electrosurgical current.

60 cycle/sec current, commonly found in household, is increased to over 300,000 cycles/secby the generator.

Standard electrical current alternates at a frequency of 50 cycles per second (Hz).

Nerve, myocardium and muscle stimulation cease at 100,000 cycles/sec (100 kHz),

Electrosurgery can be performed safely at frequencies above 100 kHz.

Electrosurgical systems

With recent advancements the replacement of old technology with isolated, balanced, and return monitoring systems has virtually eliminated any risk to patients that may arise from current division.

Electrosurgical generator is an important part in ESU and choosing a right one is extremely important.

Design

Displays:

- Large and easy to read.
- Highly visible in the dark & at a distance

Cart: tip proof
Accommodating:

- Accepts equivalent accessories

Safety

Warnings: highly visible and audible

Labels: clear & legible

Contact: patient & pad contact quality monitoring

Power: accurate

Reliability

Warranty: available

Loaner Service: replacement loaner service for repairs

Experience: long term focus on electrosurgery

What are the tissue effects possible with electrosurgical unit?

Coagulation, Cutting, Fulguration and Desiccation.

These effects depends on the following factors:

- Current density,
- Time of contact,
- Electrode size,
- Tissue conductivity/ Resistance of tissue,
- Current waveform,
- Power output

Coagulation - is a high voltage low frequency waveform, with 96% duty cycle (pulsed wave). The temperature rises slowly within cell causing dehydration, shrinkage and coagulum formation.

Cut - is a continuous low voltage high frequency wave form, with a 100% duty cycle. High temperatures are achieved in short time so there is rapid expansion of IC content causing cell to burst.

Fulguration -

Sparking and arcing with the coagulation waveform, coagulates and chars the tissue over a wide area.

The result is the creation of a coagulum rather than cellular vaporization (cut). In order to overcome the high impedance of air, the coagulation waveform has significantly higher voltage.

Electrode is not in contactwith tissue.

Effects: Tissue ablation.

Instrument:

- Argon Plasma Coagulator @ 40-60 W(Best)
- Monopolar coagulation, or
– Blend-cut with high-CREST at high setting

Desiccation -

This occurs when the electrode is in direct contact with the tissue and most efficiently with the "cutting" current. By touching the tissue with the electrode, the current concentration is reduced. Less heat is

generated and no cutting action occurs. The cells dry out and form a coagulum rather than vaporize and explode.

Effect: Desiccation/Coagulation, with preemptive heamostasis.

Best Instrument:

-Microbipolar (no fulguration).

-Monopolar coagulation @ 20-30 W, or

-Blend-cut with high-CREST (3 or more) or low % duty @ 20-40W.

Patterns of tissue destruction at different temperature

45c - Apposing tissues seal by covalent bonds (below is reversible)

60c - Protein denaturation, blanching

80c - Carbonization, drying/ shrinkage

90-100c - Cellular vaporization, plume of gas and smoke

> 125c - Complete oxidation of protein, eschar formation

The rise in temperature is governed by

Joule'slaw:Q = I2× R × t

where Q is the heat generated by a current of constant intensity (I) flowing through a conductor ofelectrical resistance (R), for a time (t).

Tissue electrical resistance

Tissue resistance mostly depends on thedegree of vascularization and water content (i.e. inversely proportional). Current flows preferentially through blood, then nerve, then muscle, then adipose tissue and finally bone.

When electro-surgery is applied, progressive tissue desiccation increases tissue resistance, which reduces current intensity (hence requiring high voltage to achieve heamostasis).

Current density is the amount of electrical current per unit areaof cross section.

In a monopolar circuit, current density is relatively high at the point of tissue contact with the active electrodedue to the small contact area.

Current density is considerably lower at the point of contact between the patient and the neutral electrode because the large surface area of the latter disperses the current returning to the ESU.

If the patient is in contact with a small portion of the neutral electrode, or if the neutral electrode is not correctly oriented, the temperature at this levelmay rise and cause skin burn.

Patient return Electrode- The Pad becomes the "Gatekeeper" of Current Flow.

BURN = INTENSITY OF CURRENT X TIME / AREA

Assess Pad Site Location

- Well vascularized muscle mass
- Close to Incision site/prep area
- Large area- Area minimum 100 sq cm
- Minimal Equipment on patient
- Good padding ofpatient, equipments and stir ups
- Electrode must be of low resistance

Avoid:

- Area with Vascular insufficiency
- Irregular body contours
- Area with excessive hair, excessive adipose tissue, scar tissues
- Bony prominences

Current form

Bipolar current -

Electrosurgical effect takes place between paired electrodes placed across the tissue to be treated. Active output and patient return functions are both are at the site of surgery.

Advantages

- Current path is confined to tissue grasped between forceps
- Return electrode not required
- Safe in pace makers
- Effective in wet field - works well under saline/ Non electrolyte solution
- Better for surface oozing
- Comparatively less electrical spread

Disadvantages include:-

- Increased time needed for coagulation due to a low power setting, charring, and tissue adherence.
- Sticky eschar on blade
- Frequent probe change

Monopolar current :-

- The active electrode is the surgical site.
- The patient return electrode is attached else where on the patient.
- The current must flow through the patient to the patient return electrode.

Advantages

- Routinely available

- Wide electrical spread
- Easier to use

Disadvantages

- Poor vessel sealing
- Cutting & coagulation
- Insulation failures
- Should not be used in patients with pacemaker

Advanced System

Over time, there are remarkable improvements in energy sources to increase the speed of surgery while reducing the side effects of energy on surrounding tissues due to lateral thermal spread.

Ligasure valley lab- covidien

It is an advanced Bipolar system which uses high current and Low voltage. It gives a uniform mechanical compression and measures tissue impedance between the jaws and continuously adjusts the current delivery.

Since it is Elastin and collagen dependent- works well on A & Vs but not on capillaries.

Advantages

- Self Feed back controlledresponse
- Vessel sealing upto 7mm
- Less fumes- not affecting visibility
- Fast sealing time
- Less coagulum on blade
- Moderate mean burst pressure
- 2 mm lateral thermal spread

Enseal:-Ethicon USA-

This device uses a patented temperature-controlled (PTC), bipolar energy delivery system in the jaw and a unique cutting mechanism, the I-BLADENano technology, atelectrode-tissue interface.

The Jaws contain Temp Sensitive Matrix with Conductive Carbon spherules (senses tissue characteristic)

The PTC polymer located in the instrument's top jaw contains chains of conductive particles that continuously modulate energy. As the temperature in the jaw reaches 100c, the polymer expands and the chains break apart. The disconnection of the chains results in a discontinuation of conductivity, which prevents the flow of electric current, ultimately reducing the temperature. When temperatures fall below 100c, the conductive particle chains come back together, thus restoring the flow of electricity and bringing the temperature back up.

Teeth located along the jaw of each instrument serve to facilitate better handling, grasping, uniform compression and temperature maintainence.

- Better end-to-end sealing
- Less thermal spread (2 mm)
- High burst pressure
- Seals vessels upto 7mm &lymphatics
- Different shaft lengths and jaw configurations available (ie, straight or curved) to accommodate a variety of procedures
- Does not require dedicated ESU

The ENSEAL® G2 Platformmodifications to the new ENSEAL® G2 Platform were meant to provide a superior sealing experience through enhanced ergonomics, tactile feedback, and safety, while retaining the positive characteristics of the older ENSEAL

Harmonic Ethicon

The HS is a high power system which works at a frequency of 55.5 KHz or 55,500 vibrations/sec.Dissection by ultrasonic is called ultracision. The ultrasound (US) transducer located in the handpiece is composed of piezoelectric crystal sandwiched under pressure among metal cylinders. The US generator converts ultrasonic energy into mechanical energy. The sealing of the vessels is achieved due to denatured protein coagulum which occurs due to tamponade and coaptation.

It has three compatible probes that are the shear, blade and a hook. The shear has opposite silicon padding which the blade and hook lacks. The shear can coagulate vessels up to 5 mm, whereas the hook and blade only 2 mm in diameter.

Works at two setting- high and low ranging from 1 to 5.

For achieving CUT- high setting, and high tension is applied- it disrupts tissue with minimal heamostasis.

For achieving COAGULATION- low setting and minimal tension is applied.

Advantages

- Lateral spread Approx 1mm spread of heat
- Cavitation effect
- Minimal sticking and charring
- Safe in patients with pacemakers
- Simultaneous Coagulation & Dissection
- Hemostatic division of unsupported vascular tissues

Issues

- Low mean burst pressure
- High Cost
- Less Portability
- False sense of safety due to heated blade
- Surgeon dependant
- Mist production affecting visibility

Harmonic Ace-7 sheer-

Advanced Hemostasis mode with tapered tip designed for precision and multi functionality. It reliably seals large vessels up to 7 mm in diameter with the Advanced Hemostasis hand control button.

Proprietary algorithm actively monitors the instrument during use, and enables the system to sense and respond appropriately to changes in patient tissue conditions. Available in three lengths- 23 cm, 36 cm, and 45 cm

Thunderbeat Olympus= Bipolar + Harmonic

It simultaneously delivers ultrasonically generated frictional heat energy and electrically generated bipolar energy. TB has higher bursting pressure and highly reduced thermal speed thanLigasure and Harmonic. It can achieve 7 mm vessel sealing.The versatility of thunderbeat was based on the following five variables: hemostasis, histologic sealing, cutting, dissection and tissue manipulation.

Advantages:

- Fewer instrument changes
- Vessels sealing upto 7mm
- Highest mean burst pressure
- Fast in cutting- decreased operating time
- Least thermal spread
- Less sticking

The Sonicision-Covidien

The industry's first cordless ultrasonic dissection device-indicated for soft tissue dissection and vessel occlusion of up to 5 mm in diameterthat simplified the surgical setup, while enabling greater mobility for the surgical team.

It can be reused for up to 100 cases, is easy to assemble, and can be sterilized. The system also comes with a battery charger that can charge 4 batteries simultaneously.

While most ultrasonic instruments possess a shaft length range between 36 and 45 cm, the Sonicision device comes in range from 13cm to 48-cm long shaft. It has a mean thermal spread, mean vessel burst pressure, hemostasis, mean seal time and mean peak active blade temperaturecomparable to the Harmonic ACE plus.

Vessel sealing capacity:-

Monopolar	1-2mm
Bipolar forceps	3mm
Harmonic / Harmonic Ace	5mm / 7 mm
Ligasure / EnSeal / Thunder beat	7mm

All ESU are comparable as long we know our basic of intrument and its handling. The endoscopist can manipulate variables such as power, waveform, duration, and amount of target tissue to produce a specific effect on tissue.

General precautions with all electro surgery-

- Inspect insulation carefully
- Use lowest possible power setting
- Use a low voltage waveform
- Use brief intermittent activation vs. prolonged activation
- Do not activate in open circuit
- Do not activate in close proximity or direct contact with another instrument
- Use bipolar electrosurgery when appropriate
- Select an all metalcannula system as the safest choice. Do not use hybrid cannula systems that mix metal with plastic
- Utilize available technology, such as a tissue response generator to reduce capacitive coupling or an active electrode monitoring system, to eliminate concerns about insulation failure and capacitive coupling.

References

1. Susan Roweton et al, Comparison of Two Histological Test Methods for the Measurement of thermal Spread Associated With Energized Vessel Sealing Journal of Testing and Evaluation. May 2016, Vol. 44
2. NisarZaidi et al, The CovidienLigaSure Maryland Jaw Device Expert Review of Medical Devices. Mar 2015, Vol. 12
3. Lingxi Zhao et al, Histological characteristics of collagen denaturation and injuries in bipolar radiofrequency-induced colonic anastomoses pathology - Research and Practice. Mar 2015, Vol. 211
4. DeekshaPandey et al, Electrosurgical technology: Quintessence of the laparoscopic armamentarium Gynecology and Minimally Invasive Therapy. Aug 2014, Vol. 3: 63-66
5. ShahidaBibi et al, A Prospective Study of In Vivo and Ex Vivo Sealing of the Human Inferior Mesenteric Artery Using an Electrothermal Bipolar Vessel-Sealing Device Journal of Laparoendoscopic& Advanced Surgical Techniques. Jul 2014, Vol. 24, No. 7
6. AsimShabbir et al Advancement and benefit of energy sealing in minimally invasive surgery Asian Journal of Endoscopic Surgery. May 2014, Vol. 7, No. 10.1111/ases.2014.7.issue-2: 95-101
7. Anna Fagotti et al, Randomized Study Comparing Use of THUNDERBEAT Technology vs Standard Electrosurgery during Laparoscopic Radical Hysterectomy and Pelvic Lymphadenectomy for Gynecologic Cancer Journal of Minimally Invasive Gynecology. May 2014, Vol. 21: 447-453
8. Cassandra A. Latimer et al, Effect of collagen and elastin content on the burst pressure of human blood vessel seals formed with a bipolar tissue sealing system Journal of Surgical Research. Jan 2014, Vol. 186: 73-80
9. KoutaroMIURA et al, Usefulness of the LigaSureTM Small Jaw Instrument in Thyroid Cancer Surgery (Journal of Japan Surgical Association). Jan 2014, Vol. 75: 1473-1478
10. Kenneth S.K. Law et al, Comparative Studies of Energy Sources in Gynecologic Laparoscopy Journal of Minimally Invasive Gynecology. May 2013, Vol. 20: 308-318
11. Harvard Z. Lin et al, Application of a New Integrated Bipolar and Ultrasonic Energy Device in Laparoscopic Hysterectomies ISRN Minimally Invasive Surgery. Jan 2013, Vol. 2013: 1-4

Events Held

Dr Rajendra Sankpal was installed as the President of Indian Association of Gynecological Endoscopists on May 16, 2015. Dr Prakash Trivedi immediate past President handed over the Presidential medal to Dr Rajendra Sankpal.

3D Laparoscopy Surgery, Fenix-2015, AIIMS, New Delhi
From Left To Right: Dr Shailesh Putambekar, Dr Alka Kriplani
Dr Malvika Sabharwal, Dr Sanjay Patel, Dr Nikunj Bansal

3D Laparoscopy Surgery, Fenix-2015, AIIMS, New Delhi
Dr Shivani Sabharwal, Dr Malvika Sabharwal

IAGE Fellowship Programm, Jeewan Mala Hospital, New Delhi, July 2015
Dr Sailesh Putambekar, Dr Malvika Sabharwal, Dr Shivani Sabharwal with Fellows

MP ENDOGYN 2015: 26th & 27th September, 2015, BHOPAL

COME WITNESS THE UNBELIEVABLE

12th AAGL International Congress on The Ultimate Advances in Minimally Invasive Gynaecological Surgery

ALONG WITH IAGE
Mumbai, India

June 2 - 5 2016
LIVE WORKSHOP & CONFERENCE

June 1 2016
PRE-CONGRESS HANDS-ON WORKSHOP

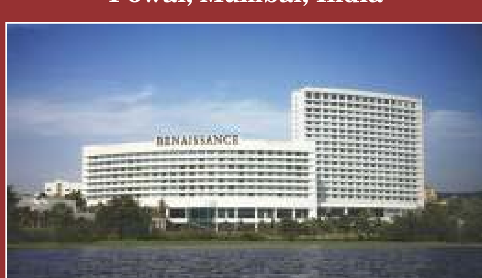
- Hysteroscopy
- Laparoscopic suturing

June 6 & 7 2016
POST-CONGRESS HANDS-ON WORKSHOPS

- Laparoscopic Hysterectomy & Myomectomy,
- Laparoscopic Radical Hysterectomy
- Vaginal-Urogynaecological Surgery

First 100 Registrations avail Surprise Gifts

Venue: Renaissance Mumbai Convention Centre Hotel, Powai, Mumbai, India



Scientific Program & General Chair

President, AAGL & IAGE

AAGL Global Congress - First time ever in Asia Live surgical relay from 13 OT.

REGISTRATION PACKAGES

NON RESIDENTIAL REGISTRATION

Category	Till 31st December, 2015	1st January to 29th February, 2016	1st March to 30th April, 2016	1st May to 31st May, 2016
IAGE/ FOGSI Member	Rs. 18,000	Rs. 20,000	Rs. 22,000	Rs. 26,000
PG Students	Rs. 15,000	Rs. 16,000	Rs. 16,000	Rs. 16,000
Accompanying Person	Rs. 18,000	Rs. 18,000	Rs. 18,000	Rs. 18,000

The above Registration Fee includes: Four days of Conference (June 2 - 5, 2016) including 2 Days of Live Surgery (8.30 - 4.00 pm) & 4.30 - 7.30 pm Live Robotic Surgery or 1 Master Class each on 2 and 3 June (4.30 - 7.30 pm) or one day of USG - Color Doppler Live or one day of Infertility IVF ICSI procedures Live + Lunches from 2 to 5 June, 2016 + Dinner on 2 and 3 June, 2016 + Gala Banquet Dinner on 4 June, 2016 + Entry to Evening Musical Social function on 2-3 days + Entry to Trade Expo + Service Tax as applicable.

RESIDENTIAL REGISTRATION

Category	Early bird Till 31st December, 2015	1st January to 29th February, 2016	1st March to 30th April, 2016	1st May to 31st May, 2016
Delegate on Twin Sharing Basis Per Person	Rs. 27,000	Rs. 28,000	Rs. 29,000	Rs. 32,000
Delegate on Single Occupancy Basis	Rs. 37,000	Rs. 38,000	Rs. 40,000	Rs. 42,000
Accompanying Person	Rs. 25,000	Rs. 25,000	Rs. 25,000	Rs. 25,000

PRE - CONFERENCE WORKSHOP Hands-On Hysteroscopy

(Without Accommodation) : Rs. 15,000 one day

(With Accommodation) : Rs. 20,000 (Twin Sharing Basis Including Registration)

POST - CONFERENCE WORKSHOP Hands-On Workshop (2 days):

1. 3D Laparoscopic Hysterectomy & Myomectomy
2. Laparoscopic Radical Hysterectomy
3. Vaginal & Urogynaecologic Surgery

(Without Accommodation) : Rs. 35,000 for each Workshop - (Both days included)

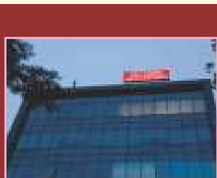
(With Accommodation) : Rs. 45,000 (Twin Sharing Including Registration)

Rs. 24,000 (Single Accommodation Including Registration)

Rs. 53,000 (Single Accommodation Including Registration)

Mode of Payment: Cheque / DD in favor of **UAMIGS2016** payable in Mumbai to be sent to the Secretariat.

For Online Registration visit: **www.aaglmumbai 2016.com** (online charges applicable)



Conference Secretariat: Total Woman's Health Care Centre,
1-2-3 Gautam Building, Opp. Balaji Temple, Tilak Road,
Ghatkopar (East), Mumbai - 400 077. Tel : 022 6148 0707
Email: dr.ptrivedi@gmail.com

www.aaglmumbai2016.com

Event Manager: VAMA EVENTS PVT. LTD.
Office 4, Gr. Floor, Anmol CHS, Sakharam Keer Marg,
Parallel to L. J. Road, Mahim, Mumbai - 400 016.
Phone No : + 91 22 2438 3498
Email: vamahospitality@hotmail.com

Events Held

Two day event was held at Nagpur on 24th & 25th October 2015 at Hotel Radisson Blu.

Two day event was held at Nagpur on 24th & 25th October 2015 at Hotel Radisson Blu

ENDOGYN 2015- National Congress of the Indian Association of Gynecological Endoscopists- held 20-22 March, 2015 at Hyatt Regency, Kolkatta

ENDOGYN 2015- National Congress of the Indian Association of Gynecological Endoscopists- held 20-22 March, 2015 at Hyatt Regency, Kolkatta

Optics

Dr Malvika Sabarwal
Padmashree Awarded by President of India
Chief Obs and Gynae
Jeewan Mala Hospital and Apollo Spectra, Karol Bagh, Delhi

Hands don't do what the eyes don't see.

Understanding optics is the most important aspect of video laparoscopic surgery in order to achieve the best possible image of operating field. This constitutes the basic knowledge of following components:

1. The Telescope
2. Light cables
3. Light source
4. Camera
5. Camera control unit
6. The monitor

Telescope

The laparoscope is metallic tube with an outer ring of optical fibers which transmit light into the body and an inner core of rod lenses via which the illuminated visual field is relayed back to the camera. It has an objective lens & an eye piece.

Available as 10mm, 5mm, 3mm, 1mm & various direction of view (0,30,45,70). Among these sizes 10mm and 5 mm with viewing angle of 0 and 30 are most commonly used. The 0o scope, offers a straight-on panoramic view. The 30o scope employs an angled lens, which results in an image that is narrower and less bright, but can be used to view around corners. The camera is attached via rotating coupler, allowing the scope to be turned independently during use. This requires camera to be held in the correct orientation throughout the procedure.

Fogging

Endoscopes are combination of metals and glass. These materials have different coefficients of expansion when heated. When an endoscope is put into a high temperature autoclave, the glass and metal expand at different rates and despite the seals between them, steam enter the optic chain and result in condensation and fogging within the lens system. Hence endoscope should not be subjected to extremes of temperature. Disinfectant solutions are available for disinfection e.g. Cidex.

Because the optics are at room temperature and the abdominal cavity is at high temperature with 100% humidity, cold optics entering abdominal cavity will fog due to condensation of water vapor on glass surface. This can be prevented by inserting distal end of optic into warm bottle of sterile water or saline for 30 secs before insertion into the sleeve.

Light cables

Fiber optic cables consist of fibers with an inner core of glass with a relatively high refractive index and a fused sheathing of low-index glass.

Fibers are small (usually10 to 25µm) and packed in incoherent bundle transmitting high-intensity light over the length of the bundle.

Light losses within the system include about a 6% loss from reflection at air glass surfaces, 30% is lost at lamp, and 20 % loss because of inevitable matches at coupling between cable and laparoscope. Thus typical light chain looses appx. 74% of generated light from distal end of optics.

Care must be taken to see that there is perfect matching i.e 10mm scope should use a 5mm cable only for optimum results. Similarly for a 5mm scope a smaller cable should be used otherwise the contact point might burn out.

Light Source

Different light sources are available such as:

Halogen - commonly used 150 watts, 15 V halogen bulb, which provide a yellow light which therefore alters the true colors of the operating field.

Metal Hallide - produces brighter, less yellow light but has the disadvantage of few minutes activation, which can be irritable when there is a switch over in case of a power failure.

Xenon - provides the best quality crisp white light which gives the perfect resolution and reproduction of the image. It is available as 175 watt and 300 watt models.

- Fiber cables carrying such intense light are capable of generating heat which may lead to burns.
- Proper white balancing before start of the operation is a good practice for obtaining a natural color. The white light is compsed of the equal proportion of Red, green and blue. These are primary colors and at the time of white balancing the camera sets its digital coding for these primary colors to equal proportion assuming that the target is white.

Camera Head

The heart of the OPTICS in the laparoscopic endovision is the camera. This can be single chip or a 3 chip, depending on whether there is a single CCD (Charge couple Device) or three separate ones for the basic Red, Green & Blue, signals. Whereas a single chip camera provides a horizontal lines resolution of about 400 lines. A 3 chip camera produces more than 750 horizontal lines resolution as well as a better color reproduction.

Camera CCU

The Camera CCU connects various aspects of the HD imaging chain, capturing and processing video signals from the camera head for display, as well as for transfer to existing recording and printing devices. In addition to processing digital HD images, the Camera CCU should be able to either down-convert HD signals to SD or up-convert SD signals to HD. The CCU should be able to accommodate both SD and HD input and, conversely, it will have two digital video outputs-DVI (digital video interface) for HD signal, and SDI (serial digital interface) for SD signal.

Monitor

A 26" HD monitor provides clear, brilliant images on a spacious, widescreen display. Images acquired in 16:9 format enables surgeons to experience more natural vision. For surgeons, this wider, natural view is less fatiguing. Additionally, during surgery as surgeons are viewing full-screen endoscopic images, trocars and hand instruments that approach the surgical area laterally are visible earlier with a 16:9 monitor than in 4:3 or 5:4 monitor. To achieve the full benefit of HD imaging and maximize performance, the monitor resolution must be properly matched to the camera head acquisition resolution

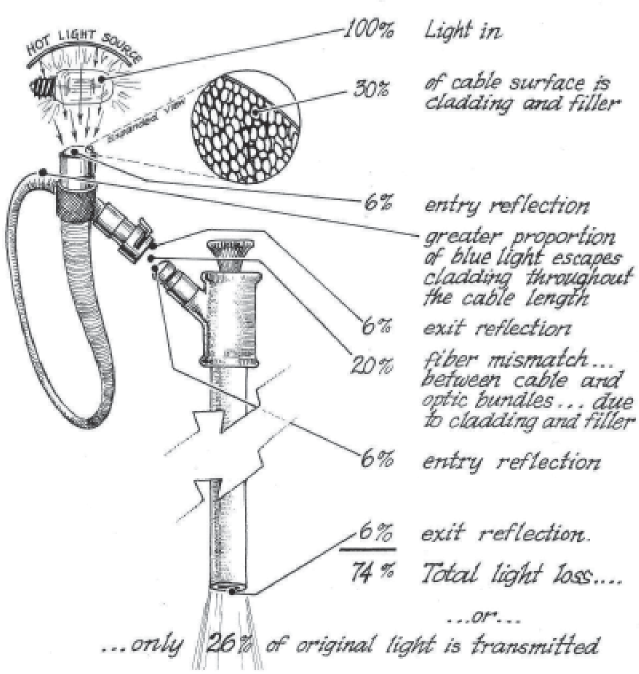
Current Developments

3-D endoscope is new technology with sensor inbuilt as chip on the tip. This transmits image through the processor (3chip camera) to 3D monitor to provide 3D pictures and we need 3D goggles for visualization. This was first described in the 1990s by Becker et al. 3-D view allows depth perception which was lacking in previous displays. The 3D endoscopic systems have both advantages and disadvantages. Further development of technologies and equipment is necessary to allow safe, widespread introduction of 3D endoscopic systems for use during advanced surgery.

LED light source is a great solution when used with the HD 3-Chip Camera as the light output settings are completely controllable. In the broadcast field, the quality of HD cameras is dependent on the performance characteristics of the lighting system. Because HD cameras have lower sensitivity due to smaller pixel size, a powerful 300W Xenon light source is recommended.

Narrow band imaging is a technology for better visualization of vessels in operating field.

Normal light loss



Forthcoming Events of IAGE

1. IAGE & Kolhapur Obs & Gynae Society. Conference GENNEXT 2016, 30th & 31st January, 2016
2. 2nd to 6th June, 2016, IAGE AAGL International Conference, *Venue:* Renaissance Hotel, Mumbai
   - Two days Live Workshop
   - Three days Conference
   - Pre & Post Conference Hands on Training in Lap Hysterectomy Myomectomy and Hysteroscopy

Ergonomics in Laparoscopic Surgery

Dr Sujal Munshi
MD, DNB, MICOG
Consultant Gynaec Endoscopic Surgeon at NOVA IVI and Munshi Hospital
Visiting Endoscopic Surgeon PS Medical College, Karamsad

Introduction

The term ergonomics is derived from the Greek words "ergon" meaning work and "nomos" meaning natural laws or arrangement. Ergonomics is "the scientific study of people at work. Ergonomics is based on anatomy, physiology, psychology, and engineering, combined in a systemic approach.

In simple words, it is the science of best suiting the surgeon to his job, or to make the setting and surroundings favorable for a worker and here a laparoscopic surgeon.

The increased technological complexity and sometimes poorly adapted equipment have led to increased complaints of surgeon fatigue and discomfort during laparoscopic surgery. Studies have shown that correct ergonomics can reduce suturing time and[1] Pressure-related chronic pain.[2] There have been reports of carpal tunnel syndrome, eyestrain and cervical spondylosis among unsuspecting surgeons performing multiple laparoscopic procedures in high-volume centres.[3] Reports of thenar neuropathy have arisen due to use of awkward thumb grips in case of laparoscopic pistol-grip instruments.[4]

Hence, it is imperative to understand the applications of ergonomics for all surgeons practicing laparoscopy. Ergonomic integration and suitable laparoscopic operating room environment are essential to improve efficiency, safety, and comfort for the operating team. Understanding ergonomics can not only make surgeon comfortable in the operating room but also improves surgical performance and ultimate benefits the patient by enlarge.

Ergonomic Challenges During Laparoscopy

Differences between open and laparoscopic surgery are the following. Open surgery has a high degree of freedom and surgeons work in line with visual axis. There is a three-dimensional direct vision and direct tactile feedback. While during laparoscopic surgery there is a two-dimensional vision and loss of depth perception to some extent. There is fulcrum effect with tremor enhancement. There are only 4 degrees of freedom, which are rotation, up/down angulations, left/right angulations, in/out movement. The major limitation is that view is not under control of the surgeon.

There is decoupling of the visual and motor axes. Visual orientation changes with the loss of depth perception due to indirect visual input and also the loss of peripheral vision caused by the limited viewing spectrum offered. The laparoscopic surgeon also assumes a relatively static posture during major part of the procedure, which, ergonomically speaking, contributes to the inefficiency.

Ergonomics Concepts in OT

Height of operating table should be adjusted between 64 and 77 cm above floor level since this discomfort and operative difficulty are lowest when instruments are positioned at elbow height.[5]

Monitor position

Ergonomically, the best view for laparoscopy is with the monitor image at or within 25 optimal degrees below the horizontal plane of the eye.[6,7] This leads to least neck strain according to the available studies. It is not advisable to have a "chin-up" arrangement on the part of the surgeon. In operations where surgeons change their ports and positions, the second monitor is essential. Mounting monitors on mobile arms allows mobility and height adjustment as per individual case and surgeon.

Trocar placements

There is no uniform consensus about port placements for advanced laparoscopic procedures. The placement of ports is currently dictated by the surgeons' preference based on individual experience. To facilitate smooth instrument manipulation along with adequate visualisation during laparoscopy, usually trocars are placed in triangular fashion. This is termed as triangulation. Few surgeons prefer palmers point for third port placement to make it ergonomically correct depending on surgical condition and surgeons height.

The target organ should be 15–20 cm from the centre port used for placing the optical trocar. Generally, the two remaining trocars are placed in the same 15–20 cm arc at 5–7 cm on either side of the optical trocars. This allows the instruments to work at a 60°–90° angle[8] with the target tissue and avoids problems of long handle due to too far or too near placement of ports and the problem of abdominal wall interference.

If necessary, two more retracting ports can be placed in the same arc but more laterally so that instruments do not clash. Structures obstructing the surgical field can also be retraced with T lift or sutures without need of additional port just for retraction

In laparoscopy instrument length is limited. Avoid putting trocar too far from the desired position, to avoid push on abdominal wall towards target organ to gain a few centimeters. This not only makes these movements less precise but also causes strain. Similarly, if the angle between the target and instrument if too wide or obtuse, manipulation of curved instrument is very difficult.

Manipulation Angles for Instrumentation

Manasnayakorn et al.[9] have indicated that the best task efficiency and performance quality are obtained with an ideal manipulation angle between 45° and 60°. Manipulation angles below 45° or above 75° are accompanied by increased difficulty and degraded performance.

Equipment Related Challenges

In minimal access surgery, the surgeon is typically viewing a two-dimensional video image of the operating field on a screen placed at a certain distance of 4–8 feet away from the surgeon's eye. With significant loss of peripheral vision. Surgeon loses the luxury of efficient navigation in a larger surgical workspace.

The surgeon cannot move his instruments with unlimited degree of freedom. Laparoscopic instruments work on reduced efficiency. The laparoscopic grasper transmits force with a ratio of only 1:3 from the handle to the tip as compared to 3:1 with the hand-held hemostat. Hence, a laparoscopist has to work six times harder for similar results.[11] Moreover, these laparoscopic instruments are generally available in one standard size and hence surgeons of all heights, builds, and hand sizes work with same ones and the efficacy suffers somewhere along the way. Customised instruments are need of time.

It is proved that the newer generation 3D visual cameras significantly improved the laparoscopic precision of novices and experienced surgeons[12].

Ergonomically designed handles

Improperly designed shapes of instruments cause strain on functional areas of the hand. Few newer designed handles are based on ergonomic criteria. This multifunctional handle is shaped to fit only one hand, it rests continuously in the half-closed hand, similar to the ''basic position'' of the resting hand, between the ring and little fingers, with the thenar performing an encircling grip. The longitudinal axis of the instrument is an extension of the forearm's rotation axis. This allows pronation and supination to be transferred directly to the instrument effector.

Robotic surgery

Robotic surgery is ergonomically advantageous as it has 7 degrees of freedom as compared to laparoscopic hand surgery. This helps one to access deeper areas in pelvis such as pocu of dougls, Pelvic floor structures and retroperitoneum. It also allows placements of ports in shorter arc without instrument interference.

Conclusion

Common reason for the inability of ergonomics to be applied optimally in the field of laparoscopy are as follows.

- lack of complete awareness among surgeons
- Communication gap between the practitioners of laparoscopy and the designers of the instruments
- Inadequate knowledge of the potential problems for the users in the instruments created by the designers
- The contradictory expert advice which reduces the credibility of ergonomics as a science.

In conclusion The suggested position of arm is slightly abduction, retroversion and rotation inwards at shoulder level. The elbow should be bent at about 90°–120°.[13] Problems related to depth perception, vision and loss of peripheral visual fields can be reduced by using a 10–15× magnification by adjusting the distance from tissue.

Laparoscopic surgery is more demanding for the surgeon. The increased technological complexity and sometimes poorly adapted equipment have led to increased complaints of surgeon fatigue and discomfort during laparoscopic surgery. Better ergonomic integration and understanding ergonomics can not only make the life of surgeon comfortable in the operating room but also improvise surgical outcome and help reduce professional hazards to surgical team.

References

1. Joice P, Hanna GB, Cuschieri A. Ergonomic evaluation of laparoscopic bowel suturing. Am J Surg. 1998; 176:373–8.
2. Van Veelen MA, Meiier DW. Ergnomics and design of laparoscopic instruments: results of a survey among laparoscopic surgeons. J Laparoendosc Adv Surg Tech A. 1999; 9:481–9.
3. Hemal AK, Srinivas M, Charles AR. Ergonomic Problems Associated with laparoscopy. J Endourol. 2001; 15:499–503.
4. Uchal M, Brogger J, Rukas R, Karlsen B, Bergamaschi R. In-line versus pistol-grip handles in a laparoscopic simulators. A randomized controlled crossover trial. Surg Endosc. 2002; 16: 1771–3.
5. De U. Ergonomics and Laparoscopy. Indian J Surg. 2005; 67:164-6.
6. Menozzi M, von Buol A, Krueger H, Miege C. Direction of gaze and comfort: Discovering the relation for the ergonomic optimization of visual tasks. Ophthalmic Physiol Opt. 1994; 14: 393-9.
7. Hanna GB, Shimi SM, Cuschieri A. Task performance in endoscopic surgery is influenced by location of the image display. Ann Surg. 1998; 227: 481–4. [PMC free article]
8. Trejo A, Jung MC, Oleynikov D, Hallbeck MS. Effect of handle design and target location on the insertion and aim with a laparoscopic surgical tool. Appl Ergon. 2007; 38:745–53.
9. Manasnayakorn S, Cuschieri A, Hanna GB. Ergonomic assessment of optimum operating table height for hand-assisted laparoscopic surgery. Surg Endosc. 2009; 23:783–9.
10. Falk V, McLoughlin J, Guthart G, Salisbury JK, Walther T, Gummert J, et al. Dexterity enhancement in endoscopic surgery by a computer-controlled
11. Forkey D, Smith W, Berguer R. 19th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. Chicago: IL; 1997. A comparison of thumb and forearm muscle effort required for laparoscopic and open surgery using an ergonomic measurement station; pp. 1705–8.
12. Aggarwal R, Grantcharov T, Moorthy K, Milland T, Darzi A. Toward feasible, valid, and reliable video-based assessments of technical surgical skills in the operating room. Ann Surg. 2008; 247: 372–9. [PubMed]
13. Kant IJ, de Jong LC, van Rijssen-Moll M, Borm PJ. A survey of static and dynamic work postures of operating room staff. Int Arch Occup Environ Health.

Access is Key to Sucess

Dr Sudha Tandon
MD, DGO
Gynaec Endoscopic Surgeon, IVF Specialist
Tandon Hospital, Mumbai and Navi Mumbai

Laparoscopic or Minimal access surgery is now a standard and well accepted route of intra-abdominal operations. Gaining laparoscopic access is associated with a number of specific risks which would not occur if the abdominal or vaginal route is chosen.

With a major complication rate of 0.4/1000 of laparoscopic procedures, an individual gynecologist will rarely encounter a major complication like a vascular or bowel injury. These injuries can have serious sequalae including laparotomy, bowel resections, vascular grafts and even death.

Many different techniques are proposed for laparoscopic entry, but it is unlikely that all of them are equally safe.

The complications of direct concern that are related to Laparoscopic entry are

1. Failure to gain access to the abdominal cavity
2. Damage to the major retro-peritoneal blood vessel
3. Damage to the gastro-intestinal tract
4. Damage to the vessels of the abdominal wall
5. Post laparoscopy bowel herniation through the entry scars

Abdominal access techniques are broadly divided into

1. Closed Technique - Veress Needle and Trocar sheath assemblies
2. Open Technique -Hasson's Technique
3. Direct Trocar Entry

Risk factors for vascular damage

1. Surface Anatomy
   The umbilicus is not a fixed anatomical landmark. The patient's BMI and the position of the patient affects the location of the umbilicus relative to the bifurcation of the aorta. The tops of the iliac crest are consistent surface landmarks for the L4 vertebra and in 80% of cases the aortic bifurcation will lie within 1.25 cms of L4. The iliac crests are usually palpable even in obese patients.
2. Position of the patient
   In 15 degree Trendenlenberg position the angle of the Veress/ Trocar to the horizontal is smaller than when the patient is horizontal and the aortic bifurcation is likely to be located more caudally. Hence the risk of damage to major vessels increases.
3. Adequate pneumoperitoneum
   An intra abdominal pressure of 20-25 mms Hg is associated with a reliable elevation of the abdominal wall. Hence this reduces the risk of injury to the great vessels than using fixed volumes of 3L of Co2
4. Lifting the abdominal wall.
   Though this may increase the distance to great vessles as claimed by some surgeons it may increase the chance of pre-peritoneal insufflations.

Closed Trocar Insertion Technique

The primary incision should be a cm vertical or horizontal incision made in the base of the umbilicus. A sharp Veress needle should be grasped down the barrel and carefully inserted vertically through the rectus sheath fascia and peritoneum. Once inside the abdomen, it should not be moved about but its correct position should be confirmed with Palmer's test and by observing the rate of gas flow and IAP. The pneumoperitoneum should be continued until an IAP of 25 mmHg is obtained. A short barrelled sharp trocar should be palmed and all but the distal 1 cm guarded by the extended index finger. The trocar should be inserted vertically through the abdominal wall until the cavity is reached and then the trocar immediately withdrawn leaving the sheath in the correct position.

It must be emphasized that the most important step in this approach is the production of an IAP of 25 mmHg. A vertical thrust of the trocar must never be performed at pressures lower than this for, in such circumstances; the bowel and aorta are very vulnerable.

Alternative Primary Entry Sites

Alternative Entry Sites Indications

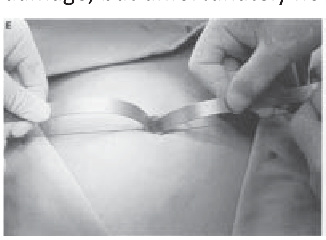
- Previous abdominal surgery
- Abdominal irradiation
- Perforated viscus
- Peritonitis
- Large pelvic mass
- In pregnant patients
- Suspected Abdominal Kochs associated
- With Intraperitoneal adhesions.

In patients with the above indications, the risk of using the umbilical port increases the chance of adherent bowel or vessel injury. Hence one must be familiar with this alternate mode of entry.

The site first suggested by Palmer is in the left hypochondrial area of the abdomen just below the 9^{th} rib in the midclavicular line. The left hypochondrial area of the abdomen is the area least likely to be associated with intra-abdominal adhesions and, therefore, the area of greatest safety for blind insertion. In this area, a skin incision is made and a Veress needle is carefully inserted at right angles to the skin until the cavity is just entered, A 5mm trocar is then inserted through which a 5mm laparoscope is inserted and the umbilical area is inspected. If it is clear of adhesions, the standard trocar is inserted under direct vision. If adhesions are present, extra ports are inserted to free the adhesions and, when the whole area is clear, the umbical trocar can then be safely inserted into the abdomen at an IAP of 25 mmHg.

Direct Trocar Entry: It is a suitable technique for majority of elective tubal sterilization as in these women, the abdominal wall is lax. This reduces operating time.

In this technique, the abdominal wall is elevated by the surgeons' hand. This creates a negative pressure in the closed abdominal cavity. The 10mm trocar is thrust through all the layers of the abdominal wall in the midline sub-umbilically. It is important in this technique to ensure that the gas tap is in the open position when the trocar is being introduced so that the negative pressure will be released as soon as the abdominal cavity is entered so allowing the bowel to fall away. The laparoscope is then immediately introduced and the tissue lying at the end of the sheath inspected. Appearance of bowel serosa or fat then the correct entry is confirmed. In this technique it is essential both to rotate the laparoscope around 360 degree to inspect the whole of the abdominal cavity at the beginning and at the end of operation to ensure that the laparoscope is withdrawn under direct version to detect any through and through bowel injury. The rate of bowel injury with this technique has been reported as 1/1000 by Kaali and Bernard and this is true especially in presence of intraabdominal adhesions. **Open Laparoscopy**: It has been described by Hasson in 1980. In this technique the layer of the abdomen are incised in a manner like minilaparatomy. The peritoneum is entered using blunt ended forceps, the cannula fixed in place and the abdomen distended in the standard way. This approach definitely reduces the risk of major blood vessel damage, but unfortunately not of bowel damage.



Optical Trocars

Trocars have been manufactured which allow visualization of the abdominal wall layers during introduction of the trocar into the peritoneal cavity. There is no evidence that it reduces entry complications

Effects of BMI on Laparoscopic Entry

LOW BMI - In Patients with a low BMI, the great vessels can lie as little as 2.5cm below the umbilicus. In this goup, the abdominal wall should be elevated and the Veress should be held on the shaft not the barrel thereby increasing the distance from the umbilicus to the aorta and reducing the length of needle to be inserted.

High BMI - In obese patients, there is an increased risk of preperitoneal insertion of the Veress needle due to the increased thickness of their abdominal wall. Hurd assessed the depth of insertion of the Veress required to reach the peritoneal cavity in patients with a BMI > 30, in relation to the method of insertion. The results are shown in Table,

The depth of insertion of the Veress required to reach the peritoneal cavity in Patients with a BMI > 30

Incision	Peri-umbilical at 45^0 to the skin	Umbilical base at 45^0	Umbilical base at 90^0
Distance from incision to peritoneal cavity	16 cm	11 cm	<6 cm

The average distance from the base of the umbilicus to the aorta in obese women was 13 cm. In the obese Patient, it may be appropriate to introduce the Veress needle through the base of the umbilicus at 90^0 to the skin. This increase the chance of achieving pneumoperitoneum without compromising the risk of vascular injury.

Conclusions

Entry techniques should possibly be tailored to the individual patient because there is no conclusive evidence as to the safest entry technique in all circumstances.

Handling and Care of Instruments in Laparoscopy

Dr Parul Aggarwal
MS, DNB
Consultant Obs and Gynae
Jeewan Hospital and Apollo Spectra, Karol Bagh, Delhi

Laparoscopic surgery requires sophisticated and precisely calibrated instruments. These instruments are complex in design and yet delicate in construction. The delicate nature of these devices and the high cost involved to repair them when damaged, warrants surgeons, nurses and reprocessing personnel to handle them carefully and appropriately at all times. With the goal of delivering the finest in patient care, all surgical team members and reprocessing personnel must be familiar with the use of and recommendations for care and handling of all laparoscopic instrumentation.

Care and Handling of Telescopes

Telescope is the most expensive and fragile component of laparoscopic instrumentation. As such, telescopes must be handled with care from the start to the end of surgery, and also during the cleaning and sterilization process.

All surfaces of a telescope should be inspected on a regular basis for any scratches, dents or other flaws. Telescope should be inspected before each use to assess functional integrity. The eyepiece should be examined to evaluate the clarity of image from the reflected light. When using a metal cannula, telescope should be inserted gently into the lumen. At any point of time during use or cleaning process, telescope should not be bent during handling, and avoid placing any heavy instruments on top of the telescope. The telescope also should never be placed near the edge of a sterile trolley or surgical field to prevent it from accidental dropping onto the floor. When transferring telescope, it is best done by gripping the ocular lens in the palm of the hand and never by the shaft. Immediately after use, wash the surfaces of the telescope with a soft cloth or sponge using a neutral pH enzymatic solution and thorough rinse with distilled water to remove any residual cleaning solution.

Care and Handling of Light Cables

Light cables are made of hundreds of glass fibers to transmit the light, and these fibers can be broken if the cable is dropped, kinked or bent at extreme angles. Following are some guidelines regarding the care and maintenance of light cables:

- Avoid squeezing, stretching, or sharply bending the cable
- Grasp connector piece when inserting or removing the light cord from the light source.
- Avoid puncturing the cable with towel clips
- Do not turn the light source on before connecting the light cable to the telescope drape
- Inspect the cable for broken fibers before each use.
- Inspect both ends of the cable to ensure clean, reflective, polished surface
- Wipe the fibre optic light cable gently to remove all blood and organic materials immediately after use using a mild detergent

Care of Laparoscopic Instruments

Reprocessing laparoscopic instruments is one of the toughest challenges to OR personnel. These instruments are extremely difficult to clean because of their long shaft and complex jaw assemblies, which may trap infectious bioburden and debris. The positive pressure of the CO2 in the insufflated abdomen also cause blood and other body fluids to flow up into these channels, and making them difficult to remove. Optimal processing of Laparoscopic instruments involves following steps:

1) Dismantling
2) Decontamination
3) Precleaning
4) Cleaning and rinsing
5) Drying
6) Sterilization and
7) Storage.

Dismantling - Instruments that can't be dismantled completely are prone to harbour blood / debris within the shafts.

Decontamination - Decontamination is the procedure used to reduce bioburden on reusable medical devices. The procedure begins in the theatre itself using the nursing staff wiping off visible blood tissue and body fluids in the instruments with a damp sterile sponge. At the conclusion of this all soiled or contaminated instruments should be placed in a container containing a disinfectant solution such as 0.5% chlorine and allowing them to soak for Ten minutes.

Precleaning - pre-cleaning treatment with an enzymatic method is recommended. These break up blood and other protein soil and facilitate cleaning.

Cleaning - Laparoscopic instruments are best rinsed in running water to ensure that all of the particulate matter in addition to residues of chemicals employed for contamination and cleaning are completely cleared from them.

A method of cleaning that's growing in popularity is ultrasonic cleaning. Ultrasonic cleaning is 16 times better than hand-cleaning. The instruments are placed in the ultrasonic unit for 10-15 minutes and use a neutral pH solution.

Drying

The instruments should be dried at the end of the cleaning before they are packed for sterilization. This is achieved by using an air gun or by using an oven.

Sterilization

The Centers for Disease Control (CDC) recommends that rigid laparoscopic instruments be sterile or, in the event that isn't feasible, they be high-level disinfected. There are three sterilization processes available to us - steam, ethylene oxide and peracetic acid. Because of product knowledge and proprietary design information, the instrument manufacturer may be the just one who can provide sterilization recommendations.

High level disinfection

Agents that are employed for HLD include 2% glutaraldehyde, 6% stabilized hydrogen peroxide and per acetic acid. Glutaraldehyde has got the benefits of having good biocidal activity, non-corrosive to optics and it is active in the presence of protein. Glutaraldehyde is irritating towards the skin, eyes, and respiratory system, especially at concentrations of 0.3 parts per million (ppm). OSHA's established maximum allowable exposure limit for glutaraldehyde is 0.2ppm. Fibreoptic light cords and telescopes have to be soaked in 2% glutaraldehyde not less than Ten minutes. Soaking should not exceed Twenty minutes. The endocamera could also disinfected by 10 minutes submersion in 2% glutaraldehyde. Soakage of other metallic instruments, including trocars, and hand instruments, has become recommended for an hour. Formaldehyde is potentially cancer causing and very irritating to the skin, eyes, nose, and respiratory tract. Furthermore, its efficacy is found wanting, and for that reason, routine utilization of formaldehyde for sterilizing instruments isn't recommended.

Storage

Items ought to be properly stored soon after sterilization or HLD so they do not become contaminated.

Conclusion

Proper care and handling of laparoscopic instrumentation can help prevent malfunctions and rapid deterioration, which in turn eliminates costly repairs and replacements. It is important that each and every member of the surgical team together with the reprocessing personnel work collaboratively to achieve this important goal, so as to ensure the delivery of the safest and highest quality of patient care

Tick the Checklist -Leave no “Scope” for error

Dr Abhishek Chandavarkar
MD DNB DGO
Advanced Endoscopy Fellowship (France & Mumbai)
Co-Editor & Managing Council Member IAGE 2015-17

As a surgeon, when we begin with endoscopy, our focus is on the patient’s history, examination findings, investigations and planning out how to go about the surgical steps. At this time, we definitely would not want to be bothered whether the right instruments are on the trolley or not. Also, we surely don’t want the entire cartload of instruments to be on the trolley, and we keep searching for instruments while the surgery is in progress.

A simple yet effective way to improve efficacy without stressing too much is to maintain a checklist which can also be handed over to your staff.

I have tried to simplify and keep the minimal possible instruments required on the trolley, which would require modification as per individual operative styles and instruments.

It is always preferable to keep the Laparoscopic and vaginal instruments on separate trolleys to prevent cross infection. Another important tip would be to avoid keeping unnecessary open surgery instruments on the trolley. Keeping the tubings (Light cable etc.) on the vaginal trolley is a better idea so that the laparoscopy instruments do not get entangled in the tubings and hence the risk of falling is reduced. Before inserting the primary trocar or verees, it is always better to set up the light, gas, bipolar, suction irrigation cables.

A. LAPAROSCOPY TROLLEY

1. Blade handle no. 3
2. 11 no. Blade
3. Tooth forceps
4. Suture cutting scissor
5. 10cc syringe filled with bupivacaine 0.5% for local infiltration at ports
6. Gauze pieces x 10
7. Mop x 1
8. Bowl with Povidone-Iodine and gauze
9. Suture material for port closure
10. Laparoscopic Instruments for diagnostic hysteron-laparoscopy
    - i. Verees
    - ii. Scopes 10mm / 5mm
    - iii. Trocar cannula 10mm x 1
    - iv. Trocar cannula 5mm x 2 (expecting operative)
    - v. Bipolar Forceps x 1 (can double up as atraumatic bowel grasper)
    - vi. Suction x 1
    - vii. Atraumatic Bowel Grasper x 1 (optional)
    - viii.Scissor (optional)

B. VAGINAL TROLLEY

1. Sponge Holder x 2
2. Speculum x 2
3. Vulsellum x 2
4. Dilators
5. Metal catheter
6. Gowns x 3
7. Drapes
   - i. Leggings x 2
   - ii. Medium size x 4
8. Towel Clips
9. Light Cable
10. Gas Cable
11. TUR Set
12. Suction set
13. Bipolar cable x 2
14. Monopolar cable x 1 (Ovarian drilling if expected)
15. Foley’ Catheter (optional)
16. Urine Bag(optional)
17. 10cc Syringe filled with distilled water(optional)
18. Vaginal Manipulator(optional)
19. Hysteroscopy equipment
    - i. Hysteroscope
    - ii. Diagnostic sheath
    - iii. Operative sheath
    - iv. Hysteroscopic scissors (expecting operative)
    - v. Hysteroscopic grasper (expecting Polyp)
    - vi. Resectoscope and accessories to be kept only if preoperative findings are suggestive of any particular use (e.g. Submucous Fibroid/ Metroplasty / TCRE)

The basic trolleys remaining the same, these are a few examples for the operative laparoscopic trolleys, again modified as per individual requirements.

For Total Laparoscopic Hysterectomy

1. Trocar cannula 10mm x 1
2. Trocar cannula 5mm x 3
3. Scissor x 1
4. Bipolar Forceps x 1
5. Suction x 1
6. Atraumatic Bowel Grasper x 1
7. Tenaculum/ Myoma screw x 1
8. Needle Holders x 2
9. Monopolar hook x 1 (optional)
10. Vaginal Manipulator x 1
11. Vaginal Delineator tube x 1

For Laparoscopic Myomectomy

1. Trocar cannula 10mm x 1
2. Trocar cannula 5mm x 3
3. Scissor x 1
4. Bipolar Forceps x 1
5. Suction x 1
6. Atraumatic Bowel Grasper x 1
7. Tenaculum / Myoma screw x 1
8. Needle Holders x 2
9. Aspiration needle for injecting Vasopressin
10. Morcellator with tenaculum and In bag morcellation preferred
11. Port closure needle
12. Vaginal Manipulator x 1 (optional)

For Laparoscopic Ovarian Cystectomy

1. Trocar cannula 10mm x 1
2. Trocar cannula 5mm x 3
3. Scissor x 1
4. Bipolar Forceps x 1
5. Suction x 1
6. Atraumatic Bowel Grasper x 1
7. Allis Grasper x 2
8. Bag for specimen (Endobag / Glove bag)
9. Port closure needle
10. Vaginal Manipulator x 1 (optional)
11. Open surgery instruments to pull out bag with specimen
    a. Allis Forceps
    b. Artery Forceps

Though I have mentioned this at the end, this is the most important checklist ANAESTHESIA CHECKLIST

1. Oxygen / Nitrous Oxide cylinders
2. Functioning Boyle's Machine / Workstation
3. Multipara Monitor with ETCO2
4. Laryngoscope with working light and batteries
5. Endotracheal tubes no. 7.5 /7 /6.5 /6 /Paediatric
6. Laryngeal Mask Airway
7. Plastic Airway
8. IV cannula gauge 18 / 20 /22
9. IV sets
10. IV fluids – Crystalloids / Colloids
11. Anaesthesia drugs
    a. Propofol
    b. Muscle relaxants - Scoline/ Vecuronium / Atracurium
    c. Glycopyrolate / Atropine
    d. Inhalational agents – Sevoflurane/ Isoflurane/ Halothane
    e. Reversal Agents – Neostigmine
12. Emergency Drugs
    a. Adrenaline
    b. Hydrocortisone
    c. Pheniramine Maleate (antihistaminic)
    d. Furosemide
    e. Nitroglycerine
    f. Mannitol
13. Suction catheter no.16
14. Ryle's Tube

Finally, to sum it up, the best measure to avoid complications is a thorough patient profile, choosing appropriate cases as per our own surgical limitations as well as patient's fitness and a fool-proof checklist of equipment and instruments, ideally with a backup of each.

One beautiful concept to guide us has been given by a wise gynaecologist many years ago, when he stated, ***"When you are deciding to, how to, and whether to operate or not, just think about this method - what would you do if this person was a close relative or friend of yours! Then decide. You will never falter!!"***

WISH
Women Imaging Specialists in Healthcare

Women imaging specialists in Healthcare
offers complete diagnostic facilities specially designed for women by women.

Services available

Ultrasound

- Full body ultrasound
- Specialized Pregnancy 3D/4D scans
- Fetal Heart scan
- Fetal Anomaly scan
- Vascular Imaging
- Colour flows / Doppler studies
- Breast Ultrasound scan
- Trans Vaginal Ultrasound Scan for early detection of Cancer
- USG guided Breast Biopsy

Mammography

- Low dose radiation mammography
- Latest digital technology
- Recommended for women above the age of 40 to detect early Breast cancer
- Recommended for women younger than the age of 35 who have a family history of Breast cancer or other risk factors or women who feel a lump or discharge from the breast

Dr. Glossy Sabharwal
MBBS, MD Radio Diagnosis, Maternal- Fetal Medicine Specialist
Breast Interventional Fellow (Paris), Women Imaging Fellow (London)
Executive Member-Delhi IRIA
M : 9811020477, E : docglossy@gmail.com

- Same day appointment
- Same day reports
- 3D/3D Color images
- Comfortable environment
- Personalised care
- Female radiologist & staff

Timing : 7am to 10pm - Monday to Saturday
(Sunday by Appointments)
For Appointments Call:
9811020477, 01126142960, 9599695441
87, Paschimi Marg, Vasant Vihar, New Delhi - 110057

Contact Us: (91) 11 410 87060, (91) 11 261 42960
87, Paschimi Marg, Vasant Vihar (Next to Vasant Vihar Club),New Delhi - 110057

SCOD
SURGICAL CENTER FOR OBESITY AND DIABETES

IEF
Certified for excellent by
International Excellence Federation
for Bariatric & Metabolic Surgery

Nothing is Impossible, Only you have the power to sculpt yourself into What you want to become

Weight Loss & Diabetes Surgery at **"CGHS Approved"** Rates

EMI Facility Now Available
for weight loss and diabetes surgery
*condition apply

10% discount on Weight loss surgery

Centers for Appointment

South Delhi : Fortis, C-DOC, Nehru Place, New Delhi.
SCOD Clinic, 87, Paschimi Marg, Vasant Vihar.

Central Delhi : Apollo Spectra Hospital, New Rohtak Road, Karol Bagh, New Delhi.
Jeewan Mala Hospital, New Rohtak Road, Karol Bagh, New Delhi.

SCOD (Surgical Center for Obesity and Diabetes)
A unit of Sabharwal Laparoscopy Center LLP
66A/3, Pal Mohan Bhawan, New Rohtak Road,
Karol Bagh, New Delhi-05

For appointment & more details please contact:
Ph: 91-9873927874, 8130130489 | 011-47774151
Email: info@scod.in, scodslc@gmail.com | Website : www.scod.in