THE EFFICACY OF LAPAROSCOPY IN THE DIAGNOSIS AND MANAGEMENT OF CHRONIC ABDOMINAL PAIN

Dissertation submitted to

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DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfillment of the regulations for the award of the degree of

M.S. (GENERAL SURGERY) BRANCH – I

DEPARTMENT OF GENERAL SURGERY

CHENGALPATTU MEDICAL COLLEGE

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I here by declare that the dissertation entitled **" THE EFFICACY OF LAPAROSCOPY IN THE DIAGNOSIS AND MANAGEMENT OF CHRONIC ABDOMINAL PAIN",** was done by me in the Department of General surgery, Chengalpattu Medical College during the tenure of my course in M.S. General Surgery from march 2018 to february – 2019 under the guidance and supervision of **Dr.V.T ARASU .M.S**, Professor, Department of General surgery, Chengalpattu Medical College. This dissertation is submitted to The Tamilnadu Dr.MGR Medical University, Chennai-32 towards the partial fulfillment of the requirement for the award of M.S. Degree in General Surgery.

I have not submitted this dissertation on any previous occasion to any University for the award of any degree.

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LIST OF CONTENTS

INTRODUCTION

Abdominal pain is a common complaint and the most difficult to treat. Nonspecific abdominal pain (NSAP), is defined as acute abdominal pain of less than 7 days duration, and for which diagnosis cannot be concluded after clinical examination and basic investigations, is a common cause of emergency surgical hospitalization.

A number of times, imaging studies cannot provide an accurate diagnosis. NSAP, in many patients, is diagnosed as acute appendicitis, with periumbilical pain and tenderness that radiates to right iliac fossa Many of them are erroneously operated for suspected appendicitis, while a few are started on anti-tuberculosis therapy, though most female patients may even be started on anti-androgens.

History taking, physical examinations, laboratory tests and advanced noninvasive imaging modalities may help, but are insufficient for complete diagnosis. Exploratory laparotomy is done in cases where no definite diagnosis can be concluded though every modality has been tried. Laparoscopy is a minimally invasive surgical procedure by which the peritoneal cavity and intra-abdominal organs can be visualized to enable to detect pathology. It has both diagnostic and therapeutic potential and is mainly useful in patients who are hemodynamically stable and who do not need urgent surgical intervention. It is helpful so as to enable us to make out the etiology and allows for appropriate

intervention. Patients with chronic abdominal pain may have already undergone many diagnostic procedures and a conclusion cannot be reached in > 40% patients even after evaluation with imaging studies, and only then a surgeon is consulted and so many a times a chance of a non therapeutic abdominal exploration is very high. So a diagnostic laparoscopy is an intermediate modality which helps in deciding whether to open and perform laparotomy for a patient.

In order to achieve a high percentage of positive diagnosis from laproscopy, it requires good technique and skills, a sound clinical knowledge and a good understanding of abdominal pathologies. This study was conducted to highlight the role of laparoscopy in unexplained/nonspecific abdominal pain.

AIM OF THE STUDY

A study of diagnostic laparoscopy in chronic abdominal conditions in which diagnosis could not be revealed with available Modalities of investigations with equivocal findings to assess the Operability and for staging.

REVIEW OF LITERATURE

Diagnostic laparoscopy, in which procedures on the intact body cavity are performed through minimal access by endoscopic visualisation, over the last decade has evolved and is now an integral part of the diagnostic and staging workup of many benign and malignant lesions. Through the effort of many individuals, more procedures once thought to be impossible through endoscopic access are now widely performed. The wide spread acceptance of this technique has been largely propelled by public awareness that minimally invasive surgery is associated with less pain , quicker return to normal activity and better cosmetic results. Since the dawn of civilization, advances in technology and advances in surgery have been inseparably linked. . The nineteenth century, with the advances in anaesthesia, asepsis and the role of blood transfusion optics, three chip cameras and 3 dimensional and high definition viewing facilities has brought on saw a revolution in the way surgery was practiced.

Greek and Roman physicians made the first attempts to view the inner body cavities. Records from 400BC show the physicians of Hippocrates' school using rectal and vaginal speculae. It is assumed that the earliest endoscopes used daylight or a naked flame as illumination.

By the end of eighteenth century Phillip Bozzini of Vienna, Austria (1805) came with idea of Lichtleiter(Light conductor), that transmits light into the body of the individual.

Antonin Desormeaux in 1853 invented an universal endoscope that used alcohol as a light source and a system of lens that intensified the visual field illumination . It was enhanced by Bruck , a Polish dentist to a internal speculum with platinum tip mounted light. It had disadvantages of flare and thermal injury that prompted changing of angle of the lens from source of light that impaired visualization to a great extent.

In the twenty first century we were at the brink of another revolution, with imaging in surgical techniques. With the advent of fibre optics

The instruments that help in the visualization of the body`s interior were used as early as the days of Hippocrates and ancient Romans. A three bladed vaginal speculum similar to the ones used now was found in the Pompeii` sruins (70 AD) from ancient Rome.

Maximillan Nitze developed a cystoscope with a series of lenses and platinum wire as a light source and reported it in 1879.Maximilian Nietze and Reinecke by 1879 came up with an idea of three lens system that led to the development of first endoscopes and cystoscopes. Leiterr and Newman made significant contributions to this development. Nietze‘s design incorporated

many operating ports and crystalline lens that allowed for excellent viewing that paved way for natural orifice/open laparascopy.

The problem of light source remained a major obstacle till the introduction of miniaturized incandescent light source by Newman of Glasgow in 1883, just four years after its invention by Thomas Alva Edison. George Killing, the German surgeon from Dersden was first to use the cystoscope in a living dog in the Seventy third congress of German Naturalists and Physicians in Hamburg in 1901.

Laparoscopic examination of the abdominal cavity in humans was subsequently described in 1910 by Jacobeus, a Swedish physician, published the results of a 97-patients series performed between 1910and 1912 at Stockholm's community hospital.

Boesh, the Swedish surgeon performed the first laparoscopic tubal ligation with electrocoagulation in 1936.

In 1938, John Veress developed a spring loaded needle for creation of pneumothorax in patients with tuberculosis.

Raoul Palmer, the French surgeon from Paris in 1940s, conceived the importance of continuous intra abdominal pressure monitoring during pneumoperitoneum and the use of gravity to assist in retraction.

The 1950s saw two major changes in endoscopic technology, the cold light and the Hopkins Rod lens system.

The Rod lens system invented by Hopkins in 1953 was a major shift from the prevailing endoscopes with long air segments in between.

Hasson from Chicago, USA published a report on 1971 about his alternative and safe access by a mini laparotomy using a specially designed cannula with an olive shaped sleeve that was used to anchor the trocar to the rectus sheath.

The first half of 1980s saw the introduction of technology that helped in fuelling the growth of minimal access surgery to what it is today.

Kurt Semm did the first laparoscopic appendicectomy during a routine gynaecological procedure in 1983.

Charles Fillipi and Fred Mall performed the first laparoscopic cholecystectomy in dogs in 1985. Phili Mouret claimed to have performed the first laparoscopic Cholecystectomy in 1987 at Lyon in France but did not publish this feat.

The first reported laparoscopic examination (1991) in the United states is credited to Bertram Bernheim of the Johns Hopkins University; he performed a procedure he termed organoscopy of two patients, one of whom

was a patient of W.S.Halstead and was found to have advanced pancreatic malignancy.

World congress of Digestive surgery held at New Delhi in October1990 by which Dr. C.Palanivelu was impressed and established the Coimbatore Institute of Gastrointestinal Endosurgery (CIGES) in India in 1991, which was the first laparoscopic gastrointestinal centre in south india.

ABDOMINAL PLANES AND REGIONS

The abdomen can be divided by a number of imaginary horizontal and vertical lines drawn using the skeletal landmarks of the thorax and abdomen . Projection of these lines into the sagittal or transverse planes can be used to define few abdominal 'planes'. Apart from dividing the abdomen into different regions, these planes are also of value in defining vertebral levels and the positions of a few relatively fixed intraabdominal structures.

Vertical Planes

Apart from the midline which passes through the xiphisternal process and the pubic symphysis, there are two paramedian planes which project from the midclavicular line (also called the lateral or the mammary line).This line passes through the midpoint of the clavicle, crosses the costal margin just lateral to the tip of the ninth costal cartilage, and passes through a point midway between the pubic symphysis and ASIS. It approximates to the lateral border of rectus abdominis.

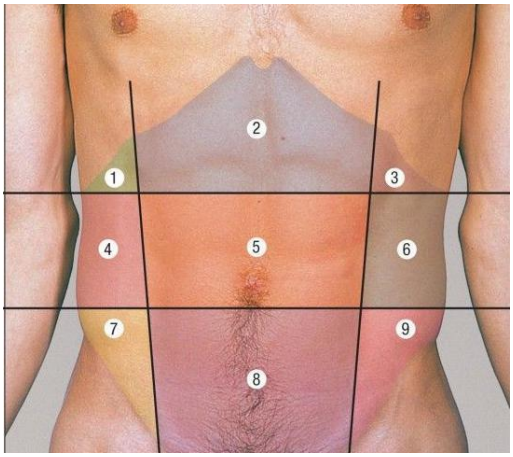
Horizontal Planes

Many horizontal planes have been defined, but only the subcostal, transpyloric and transtubercular planes are used in common clinical practise

.The transpyloric plane lies midway between the Xiphisternum and the umbilicus. It usually lies at the level of the body of L1 near its lower border and meets the costal margins at the tips of the ninth costal cartilages. The linea semilunaris crosses the costal margin at the transpyloric plane. The hilum of both kidneys, the origin of the superior mesenteric artery, the termination of the spinal cord, the neck, adjacent body and head of the pancreas, and the confluence of the superior mesenteric and splenic veins as they form the portal vein all lie in this plane. The pylorus may be found in the transpyloric plane, but is not a constant feature. The transtubercular plane joins the tubercles of the iliac crests and mostly lies at the level of the body of the L5 near its upper border. It is at or is just above, the confluence of the common iliac veins and marks the origin of the inferior vena cava.

Abdominal Regions

The abdomen can be divided into nine arbitrary regions by the transpyloric and transtubercular planes and the two mid clavicular planes projected onto the surface of the body. These regions are used in practice for localization of the position of a mass or the localization of a patient's pain. They may also be used in the description of the location of the abdominal viscera. The nine regions thus formed are: epigastrium (2); right and left hypochondrium (1 ,3); central or umbilical (5); right and left lumbar (4, 6); hypogastrium or suprapubic (8); right and left iliac fossa (7, 9).



Orientatation of viscera in the abdominal cavity –Liver is located along the right side beneath the ribs ,stretching till the point inferior to Xiphoid process . Stomach lies to the left of liver ,the greater omentum arises from the greater curvature of stomach . The coils of the small intestine are generally seen beneath it, while the cecum and the left colon lies in the RIF and LIF

respectively and are exposed partly. The appendix is attached to the caecum along with its mesentery. It may be placed pre ileal, post ileal, sub caecal, retro caecal, para caecal or sub hepatic in position.

The appendix can be identified by tracing the taenia coli. The base of the appendix lies where the three taenia coli meet. It is attached to the caecum about 2cm below the ileocaecal valve. The rectum is confined to the sacral concavity being overshadowed by coils of intestine ,the bladder lies in the anterior pelvis but projects above pubicsymphysis on distension. Sigmoid colon lies between bladder and rectum.

Stomach continues as duodenum, the pyloric sphincter marks point of continuity and it appears like a thick ring .The duodenum lies beneath the inferior surface of the liver and disappears from the view . Retracting the omentum will reveal passage of duodenum to the left and it's transformation into jejunum and then ileum . The length is about 6 metres , and if the ileum is traced it will be seen entering into the caecum in the RIF .

From the cecum the large intestine takes an arched course, passing at first upward on the right side, then across the midline and downward on the left side and forming respectively the ascending, transverse and descending

parts of the colon. In the pelvis it assumes the form of a loop, the sigmoid colon, and ends in the rectum. By retraction of the stomach towards the right ,the spleen is revealed in the (Lt) Hypochondrium beneath the stomach .A small sac like outpouching is seen on the undersurface of the right lobe of the liver- the gall bladder.

It might overhang and project as far below to the right iliac fossa too when grossly distended. The pancreas is usually not visualized easily since it is a retroperitoneal structure. If the lesser sac is entered, it is seen extending from the “c loop” of the duodenum obliquely to the left crossing the midline towards the splenic hilum.

The kidneys too being retroperitoneal are not visualized unless specifically looked for. They lie in the lumbar region with their concavities facing the midline. The Peritoneum covering the inner surface of abdomen wall and viscera gives it a shining appearance.

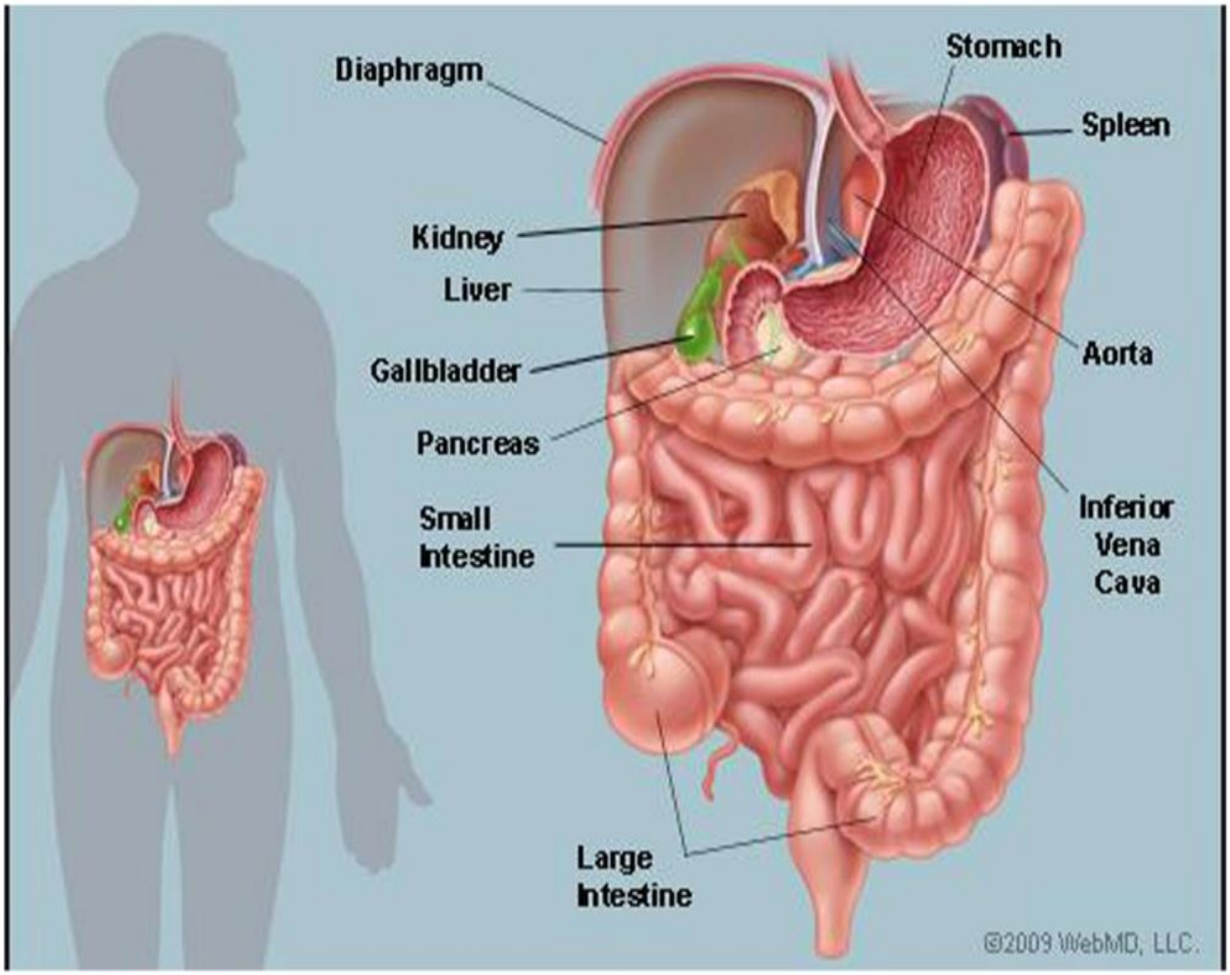


Fig 2 :Arrangement of normal intra abdominal viscera

General Arrangement of the Peritoneal Cavity

The peritoneum forms the largest serous membrane of the body, and it's arrangements are complex. In males it forms a closed sac, but in females it is open at the lateral ends of the uterine tubes. It consists of a single layer of flat mesothelial cells lying on a layer of loose connective tissue. The peritoneal cavity is a large continuous space lying between the parietal peritoneum covering the inner surface of abdominal wall and the visceral peritoneum enveloping the viscera.

The main region of peritoneal cavity is the the greater sac, which is equivalent to the main abdominal cavity surrounding the majority of the abdominal and pelvic viscera. The lesser sac or omental bursa, is a small diverticulum lined with peritoneum, which is situated behind the stomach and lesser omentum and infront of the pancreas and retroperitoneum. These lesser and greater sac communicates via the Winslow's epiploic foramen.

The peritoneal cavity can be divided into several spaces for clinical reasons because pathological processes are mostly contained within these spaces. Functionally the peritoneal cavity is divided into into two main compartments, supramesocolic and inframesocolic, which are partially divided by the transverse colon and Gastrocolic omentum.

Supramesocolic Compartment

The supramesocolic space lies above the transverse mesocolon between the diaphragm and the transverse colon. It can be functionally divided into right and left supramesocolic spaces. These regions can be subdivided into a number of subspaces, which communicate with each other. The right supramesocolic space can be divided into three subspaces- the right subphrenic space, the right subhepatic space, and the lesser sac. The left supramesocolic space can be divided into- the left subphrenic space and the leftperihepatic space.

Lesser sac (omental bursa)

The lesser sac is lined with peritoneum and connected to the greater sac by the epiploic foramen. It is usually considered part of the right supra mesocolic space because embryologically the liver grows into the right peritoneal space and stretches the dorsal mesentery to form the lesser sac behind the stomach .

The posterior peritoneal layer of the lesser omentum, over the posterior wall of the stomach and first part of the duodenum, and the uppermost part of the anterior layer of the greater omentum forms the anterior wall of the omental bursa. The posterior wall is formed mainly by the peritoneum covering the

posterior abdominal wall in this area. The superior border of the lesser sac is narrow and is between the right side of oesophagus and the upper end of the fissure for embryological remnant ligamentum venosum. The peritoneum of the posterior wall of the lesser sac is reflected anteriorly from the diaphragm to join the posterior layer of the lesser omentum.

The inferior border of the lesser sac is along the line of the fusion between the layers of the greater omentum. This runs from the gastro splenic ligament to the peritoneal fold behind the first part of the duodenum. The right border of the lesser sac is formed by the reflection of the peritoneum from the pancreatic neck and head to the inferior aspect of the first part of the duodenum.

Above the epiploic foramen the right border is formed by the reflection of peritoneum from the diaphragm to the right margin of the caudate lobe of the liver and along the leftside of the inferior vena cava, enclosing the hepatic recess. The left border of the lesser sac is from the left end of the root of the transverse mesocolon and is usually formed by the inner layer of peritoneum of the splenorenal and gastrosplenic ligaments.

The part of the lesser sac between the splenorenal and gastrosplenic ligaments is referred as the splenic recess. Above the level of the spleen, the two ligaments are merged to form the short gastrophrenic ligament, which passes from the diaphragm to the posterior aspect of the fundus of the stomach and forms the upper left border of the lesser sac. The two layers of the

gastrophrenic ligament diverge near the abdominal oesophagus, leaving part of the posterior gastric surface devoid of peritoneum. The left gastric artery runs forwards here into the lesser omentum.

Epiploic foramen (of Winslow)

The epiploic foramen (foramen of Winslow), is a short vertical slit, about 3 cm in adults , in the upper part of the right border of the lesser sac and leads into the greater sac. The anterior border contains the common bile duct to the right , portal vein posteriorly and hepatic artery to the left between its two layers.

Superiorly the hepato duodenal ligament runs over the caudate lobe of the liver which forms the roof of the foramen Winslow . To the right, the rim of the foramen is continuous with the greater sac. The roof is continuous with the peritoneum on the inferior surface of the right hepatic lobe.

Inframesocolic Compartment

The inframesocolic compartment lies below the transverse mesocolon and transverse colon. It is divided by the root of the mesentery of small intestine into two unequal domains. It contains the right paracolic gutter and left paracolic gutter which are lateral to the ascending and descending colon.

Lateral to the descending and ascending colon is a shallow recess –Rt and Lt paracolic gutter. The right (lateral) paracolic gutter communicates with the right subhepatic space , down to the space around the caecum. It descends over the pelvic brim into the pelvis. Superiorly, it continues with the lesser sac through the epiploic foramen.

Therefore bile, pus or blood released from viscera may run along the gutter and collect in sites quite far from the suspected organ of origin. Any collections from the right iliac fossa may collect in the lesser sac by coursing along right paracolic gutter communicating with foramen of Winslow. In cases, of perforation of stomach in erect posture the gastric contentmay descend to the RIF mimicking appendicitis.

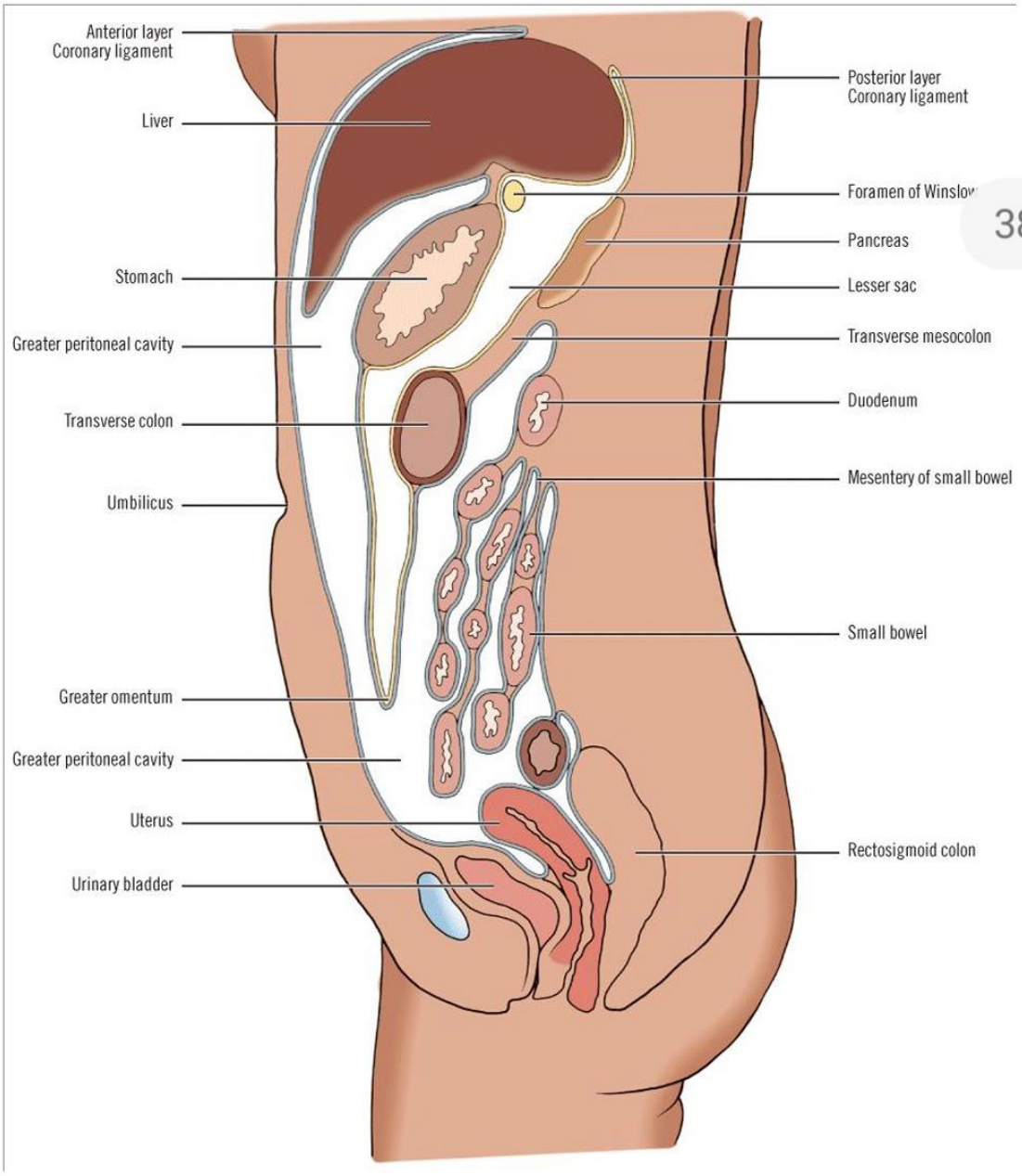


Fig 4 : Sagittal section showing peritoneal attachments and reflections

Pathophysiology of chronic abdominal pain

The most common reasons an individual seeks the advice of a physician is due to pain. Pain was defined by Sherrington as, “the physical adjunct of an imperative protective reflex.” Painful stimuli generally initiates a potent withdrawal and avoidance response . It turns out to be immensely complex because when pain is prolonged and the tissue is damaged, central nociceptor pathways are sensitized and reorganized.

Classification of Pain

Definition of pain by the International Association for the Study of Pain (IASP)is, “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”

Pain is frequently classified as physiologic or acute pain and pathologic or chronic pain, which includes inflammatory pain and neuropathic pain. Acute pain typically has a sudden onset and reduces during the healing process. Acute pain can be considered as “good pain” as it has role in protective mechanism.

Chronic pain can be considered “bad pain” as it persists long after recovery from an injury and is often refractory to common analgesics. Chronic pain can result from nerve injury (neuropathic pain) and includes diabetic neuropathy, toxin-induced nerve damage, and ischemia. Pain and temperature sensations arise from unmyelinated dendrites of sensory neurons located

around hair follicles. Impulses from nociceptors (pain) are transmitted via two types of fiber. One has thin myelinated A δ fibers (2–5 μm in diameter) having property of rapid conduction. The other is non myelinated C fibers(0.4–1.2μm in diameter) which have low velocity of conduction.

Visceral Pain

Visceral pain differs from surface pain in several important aspects. The main feature of visceral pain is, it is dull nature whereas parietal pain is sharp in nature . Conversely, diffuse stimulation of pain nerve endings throughout a viscus as caused by termination of the blood supply to a wide area of the gut activates several diffuse pain fibers at the same time and results in unbearable pain. Many a times, pain originating from viscera is poorly localized, with nausea, and usually accompanied with autonomic disturbances like sweating and changes in blood pressure.

Causes of True Visceral Pain

Any stimulus that stimulates a wide range of receptors in the viscera results in visceral pain. Stimuli include ischemia from occlusion of blood vessels, chemical damage to the viscera, spasm from repeated contraction of the smooth muscle of a hollow viscus due to obstruction or distension and excess strain on the connective tissue surrounding or lying within the viscus. Through the small Type C fibres visceral pain are transmitted.

Ischemia

Bradykinin , lactate and other acidic end products of anaerobic metabolism resulting from ischaemia of the viscera can excite the pain receptors and cause visceral pain.

Chemical Stimuli

Following perforation of the gut viscus , damaging chemical substances like proteolytic acidic gastric juice seep into the peritoneal cavity and causes wide spread digestion of visceral peritoneum resulting in severe excruciating pain by stimulating large areas of nerve fibres.

Spasm Of A Hollow Viscus:

Spasm of a part of the hollow viscus like the gut, the, bile duct, a ureter or the gall bladder can result in pain, by mechanical excitation of the free nerve endings or the spasm so severe as to cause decreased blood flow to the

musculature along the wall of hollow viscus, causing severe pain. Usually pain beginning from a spastic viscus is in the form of cramps, with these verity of pain reaching peak and then subsiding. This process occurs gradually at serial intervals, once every few minutes. The cycles occur due to intervals of contraction and relaxation of smooth muscle. For example, every time a peristaltic wave passes along a spastic gut, a cramp results. This type of pain commonly occurs in appendicitis, gastroenteritis, menstrual bleeding, at the time of delivery, gallbladder disease and ureteral obstruction.

Overdistention Of A Hollow Viscus :

Over loading of a hollow viscus can cause pain, mostly due to overstretching of the tissues. Over distention will result in compression of the blood vessels along the wall of the hollow viscus , thus causing ischemic pain.

Insensitive Viscera:

Some visceral surfaces are nonresponsive to noxious stimuli, for instance the liver parenchyma and the pulmonary alveoli. But the capsule of liver is extremely sensitive to direct injury and stretch, and the bile ducts are also sensitive to noxious stimuli .Though the alveoli that are non sensitive in lungs ,the bronchi and parietal pleura are sensitive to noxious stimuli.

“Parietal Pain” Caused By Visceral Disease:

The parietal surfaces, are supplied with extensive nerve fibres sensitive to pain from the peripheral spinal nerves. Therefore, pain from the parietal wall over a viscus is mostly sharp.

Localization Of Visceral Pain— “Visceral” And The “Parietal”

Pain Transmission Pathways

Pain arising from viscera cannot be localized, due to various reasons. Most importantly, the brain is not aware of the existence of the various internal organs ; therefore any pain that arises within will be localized externally in a superficial manner . Second, sensory impulses from the abdominal viscera are conducted via two pathways to the central nervous system—the visceral and referred parietal pathway. The original visceral pain is conducted by noxious sensory fibers inside the nerve bundles of autonomic system and also by referred fibres to the superficial surface of the body frequently remote from the excited organ. In distinction , parietal impulses are transmitted directly by the segmental spinal nerves from the parietal peritoneum, pleura, or pericardium, and are generally felt directly over the affected area.

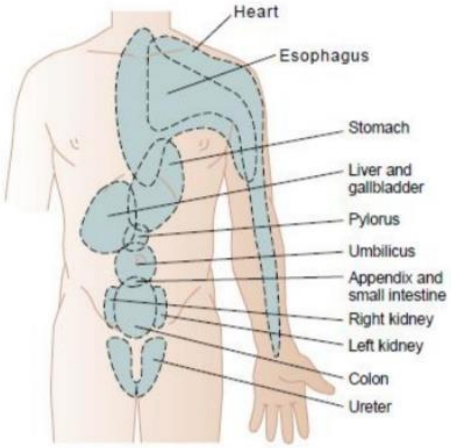


Fig 5 : Areas of Referred Pain

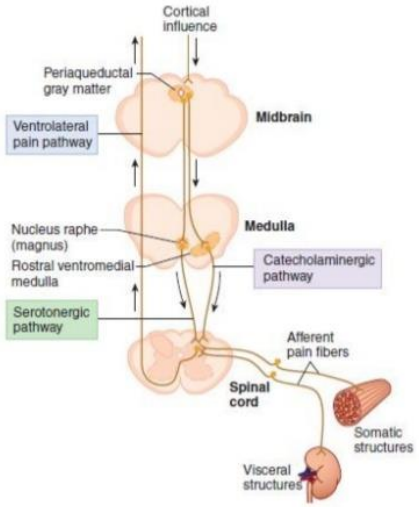


Fig 6 : Pain Transmission Pathway

APPROACH TO DIAGNOSTIC LAPAROSCOPY

Imaging systems

The basis of video imaging systems include the telescope, camera, light cable, light source and the monitor.

The camera

The camera forms a vital part of the imaging system. Charge-coupled cameras are commonly used, contains silicon wafers that are divided into multiple tiny sensors called pixels. Single chip – 450lines, Three chip – 700 to 800 lines, high definition – 1000 lines. All these cameras need white balancing before introduction into the abdomen to get a true color image of the internal organs.

Laparoscope

Dr.Hopkins, a British Physicist invented the laparoscope used now in1952.The present day laparoscopes have a series of rod lens in the centre with a rim of optical fibres on the periphery. The optical fibres carry the light into the abdominal cavity and the rods lens system help to transmit the image from the abdomen to the camera. Several types of laparoscopes have been modelled based on the size and angle of vision. Routinely10mm scopes are used and they offer excellent clarity and resolution. The forward viewing laparoscope(0`) is commonly used by surgeons . The angled view scopes(30` / 45`) provide a more flexible field ofvision compared to the forward viewing scopes.

Light Sources

The light sources vital in imaging with bright and even illumination. There are two types of light sources, the halogen and xenon. Halogen lamps are economical and are efficient for basic laparoscopic surgeries. Xenon 300watts lamp produces an intense image of light and is considered the standard light source for laparoscopic surgeries.

Light cables

The light is transmitted from the light source to the area of surgery through the light cable and fibre bundle in the laparoscope. They are of two types, the fluid filled cables and fibreoptic cables.

Monitor

The monitors are the final link of the imaging chain. It should be located infront of the surgeon in a gaze down view. The high resolution monitors with multiple inputs are ideal for modern day laparoscopic surgeries with resolution more than 1600 lines to achieve optimal images. Few monitors are designed to receive either a composite video signal or the higher quality Y/C or RGB signals. The signal type received is determined by the output of the camera box.

Insufflator

The working space can be created either by pneumoperitonuem or by abdominal lift systems. The internal pressure must be maintained at 12-14mm mercury. The insufflator should be capable of delivering atleast10litres/min when performing major surgeries.

Suction and irrigation apparatus

Irrigation and suction are vital for laparoscopic procedures, mainly for maintaining a clear visual field and hemostasis intraoperatively. There are two types of apparatus, the roller pump type irrigates fluid through the tubing with the help of motorized rollers. The other apparatus increases the pressure in the reservoir with the help of motorized pumps. The increased pressure in the reservoir pushes the fluid through the tubes.

Electrosurgical Instruments

One of the prerequisites of any surgical procedure is the ability to coagulate tissues to prevent or control bleeding. Some surgeons prefer thermo coagulation as it is safe to use with less tissue dissection. Electrosurgical units are machines which produce an alternating electrical current at a frequency which will not stimulate neuromuscular activity.

Veress Needle

The Veress needle is the commonly used needle to create a pneumoperitoneum. It has a spring loaded blunt tip which is retractable into a sharp teeth and is available as disposable/non disposable. Low flow rate is around 1litre/min and high flow rate is about 2 -2.5 liter/min. Pressure more than 3 indicates blockage in the tube/hub/shaft. The maximum flow rate through a Veress needle is about 2.5L/min

Types of Veress needle

• Disposable - One piece, plastic design, length 7- 12 cm,

• Non disposable - Inner tube with blunt tip, outer sheath with sharp edge. It can be disassembled.

Patency of veress needle is checked for leak by flushing saline after occluding the tip of the needle and pushing fluid under moderate pressure.

PALMER TEST

The palmer test was formulated in order to determine if the umbilicus was free of adhesions or bowel from previous surgery. The insufflation needle is placed in the left lateral position and the abdomen is filled with carbondioxide. A syringe half filled with saline is attached to an 18 gauge needle inserted through the umbilicus. The pressure of the carbondioxide insuffalated into the abdomen pushes the syringe up.

- Pure gas indicates the area is free to intestine

- Blood or no aspirate indicates adhesions

- Cloudy liquid indicates bowel

The test can be repeated until gas is aspirated. The trocar can then be inserted into the abdomen through this location.

Trocars and Cannulae

The trocars are the pathway to the abdominal cavity which aid introduction of various instruments. Hasson`s cannula comprises of three pieces ,a cone shaped sleeve, a metal or plastic sheath with a trumpet or flap valve, and a blunt tipped obturator.

Laparoscopic instruments

The contrast between conventional and laparoscopic instruments is the long shafts and the attached hand grips. The laproscopic instruments are commonly around 33cms long for effective reach into the abdominal cavity in adults. For pediatric surgery instruments vary in length from 18 to 25 cm. In obese patients 45cmsinstrumentsare used.

1.Hand grips : The handles are designed ergonomically so that there is minimal discomfort during handling of instruments. Ring and shank handles are the commonly used types mainly for one handed manipulation during dissection, cutting and other manoeuvres.

2.Reducing Sleeve

This is employed to minimize the port size from 10mm to 5mm or 5mm to 3mm, so that the pneumoperitoneum is maintained even when surgeon opts for a instrument of smaller diameter .

3.. Needle Holder

The laparoscopic needle holder may either have a straight or curved tip. It requires 2 needle holders to perform swift endo-suturing, though it is possible with a one needle holder and a grasper.

Disposable or reusable instruments:

Reusable instruments are expensive but are cost effective for long term usage .Insulation of single use instrument are more prone to damages easily and can lead to electrosurgical injuries. Usually the laproscopic instruments differ in

diameter from 1.8 to 12mm though a greater part of the instruments pass through a 5 or 10mm of cannula.

Instruments For Sharp Dissection

- Scissors
- Electro surgery hook
- HF Electro surgery spatula (Berci)
- HF Electro surgery knife
- Knife

Scissors

It has two blades for fine cutting of tissues.

Types of Laparoscopic Scissors

(1) Straight Scissors

(2) Curved Scissors

(3) Serrated Scissors

(4) Hook Scissors

(5) Micro-tip Scissors

Spatula, Hook And Harmonic Scalpel

Spatula with a flat tip is typical for dissecting the gall bladder from the gallbladder fossa. It is very safe as compared to a hook. A Hook has a L shaped tip. A few surgeons may use this device for enterotomy. In modern era of laparoscopic surgery ultrasonic scalpel (Harmonic scalpel) is used for advanced procedures.

Clip Applicator

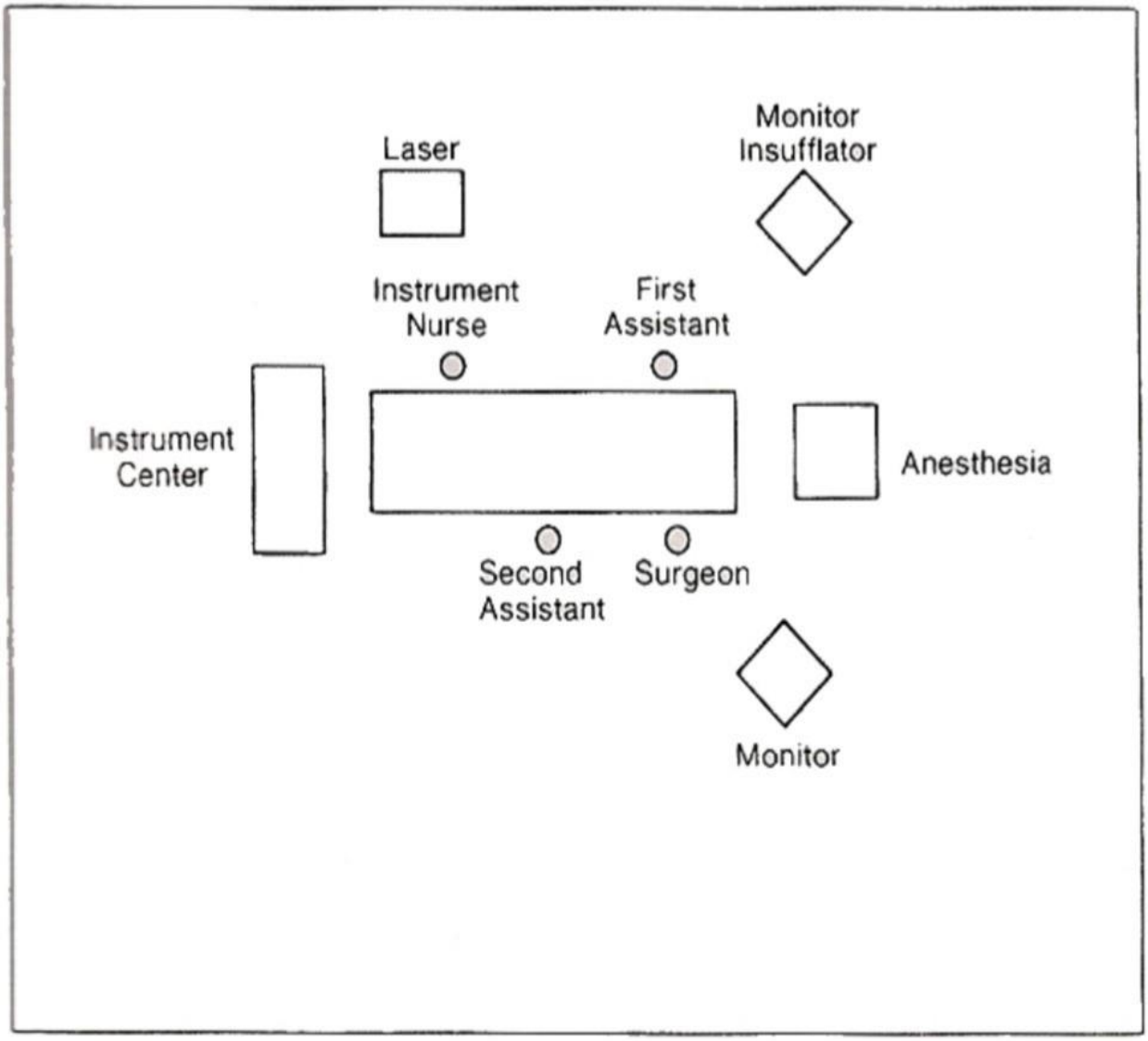
They come in both single use forms and reusable forms. Reusables forms occur in 3 different sizes - small, medium and large. They are employed to occlude both cystic artery & duct according to their size. Disposable clip applicator is available with preloaded 20 clips per unit similar to the Protack that comes with 30 clips per unit.

Electrocautery / LASER

Electrocautery or LASER energy is used to dissect tissue. Either energy modality will also adequately achieve hemostasis of small blood vessels.

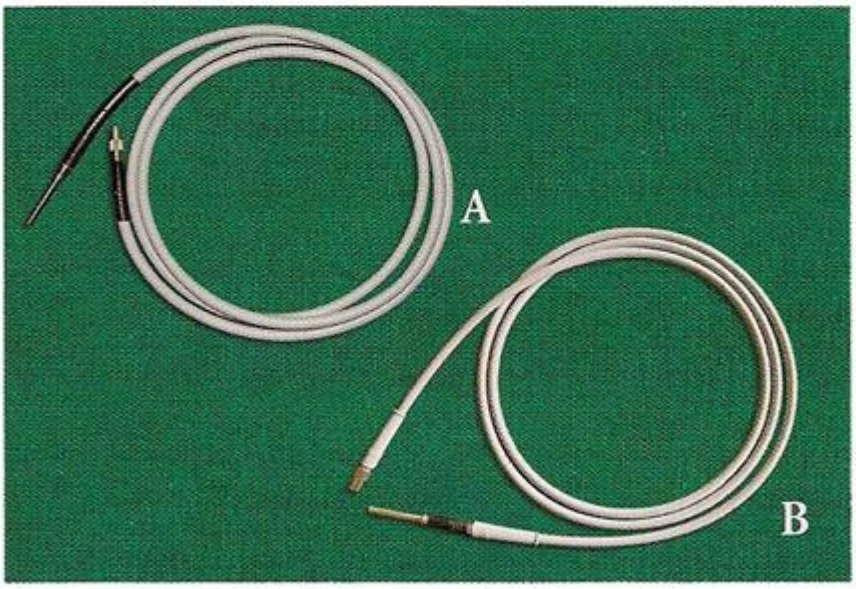
Electrocautery uses microwave wavelength energy to produce heat that can dissect and coagulate tissue. This device is familiar to most general surgeons. A power setting of 20-30 watts is usually sufficient. Although coagulation current is used primarily, a mixed blend of cutting and coagulation may be valuable. A number of different laparoscopic instruments have recently been adapted to incorporate monopolar electrocautery.

LOCATION OF EQUIPMENT



LIGHT SOURCE

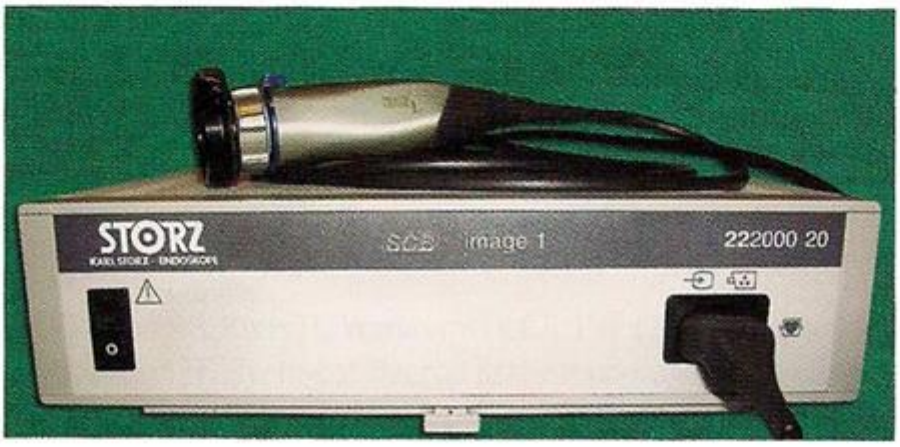
LIGHT CABLES



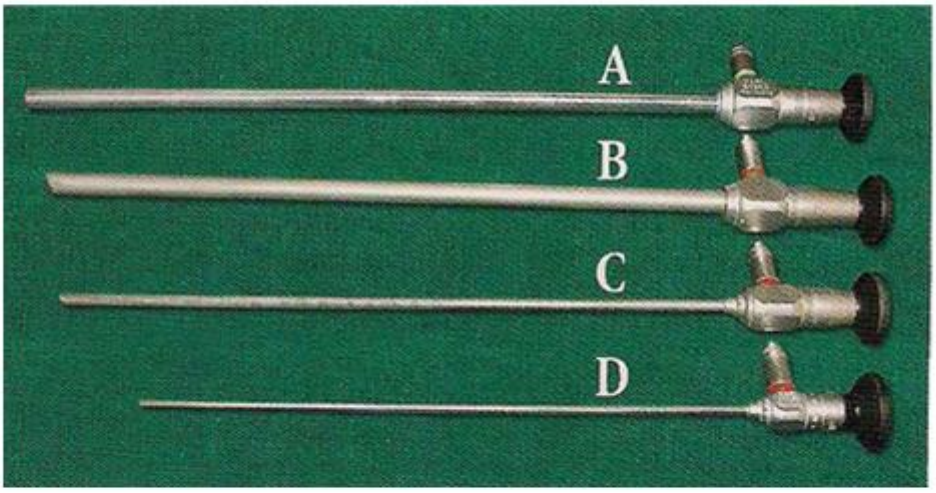
A – Fluid Cable

B – Fibre Optic Cable

DIGITAL CAMERA



LAPAROSCOPES



A – 0^{o} – 10mm

B – 30^{o} – 10mm

C – 30^{o} – 5mm

D – 30^{o} – 3mm

CARBONDIOXIDE INSUFFLATOR

ELECTROCAUTERY

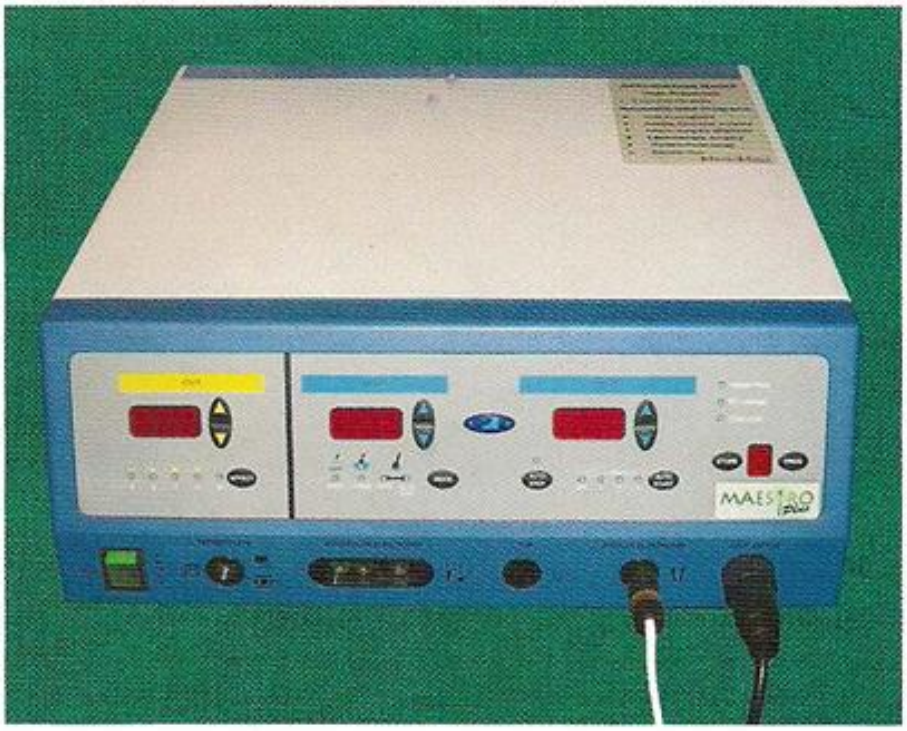


Fig 14 : Tips And Trocars

Fig 15 : Needle Holder

Fig 17 : Scissors

Fig 18 : Working Instruments

Fig 19 : Spatula , Hook and Hormonic Scalpel

Fig 11 : Suction Irrigation Hand Apparatus

Fig 12 : Veress Needle

Gas For Pneumoperitoneum

Initially pneumoperitoneum was created using air , but it was neglected due to the increased risk of air embolism.

The ideal insufflating agent should have following features:

- It should be colorless, at room temp it should be physiologically inert and should not explode in contact with electrocautery or laser coagulation.
- It should be highly soluble in blood .
- It should be easily available, have low cost and be nontoxic.

1.Carbon Dioxide

Carbon dioxide is an odorless, colorless gas. It is a easily obtainable, stable at room temperature, naturally produced in the tissues and easily removed from the body by the lungs. Because of these features, Carbon dioxide is the most commonly used gas for insufflations during laparoscopic procedures.

Advantages

- It has very low risk of gas embolism
- It is non combustible

Disadvantages

- Can lead to Hypercarbia and acidosis
- The direct effects of carbon dioxide and acidosis can lead to depressed cardiac contractility, pulmonary hypertension and systemic vasodilation with fall in pressure

2. Nitrous Oxide

Nitrogen is non reactive , colorless, gas stable at room conditions and easily available . Nitrous oxide has been used or local procedures, and for patients undergoing longer duration procedures with poor pulmonary reserve .

Advantages

- Negligible changes in acid-base balance.
- Significantly reduced pain

Disadvantages

- Aids combustion along with hydrogen or methane gas.

3. Helium (He)

Helium is a gas with no color, no odour and it is obtained from natural source. It is inert and is neither combustible , nor aids combustion. It has more chances of pulmonary embolism.

Advantage

- The main benefit is it has minimal effect on acid- base balance.

Disadvantages

- Due to the poorly solublity in water , there is increased risk of subcutaneous emphysema .
- There is increased risk of venous gas embolism as it is less soluble in water as compared to carbon dioxide.
- It is readily diffusible due of its reduced density.

4. Argon

Argon gas has no color, no odour, is non combustible and chemically inert.

Advantage

- The acid base balance of the gas is the main advantage.

Disadvantage

- The main disadvantage is the propensity to cause cardiac depression.

Laproflattor

The electronic carbon dioxide Lapro flattor is used for controlled pressure insufflations to achieve the needed working space for surgery by causing the peritoneal cavity to distend and the hollow organs to collapse. Automatic insufflators helps to predetermine the pressure required and to check for leakage of gas by a fall in the pressure.

Suction Irrigation Machine

Suction And Irrigation Hand Apparatus

Irrigation and suction are most vital at the time of laparoscopic surgeries to sustain clear visual field and confirm established hemostasis. It is available in 5mm and 10mm sizes and can be reused. The suction irrigation apparatus is

commonly during surgery to maintain a clear field . Normal saline or ringerlactate my be used for irrigation purposes. Sometimes, heparinized saline is utilized to dissolve clots to enhance proper suction incase of increased bleeding.

Operative Hand Instruments

Both reusable and single use instruments are extensively available. Single use instruments have more superior performance and augmented safety in a single use. Reusable instruments are cost effective though they may require thorough cleaning and proper maintenance.

Sterlization of instruments

Sterlization of camera heads and the cable unit may be performed by several methods according to the manufacturer recommendations. The various methods used are gas sterilization (e.g, ethylene oxide),soaking in disinfectants like cidex or 100% alcohol, or by using the available chemical sterilization (eg ., the Steris system, which is a portable sterilization unit that uses peroxyacetic acid, steam, and pressure to sterlize a camera unit in 30minutes).

Complications

• Pneumoperitoneum related gas embolism, cardiovascular complications, subcutaneous emphysema.

• Intra operative vascular injuries, gastro intestinal injuries, Urinary tract injuries, visceral injuries associated during access.

• Electro surgical injuries.

Advantages of laparoscopy

- Short hospital stay, rapid post op recovery, less metabolic disturbances, lesser wound related complications, better cosmestic results.

Disadvantages

Mechanical restriction

- Limited degree of freedom of movement.
- Problems of organ retrieval and inversion and multiplication

Visual limitations

- Two dimensional imaging.
- Reduced field of endoscopic vision.
- Quality of video endoscopic system.

LAPAROSCOPIC TECHNIQUE

1) Pre-operative check list

When the patient is brought to the operating room, the surgeon should ensure that the insufflator is functioning and has continuous supply of gas and check whether the generator, light source and video equipment are in perfect working order. Once the patient is anaesthetized and prepared, the surgeon should be confident that all the equipment necessary for the surgery is present and functioning. Its more frustrating to discover that the light cable is not compatible or the telescope is not functioning or that incorrect electrical leads have been provided.

2) Anaesthesia

A general anaesthetic with muscle relaxation, endotracheal intubation and assisted respiration should be administered. Relaxation of the abdominal muscles facilitates the introduction and manipulation of the laproscopic instruments. Laparoscopy with carbon dioxide carries a risk of hypercarbia. Absorption ofCO_2 and splinting of the diaphragm both by the pressure of the pneumoperitoneum and the placing the patient in the Trendelenburg position aggravate the risk. It is for this reason thatendotracheal intubation and assisted respiration require continuous monitoring of the heart rate, blood pressure and blood gases.

3) Positioning of the Patient

The operating table should be capable of tilting in both axes. Normally diagnostic laparoscopy requires a 15degree Trendelenburg tilt but a steeper angle may be required for some operative procedures. Lateral tilting helps to expose the pelvic side walls and with advancements in laparoscopic surgery for surgeries on the ureters, kidneys and spleen. The patient should be placed in the supine position with the legs abducted and in a modified lithotomy position.

4) Preparation for laparoscopy

The abdominal wall should be cleaned with an antiseptic solution paying attention to the umbilicus. An assistant should wash the vulva and vagina, catheterize the bladder and apply a speculum to the cervix and insert a uterine cannula. The cannula should be long enough to reach the uterine fundus, to allow effective manipulation of the uterus and should have the capability for performing chromo pertubation.

5) Insertion of Veress needle

The surgeon should check the patency of the Veress' needle and its spring mechanism. It should be connected to the pneumoflator and the gas turned on so that the basal pressure in the system can be noted. Insufflation pressure

should not rise more than 5-10 mmHg above the basal pressure. The optimum site of insertion is deep, in the umbilicus because:

- The abdominal wall is thinnest in that position and is made of

skin, fascia and peritoneum with no intervening fat.

- The peritoneum is closely applied to the underlying fascia and

does not peel off as in other sites.

- The incision is cosmetic and often invisible within 2 – 3

weeks.

6) Operative technique

After establishment of the pneumoperitoneum, a standard three-trocar technique was used (10-mm optic via umbilical trocar and two 5-mm lateral trocars). A fourth 5-mm trocar was inserted in a few cases. The whole abdominal cavity was inspected carefully from the liver, gallbladder, anterior surface of the stomach and spleen. With fine smooth graspers, the structures can be touched safely and lifted for further inspection. The small bowel was also examined inspected thoroughly using them from the ligament of Treitz to the ileocaecal valve. The colon including the appendix was inspected. Finally, the gynecological organs and peritoneal surfaces were inspected. If adhesions were seen, they were dissected with a scissors. Electrocautery was used mainly

for hemostasis and as a dissection technique in some cases. The dissection was made close to the abdominal wall to avoid injury to the bowel loops.

7) Diagnostic procedures

The role of biopsy in laparoscopic surgery is primarily reserved for patients where a tissue diagnosis is required but could not be obtained with conventional methods. The liver and peritoneal surfaces are easily accessible. Other sites such as the retroperitoneum, lesser sac, and pelvis may require dissection for exposure. Peritoneal washings also be obtained during procedure.

Aspiration - Laparoscopy is helpful, mostly when the ascites is secondary to tuberculosis or carcinomatosis and the aetiology is obscure.

Tube testing – Tubal patency is tested by chromotubation by using

dilute methylene blue (1 : 20 solution). Tubal patency is required to identify cause of infertility in female of reproductive age group.

Staging - Laparoscopy is useful to stage several malignancies, including lymphoma, pancreatic, gastric and esophageal cancer.

8) Removal of secondary trocars

Before removing the secondary trocars, the abdomen is inspected carefully for bleeding or visceral injuries. All cannulas but one through which the laparoscope is passed should be removed under direct observation.

9) Deflation of Carbon dioxide

The patient in Trendelenburg position, with the sleeve of the trocar parallel to the anterior abdominal wall, the first puncture trocar is retrieved while holding the valve in the open position. When the valve is closed and the sleeve end is in close contact with small bowel or omentum, a vacuum is created that will suck the bowel into the sleeve. During retrieval of the trocar, the bowel ma get pulled through the fascia. This can may in necrosis and subsequent obsruction.

13) Removal of primary trocar

14) Port site closure

Cannula sites greater than 5mm should be closed, in order to prevent hernia formation. For maximum effectiveness, the suture should be full thickness including fascia, muscle and peritoneum. In one technique, the needle is driven in to the abdomen, grabbed by another instrument introduced through the wound and pulled outside. The needle end is threaded on the other end of the suture and then driven through the other edge into the abdomen, and pulled out like the first one. Both needles are then removed, and the ends of the suture are tied forming the knot in the abdomen. The loop is then rotated to pull the knot out through one side of the wound. The knot is cut and the suture retied to close the wound securely with the knot on the outside. A Keith needle or any other needle with a large turning radius can be used to traverse the fascia and the peritoneum. However it requires an additional port or the introduction o the laparoscopic needle driver to drive the needle from the inside.

15) Skin closure

The small abdominal incisions should be closed with non absorbable sutures which must be removed in 5 – 7 days. Alternatively, a subcutaneous absorbable suture can also be used

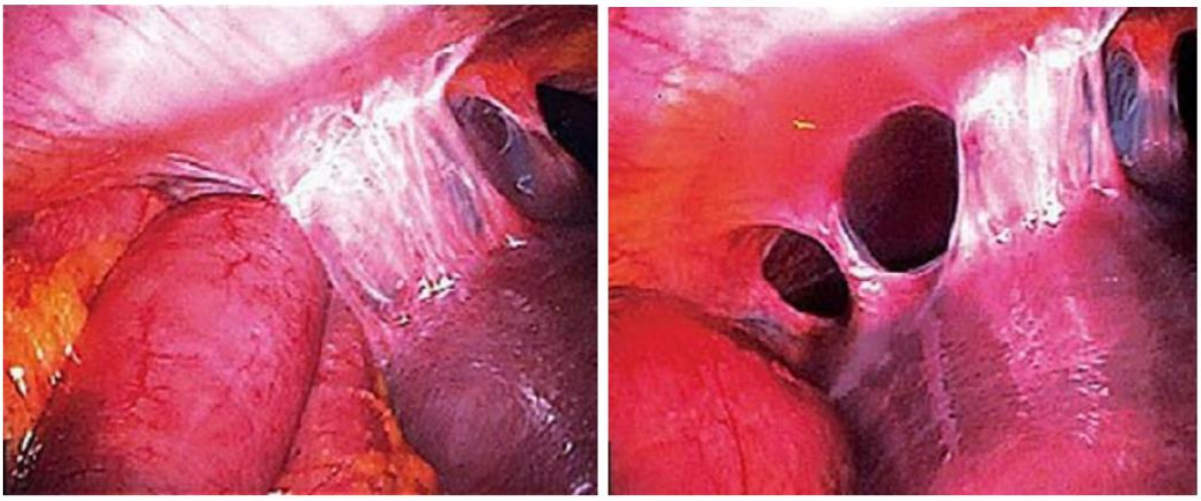


Fig 22 : Per operative Finding : Adhesions

Fig 23 : Per operative Finding : Strictures

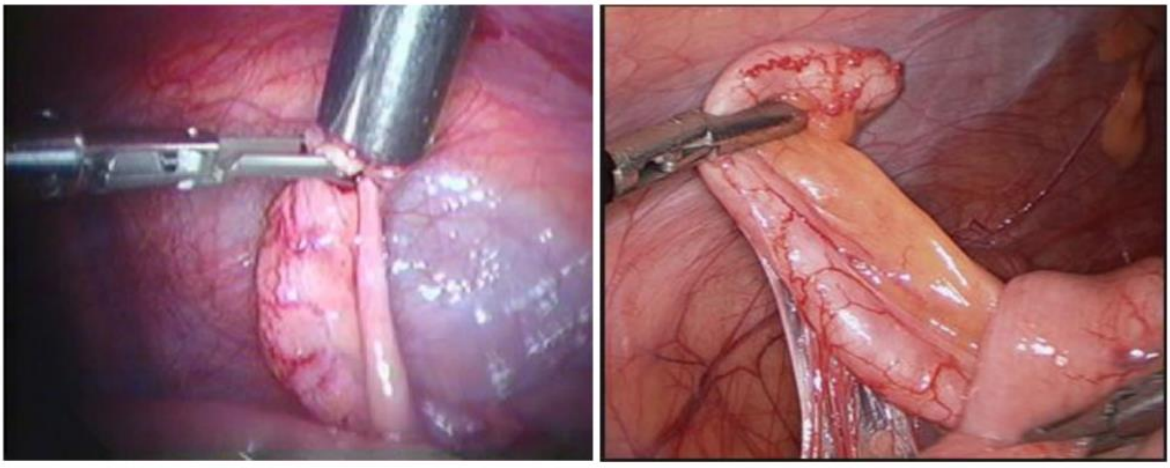


Fig 24 : Recurrent Appendicitis **Fig 25: Rec. Appendicitis With Adhesions**

METHODOLOGY

Materials and Methods

The study was conducted in the surgical wards of Chengalpattu medical college and hospital. The study group consisted of 30 patients admitted to the surgical wards of Chengalpattu medical college, Chengalpattu with pain abdomen of 3 month duration or more between march 2018 to feb 2019.a detailed history was taken from each of the patient as per proforma designed before the commencement of the study.the clinical examination findingwere also recorded in the proforma.the results were then tabulated.

The record data included particulars of the patient,duration of the illness,site of abdominal pain, other associated symptomssuch as vomiting,fever or white discharge per vagina, past history of surgical explorations, co morbidconditions, investigations. Subsequently the intra operative findings, therapeutic/diagnostic interventiondone,correlation of the intra operative findings with the histopathology report,complication during intra and post operative periodand the relief from the pain were recorded and analysed.

As a part of the workup of a patient the following investigation were done routinely.

- Hemoglobin estimation
- Bleeding time
- Clotting time
- Random blood sugar
- Total leucocyte count and differential count
- Serum electrolytes
- Blood urea
- Serum creatinine
- Urine for albumin, sugar and microscopic examination
- Electrocardiogram
- Ultrasonogram abdomen and Chest X Ray.

The other investigations listed below were done as and when indicated

Blood :

- Erythrocyte Sedimentation Rate
- Fasting blood sugar and post prandial blood sugar

Imaging:

- X Ray abdomen Erect
- Computerised tomograph of the abdomen

- Barium studies
- Esophago gastro duodenoscopy
- Colonoscopy

The following investigations will be done after taking written informed consent.

Inclusion criteria:

All cases of undiagnosed (by conventional methods and investigations such as detailed history, clinical examination, blood counts, urine examination, USG abdomen, Plain x ray abdomen) chronic abdominal pain >3 months duration of both sex.

All cases of undiagnosed chronic abdominal pain in patients >14 years of age.

Cases of clinically diagnosed chronic abdominal pain of >3 months duration not responding to the treatment given.

Exclusion:

All cases of undiagnosed chronic abdominal pain <3months duration of both sex.

All cases of undiagnosed chronic abdominal pain in patients <14year

All surgeries were carried out under general anaesthesia. All patients had a Ryle's tube inserted and bladder catheterized prior to anaesthesia Pneumoperitoneum was created using Hasson's technique. A 10mm umbilical camera port was inserted and two lateral 5mm ports depending on the organ of interest and the suspected pathology

The sites of port insertion varied depending on the presence or absence of previous abdominal surgery scars. Diagnostic laparoscopy of the abdomen was carried out carefully inspecting the entire visceral contents of the abdomen for any pathology. Starting from the liver, the gall bladder, anterior surface of the stomach, large intestine, entire length of small intestine with particular emphasis on appendix and terminal ileum, anterior surfaces of the retroperitoneal organs,uterus, fallopian tubes and ovaries and peritoneal surface.

Adhesions between the bowel loops or to the anterior abdominal wall was also looked for. The surgical procedure carried out were depending on the intra operative findings and as per indications which ranged from biopsy from suspicious lesions to adhesiolysis to appendectomy.
All the ports were closed using absorbable suture materials at the end of the procedure.

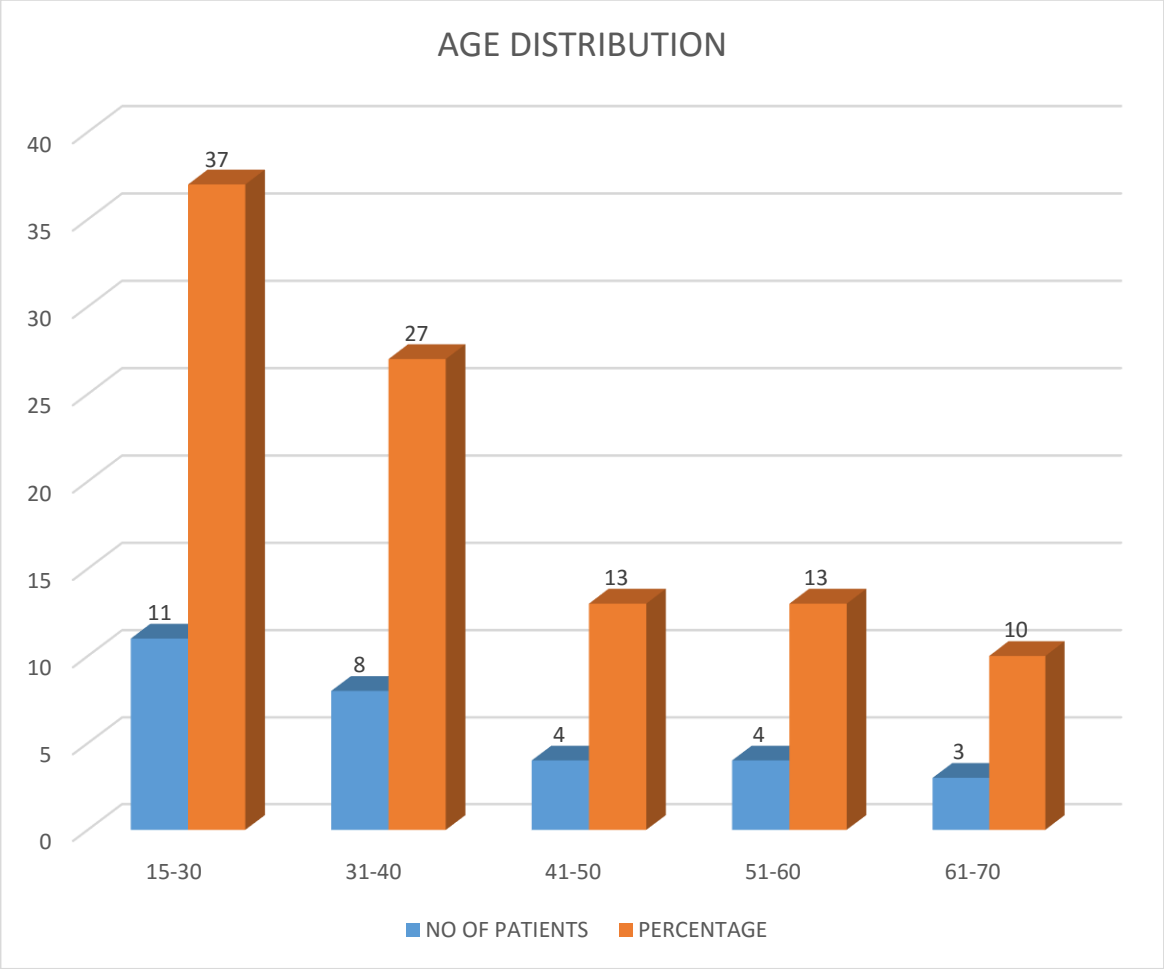
RESULTS

Age distribution:

Table 1: Age distribution of patients presenting with chronic pain abdomen

Age (in years)	No. of Patients	Percentage(%)
15-30	11	37
31-40	8	27
41-50	4	13
51-60	4	13
61-70	3	10
TOTAL	30	100

Graph 1:Showing age distribution



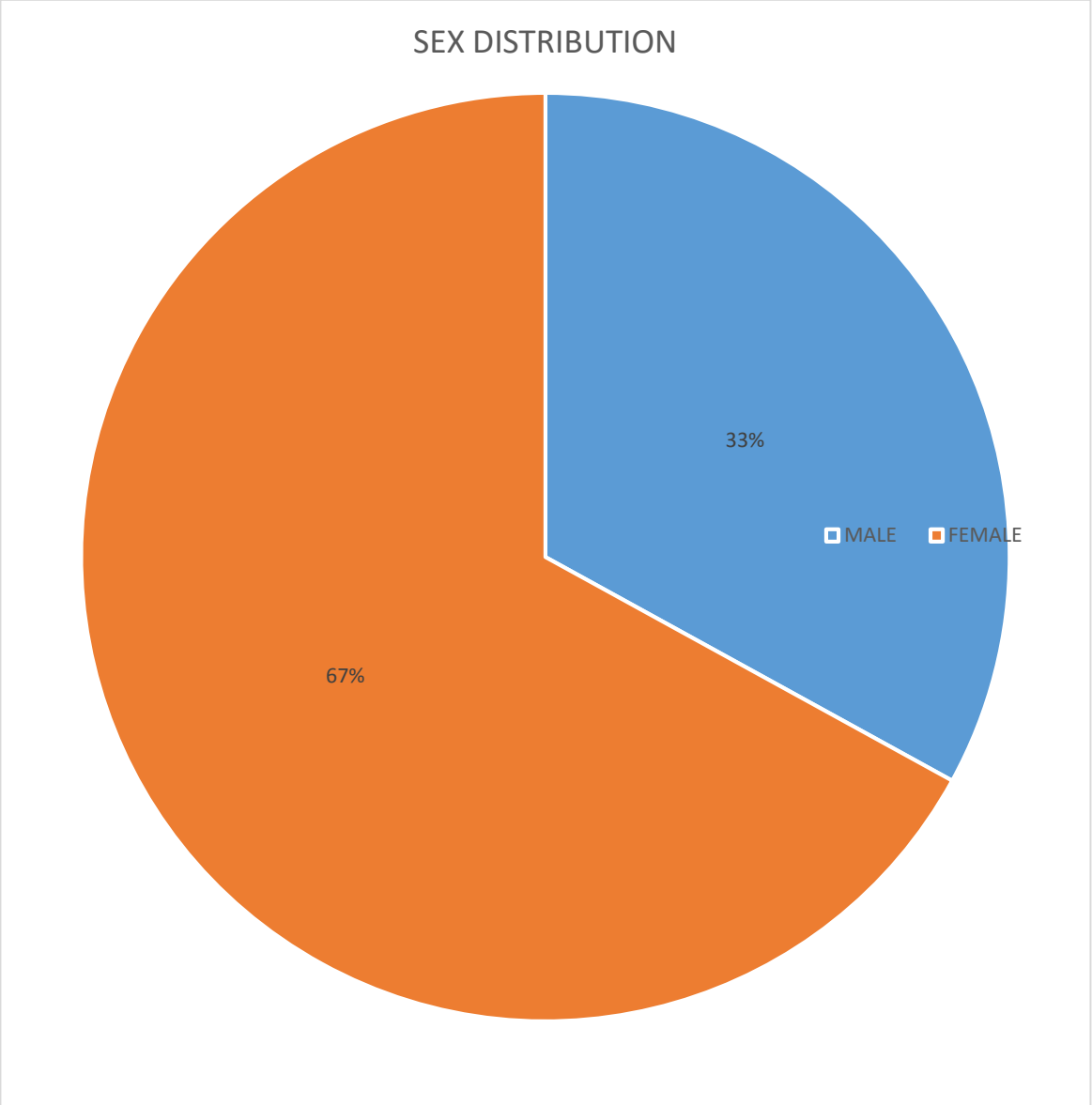
Our study of 30 patients with chronic pain abdomen showed a peak incidence of chronic pain abdomen in the third decade. The youngest patient in our study was 15 years and the oldest patient being 70 years. The mean age of Presentation was 36 years.

Sex Distribution:

Table 2: Sex Distribution Of Patients Presenting With Chronic Pain Abdomen

Sex	No. of cases	Percentage (%)
Male	10	33
Female	20	67

Graph 2:Showing Sex Distribution



our study of 30 patient show female preponderance to chronic pain abdomen (67%)

Table no 3: Duration of pain before laparoscopy:

Duration of pain (month)	No. of patients	Percentage(%)
3-6	15	50
7-12	8	27
13-18	5	17
19-24	1	3
>24	1	3

Graph 3: Duration Of Pain Before Diagnostic Laparoscopy

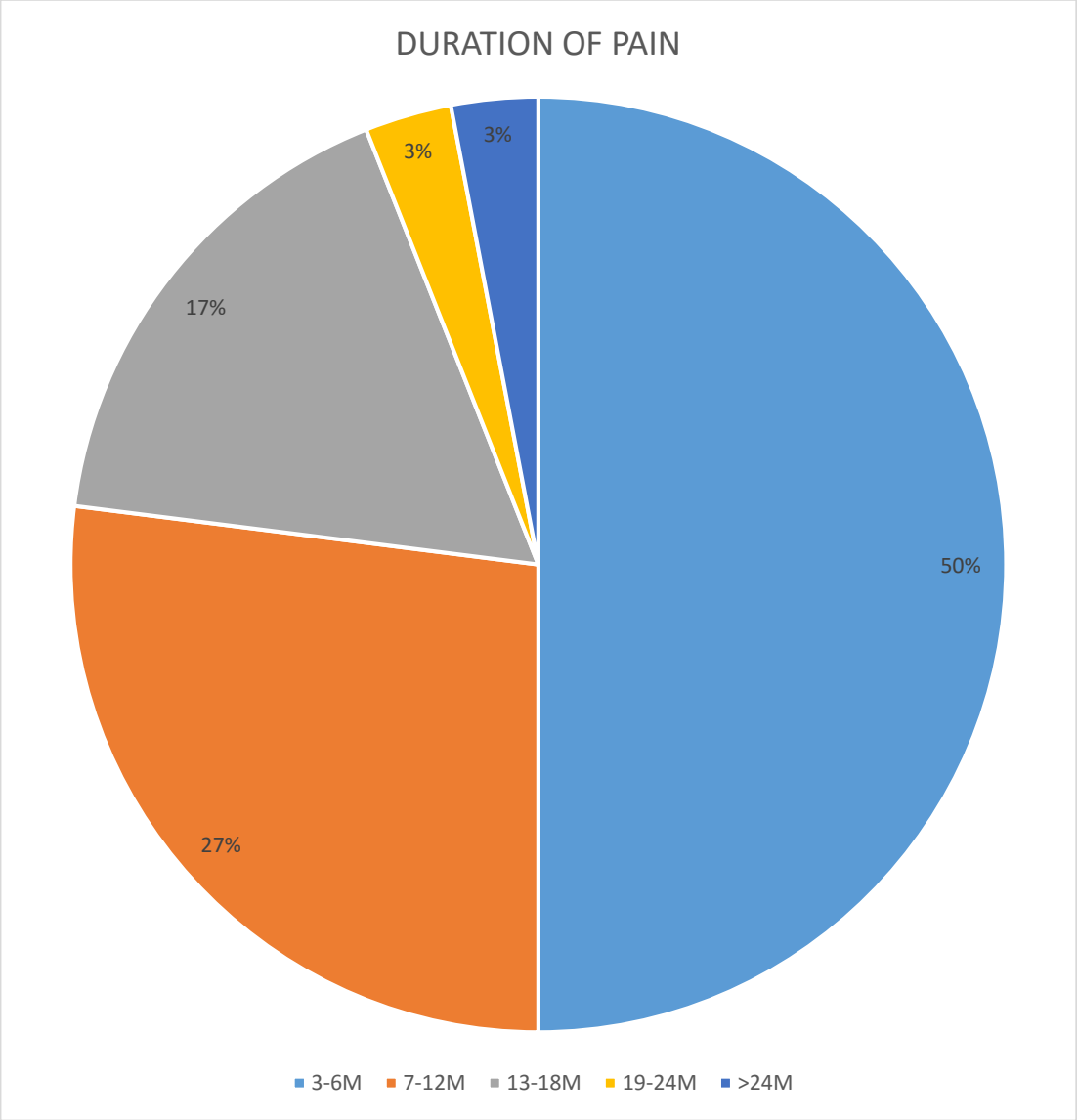


Table no 4: Location of Pain:

Region of pain	No. of patients	Percentage(%)
Upper abdomen	3	10
Peri umbilical	4	13
Lower abdomen	16	54
Diffuse abdomen	7	23

Graph 4:Showing location of pain

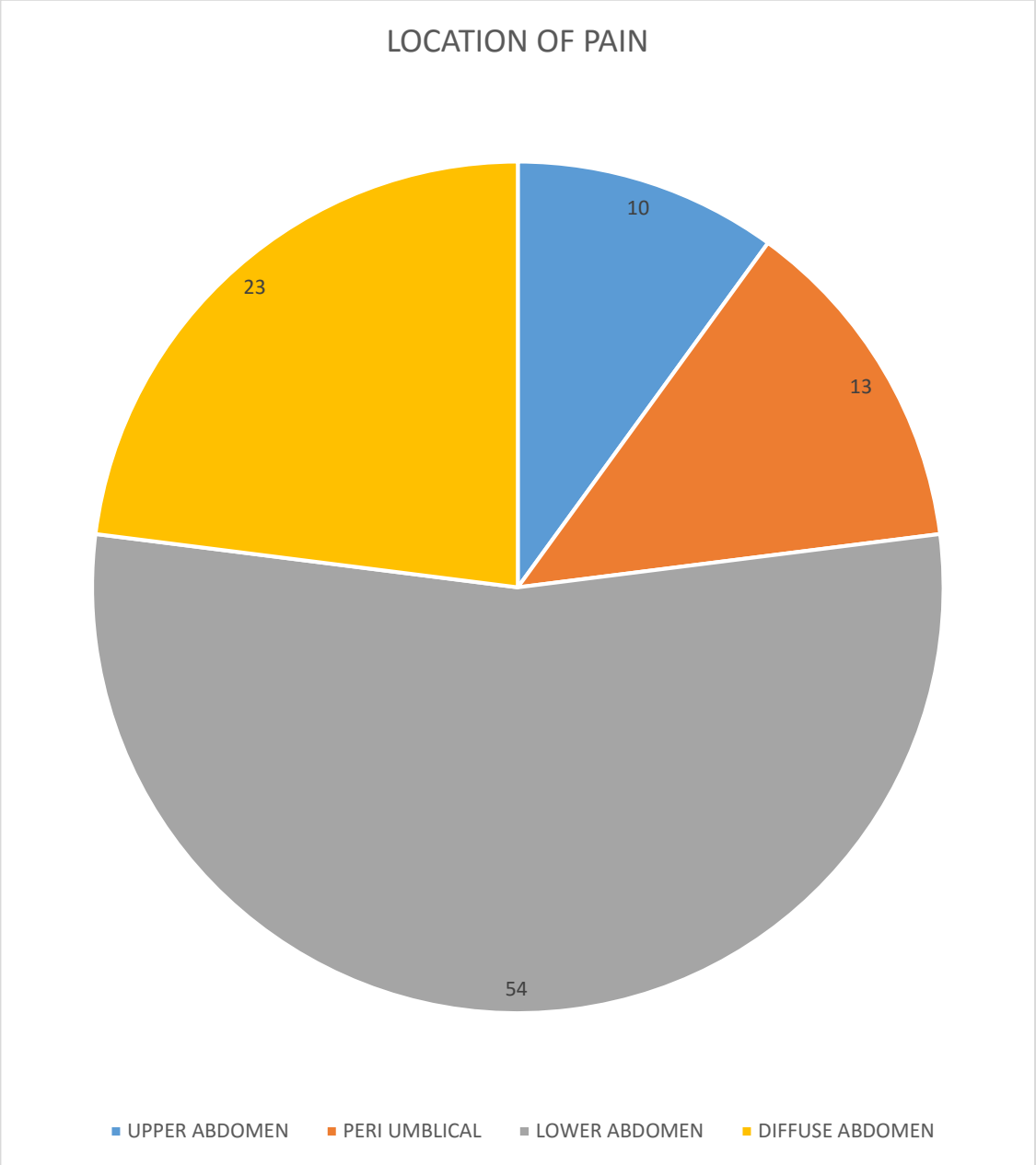
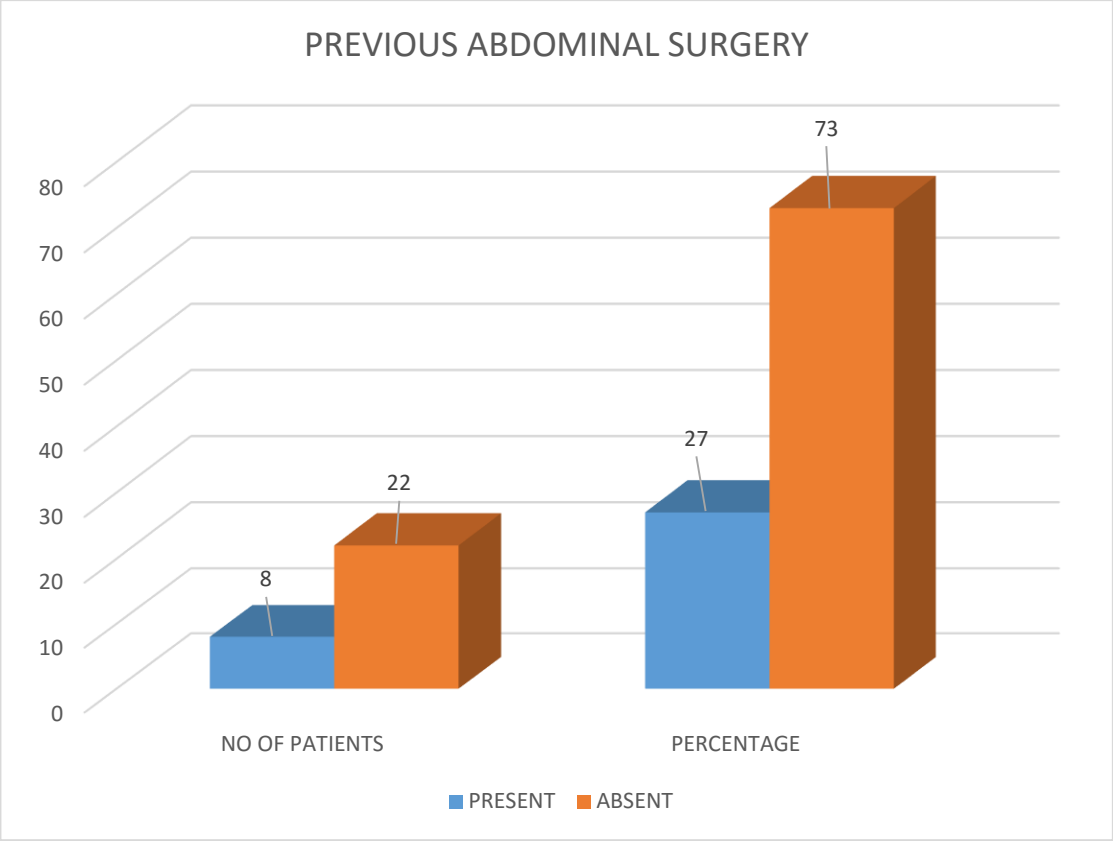


Table No 5: History Of Previous Abdominal Surgeries

History of surgery	No. of cases	Percentage(%)
Present	8	27
Absent	22	73

Graph 5:showing number of patients with history of previous abdominal surgeries.



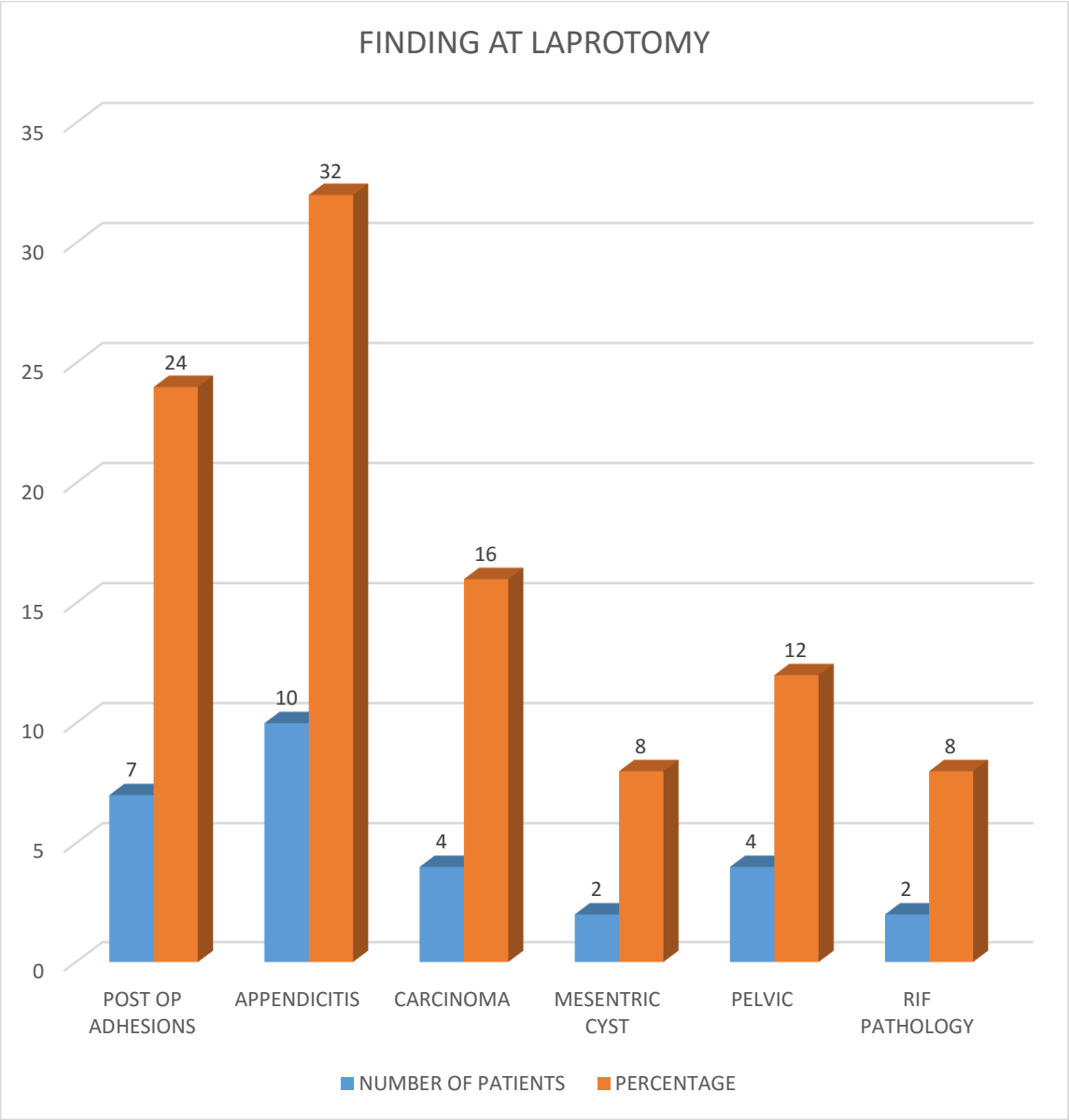
Around 8 (27%) of patients in our study had undergone a previous surgery compared to 22 (73%) of them without any history of abdominal surgeries.

Most of the patients had a previous history of tubectomy and subsequent adhesions.

Table No. 6: Findings at laparoscopy and intervention done

Diagnosis	**Procedure**	**No. of cases**	**Percentage(%)**
Post operative adhesion	Adhesiolysis	7	23
Appendicitis	Appendicectomy	10	34
Carcinoma	Laparotomy/ biopsy	4	13
Pelvic etiology	Conservative	4	13
Rif mass	Biopst/ATT	2	7
Mesenteric cyst	Conservative	2	7
Intussusception	Laparotomy	1	3

Graph 6:Showing findings at laparoscopy and treatment adopted



In our study of 30 patients, the most common finding was appendicitis , in 34% of patients. The appendices felt firm to palpate per operatively. Appendectomy was done in such patients. Subsequent histopathological examination confirmed our diagnosis in most of these cases.. The next most common finding at laparoscopy in our study was adhesion

(23%). most of the patients in this group were females and had a past history of abdominal surgery, tubectomy ,previous lscs in most cases. adhesiolysis was done in all the patients.

One of the patient in this group had adhesions between the appendix and the lateral abdominal wall. Adhesiolysis and appendectomy was done. HPE turned out to be chronic inflammation in the appendix and hence included in this group for statistical analysis. 4 patients were diagnosed with carcinoma per operatively. One of them being Carcinoma caecum and the other had peritoneal deposits whose biopsy turned out to be Adeno Carcinoma. Mesenteric lymph node biopsy was done in patient.

Diagnosis of tubercular strictures was made in 1 patient. This patient underwent resection and anastomosis of the long segment stricture and stricturoplasty for another short segment stricture by open method. Post operatively, he was started on anti tubercular drugs and the patient followed up. Histopathological examination confirmed tuberculosis.

Morbidity:

In most of our cases there was no post operative complications except in three patients who developed surgical site infection which was managed conservatively by appropriate antibiotic cover and alternate day wound

dressing. No mortality was encountered in our study group.

Duration of hospital stay:

Post operative hospital stay ranged from 4 to 11 days with a mean duration of stay of 6.8 days.

Duration of procedure:

The average length of the operative time was 67.14 minutes and two patients required conversion to an open procedure. Both the cases were converted due to technical difficulties.

Follow up:

During the follow up period, all patients were re-evaluated for pain. The patients were reviewed at one month and three months post operatively. Subjective
assessment of pain was done during the follow up and positive outcome (less pain or disappearance of pain) was noted and negative outcome (persistence of pain or worsening pain) was also noted. 5 patients were lost to follow up at the three month time frame.

Table No 7: Post Operative Pain Relief

Duration (in months)	Positive Outcome(%)	Negative Outcome(%)
At 1	85.71	14.29
At 3	70	30

DISCUSSION

Chronic abdominal pain is a common problem dealt not only by the general surgeon but by all practicing physicians. Even after extensive non-invasive work up of such patients, the exact cause of pain abdomen is seldom known.

The aim of our study is to study the efficacy of diagnostic laparoscopy as an investigative and therapeutic modality in the diagnosis and management patients with chronic pain abdomen. Diagnostic laparoscopy makes it possible for the surgeon to directly visualize the contents of the abdominal cavity better than any other investigative modality.

The study confirmed that in this difficult patient group, laparoscopy could safely identify abnormal findings and can improve the outcome in a majority of the cases. In this prospective study 30 patients were considered who were admitted in the Chengalpattu medical college and hospital , between march 2018 to febraury 2019. All patient had pain abdomen lasting for more than a period of 3 months.

Age and sex incidence

There were 10 males and 20 female patients in the study.the age group of patients in the study ranged from 15 to 70 years with the average age being 36 years. Male : female ratio was 1 : 2

Table No 8: Comparison of average age incidence

Study	**Average age in years**
Klingensmith et al15	39
Thanaponsathron et al 39	27.5
Raymond et al18	42
Gouda M El- Labban and Emad N Hokkam 40	36
Present study	35

In a study involving 34 patients by Klingensmith et al,15the majority were women (85%). The average age in their study was 39years (Range 21-75years).

In a study by Thanaponsathron et al,39 of 30 patients with chronic right lower quadrant pain, the average age was 27.5 years.

In a study by Raymond et al18 for utility of laparoscopy in chronic abdominal pain involving 70 patients, the average age was 42 years.

In a study by Gouda M El- Labban and Emad N Hokkam40 involving 30 patients, the average age of presentation was 36 years.

All the above studies show that the female sex was more commonly afflicted by chronic pain abdomen and the average age at presentation in our study is comparable with the aforementioned studies.

Pain Duration:

In our study, the duration of pain ranged between 3 months to 3 years.

In a study by Raymond et al18 of 70 patients, the duration of pain ranged from 3 months to 5 years.

In a study by Gouda M El- Labban and Emad N Hokkam40 involving 30 patients, the duration of pain ranged from 3 to 15 months.

Prior Surgery:

Table No 9: Comparison Of Past History Of Abdominal Surgeries

Study	**No. of patients with Prior surgery (%)**
Gouda M El- Labban and Emad N Hokkam 40	56.6
Kinnaresh Ashwin Kumar Baria 41	22
Present study	27

In our study of 30 patients, 8 patients had previous history of abdominal surgery.

In a study by Klingensmith et al15 involving 34 patients, most of the patients had previous history of abdominal surgery.

In a study by Gouda M El- Labban and Emad N Hokkam40 involving 30 patients,
17 had a previous history of abdominal surgery.
In a study by Kinnaresh Ashwin Kumar Baria 41 involving 50 patients, 11 of

them
had a past history of abdominal surgery.

Laparoscopic Diagnosis:

In our study comprising 30 patients, laparoscopy identified pathology in 28 patients
(93.3%)
No abnormality was found in the remaining patients (6.66%) who were just observed without any intervention.

Post operative adhesions:

Table No 10: Comparison Of Patients With Adhesions

Study	**No. of patients with adhesions (%)**
Lavonius M et al 17	63
Klingensmith et al 15	56
Present study	23.3

23.3% of the patients in our series were found to have intestinal adhesions secondary to a prior abdominal surgery, mostly tubectomy (in 4 patients). Some patients had a past history of appendectomy (in 1), hysterectomy (in 1) and one patient had a prior history of laparotomy for hollow viscous perforation. Adhesiolysis was done as a therapeutic procedure. Lavonius M et al17 in their study of laparoscopy for chronic abdominal pain in 46 patients reported post operative adhesions in 63% of cases. In a study by

Klingensmith et al15 involving 34 patients, 56% of them underwent adhesiolysis.

In a study by Vafa Shayani et al 42 involving 18 cases, laparoscopic adhesiolysis resulted in a 77.8% cure rate from chronic abdominal pain. In a study by Dunker S et al 43 laparoscopic adhesiolysis resulted in a positive outcome in more than 50% of patients.

Diagnostic Efficacy of Laparoscopy:

Table No 11: Diagnostic Efficacy of Diagnostic Laparoscopy

Study	**No. of patients**	**Diagnosis achieved (%)**
Raymond P et al18	70	85.7
Karl Miller et al14	59	89.8
Klingensmith et al15	34	65
Schrenk P et al45	92	87
Kinnaresh Ashwin Kumar Baria41	50	90
Andreollo et al46	168	86.3
Salky BA et al16	265	76
Gouda M El- Labban and Emad N40	30	83.3
Present study	30	93.3

The present study findings correlate well with other published studies.

Therapeutic efficacy of diagnostic laparoscopy:

Table No 12 : Therapeutic Efficacy

Study	**No. of patients**	**Efficacy (%)**
Klingensmith et al15	34	73
Vafa Shayani et al42	18	77.8
Miller K et al14	59	89.3
Kinnaresh Ashwin Kumar Baria41	50	94
Chao K et al47	41	78
Onders RP et al18	70	70
Paajnen et al4	35	>70
Present study	30	83

Therapeutic efficacy here denotes the percentage of patients who reported a positive outcome (no pain or decrease in pain) at the time of follow up. The efficacy of diagnostic laparoscopy achieved in the present study compares well with other previous studies

CONCLUSION

Laparoscopy has an effective diagnostic accuracy and therapeutic efficacy in the management of patients who present to us with chronic abdominal pain, especially in whom conventional methods of investigations have failed to elicit a cause for the pain.

Laparoscopy is safe, quick and effective modality of investigation for chronic abdominal pain.

Diagnostic laparoscopy has a high diagnostic and therapeutic efficacy. Ability to pin point a cause for the abdominal pain or exclude a more major cause for pain not only avoids further investigations but also plays a significant role in alleviating the fears in the minds of the patients. Not only does laparoscopy point to a diagnosis, it has the added advantage that therapeutic intervention can be done at the same sitting in most cases thus avoiding another hospitalization or another exploration of the abdomen.

Laparoscopy prevents unnecessary laparotomy in a significant number of cases.

Diagnostic laparoscopy has a definitive role in the management of patients with chronic pain abdomen and should be an important investigative tool in the armamentarium of all practicing surgeons.

SUMMARY

- This study involving 30 patients was conducted in the surgical wards of Chengalpattu Medical College, Chengalpattu from march 2018 to feb 2019.
- This study was undertaken to evaluate the efficacy of diagnostic laparoscopy as an investigative modality in patients presenting with abdominal pain of duration more than 3 months.
- All 30 patients underwent Diagnostic Laparoscopy under General anaesthesia after all the conventional investigations did not yield any diagnosis.
- 30 patients in the age group of 15 – 70 years were involved in the study with the average age of presentation being 36 years.
- 67% of the study population were females. 23% of the patients had duration of pain between 18 -36 months and 54% of them being in the lower abdominal region.
- 27% of the patients had a previous history of abdominal surgeries.
- The most common finding at laparoscopy in our study was appendicitis (33.6%). It was followed by adhesiolysis (23.3 %) and carcinoma in 13.3 %.
- 2 cases required conversion to laparotomy on technical grounds.
- Average duration of surgery in our study was 67.14 minutes

- The average duration of hospital stay being 6.9 days.
- There was no mortality in our study.
- Laparoscopy established the diagnosis in 93.3% of our patients.
- Therapeutic intervention done at the time of diagnosis relieved 83% of patients of their pain at the end of three months.

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PROFORMA

SERIAL NO **DATE**

NAME **AGE/SEX** **IP.NO**

ADDRESS **OCCUPATION** **INCOME**

COMPLAINTS :

1. PAIN ABDOMEN- Duration/No of attacks/site/radiation/ character
   Aggravating / relieving factors
2. FLATULENT DYSPEPSIA
3. NAUSEA & VOMITTING – Character, amount, frequency,
   Relation to food, relief of pain.
4. HEMATEMESIS & MALENA
5. JAUNDICE
6. BOWEL HABITS – Constipation/diarrhoea
7. APPETITE
8. FEVER
9. LOSS OF WEIGHT

PAST HISTORY : DM/HTN/PT/BA/IHD/EPILEPSY

PREVIOUS SIMILAR COMPLAINTS :

PREVIOUS ABDOMINAL SURGERY :

TREATMENT HISTORY

PERSONAL HISTORY

MENSTRUAL & OBSTETRIC HISTORY

GENERAL EXAMINATION

BUILT - GOOD / MODERATE/ POOR

NOURISHMENT - GOOD/MODERATE/MALNOURISHED/CACHEXIA

PALLOR EDEMA CLUBBING

CYANOSIS ICTERUS LYMPHADENOPATHY

PULSE BP TEMP RR

EXAMINATION OF THE ABDOMEN

INSPECTION

Contour – flat/scaphoid/distended

Skin - Scar/Sinus/engorged veins/visible pulsations/nodules

Umbilicus – site/shape

Movement with respiration

VGP/VIP/Visible mass

PALPATION

Tenderness

Mass if any

PERCUSSION

AUSCULTATION

PV/PR

OTHER SYSTEMS : RS/CVS/CNS

PROVISIONAL DIAGNOSIS :

INVESTIGATIONS :

1. ROUTINE – Blood Hb%, TC,DC,ESR. Sugar ,Urea, Creatinine

2. ECG

3. CHEST X - RAY

4. LFT

5. USG

6. CT ABDOMEN

MODE OF TREATMENT :

DIAGNOSTIC LAPAROSCOPY AND PROCEED.

ANAESTHESIA : GA / EPIDURAL / SPINAL

APPROACH : 10 MM I

II

5 MM I

II

III

THERAPEUTIC/DIAGNOSTIC

PROGRESS/FOLLOW-UP

COMPICATIONS - Wound infecton/Wound dehiscence/Port site hernia

S.No	Name	Age / Sex	I.P No	Pain			H/O Previous Surgery	Preop Diagnosis	Investigation			Procedure	Hospital Stay	Pain Relief At 3 Month
				Duration (Month)	Site	No Of Episodes			Usg	Ct	Endoscopy			
1.	Sathish	20/M	19375	3	PU	2	No	Appendicitis	N	N	N	Appendicectomy	3	Yes
2.	Chitra	32/F	17028	6	LA	>5	YES	Adhesion	N	N	N	Adhesiolysis	5	YES
3.	Sadhasivam	15/M	44875	3	LA	3	YES	? Postop Pelvic Collection	N	N	N	Conservative	7	YES
4.	Panchalai	65/F	23170	12	DA	>5	NO	Gist	N		GERD	RESECTION AND ANASTAMOSIS.	3	YES
5.	Tamilselvi	50/F	21143	6	LA	>5	NO	?Carcinoma Caecum	N	N	N	Biopsy	12	NO
6.	Vijay	17/M	714	3	LA	2	NO	Appendicitis	N	N	N	Appendicectomy	3	YES
7.	Usha	36/F	42745	15	DA	>5	YES	? Adhesion	N	N	N	Adhesiolysis	5	YES
8.	Jayakodi	45/F	29600	5	LA	>5	YES	Adhesion	N	N	N	Adhesiolysis	5	YES
9.	Jeenath Begam	33/F	35733	12	LA	>5	NO	Pid	N	N	N	Conservative	7	NO
10	Kousik	18/M	33607	3	PU	3	NO	Appendicitis	N	N	N	Appendicectomy	5	YES
11	Jeganathan	53/M	21903	5	UA	>5	NO	Ileal Mass	N	N	N	RESECTION AND ANASTAMOSIS	5	YES
12	Manimegalai	35/F	26830	7	LA	>5	NO	Rif Mass	N	N	GERD	Biopsy	6	NO
13	Karuppaiye	60/F	8322	3	LA	3	NO	Sealed Appendicular Perforation	N	N	N	Appendicectomy	7	YES
14	Nirmala	30/F	65165	24	DA	>5	YES	Adhesion	N	N	N	Adhesiolysis	5	YES
15	Suresh	33/M	16990	4	LA	3	NO	Appendicitis	N	N	N	Appendicectomy	3	YES
16	Vijayalakshmi	36/F	31263	9	LA	4	YES	Adhesion	N	N	N	Adhesiolysis	5	YES
17	Moses	20/M	29918	4	PU	3	NO	Appendicitis	N	N	N	Appendicectomy	4	YES
18	Shanthi	42/F	41770	13	DA	>5	NO	Mesenteric Cyst	N	N	N	Conservative	7	YES
19	Prasath	27/M	48688	4	LA	2	NO	Appendicitis	N	N	N	Appendicectomy	9	YES
20	Indhumathi	26/F	67851	3	LA	4	NO	Appendicitis	N	N	N	Appendicectomy	5	YES
21	Devaki	40/F	38257	9	UA	>5	YES	Rif Mass	N	N	N	Biopsy	8	NO
22	Nathiya	28/F	54266	36	LA	>5	NO	Adhesion	N	N	GERD	Adhesiolysis	5	YES
23	Salsa	36/F	15378	8	DA	3	NO	Mesenteric Cyst	N	N	N	Conservative	7	NO
24	Alima Bee	58/F	16426	12	DA	2	NO	Intussusception With Intraluminal Lipoma	N	N	N	Laparotomy	12	YES
25	Radha	48/F	38020	16	LA	>5	NO	Ovariyan Cyst	N	N	N	Conservative	8	YES
26	Ashika	20/F	31931	3	PU	3	NO	Appendicitis	N	N	N	Appendicectomy	4	YES
27	Vaideki	18/F	4094	4	LA	4	NO	Appendicitis	N	N	N	Appendicectomy	5	YES
28	Krishnan	75/M	1931	7	LA	>5	NO	Lif Mass	+	+	N	Laparotomy	21	YES
29	Anjalai	70/F	32413	12	UA	>5	NO	? Hepatic Cyst	N	+	N	Conservative	12	YES
30	Maniyan	60/M	17916	18	DA	>5	YES	Adhesion	N	+	N	Adhesiolysis	16	YES