"INTRA-ABDOMINAL ADHESIONS: A PROSPECTIVE OBSERVATIONAL STUDY OF THE INCIDENCE, PERITONEAL ADHESION INDEX (PAI) BASED DISTRIBUTION & SEVERITY IN A TERTIARY CARE HOSPITAL"

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2/1/23

Dr. Shrishail C. Metgud, MS
Professor & Head,
Department of General Surgery,
J. N. Medical College,
Belagavi

Date:
Place: Belagavi

Dr. N. S. Mahantshetti, MD
Principal,
J. N. Medical College,
Belagavi

Date:
Place: Belagavi

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Nehru Nagar, Belagavi- 590 010, Karnataka, INDIA

0831 - 2471350 0831 - 2470759 www.jnmc.edu principal@jnmc.edu

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To,
Reg. No. BH0120003,
Postgraduate Student,
2020-21 Batch,
Department of General Surgery,
J. N. Medical College, Belagavi.

ETHICAL CLEARANCE CERTIFICATE

K.L.E. ACADEMY OF HIGHER EDUCATION AND RESEARCH
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Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
Website: http//www.jnmc.edu
E-Mail : dome@jnmc.edu
Phone: (+ 91-(0)831 Office : 2472550
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ \10 **Date: 25/01/2021**

To.
REG NO: BH0120003
PG student in Surgery,
J.N.Medical College,
BELAGAVI.

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(Dr. Smita Sonoli)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Harsha Hegde)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

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LIST OF ABBREVIATIONS

BP	-	Blood pressure
LSCS	-	Lower (uterine) Segment Caesarean Section
PAA	-	Plasminogen-Activation Activity
PAI	-	Peritoneal Adhesion Index
ROS	–	Reactive Oxygen Species
tPA	-	Tissue plasminogen activator
ECM	-	Extra Cellular Matrix
FDA	-	Food and Drug Administration
IE	-	Inadvertent Enterotomy
IPOM	-	Intraperitoneal Onlay Mesh
MMT	-	Mesothelial to Mesenchymal Transition
VEGF	-	Vascular Endothelial Growth Factor
MMP	-	Matrix Metalloproteinases
CT	-	Computerised Tomography
TAPP	-	Trans Abdominal Pre-Peritoneal
TEP	-	Totally Extra Peritoneal
B/L	-	Bilateral
VAS	-	Visual Analogue Scale
IVC	-	Inferior Vena Cava
SMP	-	Splanchnic Mesodermal Plate

ABSTRACT

Background

Abdominal surgeries may result in random and unpredictable adhesion formation. Diagnostic laparoscopy can help clarify the cause-and-effect relationship between intra-abdominal adhesion, pain abdomen, and other predisposing factors.

Aims & Objectives

The study's objectives are to investigate the incidence of abdominal adhesions and grade them using the Peritoneal adhesion index (PAI). Furthermore, to identify risk factors for their formation and symptoms associated with their presence and any resolution of symptoms post adhesiolysis.

Materials & Methods

Patients admitted to KLES Dr.Prabhakar Kore Hospital & MRC, Belagavi and undergoing elective Laparoscopic Surgery above 18 years were enrolled. It is a study conducted between Jan-Dec 2021. Intraoperative videos were analyzed after clinical examination on admission to document adhesions. At postoperative days 1, 15, and 180 days, an assessment of pain at the site of adhesions was noted and compared with the pre-operative pain. The adhesions were graded using Peritoneal Adhesion Index (PAI). Various risk factors for adhesion formation and symptoms associated with their presence were studied.

Findings

Some intriguing observations of the study are:

- Pain abdomen is the dominating symptom of adhesions.
- Patients with a complaint of bloating are more likely to have adhesions
- A higher number of surgeries leads to adhesions.

- LSCS seems to be the highest risk factor, followed by tubectomy. In general surgery, open appendectomy is a significant risk factor.
- Reduction of the puckering of a puckered scar is seen after adhesiolysis.
- Hypertension, Diabetes and anaemia lead to more probability of adhesions
- Surprisingly, subjects with hypothyroidism are seen to develop fewer adhesions.
- Post-adhesiolysis, less postoperative pain and faster recovery are observed.

Interpretation

Abdominal adhesions result from surgeries. They also have a definite correlation to age, gender, pain abdomen, bloating, number of previous surgeries, and comorbidities like hypertension, Diabetes, Hypothyroidism, and Anaemia.

This higher prevalence of adhesions in the sample population may be attributed to the fact that: the hospital where the study was conducted is a Tertiary Care Hospital, where typically complicated cases and referral cases are operated. Moreover, laparoscopy, where laparoscopic procedures were performed for many other causes and not just as a diagnostic purpose.

We also hypothesised that adhesions are causing localised peritoneal pain, and diagnostic laparoscopy can help clarify the cause-and-effect relationship between intra-abdominal adhesion and pain abdomen. The preoperative pain was also hypothesised to be due to adhesions in that area due to which the peritoneum (as it is innervated) is pulled by the viscera. We found that our study has strengthened this hypothesis.

PAI scoring system has given valuable input to location and possibly the type of earlier surgeries the patient has gone through. Appendicectomy is our study's most common surgery that gives rise to abdominal adhesions.

Our studies also observed that the pain was high soon after the surgery (for example, post-op day 1) in patients with adhesions, and adhesiolysis was performed. The more severe pain is possibly due to trauma of adhesiolysis and mesothelial injuries. The pain has drastically reduced by post-op day 15 and is comparable to those without adhesions.

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INTRODUCTION

Abdominal surgeries result in random and unpredictable adhesion formation. As much as 75% of all occurrences of acute small intestinal obstruction may be attributed to adhesions that formed after surgery(1). The goal of diagnostic laparoscopy is to diagnose disease by visually inspecting abdominal organs with a small incision(2). After inserting the laparoscope into the abdomen, the surgeon is able to see the patient's whole internal organ system on the display, including the liver, stomach, intestine, gallbladder, spleen, peritoneum, and pelvic organs. Essentially every laparoscopy is also a diagnostic laparoscopy.

In open surgeries, all the organs are not completely visible. We can only see the organs exposed by the incision since they need to be handled during the surgical procedure to make them visible correctly, which can lead to an increased risk of adhesions. However, in laparoscopy, all the quadrants of the abdomen can be visualised.

Bands of fibrous tissue, known as adhesions, often occur between various tissues and organs in the abdomen. Slick surfaces on internal organs and tissues keep them from rubbing against one another while the body moves. Having abdominal adhesions may lead to the improper joining of the abdominal viscera. Intestinal obstruction occurs when the small or large intestine is twisted, kinked, or pulled out of its normal plane, preventing the bowels from moving normally or partially.

The medical literature lacks a clear description of adhesions or a recognised standardised categorization for accurate evaluation of their source, extent, and severity, making intra-abdominal adhesions an under-researched issue. The main reasons why peritoneal adhesions have yet to be given much attention in the medical literature are the absence of effective prevention and clinically focused

recommendations for the diagnosis, therapy, and choices for reducing adhesions. Patients, doctors, and healthcare systems may all suffer severely from intra-abdominal adhesions. However only a small percentage of the population is aware of this problem.

Adhesions are not always easy to spot with current imaging technology or in the lab since they lack any defining characteristics. Medical professionals face a diagnostic and therapeutic conundrum when intra-abdominal adhesions are present yet go undetected for extended periods of time. Extensive non-diagnostic testing and reliance on hunches might leave patients with prolonged symptoms and unfavourable medical outcomes. Still, they may experience severe mental suffering or despair that is misdiagnosed as depression, anxiety, or a functional bowel problem(3).

Intraperitoneal adhesions are a leading cause of small intestinal obstruction, ectopic pregnancy, and secondary female infertility, making them a significant contributor to overall morbidity. Potentially also contributes to persistent gastrointestinal and pelvic discomfort.

Abdominal adhesions are often considered a cause of pain abdomen, especially in patients who have had previous surgeries. However, this correlation is controversial. We hypothesise that adhesions are causing peritoneal pain at the site. So, diagnostic laparoscopy can help clarify the cause-and-effect relationship between intra-abdominal adhesion and pain abdomen.

REVIEW OF LITERATURE

3.1 Anatomy of the Peritoneum

The peritoneum is a thin layer of serous membrane that lines the inside of the abdomen. It's thin and double-layered, with 50–100 ml of serous fluid in the potential space between the layers to eliminate friction and enable the layers and organs to glide easily.(4) The peritoneum has a strong membrane because of its fibrous outer layer, which may be seen in a histological section. To facilitate smooth motion of the viscera, a layer of mesothelial cells produces a serous fluid that coats and lubricates the surfaces (Figure 3.1). The peritoneum provides structural integrity to the organs of the abdomen and allows for the free flow of blood, nerves, and lymphatics. The outer layer, called the parietal peritoneum, is attached to the walls of the abdomen and pelvis. The innermost layer of the peritoneum, the visceral peritoneum, encloses the intraperitoneal space and protects the organs inside it. (Figure 3.2) The peritoneum may line intraperitoneal or retroperitoneal structures.(5)

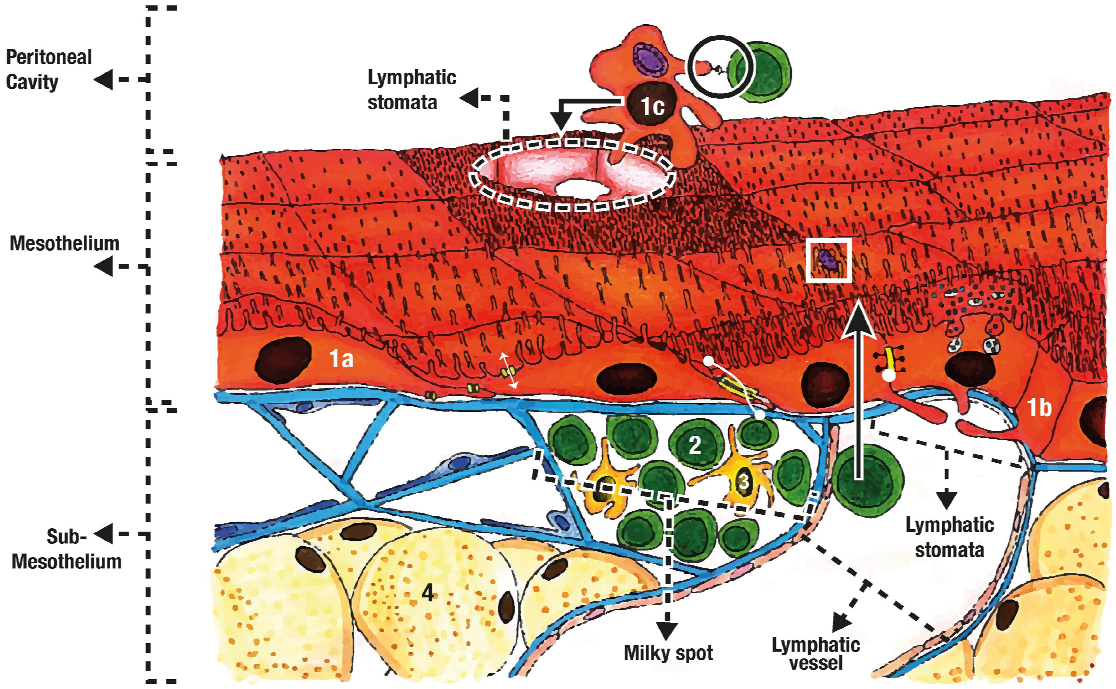


Figure 3.1: Structure and function of mesothelium. In the mesothelium, you'll find both cuboidal mesothelial cells (1b) and flat mesothelial cells (1a) (1b). Aquaporins facilitate water transport (white arrows with two tips), zonula occludens (white dotted arrows) and tight junctions (white dots) provide structural integrity and selective barrier function, respectively. Besides acting as a barrier, the mesothelial cell may also detach (1c), phagocyte, and present antigen (black circle) to stimulate the immune system. Milky patches are mostly lymphocytes (2), and macrophages may be detected in the sub-mesothelium, which also houses the basal membrane, connective tissue, and adipocytes (4). (3).

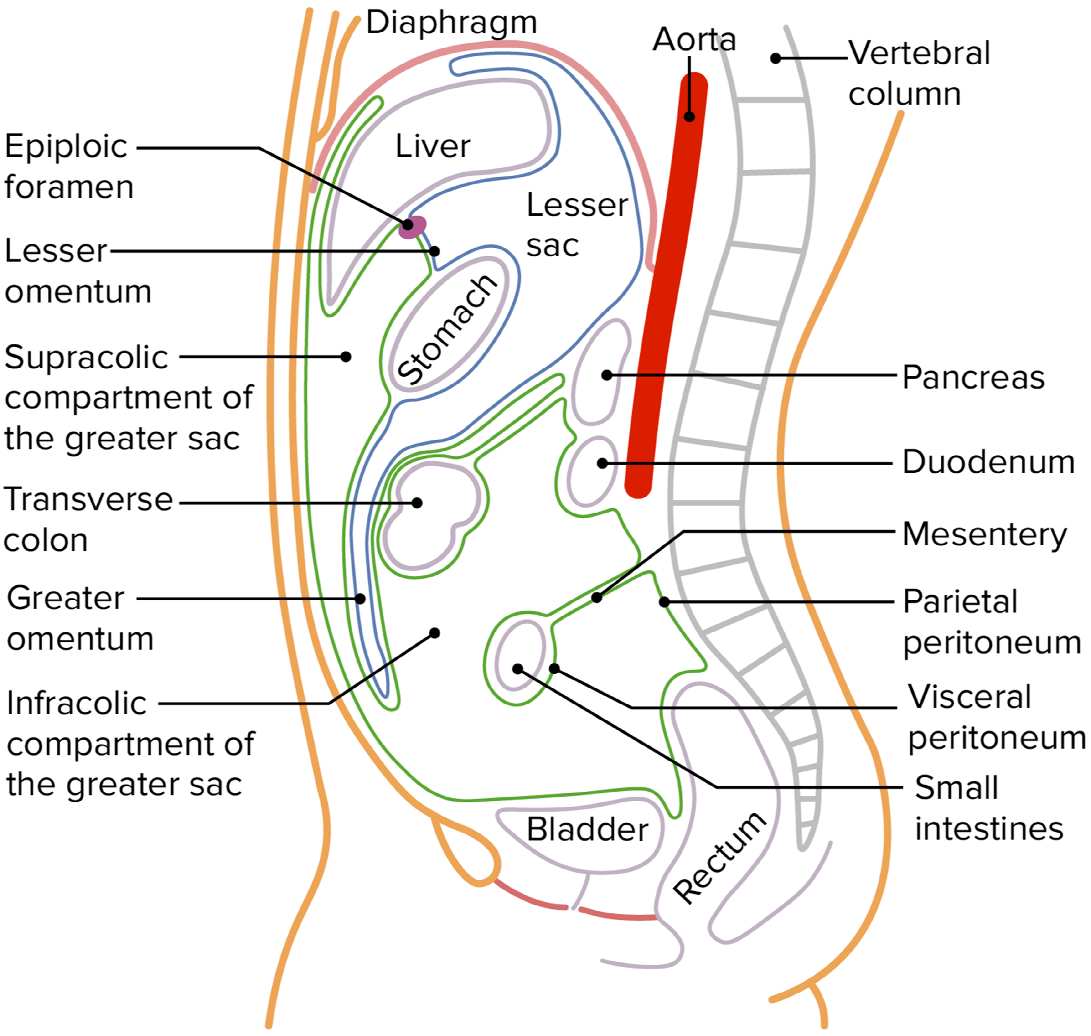


Figure 3.2: Sagittal view of abdominal cavity.

3.1.1 Structure and Function

The peritoneal cavity is bounded by :

- Anteriorly - abdominal muscles
- Posteriorly – Vertebrae
- Inferiorly - Pelvic floor
- Superiorly – Diaphragm

Both the superficial parietal and the deep visceral layers make up the peritoneum. The abdominal viscera are held in place by the omentum, ligaments, and mesentery, which create the folds of the peritoneum that make up the peritoneal cavity.

Organs located inside the abdominal cavity include

- Stomach
- Liver (except the caudate lobe, which is referred to as the Bare area, formed when the part of the peritoneum covering it has undergone zygosis)
- Spleen
- The beginning and end of the Duodenum
- Jejunum
- Ileum
- Transverse Colon
- Sigmoid Colon

The peritoneum is encased in a posterior sheath, which conceals the retroperitoneal organs. As they develop and persist beyond the parietal peritoneum, some of them are categorized as primarily retroperitoneal (like the oesophagus, rectum and kidney). (Figure 3.2)

During development, the mesenteries of the secondary retroperitoneal organs merge with the posterior abdominal wall, transforming these organs from the peritoneal cavity into the retroperitoneal region (like the ascending and descending colon).

The epiploic foramen is a key opening into the peritoneal cavity (foramen of Winslow). As a result of this foramen, the greater sac and lesser sacs communicate.

Its boundaries are

- Caudate lobe of the liver, located superiorly
- The first part of the duodenum inferiorly
- There is a ligament connecting the liver, and the small intestine anteriorly called the Hepatoduodenal ligament (consisting of the portal triad, i.e. the hepatic artery, common bile duct & portal vein)
- Inferior vena cava (IVC) and right suprarenal gland, located posteriorly

Suppose a surgeon has to clamp the hepatoduodenal ligament to halt bleeding (a procedure known as The Pringle manoeuvre) or needs anatomical access to the lesser sac. In that case, they can do so through the foramen. Also, the lesser sac hernia occurs through this opening.(5) (Figure 3.3)

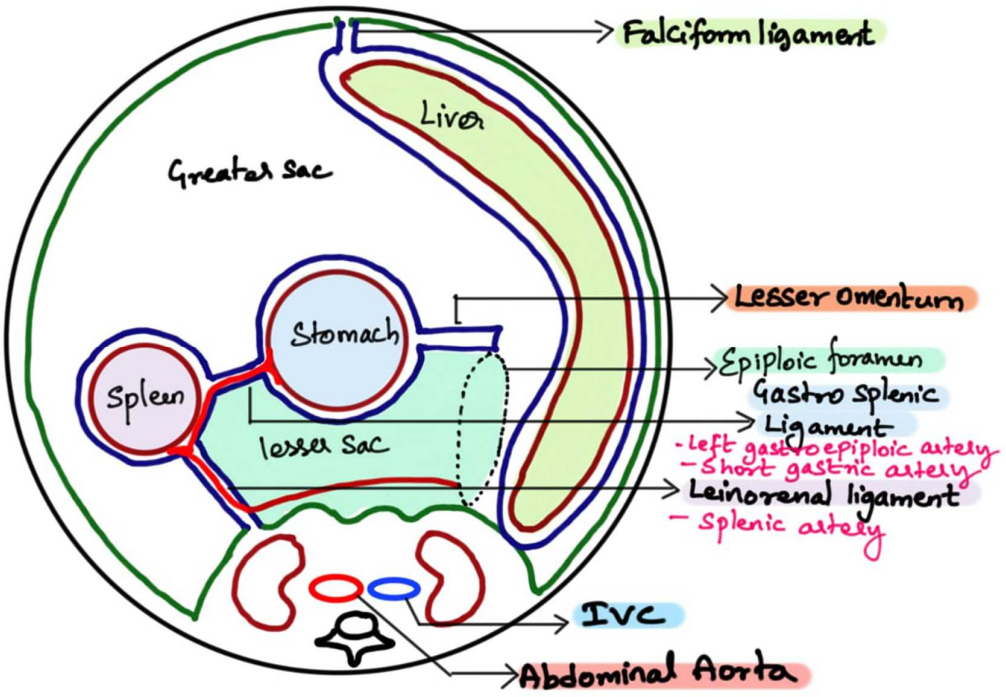


Figure 3.3: Axial view of abdominal cavity at the level of epiploic foramen.

The folds of the peritoneum:

- The stomach's greater curvature, which folds over and lays anterior to the intestine before folding back superiorly to connect to the transverse colon, provides a slack attachment point for the greater omentum. Because it may go to the location of diseased viscera or the surgical disruption and operate as a protective and insulating layer there, it is often referred to as the abdominal Policeman.
- Each mesentery includes the organ's blood vessels, nerves, and lymphatics and serves to link the organ to the abdominal wall. Only the mesentery of the small intestine is simply called a mesentery; the other mesenteries are given names that reflect the organ(s) they serve. Thus, the mesentery of the appendix is called a

mesoappendix, and the transverse and sigmoid colons are called the transverse and sigmoid mesocolon, respectively.

Organs within the peritoneal cavity can move around, while those located in the retroperitoneum are usually anchored to the body's posterior abdominal wall.

3.1.2 Embryology

The peritoneum, which originates in the mesoderm, plays a key role in maintaining the proper position of the primitive gut tube as it develops. To be more specific, the somatic mesoderm gives rise to the parietal peritoneum, whereas the splanchnic mesoderm gives rise to the visceral peritoneum. It aids in maintaining the oesophagus's suspended position by way of the ventral and dorsal mesenteries. Attaching the anterior and posterior abdominal walls, the mesenteries are peritoneal extensions. The portal triad is housed in the gastrohepatic ligament and the hepatoduodenal ligament (or the lesser omentum), both of which emerge from the ventral mesentery and both of which play an important role in the prevention of haemorrhage in the case of trauma. The dorsal mesentery is responsible for anchoring the midgut and foregut to the posterior abdominal wall by way of the gastrosplenic ligament and the greater omentum.(6,7)

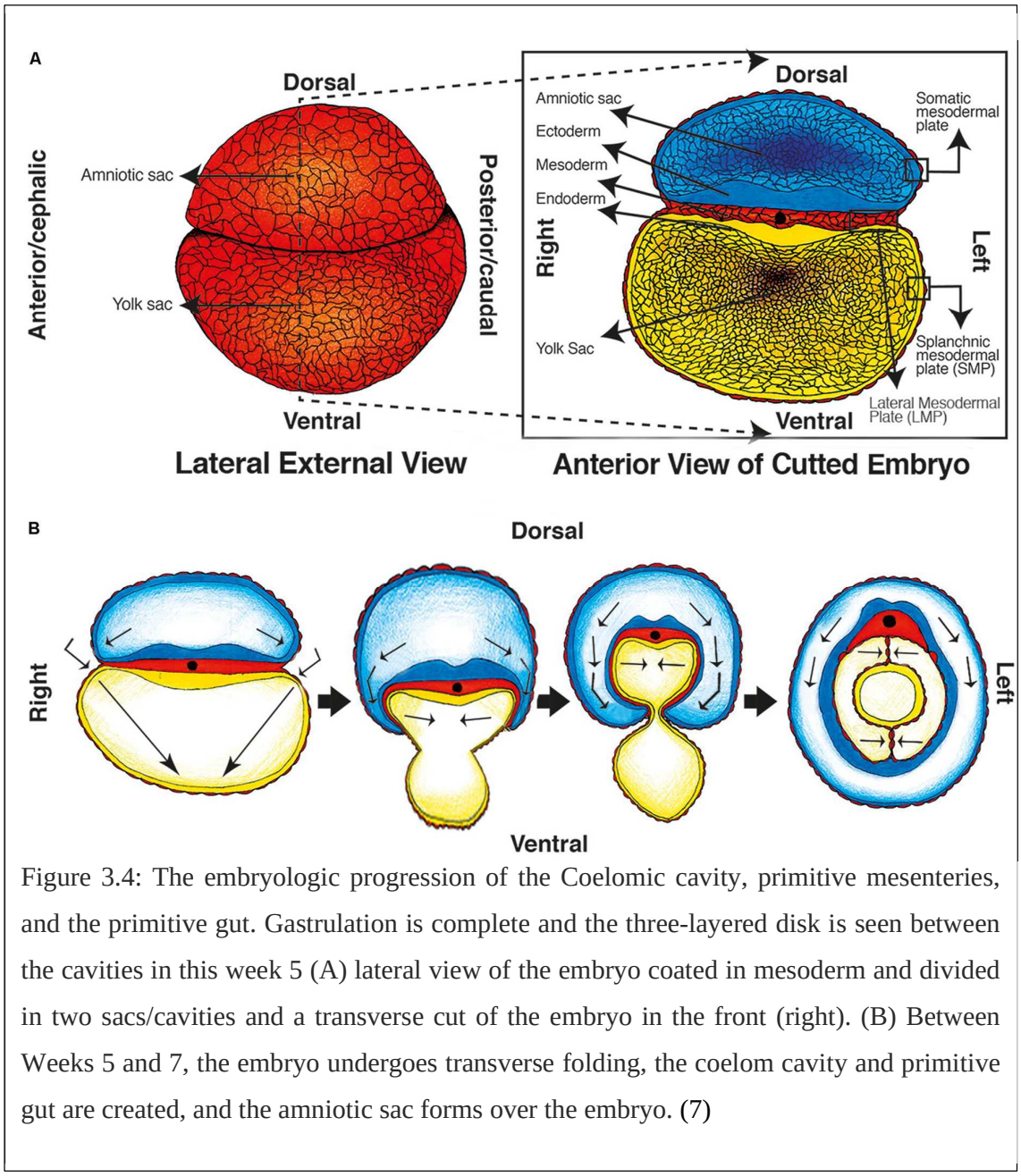


Figure 3.4: The embryologic progression of the Coelomic cavity, primitive mesenteries, and the primitive gut. Gastrulation is complete and the three-layered disk is seen between the cavities in this week 5 (A) lateral view of the embryo coated in mesoderm and divided in two sacs/cavities and a transverse cut of the embryo in the front (right). (B) Between Weeks 5 and 7, the embryo undergoes transverse folding, the coelom cavity and primitive gut are created, and the amniotic sac forms over the embryo. (7)

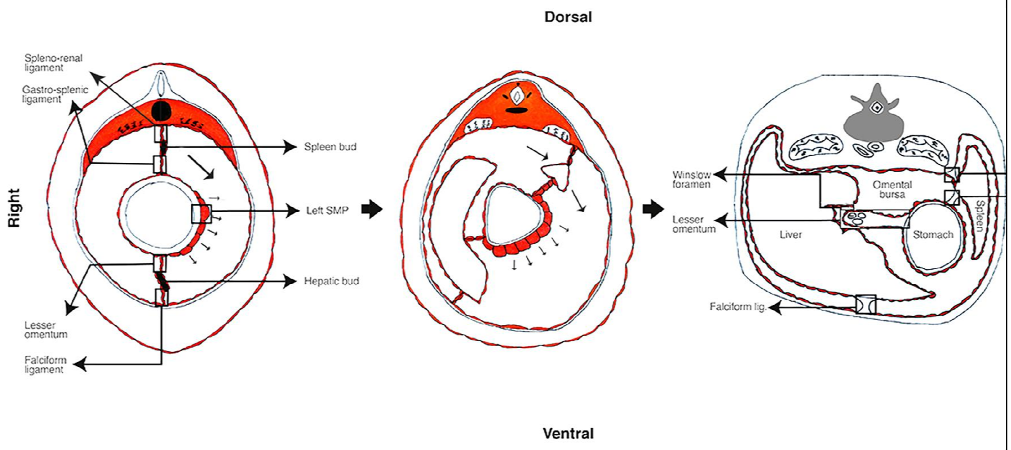


Figure 3.5: Primitive mesentery differentiation. The left-right asymmetry begins approximately at embryologic 9.5 days of development. The left SMP differentiates and interacts with the foregut that outgrows to the left, and the spleen bud begins differentiating and moves to the left, pushing the liver in formation to the right. During this period, the primitive mesenteries differentiate into hepatic and spleen buds, ligaments and the lesser omentum. (7)

3.1.3 Blood Supply and Lymphatics

The visceral peritoneum is supplied by the inferior mesenteric artery and the superior mesenteric artery. The abdominal wall is the source of blood flow to the parietal peritoneum, which also gets blood from the intercostal, epigastric, lumbar, and iliac arteries. Both the visceral peritoneum and the parietal peritoneum have their own venous drainage systems, but the former empties into the portal vein and the latter into the inferior vena cava.(8)

3.1.4 Nerves

Clinical relevance necessitates a complete comprehension of peritoneal innervation. It's important to note that the peritoneum is both somatically and autonomically innervated. The parietal peritoneum receives its innervation from

spinal nerves T10 through to L1. The somatic innervation enables the localized perception of pain and temperature. This phenomenon explains why various abdominal pathologies, like peritonitis, and appendicitis, present the way they do. Due to the Vagus nerve and sympathetic innervation of the visceral peritoneum, it might be difficult to localize abdominal symptoms triggered by organ distension.(5,8,9)

3.1.5 Referred Pain

Visceral pain is notoriously difficult to pinpoint. Dermatomes are regions of skin innervated by the same sensory ganglia and spinal cord segments that innervate the internal organs.

The embryological origin of an organ determines where the associated pain is felt; foregut structures cause discomfort in the epigastric area, while those of the midgut in the umbilical region, and those of the hindgut in the pubic area. (Figure 3.6)

- The foregut consists of
    - Oesophagus
    - Stomach
    - Pancreas
    - Liver
    - Gallbladder
    - Duodenum (proximal to the Ampulla of Vater)
- The midgut consists of
    - Duodenum (distal to the Ampulla of Vater)
    - Jejunum
    - Ileum
    - Ascending colon
    - Proximal two-thirds of the transverse colon

- The Hindgut consists of
    - The transverse colon's distal one-third
    - Sigmoid Colon
    - Rectum

Back pain is a common symptom of pathology in the kidneys, pancreas, and other organs located in the retroperitoneal space. The phrenic nerve innervates both the diaphragm and the tip of the shoulder; therefore, irritation of the diaphragm from inflammation of the liver, gallbladder, or duodenum may cause discomfort in the tip of the shoulder. (10,11)

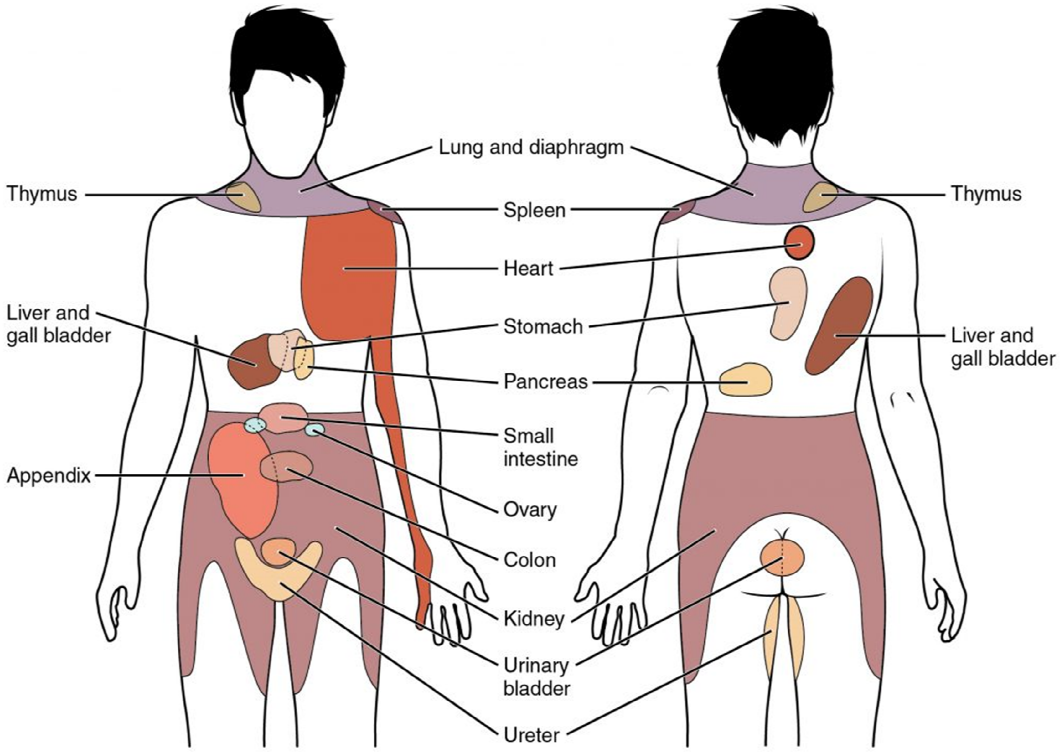


Figure 3.6: Referred pain from the main thoracic, abdominal and pelvic organs.

3.2 Laparoscopic Surgery

3.2.1 Introduction

When performing laparoscopic surgery, a fibreoptic scope is inserted through an incision in the patient's abdominal wall and into the abdominal cavity. It is a type of minimally access surgery. It has revolutionised abdominal surgeries as they are no longer painful or debilitating (12).

3.2.2 History

Minimally invasive surgery is the most recent phenomenon to revolutionise the field of medicine. The endoscope is the centrepiece of the minimal access surgery. It can be introduced either through a natural orifice or through an artificial opening in the wall of the cavity or potential cavity. Endoscopy is a common term used for all such procedures. 'Laparoscopy' term is reserved only for procedures involving the peritoneal cavity.

Hans Christian Jacobaeus, a Swedish surgeon, coined the term *laparoscopy* in 1910 after he performed the procedure on 20 patients. (Figure 3.7) (13)

Figure 3.7: Hans Christian Jacobaeus performing laparoscopic a procedure

Philipp Bozzini, a physician, was the first to use a primitive device to visualise the internal system. In 1805 he visualised the human urethra and bladder. (Figure 3.8) (14)

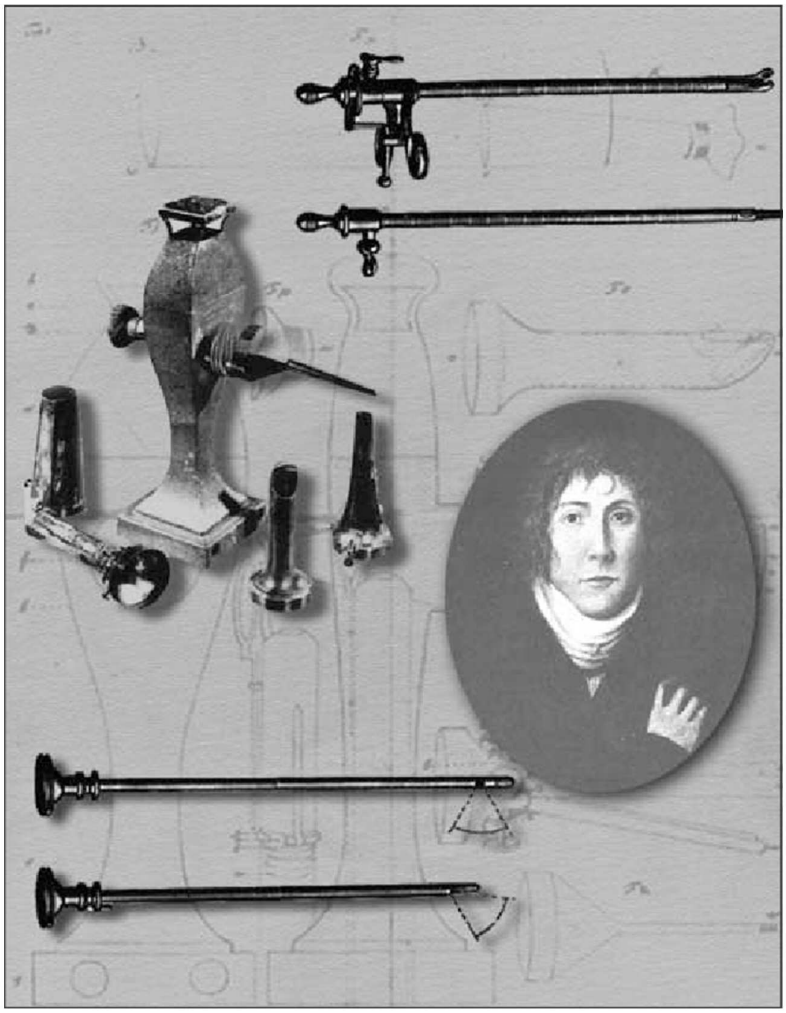


Figure 3.8: The first endoscope was created by Philipp Bozzini (right), a physician in Frankfurt, Germany (Lichtleiter, left). The Vienna Medical Academy rejected his work despite its high quality design and careful planning.

George Kelling first attempted laparoscopy in 1901, and he called it "celioscopy". (Figure 3.9) He used oxygen to insufflate the abdominal cavity (12) and a cystoscope to examine it. Carbon dioxide was first used for pneumoperitoneum in 1924 by Zollikofer.

Figure 3.9: George Kelling

In 1929, German physician Heinz Kalk developed the 135° viewing scope. Over 2000 liver punctures and other procedures, such as division of adhesions to relieve pain & obstruction, were performed by him under local anaesthesia. (Figure 3.10)

Figure 3.10: Heinz Kalk using the 135° viewing scope

In 1938 Janos Veress developed the Veress needle (Figure 3.11), which allowed safe insufflation of the peritoneal cavity (12). In 1952 a cold fibre optic light source was created, changing the avenue of endoscopic surgeries altogether (15). This

light source enabled laparoscopic surgeries to be conducted for a longer duration and thus began the era of therapeutic laparoscopic surgeries.

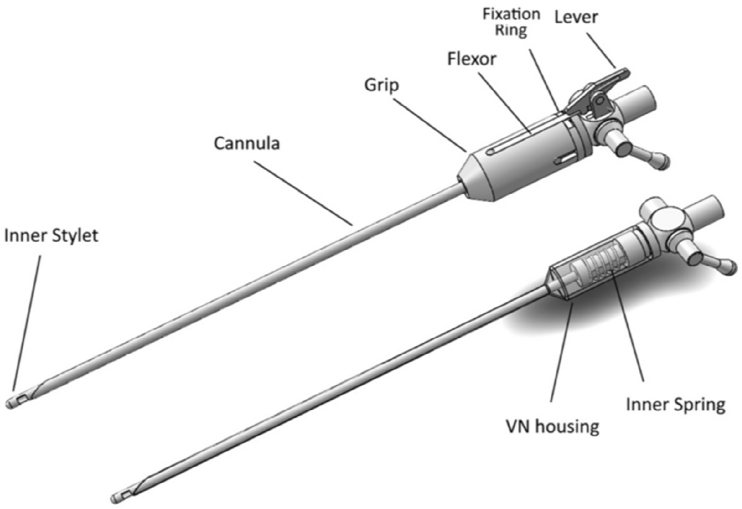


Figure 3.11: Veress needle

Mouret Philippe performed the first laparoscopic cholecystectomy in 1985, almost a hundred years after the first documented open cholecystectomy, which further opened the avenues for laparoscopic surgeries worldwide. Laparoscopic surgeries got scaled up from simple cholecystectomies to complex Whipple's procedures in the following twenty years. (16)

So, evolution of laparoscopy:

Diagnostic procedure

↓

Simple therapeutic

↓

Advanced procedures

In the present era, all the surgeries which are performed by open technique can be performed by minimally invasive/laparoscopic assisted approach.

3.2.3 Laparoscopic Surgery in India

Dr F.P. Antia performed the first diagnostic Laparoscopy at KEM hospital, Mumbai, almost 50 years after Kelling. He performed the diagnostic laparoscopy on a patient with cirrhosis and used a sigmoidoscope pump as an insufflator.

Surgeons from big cities had scepticism about laparoscopy, but it was embraced by surgeons from small cities who had access to laparoscopes due to family planning initiatives.

Dr Tehemton Udwadia (Figure 3.12) performed the first laparoscopic cholecystectomy in India in 1990 at JJ Hospital, Mumbai. (17) Dr Abhay Dalvi and Dr J. B. Agarwal conducted the first laparoscopic workshop at KEM hospital.

Figure 3.12: Dr. Tehemton Udwadia received the Padma Bhushan Award from President Shri Pranab Mukherjee in 2017.

India is at the forefront of minimally access surgery with widespread acceptance, high-quality equipment, technical expertise and cost-effectiveness.

3.2.4 Ports/Cannula and Trocars

A trocar is wrongly referred to as the whole assembly of cannula and stylet. It is just the stylet (Figure 3.13).

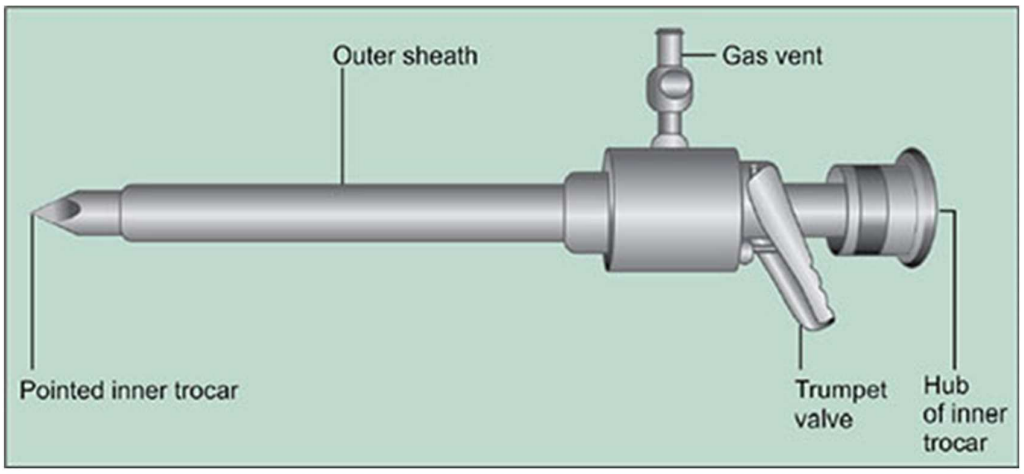


Figure 3.13: Laparoscopic Trocar

They are different types with various tips (Figure 3.14):

- Cutting tip
- Three-edged pyramid
- Two-edged blade
- Conical – they are less traumatic(18).

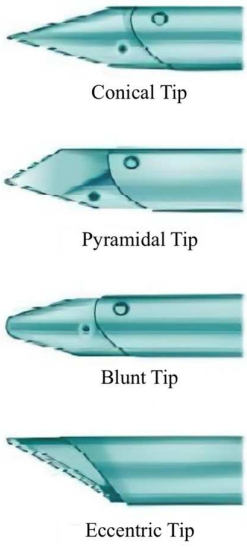


Figure 3.14: Laparoscopic Trocar various tips

Laparoscopic ports are the cannula through which instruments are passed into the peritoneal cavity. Various types of ports are available:

- Metallic/reusable ports – these are made of stainless steel and can be used repeatedly after the proper sterilisation.
- Disposable ports – these are made of plastic and are usually single-use. The advantage of these ports is that they are convenient to use without the hassles of sterilisation. (19)

3.3 What are Adhesions?

Different cellular and immunological responses characterize adhesion creation, which is a dynamic yet uncontrolled regenerative tissue healing process. Adhesions may spread to other organs due to inflammation caused by the trauma or radiation treatment, resulting in symptoms that may not manifest until long after the initial injury.

Adhesions are glue-like solid connections that unite structures from various biological systems. Adhesions are generated as a result of the body's normal process of mending injured tissues. Tissues contract and pull as they recover, limiting motion in the affected region. This 'pull' due to initial adhesions often creates mechanical restrictions/rubbing, generating more adhesion formation.

The vast majority of adhesions have absolutely no noticeable symptoms. Adhesions in the abdomen, however, may sometimes lead to a twisting of the intestines. After surgery or trauma, this disorder may cause a partial or total blockage of the intestines, commonly known as a small bowel obstruction. (3,20–24)

3.3.1 Clinical features

While adhesions alone may not cause any symptoms in and of themselves, they may cause a plethora of other problems for patients, sometimes months or even years following surgery. Constant discomfort in the abdomen and pelvis, small bowel obstruction, infertility in women, and difficult reoperation are all problems that may arise from scar tissue.

During adhesiolysis (a surgical treatment to remove adhesions), the most frequent risks include persistent discomfort, small bowel obstruction, extended operational duration, intestinal injury, and a drastically reduced pregnancy rate.(21,25–27)

3.3.2 Pathophysiology

Similar to the creation of scar tissue, adhesion formation is an inevitable element of the healing process following surgery. Adhesion is the term used to describe the situation in which a scar extends from one tissue to another, often across a gap like the peritoneal cavity.

Adhesion development and damage to the peritoneum may be caused by a number of factors, including surgeries, birth defects, radiation treatment, infections (such as bacterial peritonitis), ischemia, and foreign bodies. (e.g., microscopic Foreign Bodies like starch and talc), and chemical injury.

Possible other causes of abdominal adhesions are:

- Pelvic inflammatory disease
- Sexually transmitted disease
- Crohn's disease
- Diverticulitis
- Appendicitis

- Cholecystitis
- Peritonitis
- Pneumonia
- Tuberculosis
- Rheumatic fever
- Radiation therapy

When two surgically repaired surfaces are in close contact, adhesion development might occur.

Histopathological analyses reveal a linear progression from peritoneal damage to adhesion development. When inflammation occurs in the peritoneum, it produces an inflammatory exudate that often includes fibrin. Fibrin then works as glue to seal the injury and develops the new "fibrinous" adhesion by connecting the nearby structures where tissue damage has occurred. This exudate of fibrin is well-organized, with fibroblast invasion, collagen deposition, and the establishment of permanent fibrous tissue following. Adhesions are a common consequence of peritoneal inflammation; nevertheless, fibrinolytic activity present on mesothelial surfaces like the peritoneum, if not hindered, lyses fibrin within the inflammatory exudates prior to organization.

Inflammation after infection or injury may hinder enzyme function or synthesis, although fibrinous adhesion often remains even if the underlying cause is treated. Recent research has revealed that "fibrinous" adhesions develop first, and that they are preceded by the aggregation of cavity macrophages, which may function like extravascular platelets in the abdominal cavity. If this happens, cells like macrophages and fibroblasts penetrate the fibrinous adhesion and deposit collagen and other matrix elements to produce a persistent fibrous adhesion. (20,21,24,25,28–31)

3.3.2.2 Peritoneal Fibrinolysis

The existence of Plasminogen-Activation Activity (PAA) in the mesothelium has been confirmed by both in vitro and in vivo investigations. The levels of PAA in biopsies of visceral and parietal peritoneum taken from various abdominal sites are consistent. The key physiological mediator of PAA, tissue plasminogen activator (tPA), has been identified in human peritoneal tissue. (32)

3.3.2.3 Effect of peritoneal injury or inflammation on Fibrinolytic activity

Mechanical and chemical traumas were shown to decrease peritoneal PAA in both animal and human studies. The pathophysiology of adhesion development is predominantly influenced by a decrease in peritoneal PAA. Recent research on postoperative peritoneal drain fluid has shown a gradual decrease in PAA in the first few hours after the operation, followed by a loss of fibrinolytic activity up to 72 hours after surgery.

Surgeons have seen a broad range in patients' propensity to develop adhesions. Some people get widespread, dense, thick adhesions after a surgical operation whereas others have filmy adhesions. Patients who developed severe and dense abdominal adhesions had lower levels of t-PA activity and 10-fold higher PAI-1 levels in their peritoneal fluid than those who developed milder and softer adhesions. Adhered tissues collected from patients with different adhesion reformation tendencies showed the same pattern. Different people's propensity to adhesion formation may be explained by these findings. (32)

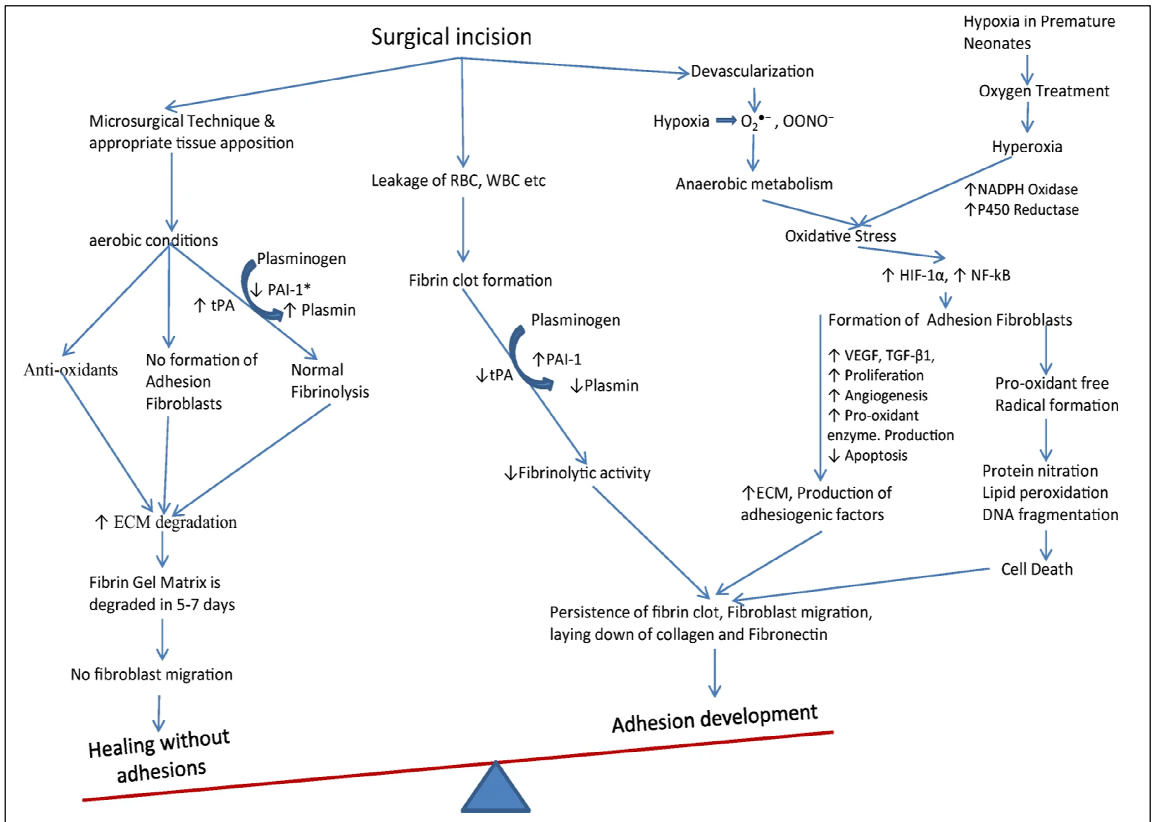


Figure 3.15: Pathogenesis of adhesion development. Vascular endothelial growth factor (VEGF), extracellular matrix (ECM), hypoxia-induced factor (HIF), nicotinamide adenine dinucleotide phosphate (NADP), plasminogen activator inhibitor (PAI), transforming growth factor beta (TGF- β), and tissue plasminogen activator (tPA) (65)

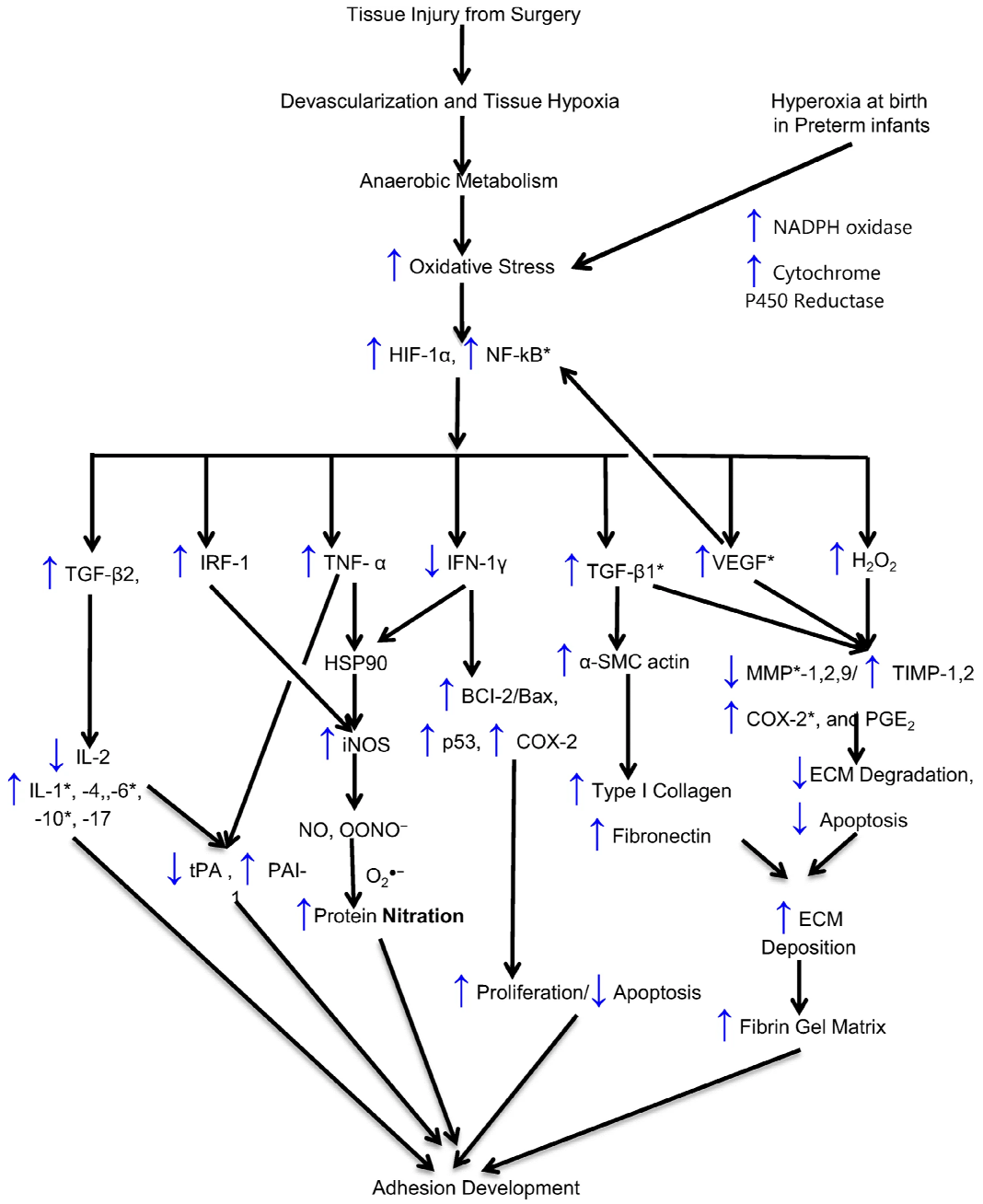


Figure 3.16: Proposed chain of events; growth factors, cytokines, associated gene mutations, and SNPs involved in adhesion development. ↑ denotes an increase and ↓ a decrease; BCl-2, B cell CLL/lymphoma 2; BAX, BCl2-associated X; COX-2, cyclooxygenase 2; ECM, extracellular matrix; HO, hydroxyl radical; H_2O_2, hydrogen peroxide; HIF, hypoxia-induced factor; HSP90, heat shock protein 90; IFN-γ, interferon-gamma; IL, interleukin; iNOS, inducible nitrous oxide synthase; IRF-1, interferon regulatory factor-1; MMP, matrix metalloproteinases; NADP, nicotine adenine dinucleotide phosphate; NF-kB, nuclear factor-kB; NO, nitric oxide; NOS, nitric oxide synthase; $O_2^{\bullet-}$, superoxide; $ONOO^-$, peroxynitrite; P53, tumor protein 53; PAI-1, plasminogen activator inhibitor; PGE2, prostaglandin E2; TGF-β1, transforming growth-beta1; TIMP, tissue inhibitor of matrix metalloproteinases; TNF-α, tumor necrosis factor; tPA, tissue plasminogen activator; VEGF, vascular endothelial growth factor (15)

Table 3.1: Cellular and signalling pathways involved in adhesion formation

Factor	Component	Role in adhesion formation
Surgical Trauma		• ↑ fibrin • ↑ levels of plasminogen activator inhibitor • Provoking a regional inflammatory reaction • Reactive Oxygen Species (ROS) production and low oxygen levels • inflammation and coagulation cascade activation • As a result of surgical hypoxia, fibrinolysis may be inhibited. (25,33)
Extracellular Matrix components	Fibronectin hyaluronic acid	• Matrix for cellular component growth • Secreted by Fibroblast. (34,35)
Cellular Mediators	Fibroblasts and Myofibroblasts	• Sub-peritoneal fibroblast deposition → adhesion development • Collagen and extracellular matrix (ECM) synthesis promotes adhesion maturation. (1,34,36)
	Mesothelial Cells	• Potential protective role • Insulin causes a pro-fibrotic phenotype and the generation of inflammatory mediators, cells, and ECM components that contribute to immune cell recruitment and coagulation. • Adhesion development is driven by the mesenchymal-to-epithelial transition (MMT).(37)
	Macrophages	• Recognizable in persistent adhesions • Significant in establishing relationships • Fibrinolytic mediator and interleukin (IL) production • Mesothelial cells must be recruited and regulated. (38)
	Neutrophils	• In this case, active mesothelial cells serve as the recruiters. • To inhibit fibrinolysis and directly cytotoxic on mesothelial cells, ROS must be released. • Possesses, at once, pro- and anti-adhesive properties,

		which have been hotly debated in the scientific literature
	T Lymphocytes	• Maintain both high quality and high volume of permanent adhesions. • Induce the production of inflammatory cytokines (38)
	Mast Cells	• Severe overabundance in scar tissue after surgery • Histamine, serotonin, cytokine, serine protease, vascular endothelial growth factor (VEGF), and chymase release. • Reduced adhesion formation has been linked to mast cell insufficiency. (34,36,39)
Signalling factors	Coagulation Cascade	Production of thrombin, a key activator of fibrin (25)
	Fibrin-Fibrinolysis Balance	• Adhesion formation results from a disruption in the equilibrium between fibrin production and fibrinolysis. • Inadequate control of plasminogen activator inhibitors (PAIs) and plasminogen-plasmin conversion • Fibroblast adhesion and extracellular matrix (ECM) maturation are facilitated by the fibrin matrix.
	Matrix Metalloproteinases	• Matrix metalloproteinase (MMP) to tissue MMP inhibitor ratios change after surgery (TIMPs) • Markers for adhesion formation using MMP-2/9 have been proposed. • Adhesions develop when MMP/TIMP ratios are chronically negatively regulated. (40)
	Interleukins	• Found in high amounts at adhesion sites; has been linked to the strength of adhesions in several studies • Effects that promote inflammation • Enhanced immune cell recruitment
	TNF-α	• Saturated with peritoneal fluid after abdominal surgery. • Promotes the production of interleukins.
	TGF-β	• Factor mediating fibrosis

		• Increased adhesions • Promotes myofibroblast migration and activation • Attracts neutrophils, T-cells, monocytes, and fibroblasts via chemotaxis. • Encourages ECM synthesis • Reduces matrix degradation by modifying protease-inhibitor ratios.
	VEGF	• Promotes angiogenesis, plays a role in coagulation and fibrinolysis • Promotes fibrin matrix deposition and increases vascular permeability. (41)

3.4 Diagnosis of the abdominal adhesions

Abdominal adhesions cannot be seen on imaging tests (such as X-rays, ultrasounds, or CT scans). However, adhesion-related bowel obstructions may be identified by such investigations.(42)

3.5 Adhesiolysis

There are two methods for adhesiolysis.

- The abdominal adhesions may be cut away using open adhesiolysis, in which a wide incision is made along the body's midline and extended to either side of the umbilicus.
- Abdominal adhesions may be seen and cut away using laparoscopic adhesiolysis, in which a laparoscope is placed via a tiny incision in the abdominal wall.

Laparoscopy is largely adopted because of its elective character, shorter recovery time, and reduced incidence of discomfort and infection compared to Laparotomy. Moreover, laparoscopic surgery is associated with a reduced risk of adhesion development in the postoperative period. However, long-term randomized

trials contrasting laparoscopic and open adhesiolysis are still needed. Determining which adhesion is the symptomatic one causing discomfort is the fundamental challenge of the laparoscopic technique to treating adhesions.

While lysis of adhesions can be very fruitful, it has two significant disadvantages:

- Inadvertent Enterotomy - harm done by accidentally setting fire to or slicing through neighbouring structures.
- A sizable survey of surgical patients brought attention to this second issue. Three-fifths of all patients who had open abdominal or pelvic surgery were readmitted to the hospital more than twice to manage post-surgical adhesions, according to a 10-year study of over 30,000 patients published in The Lancet. In addition, the majority of revision procedures (22%) happened during the first year following surgery, and readmissions persisted gradually throughout the course of the study's ten-year duration.

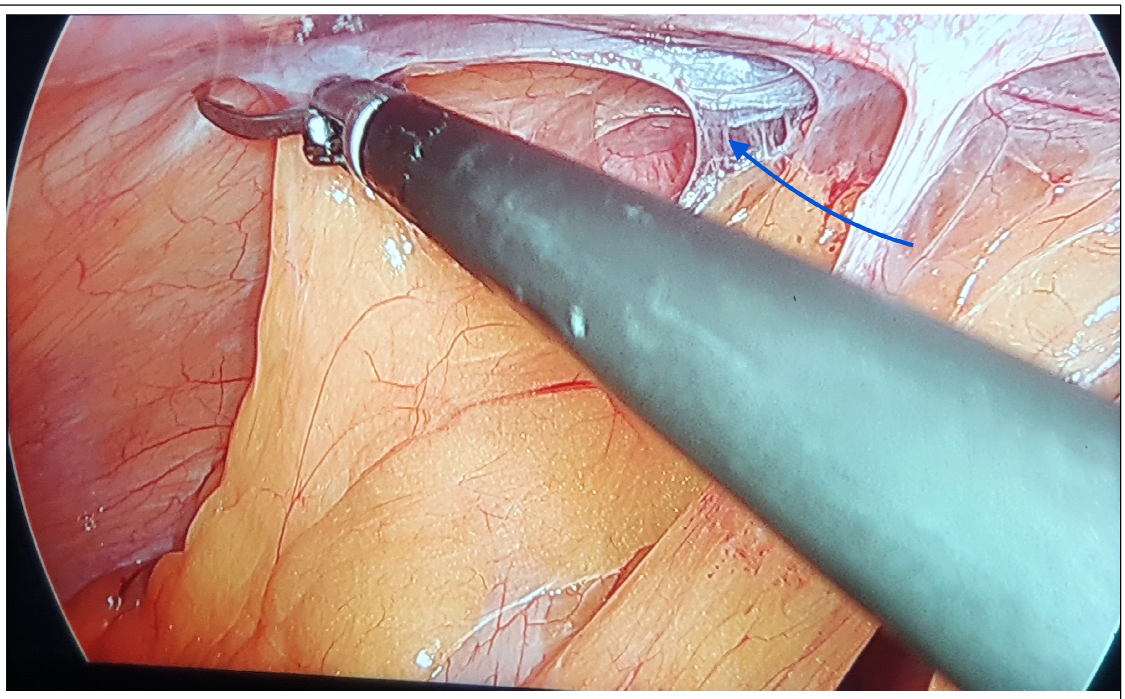
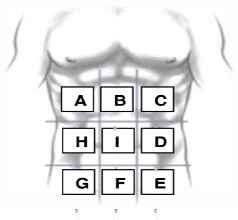


Figure 3.17: Laparoscopic view of adhesions with the blue arrow showing an avascular plane where the dissection has to be performed, called the watershed plane.

3.6 Categorisation of the adhesions - Peritoneal Adhesion Index (PAI)

In order to universalize the definition of adhesions, F. Coccolini et al. proposed a standardised classification system based on the gross appearance of adhesions and their diffusion to different abdominal regions. The absence of adhesions is represented by a score of 0, the presence of filmy adhesions by 1, strong adhesions by 2, and the presence of extremely strong vascularized adhesions by 3. The total is based on the sum of the scores from the nine different regions of the abdominal cavity. The PAI may be scored from 0–30 based on these factors, providing a clear indication of the adhesion conditions that exist. (Figure 3.18).(41)

PERITONEAL ADHESION INDEX:



Regions:	Adhesion grade:	Adhesion grade score:
A Right upper	____	**0** No adhesions
B Epigastrium	____	**1** Filmy adhesions, blunt dissection
C Left upper	____	**2** Strong adhesions, sharp dissection
D Left flank	____	**3** Very strong vascularized adhesions, sharp
E Left lower	____	dissection, damage hardly preventable
F Pelvis	____	
G Right lower	____	
H Right flank	____	
I Central	____	
L Bowel to bowel	____	

PAI ☐

Figure 3.18: Peritoneal adhesion index (PAI) is calculated by giving each region of the abdomen a score based on the degree to which it exhibits adhesions.

Although several categorization methods for abdominal adhesions have been established, the ambiguity surrounding their measurement and characterization unresolved.

3.7 Prevention of adhesions

The ability to identify and classify the various forms of adhesion formation is crucial from a preventative perspective.

- New adhesions (de novo) near the surgical incision or elsewhere in the abdominal cavity
- Recurrent adhesion reconstruction after adhesiolysis, either at the primary surgical site or at other sites.

3.7.1 Surgical Technique

Prevention of adhesions still heavily relies on skilled surgical technique. The goal is to reduce trauma to the peritoneum by employing gentle techniques and specialized equipment (such as atraumatic tools, starch-free gloves, non-linting swabs, less reactive sutures, and operating magnification in certain cases). Postoperative peritoneal infection may be avoided if tissue ischaemia is prevented and bacterial contamination is kept to a minimum during surgery. The practice of careful haemostasis is fundamental to safe and effective surgery. Adhesion development is influenced greatly by the sort of surgical incision made, since blood clots may stick to the wounded peritoneum and provide the fibrin matrix needed. More adhesions occur after gynecological surgery than obstetric surgery and after midline incisions than Pfannenstiel incisions. To what extent crystalloid solution irrigation of the peritoneal cavity during surgery helps to minimize adhesion development is debatable, and there is some evidence that such solutions may actually promote adhesions. Even in dense adhesion, sharp dissection and adhesiolysis can be done in an avascular plane. (Figure 3.17) (20,26,32,34,43)

3.7.3 Minimal invasive surgical approaches

It is hypothesized that minimally invasive procedures cause less postoperative adhesion development and hence less stress, resulting to a reduced activation of healing pathways after damage.(31,44,45) However, this has not been shown in clinical practice decisively in the literature. In support of this dubiousness, a meta-analysis and systematic assessment of diverse surgical procedures, including laparotomy and laparoscopy, indicated that alternative approaches did not improve postoperative peritoneal adhesions, small intestinal blockage, or infertility rates.(46). However, with minimum invasive surgeries, there is no contact of internal organs with the external environment since surgeons operate through special ports, and there is also no contact with the surgeon's hands. In general, adhesive disease can also develop with minimum invasive approaches, but at times less often - in about 20% of cases.

Pneumoperitoneum causes elevated intra-abdominal pressure, which may disrupt blood flow and lead to ischemic damage, acidosis, and the generation of Reactive Oxygen Species (ROS) (32,47). Preclinical research has also examined the potential role of temperature and humified gas in post-surgical adhesion formation. Humidified gas mixtures of Carbon dioxide (CO_2), Nitrous oxide (N_2O), and Oxygen (O_2) administered during hypothermia seem to considerably decrease postoperative intra-abdominal adhesion development in animals (32).

Thus, it seems that careful and limited tissue handling, prevention of thermal damage, optimum haemostasis, maintenance of a moist operating area, reduction of infection risk, and avoidance of foreign body material may be crucial variables in minimizing the development of postoperative adhesions.(48)

3.7.4 Pharmacological agents to prevent adhesions

The inflammatory reaction in the peritoneal cavity has been treated with a number of different medications. Anti-inflammatory medicines, corticosteroids, histamine antagonists, antioxidants, and calcium channel blockers are all examples of these types of medications. Fibrinolytic enzymes such as streptokinase, urokinase, plasmin, and tissue Plasminogen Activator (t-PA) have also been used. Experiments show that adhesion development is reduced locally when these enzymes are added into a slow-release gel.

The anti-adhesive characteristics of several drug types have been investigated. Many organizations have also studied these compounds for what impacts they have on the coagulation cascade and other parts of the inflammatory pathways, both of which play a role in adhesion development.

Table 3.2. Pharmaceutical agents thought to be useful in adhesion prevention and a brief description of possible reasons for efficacy in adhesion prevention.(32)

Class	**Drug**	**Mechanism of action**
AT_2 receptor antagonist	Compound 21	Anti-fibrotic & down regulation of TGF β
ACE inhibitor (low dose)		Targets EGF & TGF β signalling pathways
Hypoxia-inducible factor inhibitor (HIF I)	YC 1 N Acetylcysteine	Disrupts HIF α pathway Enhances fibrinolysis Inhibits fibrin formation
HMG Co A reductase inhibitor	Fluvastatin	Inhibits mevalonate pathway Upregulate MMP-9 expression Downregulates IL – b

	Lovastatin Atorvastatin	Increases tPA mRNA & upregulates fibrinolysis
NK 1 receptor antagonist		Inhibits substance P Upregulates MMP Enhances fibrinolysis Reduces oxidative stress
Mucin like Proteoglycan	Lubricin (Found in Synovial & Pericardial fluid)	Anti adhesive Anti-inflammatory
Chymase inhibitor		Inhibits release of mast cells
	Sodium cromoglycate	Stabilises mast cell membrane & Prevents Histamine release
NSAIDS & anti-inflammatory drugs	COX 2 inhibitor Celecoxib Tenoxicam	Antiangiogenic Anti-inflammatory Antioxidant Blocks thromboxane production
Small molecule inhibitor	Perfenidone CK666 Rhosin Bepridil QLT0267 Trametinib	Downregulates TNF α & Monocyte chemotactic factor 1 Downregulates pro-inflammatory cytokines Inhibits lipid peroxidation & reduces oxidative stress Inhibits mitogen-activated extracellular signal-regulated kinase (MEK 1&2)
Hormones	Estrogen Ghrelin	Reduction in pelvic adhesions Downregulates TGF β3 and TGF β R2

3.7.5 Inert Polymers in Adhesion Prevention Strategies

The idea behind barriers is that if you separate two damaged surfaces, they won't be able to stick together and cause more adhesions. In broad terms, you may categorize them as either solid barriers, gels, or solutions. As an additional measure, anti-adhesive medicines have been integrated into barriers to create bioactive functional barriers.

Table 3.3. Material types often used, as well as a short explanation of the rationale behind their effectiveness in adhesion prevention, are given.(32)

Material	Reasoning for Efficacy
Polytetrafluoroethylene (PTFE)	• Lacking in vitals • Weak cellular and tissue adhesion • Maintains separation between wound surfaces when healing • Biocompatible
Polylactic acid (PLA)	• Neither cells nor tissues can bind to the polymer matrix. • Poor cell and tissue adhesion • Creates separation between wound surfaces when healing • Able to interact with living organisms (FDA approval for human use in orthopaedic and neurosurgical operations) • Biodegradable • Usually used in IPOM duel mesh
Polyethene glycol (PEG)	• Stable in aqueous solutions, with high mobility • Weak cellular and tissue adhesion • Biocompatible
PLA-PEG	• Poor cellular and tissue adhesion • Adaptable and water-repellent • Biocompatible • Biodegradable

Hyaluronic Acid (HA)	• Capacity to mend injuries • Dissolving in water or bodily fluids causes a high viscosity. • Features a solid-state muco-adhesive property • Biocompatible • Bioresorbable
Alginate (ALG)	• Capacity to promote wound healing • Features a solid-state muco-adhesive property • Body fluid contains ions of varying positive charge, which contributes to crosslinking. • Biocompatible • Bioresorbable
Cellulose (oxidised regenerated) (ORC)	• Ability to promote re-epithelialization and wound healing • Features a solid-state muco-adhesive property • Biocompatible • Bioresorbable
Carboxymethyl cellulose (CMC)	• Stayed in contact with injured surfaces while they heal • Features a solid-state muco-adhesive property • Slow bioabsorption • Biocompatible
Icodextrin	• Broken down internally by amylase into oligosaccharides • The peritoneal cavity's sluggish biosorption • remained in contact with injured surfaces while they healed • Biocompatible

3.8 Review of some relevant previous studies on adhesions

In a 2010 research, 637 out of 1000 procedures (63.7%) were done on patients who have previously had one or more abdominal operations. Twenty-one hundred and ten patients, or 21.10 percent, had intraoperative adhesions. Bowel loops were implicated in 59 of the 211 patients (28 percent). Adhesion development seems to be

unrelated to the underlying cause of the first surgical intervention. History of several abdominal operations increases risk of developing intestine adhesions. When compared to the other incision types, midline incisions resulted in a much greater incidence of intestine adhesions.(49)

Between 2009 and 2011, researchers analysed data from a retrospective cohort analysis of patients who had had abdominal or pelvic surgery by laparoscopic or open techniques. There were a total of 21519 (29.8%) laparoscopic procedures and 50751 (70.0%) open procedures in this research. Of the 72270 patients who had surgery, 2527 (3.5%) were readmitted after five years for issues directly connected to adhesions, 12687 (17.6%) for issues perhaps related to adhesions, and 9436 (13.1%) for surgeries possibly complicated by adhesions. There were 359 (1%) readmissions for adhesion-related issues among the 21519 patients who had laparoscopic surgery, compared to 2168 (4%) among the 50751 patients who underwent open surgery. Readmissions for issues likely linked to adhesions occurred in 3443 out of 21519 patients in the laparoscopic surgery group, compared to 9244 out of 50751 patients in the open surgery group, or 18%. According to their findings, when comparing laparoscopic versus open surgery, the likelihood of readmission due to complications is decreased by 32% for laparoscopic procedures and 11% for those that may be connected to the initial operation. (50)

Seventy-two people with persistent abdominal discomfort had surgery and were thereafter prospectively monitored to evaluate both short-term and long-term results. Adhesions were detected in 85% of patients and were not the cause of symptoms in the other 15%. At 3.7 years of follow-up, 33% of patients who had undergone adhesiolysis reported no pain, 46% reported reduced pain, and the other patients reported no change.(51)

In a more recent trial, 77% of patients with suspected adhesive illness who underwent laparoscopy for persistent abdominal discomfort reported total or partial pain alleviation after adhesiolysis, and there were no surgical complications.(52)

A study comprehensively (overall has referenced 529 papers on adhesions) reviewed the products and agents developed to mitigate postoperative adhesion formation.(32)

Adhesive intestinal obstruction is a testament to the enduring importance of this issue; D. A. Kluiko (53) examines the diagnostic and surgical treatment strategies for painful types of abdominal adhesions. Surgeons and gastroenterologists both treat patients with a history of stomach discomfort after surgery and the presence of a scar as though they had sticky disease. Patients have a less-than-critical outlook on their health, which delays their medical treatment. Adhesion formation requires a confluence of elements to take hold over time, with early postoperative blood flow, tissue oxygenation, and peristalsis playing particularly pivotal roles. The best options for treating and avoiding intestinal blockage are minimally invasive surgical procedures. Intraoperative intestinal injuries, wound infections, and death rates were not significantly different between open and laparoscopic adhesiolysis. There are less systemic and pulmonary problems with laparoscopic procedures compared with open ones. A novel preventative strategy for adhesion development involves decreasing fibroblast proliferation and decreasing hypoxia and inflammation.

In the study by Capella-Monsonís, H. et al (54), from the earliest stages of adhesion development to its latter stages of prevention, is worth a look. Surgical adhesions are a major problem in clinical settings, especially after procedures involving the abdominal cavity, the uterus, the heart.

The time required to create a fibrous band capable of increasing morbidity after surgical intervention or abdominal trauma is one of the unresolved questions involving peritoneal adhesions. Two to three weeks following surgery, adhesions are common. Since there is a lack of data on the subject, experts cannot provide an estimate of how often adhesion development occurs after trauma. The authors of a case series study (55) involving ten patients with a history of abdominal trauma and no surgical intervention found that 7 of the total population presented high-grade adhesions, according to Mazuji and Zhülke scores, a high rate considering the limited time interval of research and follow-up, and thus determined them to continue the research in this field.

OBJECTIVES

The primary objectives of the study are

- To investigate the incidence of abdominal adhesions in patients undergoing laparoscopic surgery.
- Using Peritoneal Adhesion Index (PAI) to grade adhesions

The secondary objectives are

- To identify the risk factors for adhesion formation and symptoms associated with their presence
- To identify relief of the symptoms post adhesiolysis.

MATERIALS AND METHODS

Patients admitted to KLES Dr. Prabhakar Kore Hospital & MRC, Belagavi and undergoing elective Laparoscopic Surgery above 18 years were enrolled. It is a study conducted between Jan-Dec 2021. Intraoperative videos were analysed after clinical examination on admission to document adhesions based on the PAI was determined. At postoperative days 1, 15, and 180 days, an assessment of parietal pain at the site of adhesions was noted and compared with the pre-operation pain.

Source of the data: Elective Laparoscopic Surgery was performed on patients at KLES Dr. Prabhakar Kore Hospital & MRC in Belagavi, Karnataka, India.

4.1 Study design - Prospective observational study.

a) **Study period** - One Year (January 2021 – December 2021)

b) **Study Population**: Patients were admitted to KLES Dr. Prabhakar Kore Hospital & MRC, Belagavi and underwent elective Laparoscopic Surgery.

c) **Sample Size:**

Sample size calculation when the sample size is small:

$$n = \frac{Ny}{(N-1)e^2 + y}$$

Z= Z score for the desired confidence interval

e = margin of error

p = estimated proportion

q = 1- p

$y = Z^2p(1-p)$

In our study,

$y = Z^2p(1-p)$

$y = 1.68^2*0.21*0.79$

$y = 0.4682$

$$n = \frac{200 * 0.4686}{(200-1)0.315^2 + 0.4682} n = \frac{200 * 0.4686}{0.19845 + 0.4682}$$

n = 139.534

Rounded up the calculated sample size of our study is ≥ 140.

d) Inclusion Criteria:

- Patients who have given informed consent
- All patients above 18 years of age undergoing elective laparoscopic surgery.

e) Exclusion Criteria:

- Patients who have not given informed consent
- Patients with generalised peritonitis
- Patients who have a zero-tolerance policy for pneumoperitoneum
- Patients who have untreated coagulopathy
- Those with hemodynamic instability

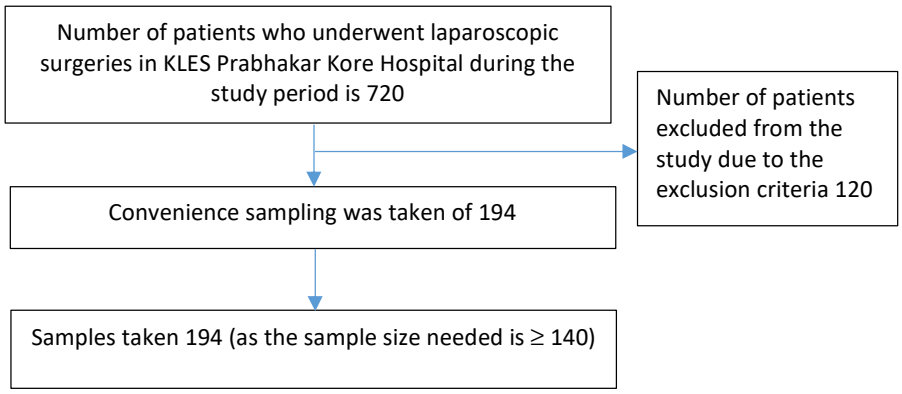


Figure 4.1: STROBE Flowchart

f) Method:

- Data collection was started after taking ethical clearance from the ethical research committee of JNMC, Belagavi.
- Patients' health history and physicals were thoroughly examined upon admission.
- An informed consent was taken from all the patients in the study.
- Intra-operative video from the laparoscope was recorded.

g) Procedure:

- The Peritoneal Adhesion Index was used to record and categorize adhesions during laparoscopic surgery performed on all patients while they were under general anaesthesia.
- The video from the laparoscopic surgeries was also reviewed by two surgeons again at a later date.
- At Postoperative day 1, 15 and 180, assessment of any parietal pain at the site of adhesions was noted and compared with pre-operation condition

h) Assessment:

A systematic assessment of the location and grading of adhesions identified with the help of laparoscope has been performed using PAI (Figure 3.18). In addition, the pain of the patient was assessed pre-operatively and on postoperative day 1, day 15 and at 6 months using Visual Analog Scale (VAS) score to study the variation in the intensity of the pain.

The peritoneal adhesion index (PAI) is calculated by giving each region of the abdomen a score based on the degree to which it exhibits scar tissue.

All the data that is collected will be entered into Microsoft Excel Sheet. Visual Analog Scale(VAS) will be used to quantify pain if any. (Figure 4.2)

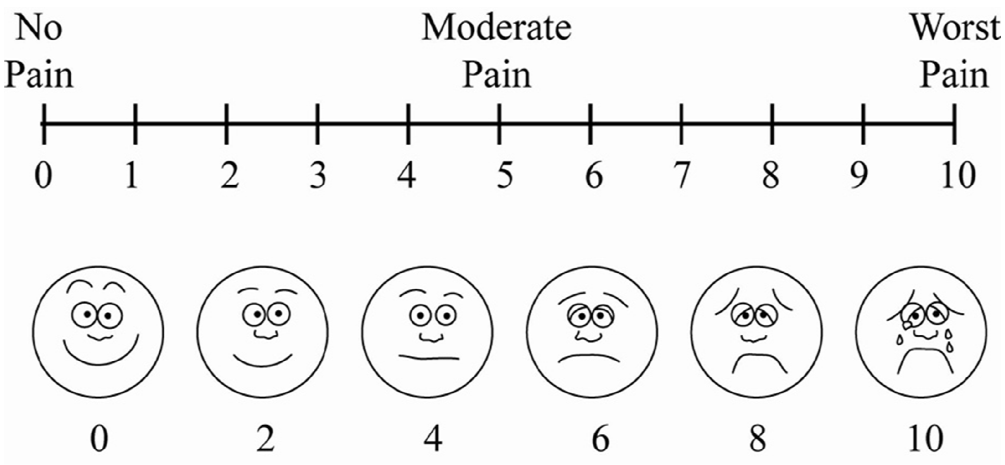


Figure 4.2: Visual Analog Scale(VAS)

All the data that is collected has been entered into Microsoft Excel worksheet.

i) STATISTICAL ANALYSIS:

- This research was an observational study; hence the following analytic strategy was used.
- Mean and standard deviation were computed for quantitative variables that were measured continuously. The information was split in half according to predetermined qualitative criteria, and the continuous variables were compared using appropriate statistical methods, such as the student's unpaired t-test. Student's paired t-test was used to compare variables before and after therapy.
- It was determined that a median was the best way to depict discrete variables.
- Rates, ratios, and percentages were used to describe the category information. Chi-square test, test of proportion, and Fisher's exact test were used to examine whether or not there was a correlation between the outcomes, clinical, and demographic variables.
- Nonparametric tests were chosen since they work better with discrete data.
- Appropriate procedures such as analysis of variance (ANOVA), correlation, regression, etc. were also utilized as necessary.
- The comparisons were depicted using suitable graphs.
- The significance level for all tests was set at a p-value of less than 5% (0.05).
- All the data that was collected and the statistical calculations & tabulations were carried out using Microsoft Excel and SPSS v20.

j) Investigations and interventions conducted during the study

- Diagnostic Laparoscopy
- Blood investigations:
    i. Hb
    ii. WBC
    iii. Platelets
    iv. Urea
    v. Serum Creatinine
    vi. Random blood glucose
    vii. PT/INR, aPTT
    viii. serum electrolytes
    ix. HbsAg, HIV
- ECG
- Chest X-ray PA view

RESULTS

The incidence of abdominal adhesions has been studied with 194 subjects undergoing Laparoscopic Surgery.

5.1 Prevalence of adhesions

Out of 194 subjects, 100 patients were observed to have the prevalence of adhesions which are tabulated in Table 5.1 below.

Table 5.1 Prevalence of abdominal adhesion

Abdominal adhesion	No of patients	% of patients
Without Adhesion	94	48.45
With Adhesion	100	51.55
Total	194	100.00

5.2 Demographic data

5.2.1 Age

All of the patients are adults, and the average age is in the 30s and 40s. The correlation between age and the incidence of abdominal adhesions is shown in Table 5.2. Abdominal adhesions were shown to be more common in older adults compared to younger adults (Figure 5.1). Figure 5.2 shows that the mean age without adhesions is about 37, and with adhesions, 41 years.

Table 5.2 and Figure 5.2 give the prevalence of the adhesions concerning the age; it is interesting to find that the middle age sample population has a higher percentage of adhesions. This exciting observation is corroborated by the results of an independent t-test, as shown in Table 5.3

Table 5.2 Association between age groups and prevalence of abdominal adhesion

Age groups	Without Adhesion	%	With Adhesion	%	Total	%
<=20yrs	15	71.43	6	28.57	21	10.82
21-30yrs	23	57.50	17	42.50	40	20.62
31-40yrs	22	45.83	26	54.17	48	24.74
41-50yrs	17	36.17	30	63.83	47	24.23
51-60yrs	7	43.75	9	56.25	16	8.25
>=61yrs	10	45.45	12	54.55	22	11.34
Total	94	48.45	100	51.55	194	100.00
Mean age	37.00		41.28		39.21	
SD age	15.78		13.61		14.82	
Chi-square=8.9410, p=0.1110						

Figure 5.1 : Association between age groups and prevalence of abdominal adhesion

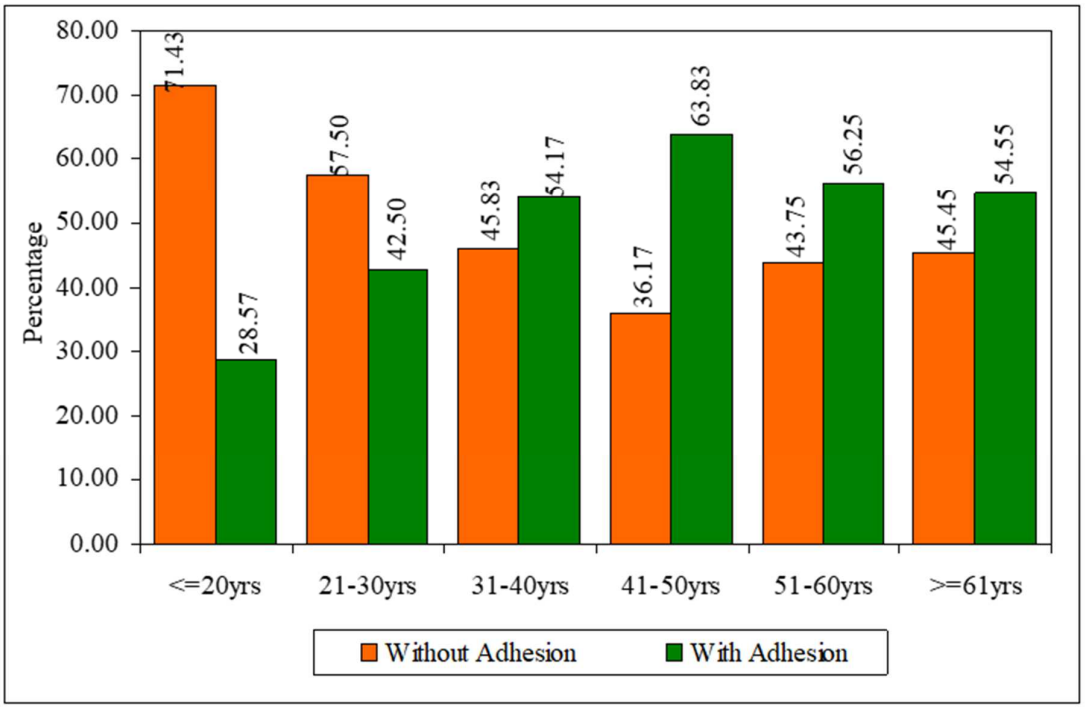
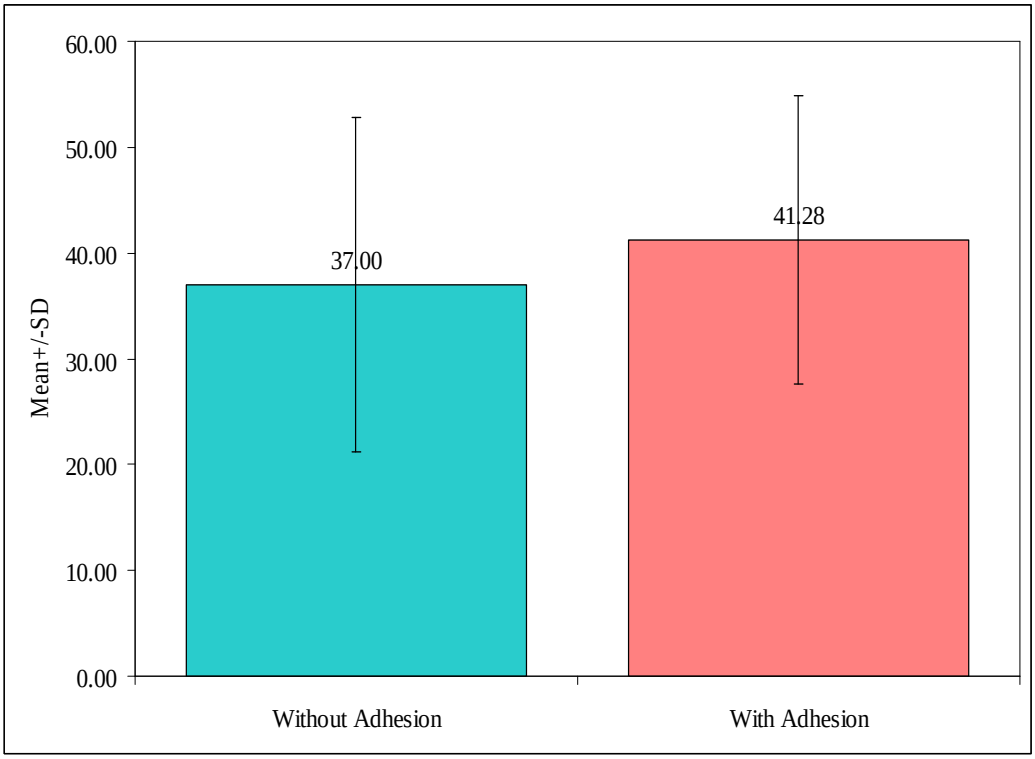


Table 5.3 Comparison of with and without adhesion with mean age by independent t-test

Abdominal adhesion	Mean	SD	SE	t-value	P-value
Without Adhesion	37.00	15.78	1.63	-2.0266	0.0441*
With Adhesion	41.28	13.61	1.36		

*p<0.05

Figure 5.2 Comparison with and without adhesion with mean age



5.2.2 Gender

Gender-wise distribution of patients is given in Table 5.4, where we can see that the percentage of the female population is higher by almost 20 %. Table 5.5 tabulates the association between gender and the prevalence of adhesions. It is observed that the female population has more tendency to have adhesions.

Table 5.4 Gender-wise distribution of patients

Gender	No of patients	% of patients
Male	79	40.72
Female	115	59.28
Total	194	100.00

Table 5.5 Association between gender and prevalence of abdominal adhesion

Gender	Without Adhesion	%	With Adhesion	%	Total	%
Male	47	59.49	32	40.51	79	40.72
Female	47	40.87	68	59.13	115	59.28
Total	94	48.45	100	51.55	194	100.00
Chi-square=6.5040, p=0.0110*						

*p<0.05

5.3 Patient complaints

5.3.1 Abdominal pain

While analysing the symptoms of adhesions, it is found that pain abdomen seems to be the most dominant symptom, with 82 out of 100 patients having a predominantly colicky type of pain abdomen. Table 5.6 gives the association between pain abdomen and the prevalence of abdominal adhesions. Figure 5.4 gives the type of pain in the patient population. Figure 5.5 provides a breakdown of patients according to whether they experience widespread or localized pain, and Table 5.7 details the afflicted regions when the pain is localized. Additionally, it has been noted that the discomfort in the abdomen is localized to the right lower region, and then the right upper quadrant.

Figure 5.3 shows the association between pain abdomen and the prevalence of abdominal adhesion. Figure 5.4 depicts the type of pain in the patient population. Figures 5.5 & 5.6 depicts whether the pain is generalised or localised, and if it is localised, which area is affected.

Table 5.6 Association between Pain Abdomen and prevalence of abdominal adhesion

Pain Abdomen	Without Adhesion	%	With Adhesion	%	Total	%
No	30	62.50	18	37.50	48	24.74
Yes	64	43.84	82	56.16	146	75.26
Total	94	48.45	100	51.55	194	100.00
Chi-square=5.0380, p=0.0250*						

*p<0.05

Figure 5.3 Association between Pain Abdomen and prevalence of abdominal adhesion

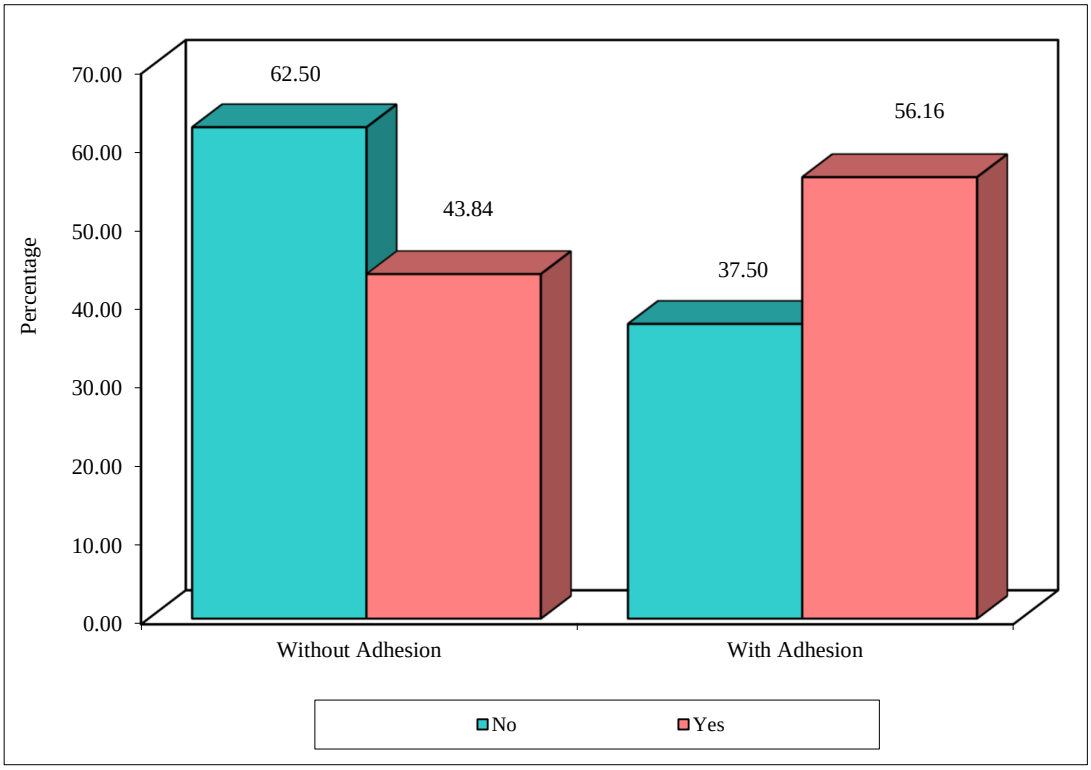


Figure 5.4 Type of pain abdomen in the patient population

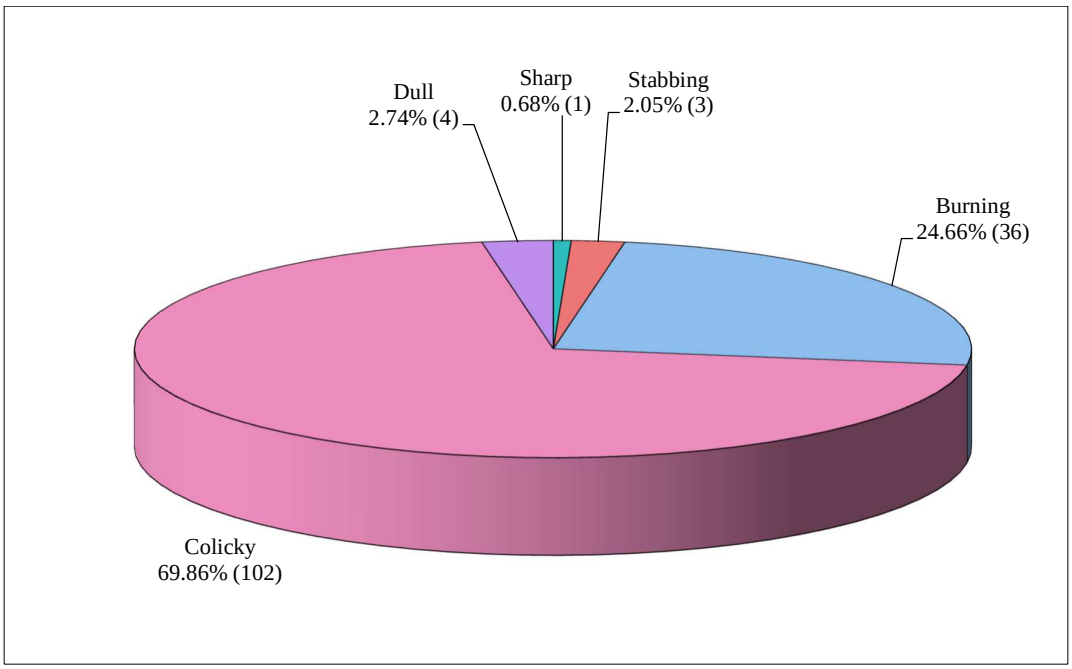


Figure 5.5 Patients with generalised/localised pain

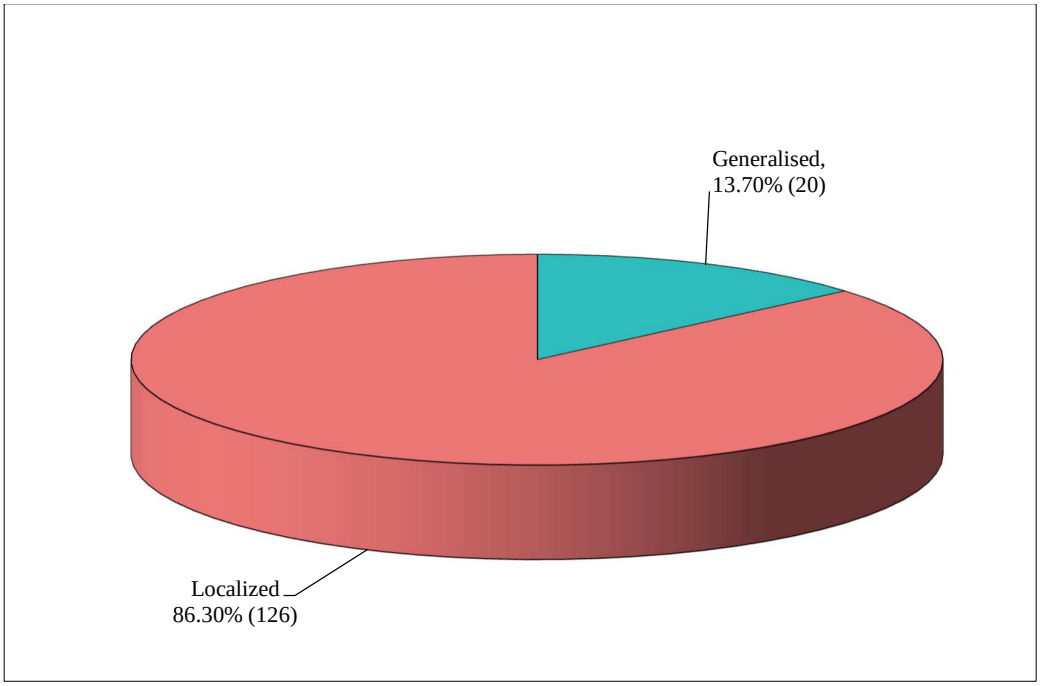
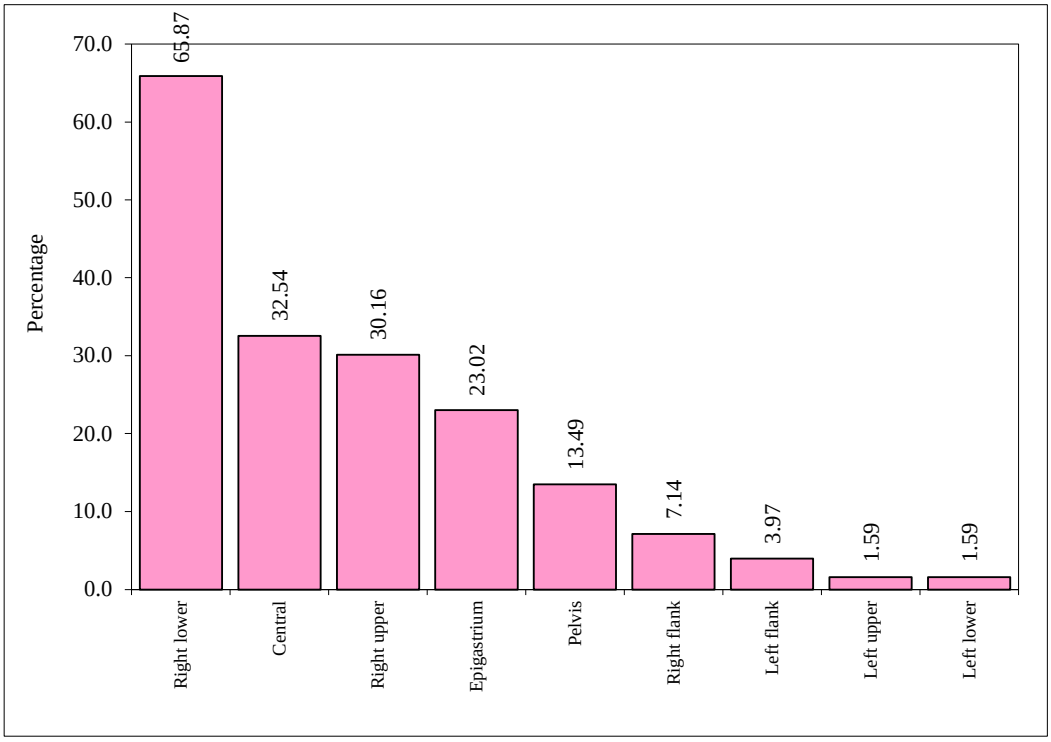


Table 5.7 If localised area affected

Area affected	No of patients	% of patients
Right upper	38	30.16
Epigastrium	29	23.02
Left upper	2	1.59
Left flank	5	3.97
Left lower	2	1.59
Pelvis	17	13.49
Right lower	83	65.87
Right flank	9	7.14
Central	41	32.54

Figure 5.6 : If localised, area affected



5.3.2 Bloating

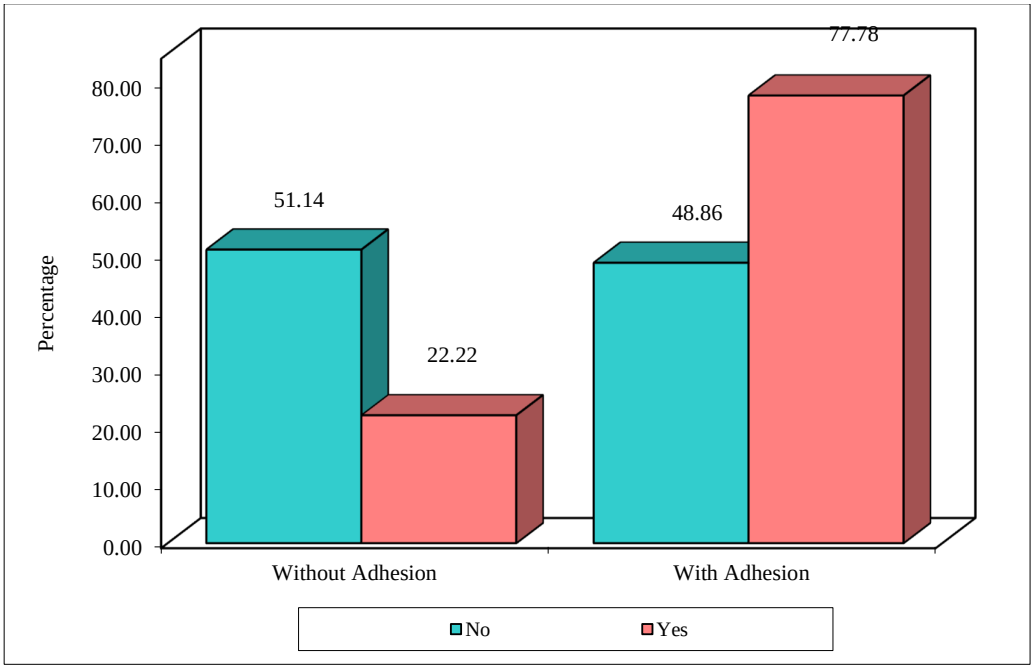
Table 5.8 gives the association between bloating of the abdomen and the prevalence of abdominal adhesions. About 78% of patients with adhesions seem to have complaints of bloating, which is depicted in Figure 5.7.

Table 5.8 Association between Bloating of abdomen and prevalence of the abdominal adhesion

Bloating of abdomen	Without Adhesion	%	With Adhesion	%	Total	%
No	90	51.14	86	48.86	176	90.72
Yes	4	22.22	14	77.78	18	9.28
Total	94	48.45	100	51.55	194	100.00
Chi-square=5.4660, p=0.0190*						

*p<0.05

Figure 5.7 Association between Bloating of the abdomen and prevalence of the abdominal adhesions



5.4 Past History & Comorbidities

5.4.1 Past History of surgeries

It is very evident that a history of previous surgeries is definitely associated with a higher prevalence of the adhesions and is completely supported by the data from the study. With one previous surgery itself the percentage of patients having adhesions is about 72% and it is increasing very rapidly with the number of previous surgeries, with more than three surgeries almost definitely leading to 100% possibility of adhesions. This corroborates the well-known fact that the higher the handling of the internal organs by surgeries, the higher is the possibility of adhesions. It is very clearly seen from the data presented in Tables 5.9 & 5.10 and Figures 5.8 & 5.9. The number of patients with a past history of at least one surgery is about 64 out of 100 patients with adhesions, and among them, a higher of number patients have undergone Lower Segment Caesarean Section (LSCS) and open tubectomy surgeries. Table 5.11 gives the number of patients with at least one surgery and the type of surgery they have gone through. Table 5.12 gives the number of patients with two past surgeries, the type of surgeries they have gone through and their percentage with respect to the total patient population. Similarly, Table 5.13 shows the number of patients who have undergone three or more surgeries.

Table 5.9 Association between previous surgery & prevalence of abdominal adhesion

Previous surgery	Without Adhesion	%	With Adhesion	%	Total	%
No	79	60.77	51	39.23	130	67.01
Yes	15	23.44	49	76.56	64	32.99
Total	94	48.45	100	51.55	194	100.00
Chi-square= 23.9310, p=0.0001*						

*p<0.05

Figure 5.8 Association between previous surgery and prevalence of abdominal adhesion

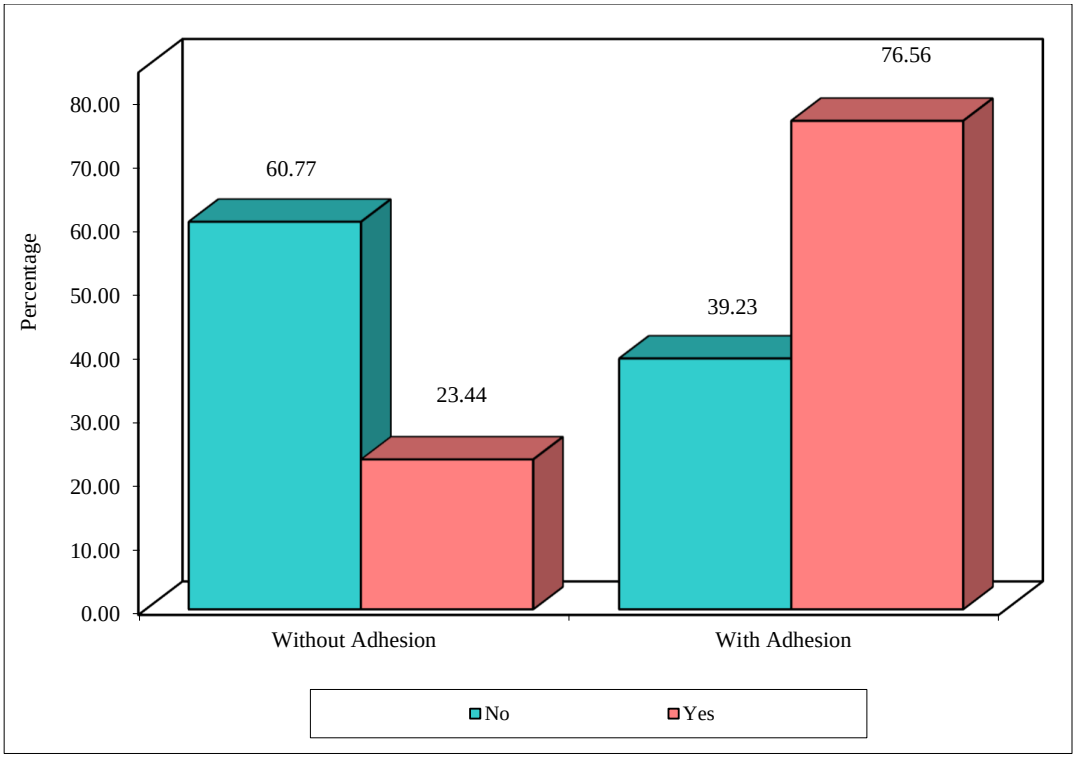


Table 5.10 Association between the number of surgeries and prevalence of abdominal adhesion

Number of surgeries	Without Adhesion	%	With Adhesion	%	Total	%
No	79	60.77	51	39.23	130	67.01
One	13	27.66	34	72.34	47	24.23
Two	2	14.29	12	85.71	14	7.22
Three	0	0.00	3	100.00	3	1.55
Total	94	48.45	100	51.55	194	100.00
Chi-square= 25.3950, p=0.0001*						

*p<0.05

Figure 5.9 Association between Number of surgeries and prevalence of abdominal adhesion

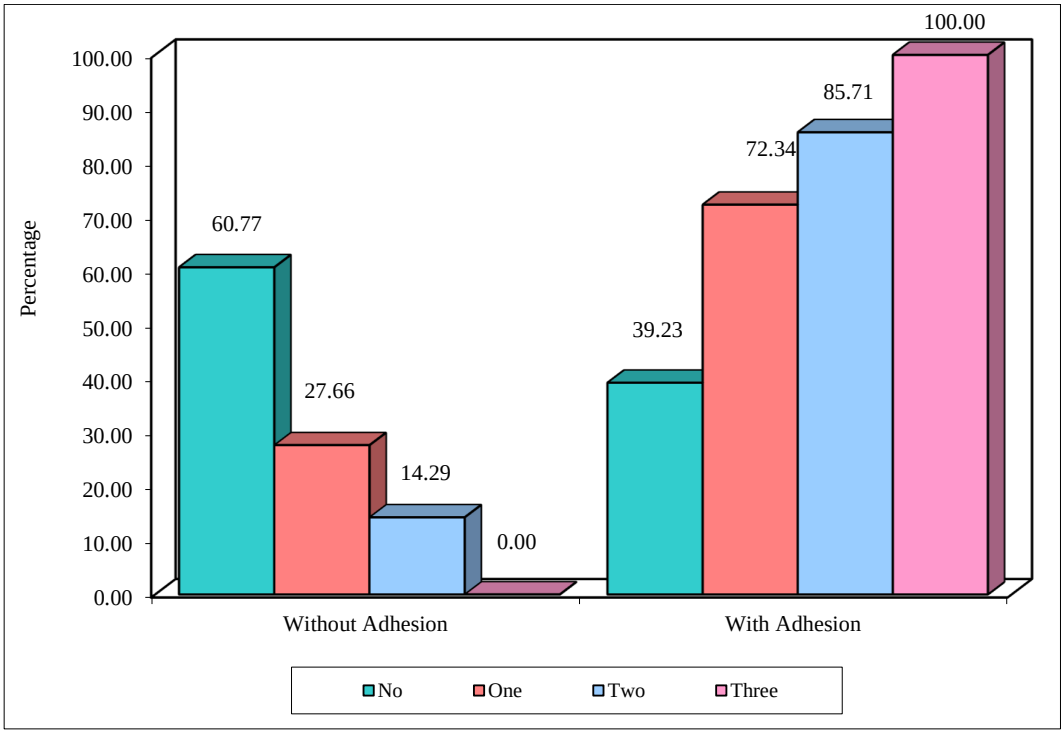


Table 5.11 Patients with Past history of at least one surgery

Past Surgery 1	No of patients	% of patients	Mean	SD
Cholecystostomy - Pigtail	2	3.13	3.00	0.00
Laproscopic Sterilisation	5	7.81	2.20	3.35
LSCS	19	29.69	4.42	3.45
Open Appendicectomy	8	12.50	3.25	3.06
Open Hysterectomy	4	6.25	1.50	2.38
Open Tubectomy	16	25.00	3.44	3.27
Others	5	7.81	2.80	5.22
Total Abdominal Hysterectomy	5	7.81	7.40	3.71
Total	64	100.00	1.92	3.49

Table 5.12 Patients with Past history of two surgeries

Past surgery 2	No of patients	% of patients
Ovarian torsion excision and tubectomy	1	1.56
Cholecystostomy - Pigtail	1	1.56
Incisional Hernia Repair	3	4.69
Laparoscopic cholecystectomy	1	1.56
Laparoscopic converted to open Hysterectomy	1	1.56
Laproscopic Ectopic Pregnancy Evacuation	1	1.56
Laproscopic Oopherectomy	1	1.56
Laproscopic Tubectomy	1	1.56
LSCS	4	6.25
Open Hysterectomy	1	1.56
Percutaneous nephrostomy for pyelonephritis	1	1.56
Total Abdominal Hysterectomy	1	1.56
Total	17	26.56

Table 5.13: Patients with past history of three or more surgeries

Past surgery 3 & more	No of patients	% of patients
Incisional Hernia	1	1.56
LSCS + Tubectomy	1	1.56
Open Myomectomy	1	1.56
Total	3	4.69

5.4.2 Hypertension

The occurrence of abdominal adhesions seems to increase in patients suffering from hypertension. About 58% of the hypertensive patients had adhesions, compared to only 51% in non-hypertensive patients. These observations are presented in Table 5.14.

Table 5.14 Association between hypertension and prevalence of abdominal adhesion

Hypertension	Without Adhesion	%	With Adhesion	%	Total	%
No	89	48.90	93	51.10	182	93.81
Yes	5	41.67	7	58.33	12	6.19
Total	94	48.45	100	51.55	194	100.00
Chi-square= 0.2360, p=0.6270						

5.4.3 Diabetes Mellitus

Similarly, it is observed that patients suffering from diabetes mellitus tend to be more prone to abdominal adhesions. About 71% of the diabetic patients had adhesions, compared to only 49% of non-diabetic patients. This observation is presented in Table 5.15.

Table 5.15 Association between diabetes and prevalence of abdominal adhesion

Diabetes	Without Adhesion	%	With Adhesion	%	Total	%
No	88	50.87	85	49.13	173	89.18
Yes	6	28.57	15	71.43	21	10.82
Total	94	48.45	100	51.55	194	100.00
Chi-square= 3.7270, p=0.0540						

5.4.4 Hypothyroidism

Interestingly, only 33% of the population with hypothyroidism had adhesions indicating a lower association of hypothyroidism to adhesions. In the patients with normal thyroid function, 52% had adhesions (observations in Table 5.16).

Table 5.16 Association between Hypothyroidism and prevalence of abdominal adhesion

Hypothyroidism	Without Adhesion	%	With Adhesion	%	Total	%
No	88	47.57	97	52.43	185	95.36
Yes	6	66.67	3	33.33	9	4.64
Total	94	48.45	100	51.55	194	100.00
Chi-square= 1.2530, p=0.2630						

5.4.5 Anaemia

Sixty per cent of patients with anaemia seem to have adhesions compared to only 48% in patients with normal haemoglobin levels (Table 5.20). It is also observed that the mean haemoglobin level for patients with adhesions is about 12.41 and for the patients without adhesion is about 13.02, which is given in Table 5.18 & Figure 5.10.

Table 5.17 Association between levels of haemoglobin and prevalence of abdominal adhesion

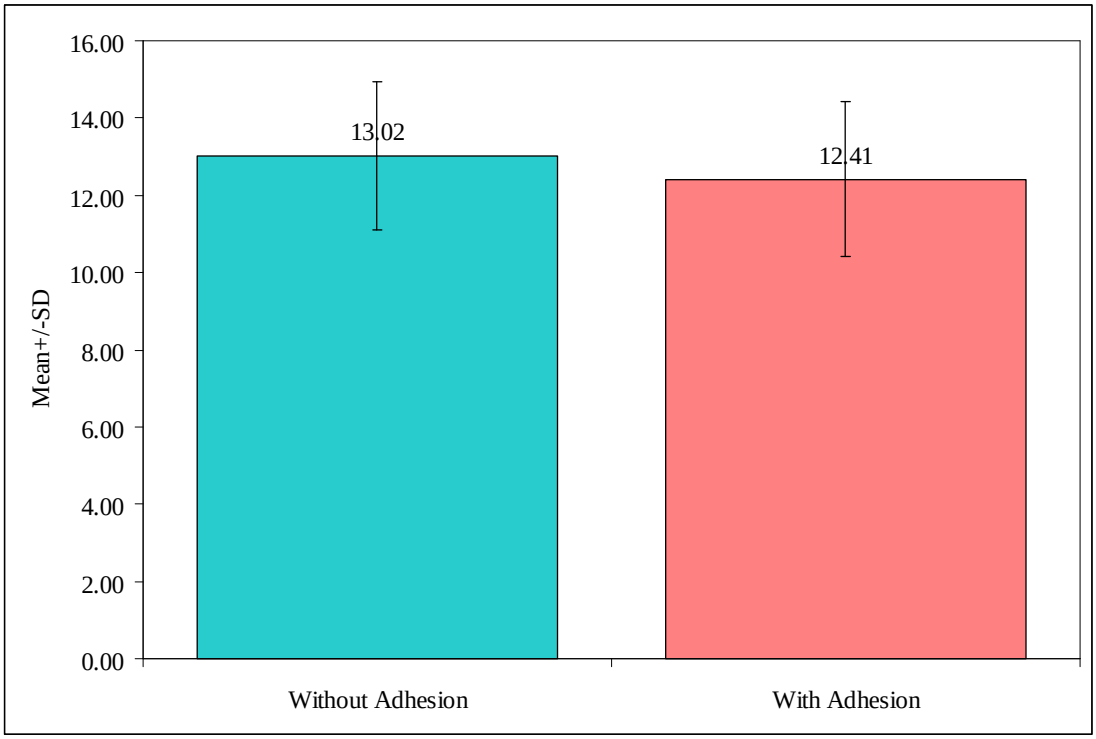
Levels of haemoglobin	Without Adhesion	%	With Adhesion	%	Total	%
Normal	70	52.24	64	47.76	134	69.07
Anaemia	24	40.00	36	60.00	60	30.93
Total	94	48.45	100	51.55	194	100.00
Chi-square= 2.4850, p=0.1150						

Table 5.18 Comparison of with adhesions and without adhesions with the mean haemoglobin by independent t test

Abdominal adhesion	Mean	SD	SE	t-value	P-value
Without Adhesion	13.02	1.91	0.20	2.1874	0.0299*
With Adhesion	12.41	2.01	0.20		

*p<0.05

Figure 5.10 Comparison of with adhesion and without adhesion with mean haemoglobin



5.4.6 Hypoalbunimia

The mean albumin levels do not seem to impact the formation of the adhesions. This observation is derived from the data from Tables 5.19 & 5.20 and Figure 5.11.

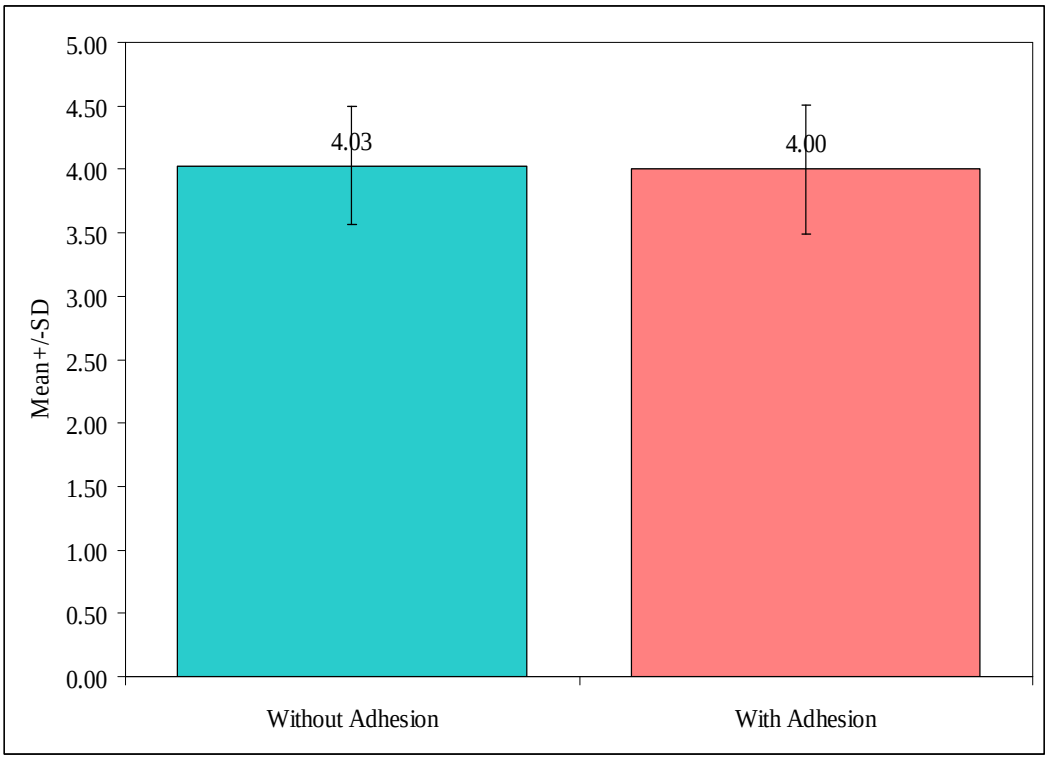
Table 5.19 Association between levels of albumin and prevalence of abdominal adhesion

Levels of albumin	Without Adhesion	%	With Adhesion	%	Total	%
Normal	86	49.71	87	50.29	173	89.18
Hypo	8	38.10	13	61.90	21	10.82
Total	94	48.45	100	51.55	194	100.00
Chi-square= 1.0120, p=0.3150						

Table 5.20 Comparison of with and without adhesion with mean albumin by independent t test

Abdominal adhesion	Mean	SD	SE	t-value	P-value
Without Adhesion	4.03	0.47	0.05	0.3319	0.7403
With Adhesion	4.00	0.51	0.05		

Figure 5.11 Comparison of with adhesion and without adhesion with mean albumin



5.5 Diagnosis at the time of admission

Each and every patient from the sample population was analysed for an association of diagnosis and prevalence of adhesions, and the adhesions were graded using PAI. The prevalence of adhesions is higher in the presence of active infection and inflammation, gangrenous changes, perforations, and recurrent hernias. This observation is evident from the Table 5.21.

Table 5.21 Association between diagnosis and prevalence of abdominal adhesion

Diagnosis	Without Adhesion	%	With Adhesion	%	Total	%	Mean adhesion	SD adhesion
Cholelithiasis	30	62.5	18	37.5	48	24.7	1.15	2.08
Acute appendicitis	43	56.6	33	43.4	76	39.2	1.93	3.22
Hiatus hernia	2	100.0	0	0.0	2	1.0	0.00	0.00
Acute calculous cholecystitis	1	16.7	5	83.3	6	3.1	2.67	2.34
Others	6	33.3	12	66.7	18	9.3	4.22	4.63
Empema gall bladder	0	0.0	3	100.0	3	1.5	5.00	1.73
Recurrent appendicitis with appendicular mass	0	0.0	3	100.0	3	1.5	9.67	2.08
Right inguinal hernia	3	100.0	0	0.0	3	1.5	0.00	0.00
Chronic cholecystitis	1	50.0	1	50.0	2	1.0	1.50	2.12
B/l ingunial hernia	3	75.0	1	25.0	4	2.1	0.75	1.50

Pain abdomen under evaluation	0	0.0	2	100.0	2	1.0	11.50	0.71
Biliary pancreatitis	3	75.0	1	25.0	4	2.1	0.50	1.00
Gangrenous appendicitis	0	0.0	2	100.0	2	1.0	9.00	1.41
Umbilical hernia	0	0.0	6	100.0	6	3.1	6.00	4.77
Duodenal perforation	0	0.0	1	100.0	1	0.5	12.00	0.00
Recurrent incissional hernia	0	0.0	2	100.0	2	1.0	6.50	0.71
Empema gall bladder with pigtail insitu	0	0.0	2	100.0	2	1.0	5.50	3.54
Divertication of recti	1	100.0	0	0.0	1	0.5	0.00	0.00
Incisional henria	0	0.0	4	100.0	4	2.1	5.75	3.86
Paraumbilical hernia	1	25.0	3	75.0	4	2.1	1.25	0.96
Diaphragmatic hernia	0	0.0	1	100.0	1	0.5	2.00	0.00
Total	94	48.5	100	51.5	194	100.0	2.52	3.60

5.6 Operative findings

5.6.1 Peritoneal adhesion index

The adhesions found were graded using Peritoneal Adhesion Index (PAI). It is found that the filmy adhesions that needed blunt dissection were higher in the bowel-to-bowel region, whereas a higher percentage of the adhesions in the pelvis region seemed to be very strong and vascularised, necessitating sharp dissection (the damage was hardly preventable). These observations can be seen in Table 5.22.

Table 5.22 Intraoperative findings-components of PAI

Components of PAI	0	%	1	%	2	%	3	%	Mean	Median	SD
Right upper	167	86.08	8	4.12	6	3.09	13	6.70	0.30	0.00	0.82
Epigastrium	179	92.27	6	3.09	8	4.12	1	0.52	0.13	0.00	0.48
Left upper	190	97.94	2	1.03	1	0.52	1	0.52	0.04	0.00	0.28
Left flank	190	97.94	2	1.03	2	1.03	0	0.00	0.03	0.00	0.23
Left lower	184	94.85	4	2.06	3	1.55	3	1.55	0.10	0.00	0.46
Pelvis	151	77.84	4	2.06	16	8.25	23	11.86	0.54	0.00	1.06
Right lower	158	81.44	9	4.64	12	6.19	15	7.73	0.40	0.00	0.91
Right flank	174	89.69	8	4.12	10	5.15	2	1.03	0.18	0.00	0.56
Central	167	86.08	5	2.58	13	6.70	9	4.64	0.30	0.00	0.79
Bowel to bowel	147	75.77	15	7.73	13	6.70	19	9.79	0.51	0.00	0.99

5.6.2 Surgery performed

Table 5.23 gives the various surgeries performed; the majority were laparoscopic appendicectomy followed by Laparoscopic cholecystectomy.

Table 5.23 Surgery performed

Surgery performed	No of patients	% of patients
B/L TAPP	4	2.06
Diagnostic laparoscopy with adhesiolysis	2	1.03
Diagnostic laparoscopy with drainage of pancreatic abscess	1	0.52
IPOM Plus	9	4.64
Laparoscopic Appendectomy	78	40.21
Laparoscopic appendectomy + Right Ovarian Cyst Excision	1	0.52
Laparoscopic appendectomy + Umbilical Henria repair	4	2.06
Laparoscopic assisted open hernia repair	1	0.52
Laparoscopic Cholecystectomy	57	29.38
Laparoscopic Cholecystectomy + Intraop cholangiogram	1	0.52
Laparoscopic Cholecystectomy + Total laparoscopic hysterectomy	1	0.52
Laparoscopic Cholecystectomy + Umbilical hernia repair	4	2.06
Laparoscopic Cystogastrostomy	1	0.52
Laparoscopic Diaphragmatic hernia repair	1	0.52
Laparoscopic drainage for Left poas abscess	1	0.52
Laparoscopic Fundoplication	1	0.52
Laparoscopic Hiatus Hernia repair + Laparoscopic Cholecystectomy	1	0.52
Laparoscopic incisional hernia repair	1	0.52
Laparoscopic plication of left diaphragm	1	0.52
Laparoscopic Posterior gastrojejunostomy	1	0.52
Laparoscopic rectopexy with posterior mesh fixation	1	0.52

Laparoscopic Splenectomy	1	0.52
Laparoscopic Subtotal Cholecystectomy	2	1.03
Laparoscopic Umbilical hernia repair	4	2.06
Laparoscopic unroofing of splenic cyst	1	0.52
Laproscopic Cellan-Jones omental patch with feeding jejunostomy	1	0.52
Laproscopic Cholecystectomy + Umbilical hernia repair	1	0.52
Open Cholecystectomy	1	0.52
TAPP	9	4.64
TEP	1	0.52
Total Laparoscopic Hysteroctomy + IPOM Plus	1	0.52
Total	194	100.00

5.6.3 Conversion to open

Table 5.24 Was surgery converted to open?

Was surgery converted to open?	No of patients	% of patients
No	192	98.97
Yes	2	1.03
Total	194	100.00

5.6.4 Extensive adhesiolysis

Table 5.25 Was extensive adhesiolysis necessary during surgery?

Was extensive adhesiolysis necessary during surgery?	No of patients	% of patients
No	165	85.05
Yes	29	14.95
Total	194	100.00

About 14% of the patients required extensive adhesiolysis (see Table 5.25) and only 1% of the surgeries performed were converted to open (see Table 5.24).

5.6.5 Scar of previous surgery

It is also observed that in 21% of the patient population with a puckered scar from previous surgeries (indicating the presence of adhesions), the puckering seems to have reduced in 78% of them post-adhesiolysis. These observations are tabulated and depicted in Table 5.26 and 5.27.

Table 5.26 Puckered scar present at previously operated site?

Puckered scar present at the previously operated site?	No of patients	% of patients
No	50	78.13
Yes	14	21.88
Total	64	100.00

Table 5.27 If puckered scar present at the site of the previous incision, did the puckering reduce?

If puckered scar is present at the site of the previous incision, did the puckering reduce?	No of patients	% of patients
No	3	21.43
Yes	11	78.57
Total	14	100.00

5.7 Postoperative pain

We can see that on the postoperative day one, there is a higher VAS score in patients with adhesions, which could be due to an injury to the parietal peritoneum during the adhesiolysis.

We can clearly see that later on, there is a pain relief in the patients is as good as the postoperative pain reduction in patients without adhesions. This has been inferred from Tables 5.28 and 5.29, and the depictions in Fig. 512 and 5.13.

Table 5.28 Comparison of with adhesion and without adhesion with VAS scores at different time points by Mann-Whitney U test

Time	Abdominal adhesion	Mean	SD	Mean rank	U-value	t-value	P-value
Day 1	Without Adhesion	3.60	2.21	85.87			
	With Adhesion	4.47	1.99	108.43	3607.00	-2.7953	0.0052*
Day 15	Without Adhesion	1.63	1.52	91.61			
	With Adhesion	1.89	1.37	103.04	4146.50	-1.4149	0.1571
6 months	Without Adhesion	0.33	0.47	95.99			
	With Adhesion	0.36	0.48	98.92	4558.00	-0.3620	0.7173

*$p<0.05$

Figure 5.12 Comparison of with adhesion and without adhesion with VAS scores at different time points

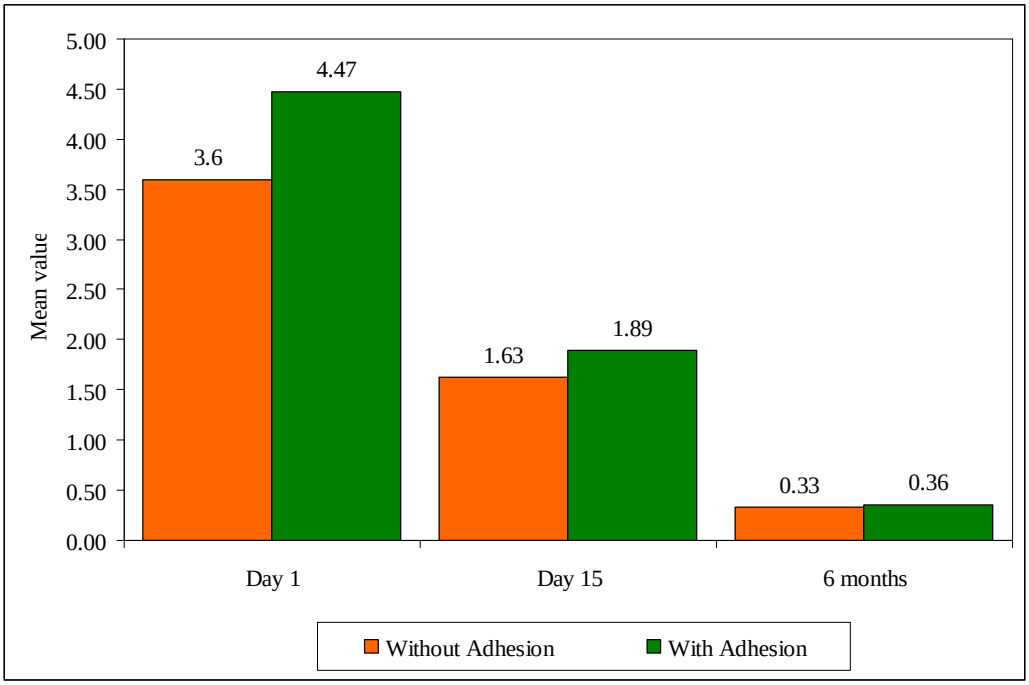
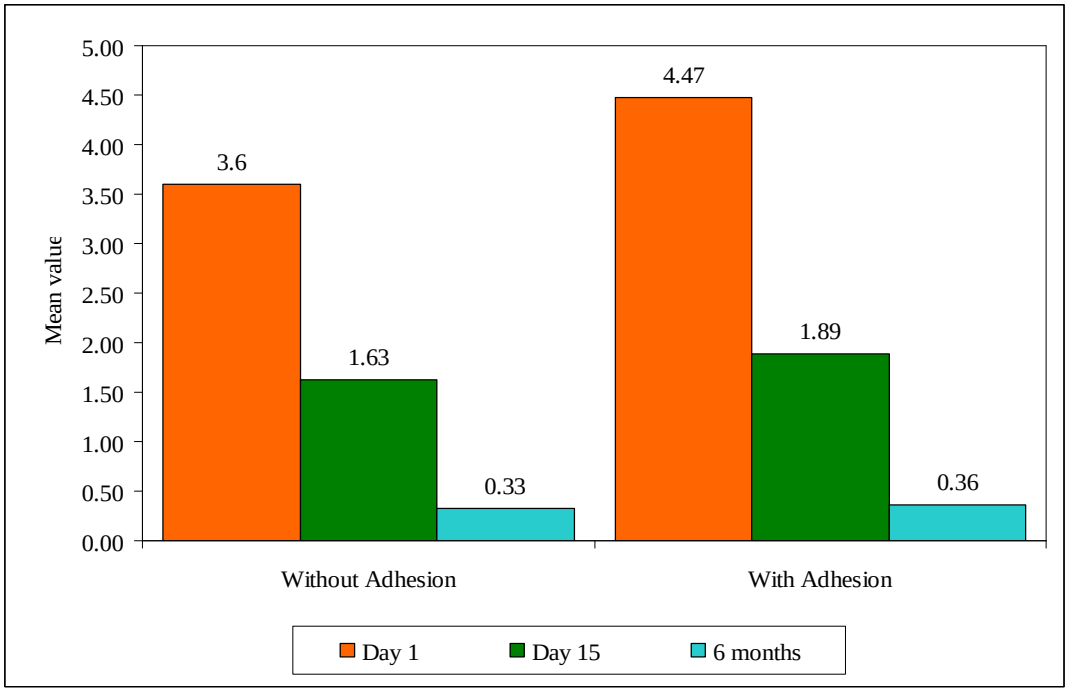


Table 5.29 Comparison of different time points with VAS scores in with adhesion and without adhesion by Mann-Whitney U test

Sample	Time points	Mean	SD	Mean Diff.	SD Diff.	% of change	Z-value	p-value
Whole	Day 1	4.05	2.14	2.28	2.07	56.43	10.6247	0.0001*
	Day 15	1.76	1.45					
	Day 1	4.05	2.14	3.70	2.03	91.46	11.4727	0.0001*
	6 months	0.35	0.48					
	Day 15	1.76	1.45	1.42	1.41	80.41	9.7698	0.0001*
	6 months	0.35	0.48					
Without	Day 1	3.60	2.21	1.97	2.15	54.73	6.8876	0.0001*
	Day 15	1.63	1.52					
	Day 1	3.60	2.21	3.27	2.06	90.83	7.8181	0.0001*
	6 months	0.33	0.47					
	Day 15	1.63	1.52	1.30	1.45	79.74	6.4397	0.0001*
	6 months	0.33	0.47					
With	Day 1	4.47	1.99	2.58	1.95	57.72	8.0119	0.0001*
	Day 15	1.89	1.37					
	Day 1	4.47	1.99	4.11	1.93	91.95	8.4186	0.0001*
	6 months	0.36	0.48					
	Day 15	1.89	1.37	1.53	1.37	80.95	7.3623	0.0001*
	6 months	0.36	0.48					

*$p<0.05$

Figure 5.13 Comparison of different time points with VAS scores in with adhesion and without adhesion



5.8 Results summary & analysis

Table 5.30 Multiple logistic regression analysis of the prevalence of adhesions

Factors	Unadjusted OR	95% CI for OR		p-value	Adjusted OR	95% CI for OR		p-value
		Lower	Upper			Lower	Upper	
Age groups								
<=20yrs	Ref.				Ref.			
21-30yrs	0.74	0.40	1.38	0.3450	0.43	0.18	1.03	0.0590
31-40yrs	1.18	0.67	2.09	0.5640	0.49	0.21	1.12	0.0910
41-50yrs	1.77	0.97	3.20	0.0610	0.76	0.32	1.81	0.5380
51-60yrs	1.29	0.48	3.45	0.6180	0.49	0.14	1.71	0.2630
>=61yrs	1.20	0.52	2.78	0.6700	0.53	0.18	1.56	0.2460
Gender								
Male	Ref.				Ref.			
Female	1.45	1.00	2.10	0.0500*	1.21	0.61	2.41	0.5930
Pain abdomen								
No	Ref.				Ref.			
Yes	1.28	0.92	1.78	0.1370	1.14	0.63	2.06	0.6670
Bloating of abdomen								
No	Ref.				Ref.			
Yes	3.50	1.15	10.63	0.0270*	2.84	0.82	9.83	0.0990
Previous surgery								
No	Ref.				Ref.			
Yes	3.27	1.83	5.83	0.0001*	-	-	-	-
Number of surgeries								
No	Ref.				Ref.			
One	2.62	1.38	4.96	0.0030*	-	-	-	-
Two	6.00	1.34	26.81	0.0190*	-	-	-	-
Three	-	-	-	-	-	-	-	-

Hypertension								
No	Ref.				Ref.			
Yes	1.40	0.44	4.41	0.5660	0.93	0.22	3.90	0.9210
Diabetes								
No	Ref.				Ref.			
Yes	2.50	0.97	6.44	0.0580	2.21	0.70	7.04	0.1790
Hypothyroidism								
No	Ref.				Ref.			
Yes	0.50	0.13	2.00	0.3270	0.37	0.07	2.11	0.2650
Levels of haemoglobin								
Normal	Ref.				Ref.			
Anaemia	1.50	0.90	2.51	0.1240	0.94	0.45	1.97	0.8730
Levels of albumin								
Normal	Ref.				Ref.			
Hypo	1.63	0.67	3.92	0.2800	1.02	0.35	2.92	0.9780

*$p<0.05$

Table 5.31 presents the consolidated multiple logistic regression analysis of the prevalence of adhesions with age, gender, previous surgeries, comorbidities like hypertension, diabetes, hypothyroidism, haemoglobin levels and mean albumin levels.

Table 5.31 Association between the status of pain and status of adhesion

Status of Adhesion	Status of pain																	
	A - Right upper		B - Epigastrium		C - Left upper		D - Left flank		E - Left lower		F - Pelvis		G - Right lower		H - Right flank		I - Central	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
A - Right upper																		
No	88	21																
Yes	0	17																
B - Epigastrium																		
No			95	25														
Yes			2	4														
C - Left upper																		
No					123	2												
Yes					1	0												
D - Left flank																		
No							121	4										
Yes							0	1										

E - Left lower																		
No									122	0								
Yes									2	2								
F - Pelvis																		
No											85	11						
Yes											24	6						
G - Right lower																		
No													41	54				
Yes													2	29				
H - Right flank																		
No															107	6		
Yes															10	3		
I - Central																		
No																	81	35
Yes																	4	6

5.8 Summary of the results:

Of 194 subjects enrolled, 100 had adhesions.

The study shows:

- The incidence of adhesions is increasing with age and is more in females.
- Pain abdomen is the dominating symptom of adhesions.
- Patients with a complaint of bloating are more likely to have adhesions
- A higher number of surgeries leads to adhesions.
- LSCS seems to be the highest risk factor, followed by tubectomy. In general surgery, open appendectomy is a significant risk factor.
- Reduction of the puckering of a puckered scar is seen after adhesiolysis.
- Higher BP, Diabetes, and anaemia lead to more probability of adhesions
- Surprisingly, subjects with hypothyroidism are seen to develop fewer adhesions.

DISCUSSION

The internal tissues and organs in the human body have slippery surfaces inhibiting them from getting attached due to body movements. Any imbalance between the pro-inflammatory and anti-inflammatory substances may lead to the formation of adhesions. Most adhesions tend to happen in the abdomen due to its roomy cavity and many viscera. The problem with adhesions is that they can cause pain or alter/restrict the movements of the gut leading to possible obstructions. The post-operative adhesions are random and unpredictable and are the most predominant cause of acute small bowel obstructions.

The incidence and prevention of intra-abdominal adhesions represent an under-researched problem and received little attention in the medical literature. Towards addressing this lacuna, our primary intention is to study the incidence of adhesions in laparoscopic surgery patients in our study.

The incidence of abdominal adhesions has been studied with about 194 subjects undergoing elective Laparoscopic Surgery. The sample size chosen is convenient due to the reduced patient population and the covid-19 pandemic restrictions. However, the size was also restricted due to the non-availability of the videos for all the patients who underwent laparoscopic surgeries. Further, the study included only laparoscopic surgeries, in which the study team is involved either in observation, assisting, or performing.

The prevalence of adhesions in our study is about 51.55%, which is higher than in other studies. This higher prevalence may be attributed to the fact that: the hospital where the study was conducted is a Tertiary Care Hospital, where typically complicated cases and referral cases are operated. Moreover, laparoscopy, where

laparoscopic procedures were performed for many other causes and not just a diagnostic purpose only.

The mean age of the sample population is 39 years, and an increase in the age was associated with a higher incidence of adhesions. This phenomenon may be attributed to the possibility that the patient might have undergone more surgeries with an increase in age.

Around 59% of the study population was female. Furthermore, tubectomy (open> laparoscopic) was the most common surgery associated with a higher incidence of adhesions. However, further detailed studies are needed to establish this association definitively.

The percentage of patients with pain abdomen who did not have adhesions was 24.74%, while that of the patients with pain abdomen who had adhesions was 75.26%. The analysis of the symptoms, primarily pain abdomen, which was a predominantly colicky type, and the localisation of pain helped locate the adhesion site. The association seems significant, but a definitive association of pain abdomen with adhesion might require more studies. We learnt from the literature before the study that abdominal adhesions are often considered a cause of pain abdomen, especially in patients who have had previous surgeries. However, this correlation was considered to be controversial. We also hypothesised that adhesions are causing localised peritoneal pain, and diagnostic laparoscopy can help clarify the cause-and-effect relationship between intra-abdominal adhesion and pain abdomen. The preoperative pain was also hypothesised to be due to adhesions in that area due to which the peritoneum (as it is innervated) is pulled by the viscera. We found that our study strengthened the hypothesis made prior to our study

However, the most common area of pain abdomen was localised to the right upper quadrant. The pain in this area corresponds to Calculous cholecystitis in the patient population. The adhesions were graded using Peritoneal Adhesion Index (PAI). This grading methodology has been beneficial and given a quantitative assessment wherein we could quantify the impact of the adhesions apart from just pointing out their incidence. The score has indicated filmy adhesions in the right upper abdomen area with a score of 8, strong adhesions in the pelvis area with a score of 16, and very strong adhesions in the right upper and lower abdomen areas apart from the bowel-to-bowel adhesions. This PAI scoring system has given valuable input to location and possibly the type of earlier surgeries the patient has gone through. Appendicectomy is our study's most common surgery that gives rise to abdominal adhesions.

The observations in our study also supported the observations derived from the PAI score, wherein the most common preoperative diagnosis was acute appendicitis, followed by cholelithiasis. Patients with acute calculous cholecystitis had a higher incidence of adhesions followed by the empyema gall bladder, recurrent appendicitis or appendicular mass. The most common area where adhesions were found to be highest was in the right upper quadrant.

Our studies also observed that the pain was high soon after the surgery (for example, post-op day 1) in patients with adhesions, and adhesiolysis was performed. The more severe pain is possibly due to trauma of adhesiolysis and mesothelial injuries. The pain has drastically reduced by post-op day 15 and is comparable to those without adhesions.

The second objective of our study is to identify various risk factors for adhesion formation, and symptoms associated with their presence were studied and found some exciting observations.

Primarily, the number of surgeries performed on a patient has significantly increased the incidence of adhesions. We have also seen a robust correlation between the number of the history of surgeries to the incidence of adhesions. Our observations are corroborated by similar studies in the literature(49,56–64). In our study, in a patients with history of one surgery, there was a 72% incidence which increased to 85.71% in patients with a history of 2 surgeries. Moreover, the presence of adhesions was almost inevitable (100%) in a patient with a history of 3 surgeries. In our study, the most common history of the surgery performed was LSCS, followed by tubectomy.

Other risk factors associated with the incidence of adhesions seem to be comorbidities: With Hypertension and Diabetes, although they were not statistically significant, there was a slight increase in adhesions. This increase could be attributable to an increased risk of infections (ex., appendicitis, cholecystitis, pelvic inflammatory disease) due to an immunocompromised state in diabetic patients. However, more studies are needed to establish these associations.

Another interesting observation from the study is that with hypothyroidism, there is a statistically significant decrease in the incidence of adhesions. It is probably due to a decrease in basal metabolic rate and an associated decrease in the strength of the inflammatory response.

Anaemia is found to be a statistically significant factor in increasing the incidence of adhesion. More detailed studies have to be performed to understand this association as well. Nutritional status in terms of Albumin and Haemoglobin

concentration was found to affect the incidence of adhesion, wherein poor nutrition has increased the risk of infections. Patients with Hypoalbuminemia had a higher incidence of adhesions, although not statistically significant.

The study has firmly brought out factors associated with the incidence of abdominal adhesions with respect to demographic factors like age and gender; and past history of surgeries. The fact that multiple surgeons did the surgeries removes the possible risk factor due to the surgeon's skill. PAI scoring system has quantified the impact due to adhesions. It also brought out interesting associations with risk factors like comorbidities like hypertension, diabetes, hypothyroidism, and anaemia.

CONCLUSION

Standardized clinically focused recommendations for the diagnosis, treatment, assessment, and strategies for minimizing adhesions are urgently needed. Intra-abdominal adhesions are a major problem that place a heavy financial, emotional, and emotional toll on patients, doctors, and healthcare systems.

The incidence of abdominal adhesions has been studied with about 194 subjects undergoing Laparoscopic Surgery. The prospective observational study was conducted between Jan-Dec 2021. Intraoperative videos were analysed after clinical examination on admission to document adhesions. At postoperative days 1, 15, and 180 days, abdominal pain was assessed and compared with the pre-operation pain. The adhesions were graded using Peritoneal Adhesion Index (PAI). Various risk factors for adhesion formation and symptoms associated with their presence were studied, and found some exciting observations viz.,

- Pain abdomen is the dominating symptom of adhesions.
- Adhesions are generally showing up as bloating.
- A higher number of surgeries leads to adhesions.
- LSCS seems to be the highest risk factor, followed by tubectomy. In general surgery, open appendectomy is a significant risk factor.
- Reduction of the puckering of a puckered scar is seen after adhesiolysis.
- Higher BP, Diabetes, and anaemia lead to more probability of adhesions
- Surprisingly, subjects with hypothyroidism are seen to develop fewer adhesions.

In summary, abdominal adhesions result from surgeries. They have a definite correlation to age, gender, pain abdomen, bloating, number of previous surgeries, and comorbidities like hypertension, Diabetes, Hypothyroidism, and Anaemia.

SUMMARY

Abdominal surgeries result in random and unpredictable adhesion formation. Further, adhesions that form after surgery are the leading cause of acute small bowel obstruction. Diagnostic laparoscopy is a minimally invasive surgical treatment that allows for a visual examination of intra-abdominal organs to diagnose disease. Once the laparoscope is inserted into the abdomen, the whole liver, stomach, small and large intestines, gallbladder, spleen, peritoneum, and pelvic organs may be observed on display. Essentially every laparoscopy is a diagnostic laparoscopy.

In open surgeries, all the organs are not completely visible. We can only see the organs exposed by the incision. Therefore, various organs need to be handled during the surgical procedure to make them visible correctly and increase the risk of adhesions. However, in laparoscopy, all the quadrants of the abdomen can be visualised.

Normally, the internal organs and tissues of the body have smooth surfaces that prevent them from adhering to one another and becoming stuck when the body moves. Adhesions, on the other hand, are bands and bundles of fibrous tissue that develop between the organs and tissues of the abdomen. When these adhesions form, they may bend, twist, or drag the small or large intestine out of the plane, resulting in intestinal obstruction and a full or partial blockage of bowel movement or faeces.

Adhesions are not always easy to spot with current imaging technology or in the lab since they lack any defining characteristics. Healthcare personnel will be faced with a diagnostic and therapeutic conundrum as a consequence of the failure to promptly identify many instances of intra-abdominal adhesions. Prolonged symptoms and unfavourable medical outcomes aren't the only things patients have to worry about; they may also experience significant emotional distress or demoralization that

gets mislabelled as depression, anxiety, or a functional bowel disorder despite extensive non-diagnostic testing and haphazard treatments.

Abdominal adhesions are often considered a cause of pain abdomen, especially in patients who have had previous surgeries. However, this correlation is controversial. We hypothesise that adhesions are causing localised peritoneal pain. So, diagnostic laparoscopy can help clarify the cause-and-effect relationship between intra-abdominal adhesion and pain abdomen.

Standardized clinically focused recommendations for the diagnosis, treatment, assessment, and strategies for minimizing adhesions are urgently needed. Intra-abdominal adhesions impose a significant cost on patients, providers, and healthcare systems.

In this study, the incidence of abdominal adhesions has been studied with about 194 subjects undergoing elective Laparoscopic Surgery. The prospective observational study was conducted between Jan-Dec 2021. The subjects were all above 18 years of age. Intraoperative videos were analysed after clinical examination on admission to document adhesions. At postoperative days 1, 15, and 180 days, an assessment of pain at the site of adhesions was noted and compared with the pre-operative pain. The adhesions were graded using Peritoneal Adhesion Index (PAI). Various risk factors for adhesion formation and symptoms associated with their presence were studied, and found some intriguing observations viz.,

- Pain abdomen is the dominating symptom of adhesions.
- Patients with a complaint of bloating are more likely to have adhesions
- A higher number of surgeries leads to adhesions.
- LSCS seems to be the highest risk factor, followed by tubectomy. In general surgery, open appendectomy is a significant risk factor.

- Reduction of the puckering of a puckered scar is seen after adhesiolysis.
- Higher BP, Diabetes and anaemia lead to more probability of adhesions
- Surprisingly, subjects with hypothyroidism are seen to develop fewer adhesions.

In summary, abdominal adhesions result from surgeries. They have a definite correlation to age, gender, pain abdomen, bloating, number of previous surgeries, and comorbidities like hypertension, Diabetes, Hypothyroidism, and Anaemia.

SCOPE AND LIMITATIONS

8.1 Scope of the study

The scope of the study include

- To investigate the incidence of abdominal adhesions in patients undergoing laparoscopic surgery.
- Using Peritoneal Adhesion Index (PAI) to grade adhesions
- To identify the risk factors for adhesion formation and symptoms associated with their presence and
- To identify relief of the symptoms post adhesiolysis.

8.2 Strengths & Limitations

Strengths of the study

The study has firmly brought out factors associated with the incidence of abdominal adhesions with respect to demographic factors like age and gender; and past history of surgeries. The fact that multiple surgeons did the surgeries removes the possible risk factor due to the surgeon's skill. PAI scoring system has quantified the impact due to adhesions. It also brought out interesting associations with risk factors like comorbidities like hypertension, diabetes, hypothyroidism, and anaemia.

Limitations of the study

The sample size could have been much larger, but for the limitations of lower patient load due to covid pandemic and lack of complete patient data like videos. It is imperative to take videos of all the surgeries to provide good photographic evidence. In addition, more cases with no past history of surgeries could have given more conclusive affirmation of the risk factors due to surgeries for the incidence of adhesions. Another limitation of the study is that all the adhesiolysis procedures were done at a single centre, though multiple surgeons did them.

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ANNEXURE I: CONSENT

FOR PARTICIPATION IN RESEARCH STUDY

Information Sheet and Consent Form

This informed consent form is for men and women attending and admitted under various departments of KLES Dr. Prabhakar Kore Hospital & MRC whom we are inviting to participate in the study "Intra-Abdominal Adhesions: A prospective observational study of the incidence, Peritoneal Adhesion Index (PAI) based distribution & severity in a tertiary care hospital."

Study title : *"Intra-Abdominal Adhesions: A prospective observational study of the incidence, Peritoneal Adhesion Index (PAI) based distribution & severity in a tertiary care hospital."*

Conducted by REG NO: BH0120003 , Post Graduate Resident in M.S. General Surgery under the guidance of , Associate Professor, Department of General Surgery, Jawaharlal Nehru Medical College, Belagavi under KAHER, Belagavi.

This Informed Consent Form has two parts:
I. Information Sheet (information about the study)
II. Certificate of Consent (for signatures if you choose to participate)

Part I: Information Sheet

Introduction: We are doing research on intra-abdominal adhesions. We are giving you information and inviting you to be part of this research study. Before you agree to participate in this study, you can talk to anyone you feel comfortable with about the study as it is important that you read and understand the following explanation of the proposed study. This document describes the purpose, risks, and precautions of the study. You also have the right to withdraw from the study at any time. No guarantee or assurances can be made as to the results of the study.

If you are not completely truthful regarding your health history, you may harm yourself by participating in this study.

After you completely review each page of the document you should personally put your initials and date in this document. If you do not understand any part of this document, you may clarify your doubts.

Background: You are being asked to take part in this study because you meet the selection criteria for the study. You will be undergoing laparoscopic surgery under general anaesthesia.

Purpose of this study: The purpose of the study is to investigate the incidence of intra-abdominal adhesions. Using Peritoneal Adhesion Index to grade adhesions. And to identify risk factors for their formation and symptoms associated with their presence and also any resolvent in the symptoms post adhesiolysis. The study will take place in and around the city of Belagavi; and will involve approximately 84 subjects. We believe that you can help us better understand intra-abdominal adhesions, if you agree to participate and meet the qualifications for the study, you will be enrolled into the study.

Study design and procedure: It is a prospective observational study. A proforma was created best suited for our study. Data will be collected and analyzed by using Microsoft excel and SPSS version 20 and then the data will be properly tabulated and represented in the form of percentages in different populations, genders and ages.

Has this study obtained the ethical committee approval? This clinical study has been approved by the institutional ethics review board of J N Medical college, KLE university, Belagavi- 590010

Potential risks and side effects: There is no increased risk involved in being a part of this study and the complications are those which are normally anticipated.

Financial Incentives for participation: This is an academic project conducted to understand more about

intra-abdominal adhesions as a disease in respect to Indian population. There is no charge for participation; you will not be paid to participate in this clinical study. There will be no compensation what so ever.

Confidentiality: Records of your participation in this study will be kept confidential to the extent allowed by the laws and regulations. Study related medical documents that identify you and the informed consent form by you, may be examined by the ethics committee. Your full name will not appear in any information collected and submitted. When the results of the research are published, or discussed in a conference, no information will be displayed that would disclose your identity. Any information that is obtained in this study that can be associated with your identity will remain confidential.

Voluntary participation: Your participation in research is voluntary. It is your choice whether to participate or not. Your decision whether to participate in the study or not will not change present or future health care services offered to you and will not affect your relationship with J.N. Medical College / KLES Dr. Prabhakar Kore Hospital & MRC. If you choose not to participate in this study, you will still be offered the routine treatment that is given at our hospital. You will continue to receive the routine care at our hospital even if you decline to participate in this study. If you decide to participate you are free to withdraw at any time.

Part II: Certificate of Consent

I, Mr/Ms/Mrs. _____ have been invited to participate in a research study titled "Intra-Abdominal Adhesions: A prospective observational study of the incidence, Peritoneal Adhesion Index (PAI) based distribution & severity in a tertiary care hospital". I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s). I consent voluntarily to be a participant in this study

Name of Participant: _____

Signature or Left Thumb Print of Participant: _____

Date (dd/mm/yyyy): _____

If a patient has limited ability to read and write, In these instances the patient his/her thumb impression in the place of the signature.

Patient's Legally Acceptable Representative's Statement

I, Mr/Ms/Mrs. _____ as the patient's legally acceptable representative, was present during the consenting procedure and understand the preceding information describing this study. All of the questions regarding the study and the patient's participation in it have been answered to my satisfaction and that of the patient. I state that all aspects of the study were clearly presented during the consent procedure. The patient is willing to participate in the study and I sign below on his/her behalf testifying to this effect.

Name of Participant:_____

Name of the Legally Acceptable Representative: _____

Relationship to the participant: _____

Signature of the Legally Acceptable Representative: _____

Date (dd/mm/yyyy): _____

Statement by the researcher/person taking consent

The participant signing this consent form has fully understood the study and has been well informed about the study as well. I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher/person taking the consent: _____

Signature of Researcher /person taking the consent: _____

Date (dd/mm/yyyy):): _____

THANK YOU FOR YOUR COOPERATION

Participant Details:

Name: _____ _____ _____
(First name) *(Middle name)* *(Last name)*

Gender: Male / Female

Email id: _____

Phone Number: | | | | | | | | | | |

IP No: | | | | | | | |

Unique participant ID: | Name | | M/F | Last three digits of the IP no. | | |

(For use by the investigators only)

ANNEXURE II: PROFORMA

Proforma

The proforma is for the study titled "Intra-Abdominal Adhesions: A prospective observational study of the incidence, Peritoneal Adhesion Index (PAI) based distribution & severity in a tertiary care hospital".

Unique participant ID: | | | | | | |

Informed consent taken? Y/N

Date of consent: d d m m y y y y

Demographic data:

Age: | | years old **Gender:** M/F

Height: | | | cm **Weight:** | | | kg

Address: 1-Belagavi, 2-Outside Belagavi

Occupation: 1-Unemployed, 2-Unskilled, 3-Semi-skilled, 4-Skilled, 5-Professional

Education: 1-Illiterate, 2-Primary(1^{st}-7^{th}std.), 3-High school(8^{th}-10^{th}std.), 4-Intermediate, 5-Degree & above

Socio-economic status: 1-Low, 2-Middle, 3-High

Date of Admission: d d m m y y y y

Date of interview: d d m m y y y y

Date of Surgery: d d m m y y y y

Date of Discharge: d d m m y y y y

History :

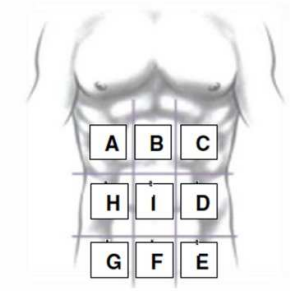
Pain Abdomen: Y/N

If yes,

Describe the pain: 1-sharp, 2-stabbing, 3-burning, 4-colicky, 5-dull

Area affected: 1-genralized, 2-localized ☐

If localized, area affected (Please tick ✓ the suitable area):



Bloating of abdomen: Y/N

Signs of obstruction: Y/N

Past history of abdominal tuberculosis: Y/N

Past history of radiation treatment: Y/N

Past history of female infertility: Y/N

Past history of surgeries:

Sl. no	Date of surgery	Surgery Performed	Incision used	Indication for the surgery	Scar & type of healing
1					
2					
3					
4					
5					
6					

On Examination:

General physical examination:

Pallor / Icterus / Cyanosis / Clubbing / Oedema / Lymphadenopathy

Vital Signs: Febrile/Afebrile; Pulse: _____ bpm; BP: _____ mmHg; RR: _____ cpm

Abdomen:

Cardio Vascular System:

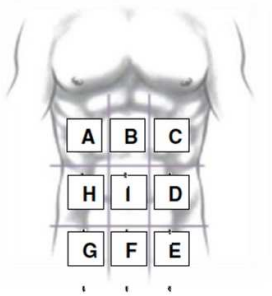
Respiratory System:

Clinical Impression:

Surgery being performed:

Intra operative findings:

PERITONEAL ADHESION INDEX:



Regions:	Adhesion grade:
A Right upper	____
B Epigastrium	____
C Left upper	____
D Left flank	____
E Left lower	____
F Pelvis	____
G Right lower	____
H Right flank	____
I Central	____
L Bowel to bowel	____

Adhesion grade score:

0 No adhesions

1 Filmy adhesions, blunt dissection

2 Strong adhesions, sharp dissection

3 Very strong vascularized adhesions, sharp dissection, damage hardly preventable

PAI ☐

Was the surgery converted to laparotomy? Y/N

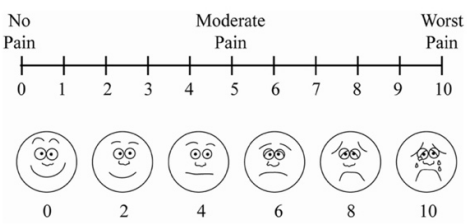
Was extensive adhesiolysis necessary during surgery? Y/N

Post-operative

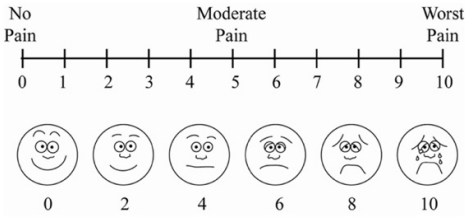
If puckered scar is present at the site of previous incision then, did the puckering reduce? Y/N

If pre-operatively partial pain abdomen is present in the area of adhesions found intra-operatively then Visual pain index is done on day 1 and 15 post op.

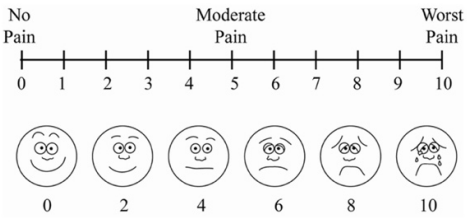
Day 1



Day 15



Day 180



Remarks:

Intra-Abdominal Adhesions: A prospective observational study of the incidence, Peritoneal Adhesion Index (PAI) based distribution & severity in a tertiary care hospital

Sl. No	Demographic			History & Examination																												Diagnosis	Intra operative findings										Surgery performed	Was surgery converted to open? (yes/no)	Was extensive adhesiolysis necessary during surgery?	Post operative			
				Pain Abdomen																													PAI																
							If, localised, area affected																																											
	Unique Patient Id	Age	Gender (M/F)	Pain Abdomen (Yes/No)	Describe the pain (1-sharp, 2-stabbing, 3-burning, 4-colicky, 5-dull, 6-dragging)	Area affected (1-generalised, 2-localised)	A - Right upper	B - Epigastrium	C - Left upper	D - Left flank	E - Left lower	F - Pelvis	G - Right lower	H - Right flank	I - Central	Bloating of abdomen (Yes/No)	Signs of obstruction (Yes/No)	Past history of TB (Yes/No)	Past history of radiation therapy (Yes/No)	If female, h/o Pelvic inflamatory disease (Yes/No)	If female, h/o infertility (Yes/No)	Previous surgeries? (Yes/No)	Number of surgeries	Time elapsed since last surgery in months	Past Surgery 1	Past surgery 2	Past surgery 3 & more	Puckered scar present at previously operated site ?	HTN	DM	Hypothyroidism	Hb	Alb		A - Right upper	B - Epigastrium	C - Left upper	D - Left flank	E - Left lower	F - Pelvis	G - Right lower	H - Right flank	I - Central	L - Bowel to bowel	TOTAL				Day1	Day 15	6 months
1	RSF5155	36	F	Yes	3	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	1	360	Open Appendicectomy	N/A	N/A	No	No	No	No	11	3.5	Cholelithiasis	0	0	0	0	0	0	3	0	0	0	3	Laparoscopic Cholecystectomy	No	No	N/A	3	4	1
2	SSF6239	32	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	1	48	LSCS	N/A	N/A	No	No	No	No	9.7	4	Acute Appendicitis	0	0	0	0	0	0	1	0	0	2	3	Laparoscopic Appendectomy	No	No	N/A	7	0	1
3	VSM7728	50	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	11	4.2	Hiatus Hernia + Cholelithiais	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Hiatus Hernia repair + Laparoscopic Cholecystectomy	No	No	N/A	2	0	0
4	KHF8642	50	F	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	No	11	4.5	Calculous Cholecystitis	3	0	0	0	0	0	0	0	0	0	3	Laparoscopic Cholecystectomy	No	No	N/A	5	0	1
5	VSF9801	30	F	Yes	5	2	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	1	84	LSCS	N/A	N/A	No	No	No	No	14	4.2	Acute Appendicitis + Right Ovarian Cyst	0	0	0	0	0	2	2	0	0	0	4	Laparoscopic Appendectomy + Right Ovarian Cyst Excision	No	No	N/A	3	4	0
6	ANF0186	43	F	Yes	4	2	Yes	Yes	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	1	96	LSCS	N/A	N/A	No	No	No	No	11	4.5	Calculous Cholecystitis	2	0	0	0	0	0	0	0	0	0	2	Laparoscopic Cholecystectomy	No	No	N/A	6	2	1
7	MNF0855	38	F	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	No	No	No	No	Yes	2	12	Tubectomy i/v/o ectopic pregnancy	Laproscopic Oopherectomy	N/A	No	No	No	No	11	4.1	Irreducible Incisional Hernia(umbilical port site) + Fibroid Uterus	0	0	0	0	0	0	0	0	3	3	6	Total Laparoscopic Hysteroctomy + IPOM Plus	No	Yes	N/A	7	4	1
8	AMF4785	40	F	Yes	4	2	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	1	240	LSCS	N/A	N/A	No	No	No	No	10	3.7	Empema Gall Bladder	3	1	0	0	0	0	0	2	0	0	6	Laparoscopic Subtotal Cholecystectomy	No	Yes	N/A	7	2	1
9	SCF3528	29	F	Yes	5	2	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	Yes	3	48	LSCS	LSCS	LSCS + Tubectomy	No	No	No	Yes	9.8	4.7	Spleenomegaly secondary to hereditary Spherocytosis	0	0	0	0	0	3	0	0	0	0	3	Laparoscopic Splenectomy	No	No	N/A	3	4	0
10	SJM3656	31	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.1	Acute Appendicitis	0	0	0	0	0	0	1	0	0	1	2	Laparoscopic Appendectomy	No	No	N/A	4	0	1
11	KPF4024	45	F	Yes	4	2	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	1	240	Open Tubectomy	N/A	N/A	No	No	No	No	13	4.1	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	4	1	0
12	SBF4336	25	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	1	24	LSCS	N/A	N/A	No	No	No	No	13	4.1	Acute Appendicitis	0	0	0	0	0	0	1	0	0	1	2	Laparoscopic Appendectomy	No	No	N/A	6	3	1
13	RDM7350	19	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	Yes	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.1	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	0	1
14	SPF9407	28	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	3.8	Acute Appendicitis	0	0	0	0	0	0	0	0	0	1	1	Laparoscopic Appendectomy	No	No	N/A	7	1	1
15	SHM0230	18	M	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	17	4.5	Acute Appendicitis	0	0	0	0	0	0	2	0	0	1	3	Laparoscopic Appendectomy	No	No	N/A	5	1	0
16	GKM7284	43	M	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.8	Acute Appendicitis	0	0	0	0	0	0	1	0	0	1	2	Laparoscopic Appendectomy	No	No	N/A	6	0	1
17	MMM7947	29	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	4	Acute Appendicitis	0	0	0	0	0	0	2	0	0	1	3	Laparoscopic Appendectomy	No	No	N/A	6	2	0
18	GGF9570	53	F	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	3.6	Cholilithiasis + Paraumbilical Hernia	1	2	0	0	0	0	0	3	3	9	Laparoscopic Cholecystectomy + Umbilical hernia repair	No	Yes	N/A	6	3	0
19	SKM9566	36	M	Yes	5	2	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	2.8	Recurrent Appendicitis with appendicular mass	0	0	0	0	0	1	3	2	0	3	9	Laparoscopic Appendectomy	No	Yes	N/A	7	2	1
20	SPF9745	23	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.3	Acute Appendicitis	0	0	0	0	0	0	1	0	0	1	2	Laparoscopic Appendectomy	No	No	N/A	7	2	1
21	NNF0529	64	F	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	No	14	4.2	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	3	3	1
22	NHM7184	72	M	Yes	5	2	No	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	3.7	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	4	0
23	SPF7511	48	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	216	Open Tubectomy	N/A	N/A	Yes	No	No	No	12	4	Cholelithiasis	0	0	0	0	0	2	0	0	0	0	2	Laparoscopic Interval Cholecystectomy	No	No	Yes	2	0	0
24	SSF9261	29	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.4	Cholelithiasis + Umbilical Hernia	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy + Umbilical hernia repair	No	No	N/A	0	0	0
25	BSF0392	24	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	2	1
26	SPF1862	32	F	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	No	Yes	No	Yes	1	120	Laproscopic Sterilization	N/A	N/A	No	No	No	No	13	4.5	Subacute Appendicits with Appendicilith + Umbilical Hernia	0	0	0	0	2	2	2	1	0	1	8	Laparoscopic Appendectomy + Umbilical Henria repair	No	Yes	N/A	3	3	1
27	RLF4158	51	F	Yes	5	2	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.4	Acute Appendicitis + Mesentric Lumphadinitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy + Mesentric Lymphnode biopsy	No	No	N/A	4	2	0
28	VDM7244	43	M	Yes	5	2	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	9	2.6	Chronic Calcific Pancreatitis with pseudocyst	0	0	0	0	0	0	0	0	0	1	1	Laparoscopic Cystogastrostomy	No	No	N/A	7	0	0
29	RAM8638	42	M	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	3.9	Right Inguinal Hernia	0	0	0	0	0	0	0	0	0	0	0	TEP	No	No	N/A	5	3	1
30	RTM0268	32	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	3.3	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	1	0

31	**HAM2623**	28	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.1	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	4	4	1
32	**VSM4364**	48	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	Yes	1	360	Open Appendicectomy	N/A	N/A	No	No	No	No	15	4.3	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy	No	No	N/A	2	1	0
33	**GNF5308**	27	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	2	12	LSCS	Laproscopic Ectopic Pregnancy Evacuation	N/A	No	No	No	No	13	4.1	Acute Appendicitis	0	0	0	0	0	2	1	0	0	1	4	Laparoscopic Appendectomy	No	No	N/A	3	1	1
34	**SKF7724**	39	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.2	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	2	0	0
35	**MKM9377**	50	M	Yes	5	2	Yes	Yes	No	Yes	No	No	No	No	Yes	No	No	No	No	N/A	N/A	Yes	2	60	Open Appendicectomy	Incisional Hernia Repair	N/A	No	No	No	No	14	4.3	Cholilithiasis + Chronic Calcific Pancreatitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy	No	No	N/A	7	2	1
36	**GBM5919**	19	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.1	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	4	0
37	**NNM5930**	34	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4	Subacute Appendicits	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	1	1
38	**SPF6220**	43	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	12	3.9	Recurrent Appendicitis with appendicular mass	0	0	0	0	0	2	3	1	0	2	8	Laparoscopic Appendectomy	No	Yes	N/A	4	4	0
39	**SBF7446**	58	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.8	Chronic cholecystitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy	No	No	N/A	1	0	0
40	**LGF3119**	70	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.1	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	0	0	0
41	**SSF5899**	62	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	11	3.9	Acute Appendicitis	0	0	0	0	0	2	3	2	0	3	10	Laparoscopic Appendectomy	No	Yes	N/A	4	2	0
42	**VYM5971**	25	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	4.2	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	2	0
43	**MKM4854**	60	M	Yes	5	2	Yes	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No	N/A	N/A	Yes	1	300	Open Appendicectomy	N/A	N/A	No	No	No	No	16	4.1	Cholelithiasis + Umbilical Hernia	0	0	0	0	0	0	0	0	2	2	4	Laproscopic Cholecystectomy + Umbilical hernia repair	No	No	N/A	6	1	0
44	**SGF6777**	30	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.6	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	1	1
45	**IIF8789**	31	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	2	24	LSCS	Incisional Henia Repair	N/A	No	No	No	No	14	4.3	Right ventral hernia with omenrocele	0	0	0	0	0	3	0	3	3	3	12	IPOM Plus	No	Yes	N/A	1	0	0
46	**GPM9554**	21	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.3	B/L Indirect Inguinal Hernia	0	0	0	0	0	0	0	0	0	0	0	B/L TAPP	No	No	N/A	1	0	0
47	**DJF0041**	49	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.1	Acute Calculous Cholecystitis	2	0	0	0	0	0	0	0	0	0	2	Laparoscopic Cholecystectomy			N/A	6	4	1
48	**MNM1136**	28	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.5	Left irreducible indirect inguinal hernia with omentocele	0	0	0	0	3	0	0	0	0	0	3	TAPP	No	No	N/A	1	0	0
49	**LGF1780**	31	F	Yes	5	2	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	Yes	1	72	Total Abdominal Hysterectomy	N/A	N/A	Yes	No	No	No	13	4.6	Pain Abdomen under evaluation	0	0	0	0	3	3	3	0	0	3	12	Diagnostic laparoscopy with adhesiolysis	No	Yes	Yes	4	4	0
50	**VMF3346**	33	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	Yes	9.4	4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	1	1
51	**SNF3290**	40	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	2	168	LSCS	LSCS	N/A	Yes	No	No	No	11	3.9	Acute Calculous Cholecystitis	0	0	0	0	0	2	0	0	0	0	2	Laparoscopic Cholecystectomy	No	No	Yes	5	2	0
52	**PNM3671**	33	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	Yes	1	120	Left Open Hernia Repair	N/A	N/A	No	No	No	No	16	5	Left recurrent ingunial hernia	0	0	0	0	0	0	0	0	0	0	0	TAPP	No	No	N/A	0	1	0
53	**SHF7378**	38	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	8.7	4	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy	No	No	N/A	1	1	0
54	**RKF8435**	38	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	1	144	Open Appendicectomy	N/A	N/A	No	No	No	No	11	3.4	Cholelithiasis	2	0	0	0	0	0	0	0	0	0	2	Laparoscopic Cholecystectomy	No	No	N/A	5	4	0
55	**SBF7587**	21	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.2	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	6	3	1
56	**NZF3914**	24	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	9	4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	0	0
57	**GHF3696**	42	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	6	Cholecystostomy - Pigtail	N/A	N/A	No	No	No	No	13	3.7	Cholelithiasis s/p Percutaneous Cholecystostomy	3	0	0	0	0	0	0	0	0	0	3	Laparoscopic Interval Cholecystectomy	No	No	N/A	2	1	0
58	**PKF4292**	28	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	Yes	14	4.8	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	4	1
59	**BSF5586**	50	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	Yes	12	3.7	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	5	0	0
60	**ARM6591**	19	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	2.4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	3	2	1
61	**LMM8596**	20	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	17	4.3	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	4	3	1
62	**JVM8575**	25	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.2	Left sided eventration of diaphragm	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic plication of left diaphragm	No	No	N/A	2	1	0
63	**MZF0060**	18	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.3	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	4	2	0
64	**SBM3053**	63	M	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	3.8	Calculous Cholecystitis ? GB Carcinoma	3	2	0	0	0	0	0	1	0	1	7	Diagnostic laparoscopy with adhesiolysis with omental biopsy	No	Yes	N/A	4	1	1

65	SJF3498	38	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	1	84	Open Tubectomy	N/A	N/A	Yes	No	No	No	12	4.3	Acute Appendicitis	0	0	0	0	0	3	1	0	0	0	4	Laparoscopic Appendectomy	No	Yes	No	6	4	0
66	SNM9885	52	M	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.1	Gastric outlet obstruction secondary to chronic duodenitis with landzerts	0	1	0	0	0	0	0	0	0	3	4	Laparoscopic Posterior gastrojejunostomy	No	No	N/A	5	4	1
67	VIF0931	30	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	6	LSCS	N/A	N/A	No	No	No	No	12	4.3	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy	No	No	N/A	2	0	0
68	ACM4764	54	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	9.4	4	Acute Appendicitis + Fibroid uterus	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy + Excision of pedunculted subserosal fibroid	No	No	N/A	7	1	0
69	NIF4853	38	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	9.4	3.8	Cholelithiasis	1	0	0	0	0	0	0	0	0	0	1	Laparoscopic Interval Cholecystectomy	No	No	N/A	0	1	0
70	DTF6819	71	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	14	4.1	Acute Appendicitis + Umbilical Hernia	0	0	0	0	0	0	0	0	2	0	2	Laparoscopic Appendectomy + Umbilical Henria repair	No	No	N/A	4	0	1
71	SVF7861	63	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	10	2.6	Empema Gall Bladder	3	1	0	0	0	0	0	0	0	2	6	Laparoscopic Cholecystectomy	No	No	N/A	6	2	0
72	KKF8384	42	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	1	240	Total Abdominal Hysterectomy	N/A	N/A	Yes	No	No	No	11	3	Acute Appendicitis	0	0	0	0	0	3	3	0	0	3	9	Laparoscopic Appendectomy	No	Yes	Yes	6	2	1
73	KNM8837	18	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.5	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	2	0
74	MRM1507	46	M	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4	Cholilithiasis + Cholidocolithiasis	1	0	0	0	0	0	0	0	0	0	1	Laparoscopic Cholecystectomy + Intraop cholangiogram	No	No	N/A	6	3	0
75	SPF2408	18	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	11	4.2	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	4	0
76	FMM6389	47	M	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.1	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	7	2	1
77	BNF1089	67	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	1	240	Laproscopic Sterilization	N/A	N/A	No	No	No	No	12	3.5	Biliary Pancreatitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	6	4	1
78	VGM4493	20	M	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	3	4	0
79	BPF6882	20	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.9	Acute Appendicitis + Mesentric Lumphadinitis	0	0	0	0	0	0	0	0	0	1	1	Laparoscopic Appendectomy + Mesentric Lymphnode biopsy	No	No	N/A	7	2	1
80	IDM9337	42	M	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	Yes	14	3.6	Acute Appendicitis + Umbilical Hernia	0	0	0	0	0	0	0	0	2	0	2	Laparoscopic Appendectomy + Umbilical Henria repair	No	No	N/A	6	1	1
81	BPF0717	42	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	9.5	4.1	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	3	0
82	SPF1379	37	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	3	96	LSCS	Laproscopic Tubectomy	Open Myomectomy	No	No	No	No	13	4	Cholelithiasis + Umbilical Hernia	0	0	0	0	0	0	0	0	2	0	2	Laparoscopic Cholecystectomy + Umbilical hernia repair	No	No	N/A	6	1	0
83	SPF2082	20	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.4	Subacute Appendicits	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	1	0
84	RHF3864	33	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	1	132	Laproscopic Sterilization	N/A	N/A	No	No	No	No	12	3.7	Cholelithiasis	2	0	0	0	0	0	0	0	0	0	2	Laparoscopic Cholecystectomy	No	No	N/A	3	0	0
85	BMM8240	29	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	2	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	0	1
86	GDM3985	21	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.1	Subacute Appendicits	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	3	1
87	AMF5398	28	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.4	Acute Appendicitis	0	0	0	0	0	2	2	1	0	2	7	Laparoscopic Appendectomy	No	Yes	N/A	3	2	0
88	SPF9580	18	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.3	Chronic appendicitis	0	0	0	0	0	1	2	0	0	0	3	Laparoscopic Appendectomy	No	No	N/A	6	4	0
89	TKM8946	40	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	17	3.9	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	4	1
90	LLF0636	31	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	1	120	Open Tubectomy	N/A	N/A	Yes	No	No	No	10	3.6	Chronic appendicitis	0	0	0	0	0	3	0	0	0	0	3	Laparoscopic Appendectomy	No	No	Yes	7	0	0
91	MAF1276	44	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	1	180	LSCS	N/A	N/A	No	No	Yes	No	12	3.8	Chronic cholecystitis	3	0	0	0	0	0	0	0	0	0	3	Laparoscopic Cholecystectomy	No	No	N/A	4	3	1
92	RJF5419	41	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.3	Acute Appendicitis + Mesentric Lumphadinitis	0	0	0	0	0	1	2	1	0	2	6	Laparoscopic Appendectomy	No	No	N/A	6	4	0
93	NSF5502	53	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.9	Cholelithiasis	1	0	0	0	0	0	0	0	0	0	1	Laparoscopic Cholecystectomy	No	No	N/A	3	2	1
94	SPF6006	50	F	Yes	4	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	11	4	Gangrenous cholecystitis with GB Perforatiion	3	3	0	0	0	0	0	2	0	0	8	Laparoscopic Cholecystectomy	No	Yes	N/A	4	4	0
95	SNF5438	34	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	3.1	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy	No	No	N/A	0	1	0
96	GCF6727	42	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	2	108	Open Appendicectomy	Ovarian torsion excision and tubectomy	N/A	No	Yes	No	No	10	3.5	Cholelithiasis	2	0	0	0	0	3	2	0	0	2	9	Laparoscopic Cholecystectomy	No	No	N/A	5	4	0
97	AMF8183	65	F	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	1	60	Open Tubectomy	N/A	N/A	Yes	No	Yes	No	13	4.3	Cholelithiasis	0	0	0	0	0	3	0	0	0	0	3	Laparoscopic Cholecystectomy	No	No	No	4	2	0
98	GKM8308	33	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.4	Umbilical Hernia with omentocele	0	0	0	0	0	0	0	0	3	0	3	Umbilical Hernia Repair	No	No	N/A	0	0	0
99	MPF2456	49	F	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	3.7	Duodenal Perforation	1	2	1	1	1	1	1	1	1	2	12	Laproscopic Cellan-Jones omental patch with feeding jejunostomy	No	Yes	N/A	4	1	1

100	MGM2782	49	M	Yes	4	2	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	No	16	4.7	Cholelithiasis + Right indirect inguinal hernia	3	1	0	0	0	0	0	0	0	0	4	Open Cholecystectomy	Yes	Yes	N/A	6	2	0
101	INM4874	20	M	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	4	0
102	ABF6652	26	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	1	6	LSCS	N/A	N/A	No	No	No	No	11	3	Gangrenous appendicitis	0	0	0	0	0	3	3	1	0	3	10	Laparoscopic Appendectomy	No	Yes	N/A	7	1	1
103	BKM6643	65	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	13	3.4	Supraumbilical Hernia	0	2	3	0	0	0	0	0	2	2	9	u TAPP	No	No	N/A	0	1	0
104	NSF8111	31	F	Yes	5	2	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	3.6	Hydatid cyst of the spleen	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic unroofing of splenic cyst	No	No	N/A	5	1	0
105	ZKM8917	48	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	4.8	B/L Direct Inguinal Hernia	0	0	0	0	0	0	0	0	0	0	0	B/L TAPP	No	No	N/A	2	0	0
106	GSM9232	67	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	11	3.8	B/L Indirect Inguinal Hernia with enterocele on right and omentocele on left	0	0	0	0	1	0	2	0	0	0	3	B/L TAPP	No	No	N/A	1	1	0
107	MAM0161	23	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	Yes	1	36	Drainage of Appendicular Mass	N/A	N/A	No	No	No	No	16	4.7	Recurrent Appendicitis with appendicular mass	0	0	0	0	1	3	3	2	0	3	12	Laparoscopic Appendectomy	No	Yes	N/A	3	0	1
108	SKM9757	65	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.1	Right sided indirect inguinal hernia with entrocele	0	0	0	0	0	0	0	0	0	0	0	TAPP	No	No	N/A	2	1	0
109	PAM1589	75	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.1	Cholelithiasis s/p ercp for cbd stricture	1	0	0	0	0	0	0	0	0	0	1	Laparoscopic Cholecystectomy	No	No	N/A	2	1	0
110	GDF1848	52	F	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	No	No	No	Yes	2	144	Total Abdominal Hysterectomy	Incisional Henia Repair	N/A	No	No	No	No	13	4.7	Recurrent incissional henria	0	0	0	0	0	3	0	0	1	2	6	IPOM	No	No	N/A	4	3	0
111	ATF2747	19	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	1	1	Laparoscopic Appendectomy	No	No	N/A	3	2	0
112	MPM4312	18	M	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	3.9	Peritonitis secondary to perforated appendix	1	1	1	1	1	2	3	2	2	3	17	Laparoscopic Appendectomy	No	Yes	N/A	5	4	1
113	RNM4312	54	M	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	No	14	4	Cholelithiasis	3	1	0	0	0	0	0	0	0	0	4	Laparoscopic Subtotal Cholecystectomy	No	No	N/A	3	2	1
114	GAM5421	48	M	Yes	6	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	3.6	B/L Ingunial Hernia	0	0	0	0	0	0	0	0	0	0	0	B/L TAPP	No	No	N/A	4	4	1
115	TMF6780	26	F	Yes	4	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	8.1	3.5	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	4	0	1
116	VKM4128	23	M	Yes	5	2	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	5	Pain Abdomen under evaluation	0	0	0	0	0	2	3	3	0	3	11	Diagnostic laparoscopy with Appendectomy, right sided TAPP, adhesiolysis with mesentric lymph node biopsy	No	Yes	N/A	5	3	1
117	BRF4454	60	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	No	No	No	Yes	2	2	Total Abdominal Hysterectomy	Cholecystostomy - Pigtail	N/A	No	No	Yes	No	11	4.2	Empema Gall Bladder with pigtail insitu	3	2	0	0	0	3	0	0	0	0	8	Laparoscopic Cholecystectomy	No	Yes	N/A	0	0	0
118	NHM4915	32	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.7	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	4	3	0
119	SKF5614	42	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	15	Total Abdominal Hysterectomy	N/A	N/A	No	No	No	Yes	13	4.2	Biliary Pancreatitis	0	0	0	0	0	2	0	0	0	0	2	Laparoscopic Cholecystectomy	No	No	N/A	1	0	0
120	SMF5842	32	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.2	Divertication of recti	0	0	0	0	0	0	0	0	0	0	0	IPOM	No	No	N/A	1	0	0
121	RUF7603	36	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.2	Supraumbilical Hernia	0	0	0	0	0	0	0	0	2	0	2	IPOM	No	No	N/A	2	0	0
122	VNF8317	23	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	Yes	12	3.6	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	2	1
123	SMF9865	32	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	-	-	Biliary Pancreatitis	0	0	0	0	0	0	0	0	0	0	0	LAP CHOLYCYSTECTOMY	No	No	N/A	1	1	0
124	RPM0213	46	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	-	Chronic appendicitis + umbilical hernia	0	0	0	0	0	0	3	0	3	3	9	Laparoscopic Appendectomy + Umbilical Henria repair	No	Yes	N/A	5	0	1
125	PGM0538	43	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	Yes	1	1.5	Cholecystostomy - Pigtail	N/A	N/A	No	No	No	No	17	4	Empema Gall Bladder with pigtail insitu	3	0	0	0	0	0	0	0	0	0	3	Laparoscopic Cholecystectomy	No	No	N/A	2	0	0
126	BKF2843	65	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	11	3.6	Chronic Calculous Cholecystits + umbilical hernia	2	0	0	0	0	0	0	0	3	0	5	Laparoscopic Cholecystectomy + Umbilical hernia repair	No	No	N/A	7	0	1
127	SSM3919	44	M	Yes	6	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.7	Umbilical Hernia with omentocele	0	0	0	0	0	0	0	0	3	3	6	IPOM	No	No	N/A	5	1	1
128	SUF4869	18	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	8.6	3.8	Acute Appendicitis	0	0	0	0	0	0	0	1	0	0	1	Laparoscopic Appendectomy	No	No	N/A	5	0	0
129	EMM4716	48	M	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	Yes	1	204	Open Appendicectomy	N/A	N/A	Yes	No	No	No	13	4	Chronic emphysematous cholecystitis	3	0	0	0	0	0	0	0	0	3	6	Laparoscopic Cholecystectomy	No	No	No	7	3	0
130	AAF5209	55	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	2	144	LSCS	Total Abdominal Hysterectomy	N/A	No	No	No	No	10	3.8	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	5	4	1
131	SDF8709	37	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	11	4	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	1	1	0
132	SGM9557	35	M	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	10	4.1	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	0	0

133	KKM8916	61	M	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	13	4.4	Obstructive jaundice secondary to choledocholithiasis + Umbilical hernia	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy +Umbilical hernia repair	No	No	N/A	6	4	1
134	SBM6448	53	M	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	14	3.9	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	5	2	0
135	BPF7076	32	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	4.2	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	4	1
136	KMF1865	21	F	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4.3	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	7	4	0
137	YMF3263	48	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	240	Open Tubectomy	N/A	N/A	No	No	No	No	12	4.2	Calculous Cholecystitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy + Total laparoscopic hysterectomy	No	No	N/A	2	0	0
138	SBF5536	26	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	1	6	Laproscopic Sterilization	N/A	N/A	No	No	No	No	12	3.5	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	3	0
139	KTF8139	81	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	9.9	4	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	2	1	0
140	SMF6690	32	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	3.6	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	3	0
141	BKM6686	34	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	3.4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	0	0
142	PKF7803	37	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	2	72	LSCS	LSCS	N/A	No	No	No	No	14	3.8	Acute Appendicitis	0	0	0	0	0	3	0	0	0	0	3	Laparoscopic Appendectomy	No	No	N/A	6	0	1
143	MDM7132	44	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	Yes	1	24	Right sided open ingunial hernia repair	N/A	N/A	No	No	Yes	No	14	3.4	Supraumbilical Hernia	0	2	0	0	0	0	0	0	0	0	2	uTAPP	No	No	N/A	2	0	0
144	FMM4217	30	M	Yes	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	3.1	3.4	Pseudocyst of pancreas with walled off necrosis	0	2	0	0	0	0	0	0	2	2	6	Diagnostic laparoscopy with drainage of pancreatic abscess	No	No	N/A	4	0	0
145	JMF6790	33	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	2	90	LSCS	Laparoscopic cholecystectomy	N/A	No	No	No	No	11	4.2	Acute Appendicitis	0	0	0	0	0	3	3	0	0	2	8	Laparoscopic Appendectomy + Adesiolysis	No	Yes	N/A	7	1	0
146	KRF7457	43	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	240	Open Tubectomy	N/A	N/A	No	No	No	No	12	3.9	Incisional Henria	0	0	0	0	0	3	0	0	2	3	8	IPOM	No	Yes	N/A	2	0	0
147	PPM9190	48	M	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	3.8	Acute appendicitis + incomplete malrotation with internal hernia	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy + Caecopexy	No	No	N/A	4	2	1
148	PTF9551	25	F	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	12	Laproscopic Sterilization	N/A	N/A	No	No	No	No	13	4.3	Paraumbilical Hernia	0	0	0	0	0	0	0	0	1	0	1	Laparoscopic Umbilical hernia repair	No	No	N/A	6	3	0
149	BKM2307	46	M	Yes	3	2	No	Yes	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	14	4.3	Diaphragmatic Hernia	0	0	2	0	0	0	0	0	0	0	2	Laparoscopic Diaphragmatic hernia repair	No	No	N/A	5	2	0
150	SAF2775	50	F	Yes	6	2	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	Yes	2	180	LSCS	Laparoscopic converted to open Hysterectomy	N/A	No	Yes	No	No	12	3.8	Incisional Henria	0	0	0	0	0	3	0	0	0	0	3	IPOM PLUS	No	No	N/A	4	1	0
151	KKF4407	43	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	3	180	LSCS	LSCS	Incisional Hernia	No	No	No	No	11	3.8	Recurrent incissional henria	0	0	0	0	0	3	0	0	2	2	7	IPOM PLUS	No	Yes	N/A	2	1	0
152	SPM4379	59	M	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.2	Paraumbilical Hernia	0	0	0	0	0	0	0	0	2	0	2	Laparoscopic Umbilical hernia repair	No	No	N/A	7	4	1
153	VPM4872	18	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	Yes	1	180	Orchidopexy	N/A	N/A	No	No	No	No	15	4.4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	4	0
154	NDM5655	67	M	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	3.5	Perforated appendix with plegmon	0	0	0	0	0	2	3	2	0	0	7	Laparoscopic Appendectomy	No	No	N/A	7	4	0
155	NBF5626	40	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	1	180	Open Tubectomy	N/A	N/A	No	No	No	No	12	3.7	Acute Appendicitis	0	0	0	0	0	2	0	0	0	0	2	Laparoscopic Appendectomy	No	No	N/A	3	0	0
156	PFF5911	67	F	Yes	5	2	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	2	8	Open Tubectomy	Percutaneous nephrostomy for pyelonephritis	N/A	Yes	Yes	No	No	11	3.2	Left sided psoas abscess	0	0	0	2	2	2	0	0	0	0	6	Laparoscopic drainiage for Left poas abscess	No	No	Yes	4	4	1
157	AGF5882	42	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.8	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	0	1	0
158	MBM6626	40	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	4.8	Paraumbilical Hernia	0	0	0	0	0	0	0	0	2	0	2	Laparoscopic Umbilical hernia repair	No	No	N/A	0	0	0
159	RSF8173	67	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	300	Open Hysterectomy	N/A	N/A	No	No	No	No	12	3.3	Cholelithiasis with cholidocolithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	0	1	0
160	JLF0842	38	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	120	Open Hysterectomy	N/A	N/A	No	No	No	No	12	4.9	Cholelithiasis	1	0	0	0	0	0	0	0	0	0	1	Laparoscopic Cholecystectomy	No	No	N/A	2	1	0
161	RCF1524	44	F	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	2	180	LSCS	Open Hysterectomy	N/A	Yes	No	Yes	No	12	3.1	Incisional Henria	0	0	0	0	2	3	2	0	3	0	10	IPOM	No	Yes	Yes	5	0	1
162	KTF1497	19	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	2	1
163	BMF2102	33	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	1	60	Open Tubectomy	N/A	N/A	Yes	No	No	No	7.6	4.3	Acute Appendicitis	0	0	0	0	0	3	3	2	1	3	12	Laparoscopic Appendectomy	No	Yes	Yes	6	3	1
164	MSF2110	49	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	108	Open Hysterectomy	N/A	N/A	No	No	No	No	12	4.6	Paraumbilical Hernia	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Umbilical hernia repair	No	No	N/A	1	1	0
165	NMF5765	24	F	Yes	5	2	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	3.9	Chronic appendicitis	0	0	0	0	0	2	2	0	0	0	4	Laparoscopic Appendectomy	No	No	N/A	5	3	1

166	**SRF6537**	38	F	Yes	5	2	No	No	No	No	No	No	Yes	No	N/A	No	No	No	No	No	No	Yes	1	216	Open Tubectomy	N/A	N/A	No	No	No	No	12	3.9	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	4	0	1
167	**KHF0469**	54	F	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	Yes	1	36	Open Tubectomy	N/A	N/A	Yes	No	Yes	No	11	3.8	Cholilithiasis + Paraumbilical Hernia	0	0	0	0	0	3	0	0	0	0	3	Laparoscopic Cholecystectomy	No	No	Yes	5	3	1
168	**BIF9788**	55	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	3.5	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy	No	No	N/A	0	0	0
169	**CHM2713**	19	M	Yes	6	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.6	Rigth sided Ingunial Hernia	0	0	0	0	0	0	0	0	0	0	0	TAPP	No	No	N/A	3	0	1
170	**BBM2338**	55	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	9.7	4.5	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	0	0	0
171	**MKM2914**	24	M	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	17	4.2	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	6	1	1
172	**GSF5511**	32	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	5.1	Acute Appendicitis	0	0	0	0	3	3	3	2	2	3	16	Laparoscopic Appendectomy + Adesiolysis	No	Yes	N/A	3	2	0
173	**LLF8438**	43	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	Yes	11	3.8	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	1	1	0
174	**RLM9373**	40	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	4.3	Rectal Prolapse	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic rectopexy with posterior mesh fixation	No	No	N/A	1	1	0
175	**MHM9570**	22	M	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4.3	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	0	0
176	**NJF3482**	21	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	4	Subacute Appendicits	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	5	2	0
177	**MAF4348**	48	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	1	96	Open Hysterectomy	N/A	N/A	Yes	No	No	No	11	3	Acute Appendicitis	0	0	0	0	0	3	0	0	1	1	5	Laparoscopic Appendectomy	No	No	Type	4	0	0
178	**SMM4395**	48	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	Yes	No	No	13	3.8	Biliary Pancreatitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	2	0	0
179	**MPF6617**	41	F	Yes	5	2	No	No	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	1	60	Open Appendicectomy	N/A	N/A	No	No	No	No	12	3.4	Incisional Henria	0	0	0	0	0	0	2	0	0	0	2	Laparoscopic incisional hernia repair	No	No	N/A	6	4	1
180	**SKF0148**	24	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4.4	Acute Appendicitis	0	0	0	0	0	0	1	0	0	1	2	Laparoscopic Appendectomy	No	No	N/A	7	3	1
181	**RGM0958**	19	M	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	15	4	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	2	0
182	**BPM1008**	43	M	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	5	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	1	1
183	**PHF0957**	25	F	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	14	3.8	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	6	1	1
184	**SDM1164**	71	M	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	Yes	1	240	Left donor nephrectomy	N/A	N/A	No	No	Yes	No	13	3.3	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	3	1	1
185	**MDF2546**	40	F	Yes	4	2	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	1	180	Open Tubectomy	N/A	N/A	No	No	No	No	13	3.2	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	5	4	0
186	**NKF3695**	68	F	Yes	4	2	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	1	180	Open Tubectomy	N/A	N/A	No	No	Yes	No	13	3.9	Empema Gall Bladder	3	0	0	0	0	0	0	0	0	0	3	Laparoscopic Cholecystectomy	No	No	N/A	4	2	1
187	**GUM3614**	70	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	3.8	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Interval Cholecystectomy	No	No	N/A	2	0	0
188	**SJF3601**	30	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	1	120	Open Tubectomy	N/A	N/A	Yes	No	No	No	12	4.4	Subacute Appendicits	0	0	0	0	0	3	0	0	0	0	3	Laparoscopic Appendectomy	No	No	Yes	5	3	1
189	**NDF4916**	19	F	Yes	5	2	No	No	No	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	3.7	Acute Appendicitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy	No	No	N/A	7	3	1
190	**MNM5799**	38	M	Yes	5	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes	No	13	3.5	Umbilical Hernia	0	2	0	2	0	2	0	2	3	3	14	Laparoscopic assisted open hernia repair	Yes	Yes	N/A	6	2	0
191	**IKM6176**	22	M	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	16	3.9	Left sided ingunial hernia	0	0	0	0	0	0	0	0	0	0	0	TAPP	No	No	N/A	2	0	0
192	**AHM5784**	31	M	Yes	3	2	No	Yes	No	No	No	No	No	No	No	No	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	Yes	14	4.4	Hiatus Hernia	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Fundoplication	No	No	N/A	6	4	1
193	**PNF5155**	21	F	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	13	3.7	Cholelithiasis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Cholecystectomy	No	No	N/A	0	1	0
194	**BMM8135**	38	M	Yes	5	2	Yes	Yes	No	No	No	No	Yes	No	Yes	Yes	No	No	No	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	No	No	No	12	4	Acute Appendicitis + calculous cholecystitis	0	0	0	0	0	0	0	0	0	0	0	Laparoscopic Appendectomy + Laparoscopic Cholecystectomy	No	No	N/A	7	3	0