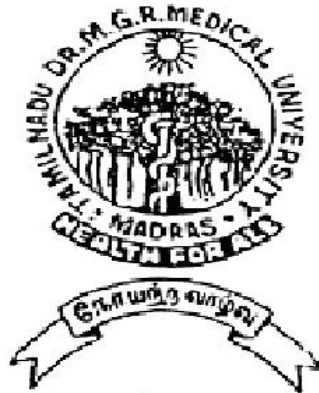


**A STUDY OF INCISIONAL HERNIA INCIDENCE
AND RISK FACTORS IN GOVERNMENT
RAJAJI HOSPITAL MADURAI**

**DISSERTATION SUBMITTED FOR
BRANCH – I M.S (GENERAL SURGERY)**

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**THE TAMILNADU
DR.M.G.R. MEDICAL UNIVERSITY
CHENNAI**

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Preparing this dissertation

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BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled “**A STUDY ON
INCISIONAL HERNIA INCIDENCE AND RISK FACTORS IN GRH
MADURAI**” Submitted by **Dr.A.RAMESH** to the **Dr.M.G.R Medical
University**, Chennai in partial fulfillment of the requirement for the award of **M.S
Degree Branch-I(General Surgery)**

is a bonafide research work carried out by him under direct supervision &
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I **Dr.A.RAMESH** declare that, I carried out this work on, “**A STUDY ON INCISIONAL HERNIA INCIDENCE AND RISK FACTORS**” IN **GRH MADURAI** at the department of surgery, Govt. Rajaji Hospital during the period of June 2009 to May 2011. I also declare that this bonafide work or a part of this work was not admitted by me or any others for any award, degree diploma to any other University, Board either in India or abroad.

This is submitted to the The Tamilnadu Dr. M.G. R. Medical University, Chennai in partial fulfillment of the rules and regulation for the M.S degree examination in General Surgery.

Place: Madurai

Dr.A.RAMESH

Date:

CONTENTS

S.No.	TOPIC	Page No.
1.	Introduction	1
2.	Historical Aspects	2
3.	Aim of Study	4
4.	Surgical Anatomy	5
5.	Review of Literature	14
6.	Material and Methods	46
7.	Observation and Results	48
8.	Discussion	56
9.	Summary	60
10.	Conclusion	61

Annexure

Bibliography

Abbreviations

Proforma

Master Chart

INTRODUCTION

This occurs after 2-10% of all abdominal surgeries, although some people are more at risk. The rate of incisional hernia occurrence can be as high as 13% with some abdominal surgeries.

Men, women, and children of all ages and ethnic backgrounds may develop an incisional hernia after an abdominal surgery. They occur more commonly among adults than among children.

After surgical repair, incisional hernias have a high rate of recurring or returning. It is almost as high as 20-45%.

Incisional hernias can range in size from very small to large and complex and appear as a bulge at or near the area of a previous surgical scar. Nearly any prior abdominal operation can develop an incisional hernia, however they most frequently occur along incisions running down from the xiphoid to the pubic area

In my study, I have analyzed the prevalence and incidence of incisional hernia diseases. Age incidence, clinical features and investigatory procedure and types of management for hernia disease.

HISTORICAL ASPECTS

The concept of incisional hernia dates back to the end of 19th century to the beginning 20th century. It was in this period cases of post operative eventration appeared and gradually increased in number at the same time surgical techniques aimed at the correction developed.

The evolution of surgical technique has followed the progress of research and development of technology consequently the possibility of prosthetic repair initially with metal protheses and later with synthetic ones was consider.

In 1972 **De Franchis** published a report on incisional hernia surgery which became a reference point for its descriptions of various surgical techniques.

In 1896 **Quenu** describe the suturing of several layers adjacent to the incision of rectus muscle sheath which represented a method of autoplasty. Most frequently adopted autoplasty is that described by **Mayo** in 1901 which is based on overlapping.

The age of alloplasty can be divided in to 2 periods

(1) Metals

(2) Inert synthetic material

First proposal to use metal prosthesis dates back to 1900 when **Shipley** used metal wires. Gold, aluminium, brass were used and subsequently were discontinued as they evoked tissue reaction except for tantalum which showed good tolerability.

After 1940, the inert synthetic material came into usage. Commonly used where nylon, Dacron, Teflon, PTFE, Mersilene and Polypropelene

AIM OF THE STUDY

This study comprises of 105 cases of incisional hernia admitted and treated in Madurai medical college.

The aim of the study is to analyze the following

- 1 .The incidence of incisional hernia in and around this region as admitted in GRH, Madurai
2. To study the site of occurrence, age and sex incidence.
3. To study the clinical features and investigation methods.
4. To study the risk factors.
5. To study the various methods of treatment.

SURGICAL ANATOMY

Abdominal wall anatomy

Boundaries:

1. Superiorly:

Costal cartilages 7-12

2. Inferiorly:

1. Pubis

2. Inguinal ligament

3. Postero-laterally

Thoraco-lumbar fascia encompassing

(1)Erector spinae

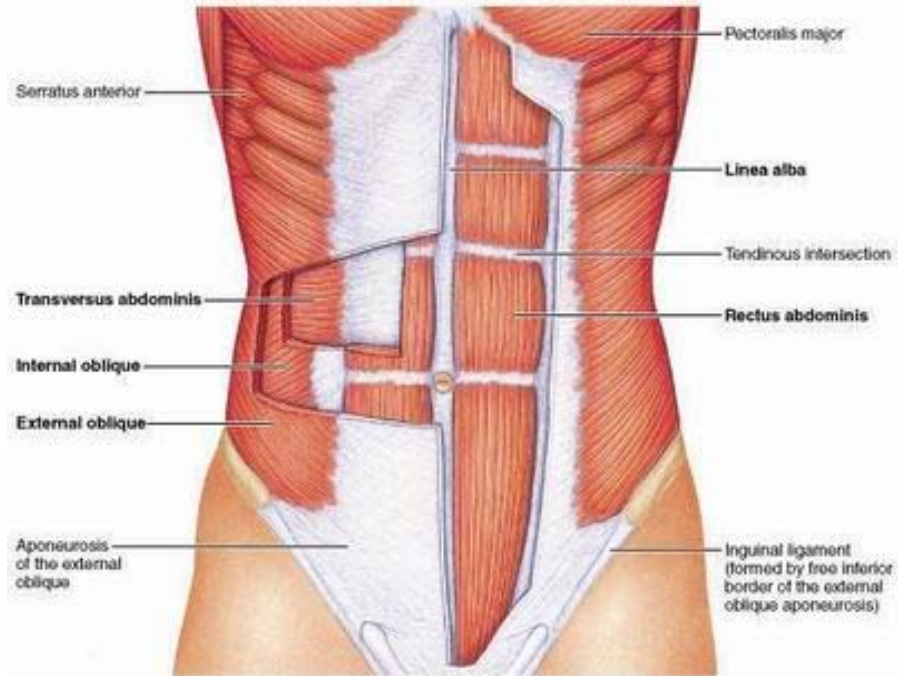
(2)Quadratus lumborum &Iliacus

(3)Psoas major & minor

(4)Longismus thoracis

(5)Transverse spinal muscles

ANTERIOR ABDOMINAL WALL MUSCULATURE



SKELETAL ANATOMY

1. Xiphoid
2. Ribs 7,8,9,10
3. Floating ribs 11,12
4. Vertebral bodies of L1-5
5. Iliac crest
6. ASIS
7. Pubic symphysis

The anterior abdominal wall is divided into two parts:

(1) An Anterolateral portion composed of the external oblique, internal oblique and transverse abdominis muscles

(2) Midline portion composed of the rectus abdominis and pyramidalis muscles

Anterolateral portion

The three flat muscles, external oblique, internal oblique, and transverse abdominis are arranged so that their fibres are roughly parallel as they approach their insertion on the rectus sheath.

Midline portion

When present the insertion of the pyramidalis in to the linea alba is a land mark for an accurate midline incision.the rectus muscle is enclosed in a stout sheath formed by the bilaminar aponeurosis of the abdominal muscles which pass, anteriorly and posteriorly around the muscle and attach medially to the linea alba which is formed by decussation.

In the lower $\frac{1}{4}$ of the abdominal wall, the aponeurosis of the internal oblique and transversus abdominis muscles pass anterior to the muscle, which is bounded posteriorly by the transversalis fascia only.

The dividing line is the linea semicircularis of Douglas, which marks the level at which the rectus sheath loses its posterior wall. The line is well marked if the change is abrupt; it is less definite if the change is gradual

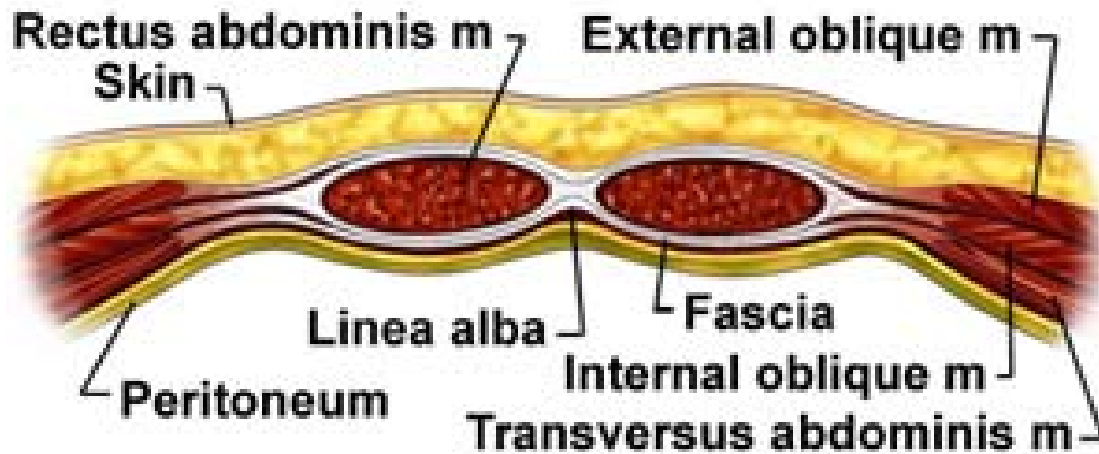
The following array shows some comparisons between the structures of the upper $\frac{3}{4}$ and the lower $\frac{1}{4}$ of the abdominal wall

S.No	Upper abdominal wall	Lower abdominal wall
1.	Linea alba well developed	Linea alba not well developed
2.	Right and left recti well separated	Right and left recti very closed together
3.	External oblique fascia and aponeurosis weak or absent	External oblique fascia strong and well developed
4.	Both layers of rectus sheath present	Only anterior layer of rectus sheath present

Skin and Subcutaneous Tissue

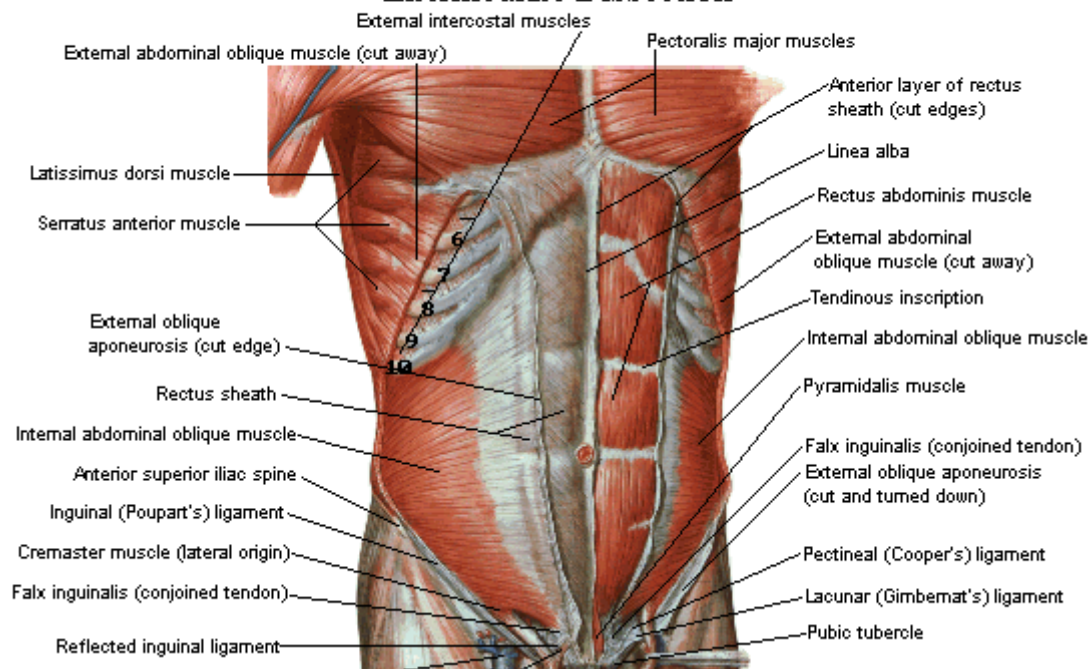
1. Subcutaneous superficial and subcutaneous deep layers
2. Superficial layer is Camper's – the first layer of abdominal fat
3. Separated by Scarpa's fascia – the deeper, thicker, more membranous layer of peritoneal fat
4. Superficial covers entire abdominal wall
5. The deep fascia is a distinct layer only below the umbilicus .This is the fascia that directly surrounds the muscles

ANATOMICAL LAYERS OF THE ANTERIOR ABDOMINAL WALL



Anterior Abdominal Wall

Intermediate Dissection



Musculature (3 types)

1. Anterior

1. Rectus abdominus.
2. Pyramidalis muscles- nonfunctional,not always present
sit in the sheath superficial to the rectus muscle.

2. Anterolaterally

1. External oblique.
2. Internal oblique.
3. Transversus abdominus.

3. Posteriorly

1. Quadratus lumborum muscle

TRANSVERSUS ABDOMINUS MUSCLE

1.Origin

1. Internal surface of cartilage of ribs 6-12
2. Lower 6 costal cartilages
3. Thoracolumbar fascia
4. Iliac crest
5. Inguinal ligament lateral 1/3rd

2. Insertions

1. Xiphoid
2. Linea alba
3. Pubic crest
4. Forms conjoined tendon with internal oblique

3. Nerves

1. Lower 6 intercostals
2. subcostal
3. L 1
4. Iliohypogastric
5. Ilioinguinal

4. Action

1. compresses abdominal contents

5. Relationship to the arcuate line

1. Above- fibers go posterior to rectus abdominus
2. Below- fibers go anterior to the rectus sheath

INTERNAL OBLIQUE

- 1) Origin:
 - a. Thoracolumbar fascia
 - b. Iliac crest anterior 2/3rds
 - c. Inguinal ligament - lateral 1/2
 - d. Posterior surface of the transversus abdominus
- 2) Insertion
 - a. Inferior borders of lower 3 ribs / costal cartilages - Ribs 10, 11, 12
 - b. Linea alba
 - c. Pubic symphysis via the conjoined tendon
 - d. Most inferior and medial fibers join the transverses abdominis muscle to form the conjoined tendon
 - e. Relationship to the arcuate line
 - i. Above - Fibers split to encircle rectus abdominis
 - ii. Below- Fibers don not split and contribute only to the anterior rectus sheath
- 3) Nerves
 - a. Lower 6 thoracic nerves
 - i. 5 intercostals
 - ii. Subcostal
 - b. L1 - iliohypogastric, ilioinguinal

- 4) Fibers
 - a. Run perpendicular to external oblique
 - b. Superior and medial
- 5) Action
 - a. Rotation of the trunk
 - b. Increases intra-abdominal pressure
 - c. Pulls down ribs with forced expiration
 - d. Assists with flexion
 - e. Forms the roof of the inguinal canal
 - f. Gives rise to cremasteric muscle entering the spermatic cord
- 6) In upper 2/3rd of abdomen the aponeurosis splits into 2 leaflets at the linea semilunaris

EXTERNAL OBLIQUE

- 1) Origin:

Outer surface of lower 8 ribs – 5th -12th .Interdigitates with serratus and latissimus
- 2) Insertion
 - a. Xiphoid
 - b. Linea alba
 - c. Pubic tubercle
 - d. Iliac crest inferiorly [anterior half]

- e. Inferior margin forms the inguinal ligament
 - f. Also interlocks with latissimus and serratus
- 3) Nerve
- a. Lower 6 thoracic intercostals
 - b. Subcostal nerve [T12]
 - c. L1 lumbar anterior rami- iliohypogastric, ilioinguinal
- 4) Direction of the fibers
- a. courses infero-medially
- 5) Action
- a. Rotation of the abdomen
 - b. Assists in flexion
 - c. Increase intra-abdominal pressure
 - d. Lower ribs for forced expiration

RECTUS ABDOMINUS MUSCLE

- 1) Origin:
- a. Pubis symphysis
 - b. Pubic crest
- 2) Insertion
- a. Xiphoid
 - b. Costal cartilages 5,6,7

- 3) Additional attachments
 - a. Anterior rectus sheath is firmly attached at the tendinous intersections of the rectus abdominus muscle

There are 3 [-4] tendinous intersections

1. Xiphoid
 2. Umbilicus
 3. One between these two
- b. Also attached to the linea alba.
- 4) Nerves
 - a. Lower 6 thoracic nerves
 - b. Run between internal oblique and transverses abdominis
 - 5) Action
 - a. Increases intra-abdominal pressure
 - b. Flexion of the vertebral column
 - c. Accessory muscle of expiration

PYRAMIDALIS

- 1) Origin

Anterior pubis
- 2) Insertion

Linea Alba - half way between the umbilicus and pubis

3) Nerve

12th thoracic nerve = subcostal nerve

4) Action

Tenses the linea alba

LINEA ALBA

1. From xiphoid to pubic symphysis
2. Stabilizes abdomen
3. Tendinous structure

LINEA SEMILUNARIS

1. Lateral margins of the rectus
2. Starts at the 9th rib
3. Deep inferior epigastric artery perices the transversalis fascia and enters the rectus at the point where the arcuate line meets the linea semilunaris

PERITONEUM

1. Covers inner surface of abdominal wall and invests the viscera
2. Peritoneal integrity is essential to the prevention of adhesions

TRANSVERSALIS FASCIA

1. Lines the entire abdominal wall anterior to the peritoneum
2. Above arcuate line it is posterior to the transversalis muscle
3. Inferior to the arcuate line it is the main structural support of the posterior rectus sheath
4. Main vascular supply is via the inferior epigastric vessels which is posterior to the fascia and pierces the fascia to enter the muscle at the junction of the linea semilunaris and the arcuate line

VASCULAR SUPPLY

1) 5 MAIN VESSELS

- a. Internal mammary- Deep superior epigastric
Penetrates into the muscle immediately at entry point at 7th rib
- b. Femoral artery
 - i. Superficial inferior epigastric
 - ii. Superficial circumflex iliac
 - iii. Superficial external pudental
- c. External iliac
 - i. Deep inferior epigastric
 - ii. Deep circumflex iliac

- d. Internal iliac
- e. Aorta
- i. Iliolumbar branch
- ii. 2 intercostals
- iii. Subcostals
- iii. 4 lumbar

SUPERFICIAL INFERIOR EPIGASTRIC

1. Basis for axial pattern flaps at lower abdomen
2. From femoral artery
3. Comes off 8 cm lateral to midline and just below inguinal ligament

INNERVATION

- 1) Ventral rami of roots T7-L1 provide sensibility
- 2) Motors nerves include
 - a. Lower five intercostals (T7-11)
 - b. Subcostal (T12)
 - c. Iliohypogastric (L1)
 - d. Ilioinguinal (L1)
- 3) Nerves should be preserved for motor and sensory function.
- 4) Nerve course

Pass between transversus abdominus and the internal obliques once lateral to the ASIS

REVIEW OF LITERATURE

INCISIONAL HERNIAS- INCIDENCE

This occurs after 2-10% of all abdominal surgeries, although some people are more at risk. The rate of incisional hernia occurrence can be as high as 13% with some abdominal surgeries. Men, women, and children of all ages and ethnic backgrounds may develop an incisional hernia after an abdominal surgery. They occur more commonly among adults than among children. After surgical repair, incisional hernias have a high rate of recurring or returning. It is almost as high as 20-45%.

The incidence is also higher if there is wound infection immediately after surgery. In the past, material that was used to close the abdominal incision was of the absorbable nature and the rate of such hernias was higher. However, now synthetic, non-absorbable suture material is used and the rate has come down.

Incisional hernias can range in size from very small to large and complex and appear as a bulge at or near the area of a previous surgical scar. Nearly any prior abdominal operation can develop an incisional hernia, however they most frequently occur along incisions running down from the xiphoid to the pubic area.

These hernias may occur after large surgeries such as intestinal or vascular (large arteries, and veins) surgery, or after smaller surgeries such as an appendectomy or an even through the small scar of a laparoscopy wound.

Surgical correction of Incisional hernias is usually recommended, as they carry a potential risk of becoming strangulated at the opening in the abdominal wall and having their blood supply cut off. If this happens it becomes a medical and surgical emergency.

It is especially advised that these hernias be repaired via a TENSION FREE repair method. If the defect is very small, it may be closed with strong non-absorbable sutures. If the hernia defect is larger, it should be closed with a piece of synthetic mesh as incisional hernias have a high rate of recurrence if repaired under tension

INCISIONAL HERNIAS- CAUSES

Not all abdominal surgeries will lead to incisional hernia, but any full thickness abdominal incision can leave a weakness and make that area prone to hernia. Usually a proper closure and adequate post-operative measure avoids the problem. However, sometimes despite the best care, a person may develop the hernia and at other times it can be predicted depending on the patient's general condition and the type of surgery performed.

Normally there are three layers covering the abdominal contents. These include a thin inner sheet called the peritoneum, a thick middle layer of muscles and the third outer layer – the outer skin. An incisional hernia forms usually due to weakness of the thick layers of muscles. There are various factors that can lead to the weakness or hernia formation and these factors generally can be broadly looked at as –

- 1) Mechanical factors
- 2) Patient-related factors
- 3) Technical factors

1) Mechanical factors

Mechanical factors increase the intra-abdominal pressure after an operation and causes the hernia. Common causes include-

►Chronic cough

Coughing and vomiting are associated with a brief but significant increase in intra-abdominal pressure. This, again, leads to too much tension on the incision and possible breakdown of the incision.

►Lifting heavy weights-

Obviously, if a patient lifts something too heavy immediately after the operation, he or she can also tear the incision and cause a hernia.

▮**Postoperative ileus**

This occurs when the abdomen becomes distended because the intestines are not working properly after an operation. The swelling of the intestines increases the pressure in the abdomen and places tension on the incision. The tension then leads to defective healing.

▮**Straining to move bowels after surgery**

Constipation is another culprit for hernia formation. During the post-operative period and for a few months afterwards one should avoid straining while moving the bowels.

2. Patient Related Factors

a. Patient Factors:

1. Obesity
2. Diabetes
- 3 Renal Failure
4. Anemia and Hypoproteinemia
5. Post Operative Chest Infection

b. Disease Factors:

1. Peritonitis
2. Visceral Cancer

3. Ascites

4. Colostomy

3. Technical Factors

a. Surgeon's Factors:

1. Type of Incision- Low midline/ Paramedian

2. Placement of Subcostal Drain

3. Stoma Wound Protection Suturing Technique

b. Suturing Technique:

1. Type of Suture material: Absorbable: Vicryl/PDS/Dexon

Non absorbable: Nylon/Prolene/Ethibond

2. Size of Suture

3. Technique of Suturing

CLINICAL PRESENTATION

Incisional hernias are usually associated with:

▶ A burning sensation,

▶ A pressure or fullness

▶ An ache or constant pain at the site of the hernia

▶An awareness that something is present in the incision that should not be there

Reducible hernia

The bulge may be always present but typically goes away when the patient lies down. The reason is that the pressure that pushes tissue into the hernia when the patients stand is eliminated when the patient lies down because the tissue goes back into the abdomen. People can often push in the bulge (reduce the hernia), by applying gentle, steady pressure over the lump.

Incarcerated hernia

If the lump does not go away, the tissue is stuck. This is known as an incarcerated hernia and is almost always associated with unrelenting discomfort. This requires early surgical attention.

Bowel Obstruction

An incarcerated hernia can lead to bowel obstruction, which causes pain, abdominal distention and vomiting. This is a surgical emergency and if left alone can put the life of the patient at risk.

Strangulated hernia

If the neck of the hernia is narrow - there is always the risk of strangulation of the hernia. In this situation the blood supply to the intestine or the structure in the hernial sac is cut off and this leads to gangrene. This can be catastrophic and fatal if not treated immediately by surgery.

CLINICAL DIAGNOSIS

▶Reviewing the patient's symptoms and medical history are important in establishing the diagnosis of incisional hernia.

▶Detailed case records, of prior surgeries, is required with emphasis on postoperative period.

▶The surgeon should establish the amount of pain or discomfort the patient is experiencing and if it has grown in size since it was first noticed.

▶The hernial area is touched (palpated) to feel for any abnormal lump and if it increases in size when the patient coughs or strains or when they bend.

If in doubt about the diagnosis - radiological tests such as an ultrasound examination or in a complex case a computed tomography (CT) may be performed.

This will tell the surgeon the extent of the hernia and the contents in the bulge

PRE OPERATIVE PREPARATION

Preoperative measures for the surgical procedure are:

▶Many months before the surgery, the patient's doctor may advise for weight loss to help reduce the risks of surgery and to improve the surgical results.

▶In diabetics the control of sugar is advocated.

▶In smokers – cessation of smoking for over a month or more before surgery is recommended.

▶If on any blood thinning tablets like aspirin – it should be stopped for 3 to 5 days before surgery. Some of the newer medications like clopidrel need to be stopped for a week before surgery.

▶However do check with surgeon first before stopping any tablets.

▶Close to the time of the scheduled surgery, the patient will have standard preoperative blood and urine tests, an electrocardiogram, and a chest x ray to make sure that heart and lungs and major organ systems are functioning well.

▶Starting the night before surgery, patients must not eat or drink anything.

▶The lower chest, abdomen, groin and genital area may be shaved and prepared for the surgery.

▶The night before surgery a bath maybe advisable. While bathing thorough cleaning of the abdominal and genital area with soap and water a few times can help in lowering the bacterial count and lessen the chances of any infection from surgery.

▶An enema maybe administered to the patient prior to performing the surgery. Sometimes a laxative maybe given instead of an enema to clear the bowels prior to surgery.

▶Once in the hospital, a tube may be placed into a vein in the arm (intravenous line) to deliver fluid and medication during surgery.

▶The patient will be given a preoperative injection of antibiotics before the procedure. A sedative may be given to relax the patient.

▶On the evening before the operation a light easily digestible meal is advised.

TREATMENT

Incisional Hernias should be repaired surgically at a convenient time after they are discovered. Unfortunately, there is no other treatment other than surgery that has significant success.

Surgical Options are:

▶**Open Surgical Repair**

▶**Laparoscopic Surgical Repair**

Synthetic mesh allows defects of any size to be repaired without tension with a low recurrence rate. Synthetic mesh is a weave, usually of a synthetic material called polypropylene, which looks like the mosquito-net or wired-screens on the window and doors.

The mesh is used to patch an area. The idea is that if the cut ends of the surgical defect are sewn back together, tension may be present at the repair site. In addition, the pressures that led to the hernia in the first place are still present. And together, the tension on the repair and the pressures that caused the hernia can cause the hernia to recur.

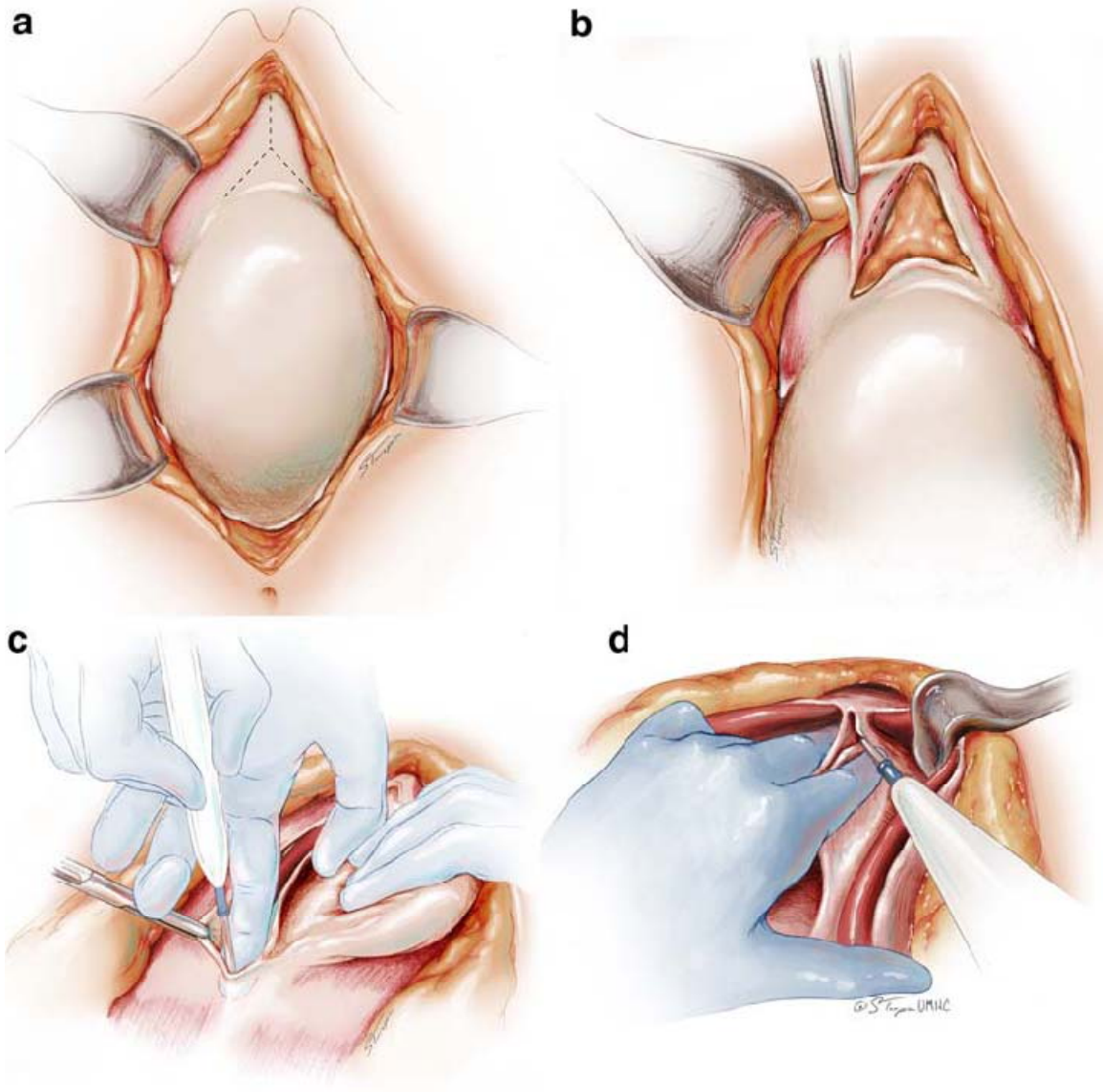
The use of the synthetic mesh provides a tension free repair and provides the added support to the weak wall of the abdomen.

Mesh and infection

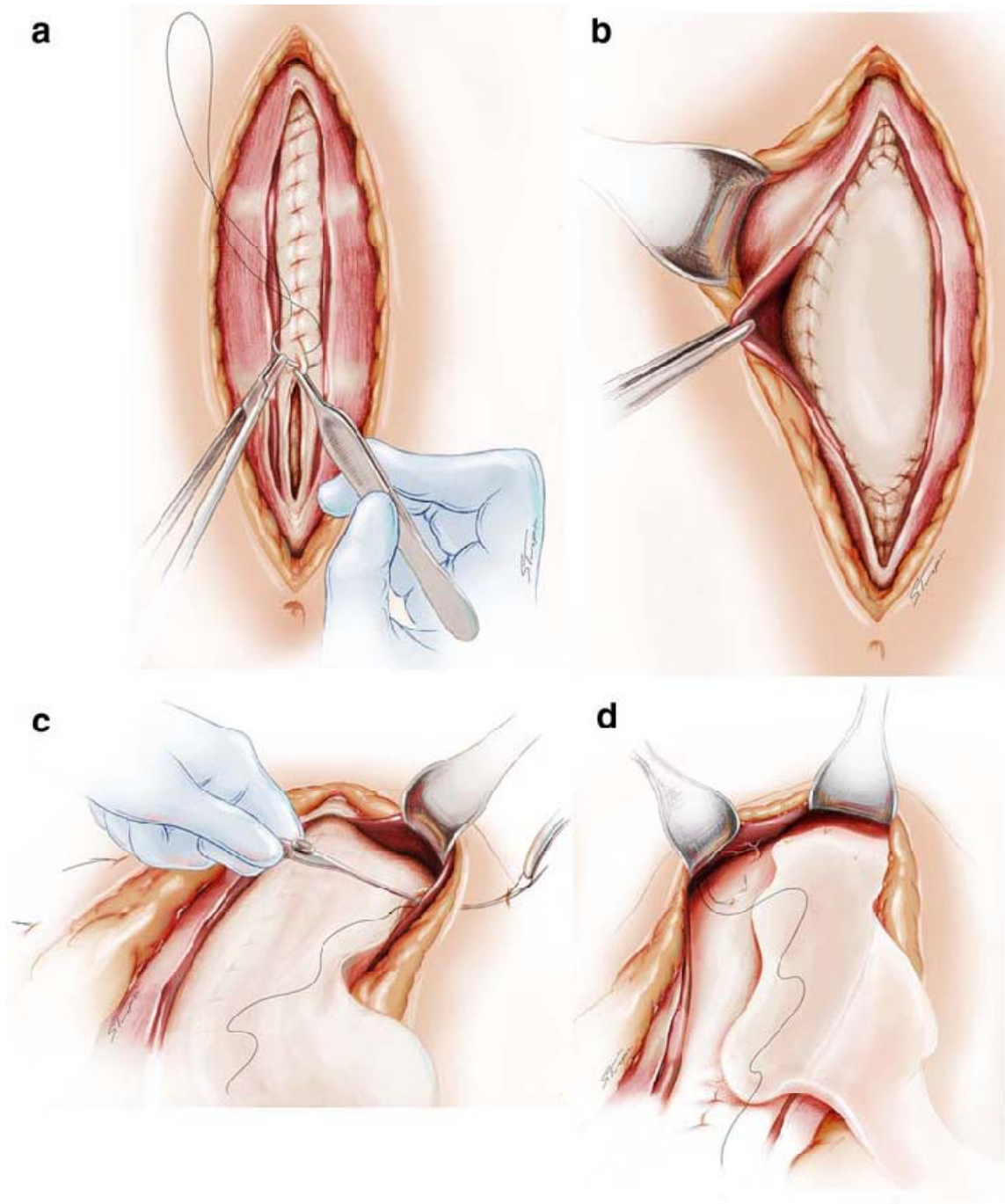
Any foreign material placed in the body is a potential source for infection. Due precautions need to be exercised before and during surgery to prevent infections.

In the current era where almost everything used in operation theatre is disposable the incidence of infection is low. However if does happen the mesh may need to be removed. Sometimes the mesh may erode through the skin or into the intestine.

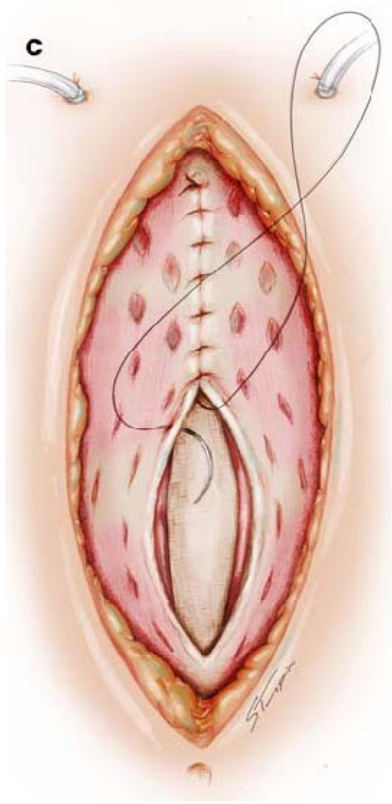
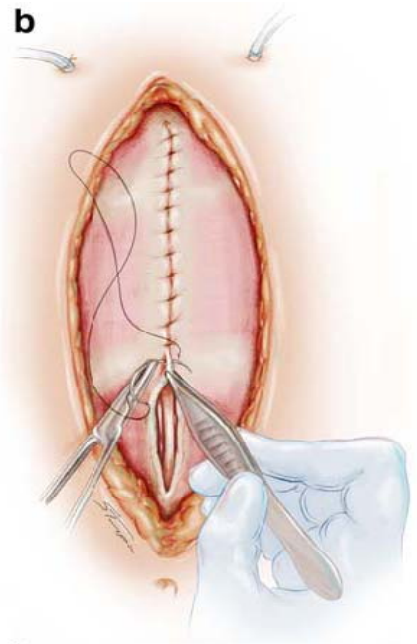
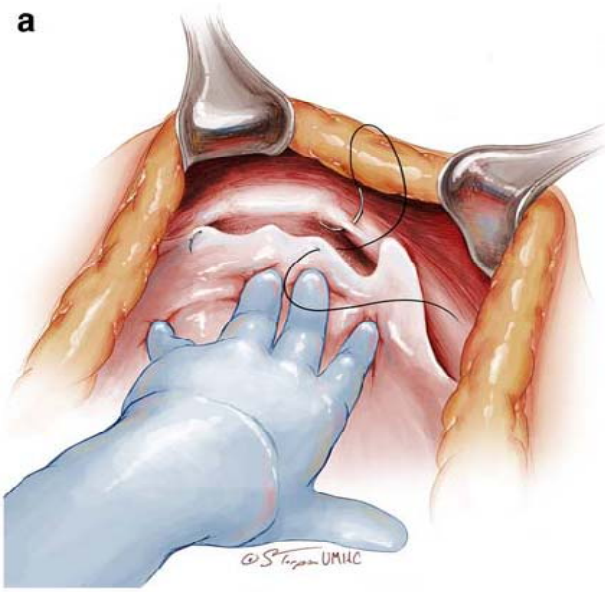
- (a) Hernia exposure (b) Entrance into the preperitoneal space.
- (c) Detach hernia and posterior sheath from the linea alba.
- (d) Detach posterior sheath from the linea alba superior and inferior to hernia



(a) Closure of the posterior sheath (b) Posterior sheath closure with absorbable mesh if needed (c) Transfascial suture to secure mesh. (d) Suture to the posterior sheath to secure the mesh



(a) Securing of mesh to Cooper's ligament. (b) Closure of the anterior sheath. (c) Relaxing incisions if needed. (d) Drain positions



OPEN SURGICAL REPAIR PROCEDURE

The patient lies on the operating table, either flat on the back or on the side, depending on the location of the hernia.

▶General anesthesia is usually given, though some patients may have local or regional anesthesia, depending on the location of the hernia and complexity of the repair.

▶A catheter may be inserted into the bladder to remove urine and decompress the bladder.

▶If the hernia is near the stomach, a gastric (nose or mouth to stomach) tube may be inserted to decompress the stomach.

▶The abdomen and groin are prepared with an antibacterial solution.

▶An incision is made about the length of the lump that is present.

▶The tissue layers are divided until the weakness in the abdominal wall is identified.

▶The contents of the hernia are pushed back into the abdomen.

▶The tissue around the defect is dissected to find good, strong, healthy tissue, known as fascia. The fascia is the gristly layer that provides the strength to your abdominal wall.

▶The defect is then closed, either by suturing together the good strong tissue on either side of the hole or by applying a synthetic mesh across it to patch the hole.

▶Following the repair, the layers of tissue are brought back together with sutures.

▶The skin is closed with stainless steel staples, dissolvable sutures or non-dissolvable sutures. Occasionally, a small amount of skin is also removed to leave a better cosmetic result.

LAPAROSCOPIC SURGICAL REPAIR

After administering anesthesia the abdomen and groin are prepared with an antibacterial solution.

▶The abdomen is inflated with a harmless gas (carbon dioxide) to allow the doctor to view the internal structures.

▶Three to four small keyhole incisions are used for an incisional hernia repair: two are 5 mm in length and one or two maybe 12 mm in length.

▶A laparoscope is a thin, telescope-like instrument, which helps to visualize the operating field, if inserted.

▶A camera, which is attached to the laparoscope, captures and produces a continuous image that is magnified and projected onto a television screen.

▶Using the laparoscopic surgical tools, the tissues and vessels are divided until the weakness in the abdominal wall is identified.

▶The tissue around the defect is dissected to find good, strong, healthy tissue, known as fascia. The fascia is the gristly layer that provides the strength to the abdominal wall.

▶The defect is then closed, either by suturing together the good strong tissue on either side of the hole or by applying a synthetic mesh across it to patch the hole.

▶The small abdominal incisions are closed with stitches or with surgical tape. The small abdominal incisions heal faster and within a few months, the incision is barely visible.

Benefits of laparoscopic hernia surgery:

▶Three to four tiny scars rather than one larger incision

▶Reduced postoperative pain

▶Faster return to work

▶Shorter recovery time and earlier resumption of daily activities (a recovery time of days instead of weeks)

POST OPERATIVE FOLLOW UP

▶Immediately after surgery, the patient will be observed in a recovery area for one to several hours depending on the time duration of the surgery. This is to monitor body temperature, pulse, blood pressure, and heart function.

▶There maybe a small drain from inside the wound to collect secretions for a day or more.

▶The surgical wound will be observed for undue bleeding or swelling.

▶The patient may then be transferred to a regular room.

▶Laparoscopically done cases will usually be discharged on the day of the surgery but more complex hernias such as those with incarcerated or strangulated intestines will require overnight hospitalization.

▶Open surgical cases may stay for 4 to 5 days or longer.

▶Some patients may have prolonged suture-site pain, which may be treated with pain medication or anti-inflammatory drugs.

▶Antibiotics may be prescribed to help prevent postoperative infection.

MATERIALS AND METHODS

The study material consist of 105 cases of incisional hernia in all the seven surgical units of our department of Madurai Medical College hospital, Madurai during the period from June 2009- May 2011.

All cases of pain abdomen admitted in the surgical ward were carefully and thoroughly examined to arrive at a clinical diagnosis. A preformed proforma was carefully filled up giving particular importance to the duration of illness, general and special investigations, and wherever possible, histopathological examination of the specimen was carries out.

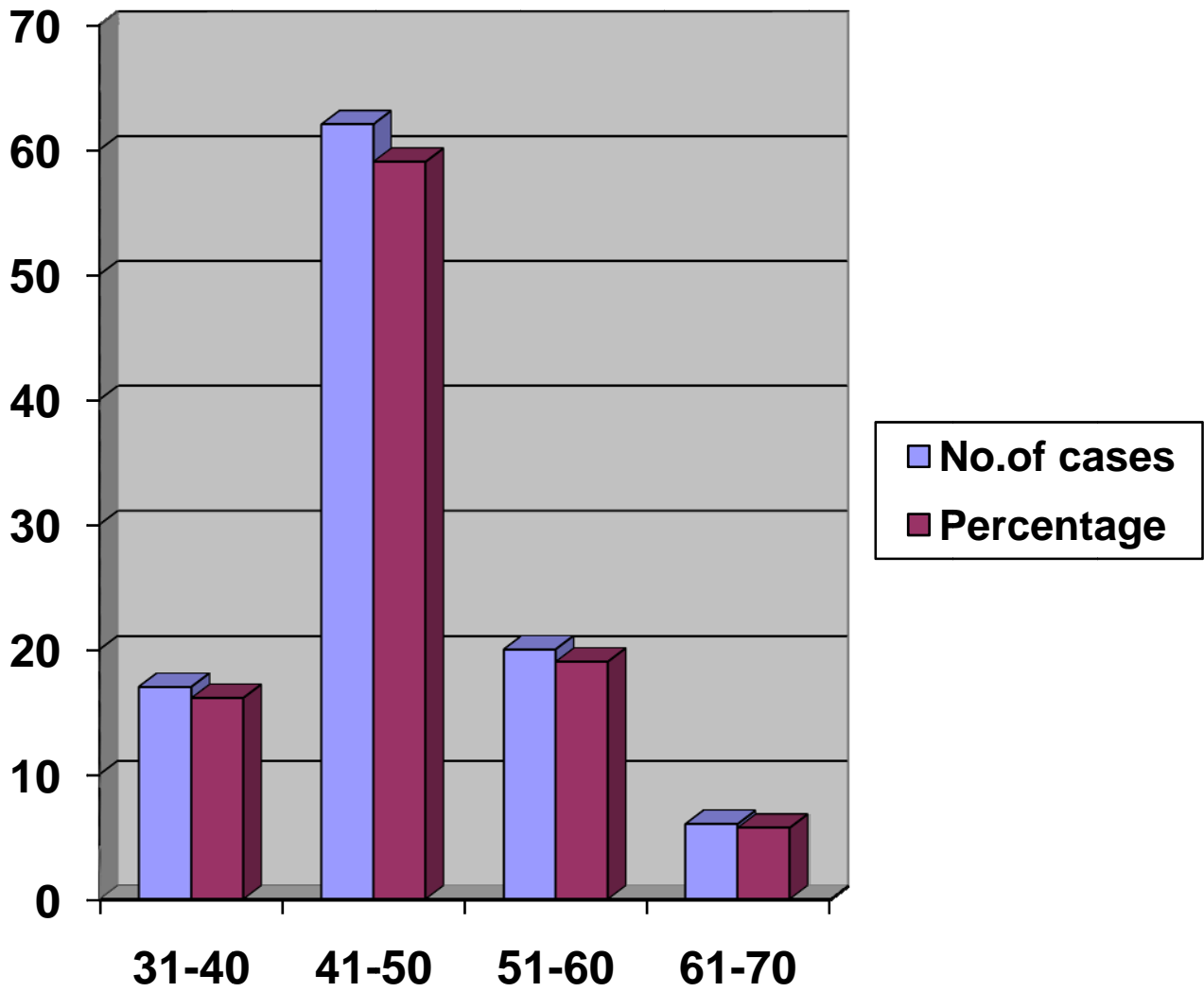
The following procedures were adopted according to the condition of the patient, i.e.

1. Open anatomical repair
2. Open mesh repair
3. Laparoscopic mesh repair
4. Emergency laparotomy resection & anastomosis with hernia repair

If selected cases, preoperative, postoperative clinical and operative photographs were taken. All the patients were followed up in the immediate post operative period and in the subsequent period ranging from 3 months till the end of the study period

AGE DISTRIBUTION

100



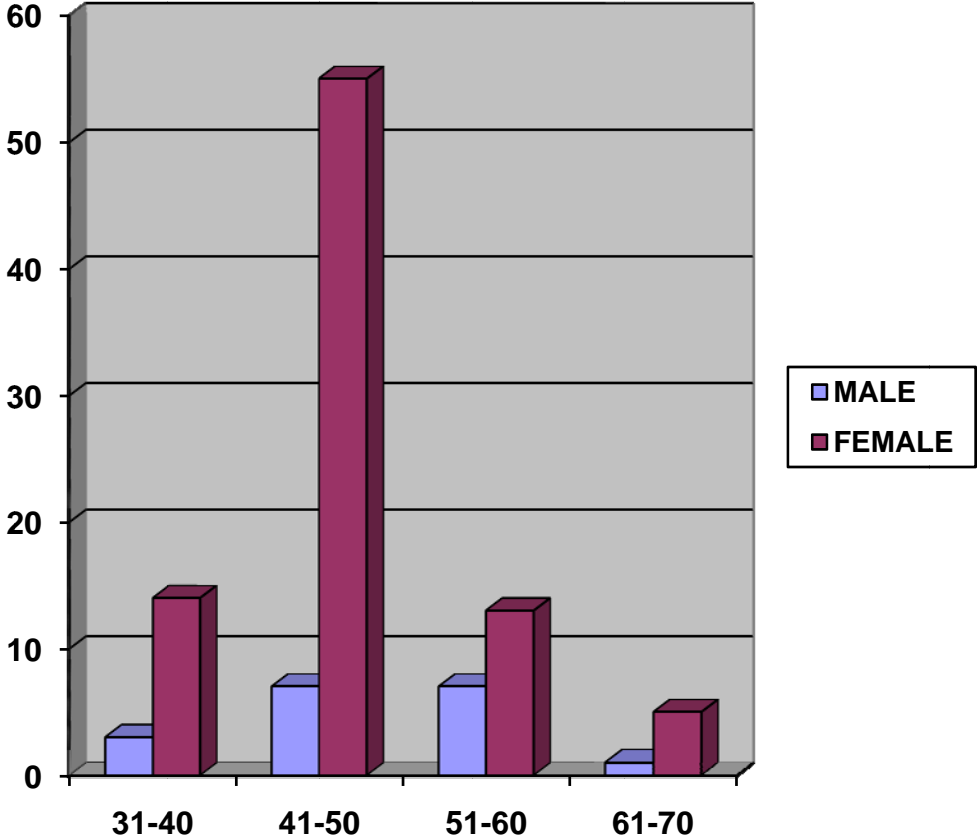
OBSERVATION AND RESULTS

Table-1: Age Incidence

Age in years	No.of cases	Percentage
31-40	17	16.1%
41-50	62	59%
51-60	20	19%
61-70	06	5.7%

In my study, increased incidence of incisional hernia disease was between 41-50 years

SEX DISTRIBUTION



SITE OF OCCURRENCE OF IH

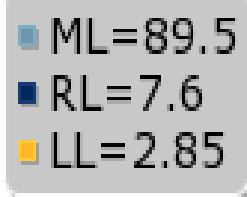


Table-2 Sex Incidence

Sex Incidence	Male	Female
31-40	3	14
41-50	7	55
51-60	7	13
61-70	1	5

Females have increased incidence of incisional hernia disease.

Table- 3 Clinical Presentation

S.No	Clinical Presentation	No.of.Cases	Percentage
1.	Bulge in the lower abdomen over the previous scar site with cough impulse & reducibility	76	72.4%
2.	Pain over the swelling	34	32.4%
3.	Irreducible swelling	12	11.4%
4.	Intestinal obstruction (1) Constipation (2) Vomiting (3) irreducibility	4	7.6%
5.	Strangulation -Abdominal tenderness, guarding	4	7.6%

Table -4
Associated disease

S.No	Associated disease	No.of cases	Percentage
1.	Diabetes Mellitus	30	28.6%
2.	COPD	19	18%
3.	Prostatism	6	5.72%
4.	Hypertension	14	13.3%

Table-5 Investigation

S.No	Investigation	No.of cases	Percentage
1.	Elevated blood glucose	30	28.6%
2.	Elevated serum cholestrol	46	43.8%
3.	Elevated urea creatinine	12	11.4%
4.	Hypoproteinemia	16	15.2%

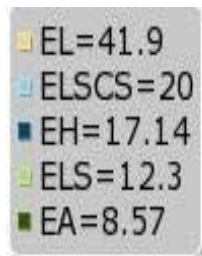
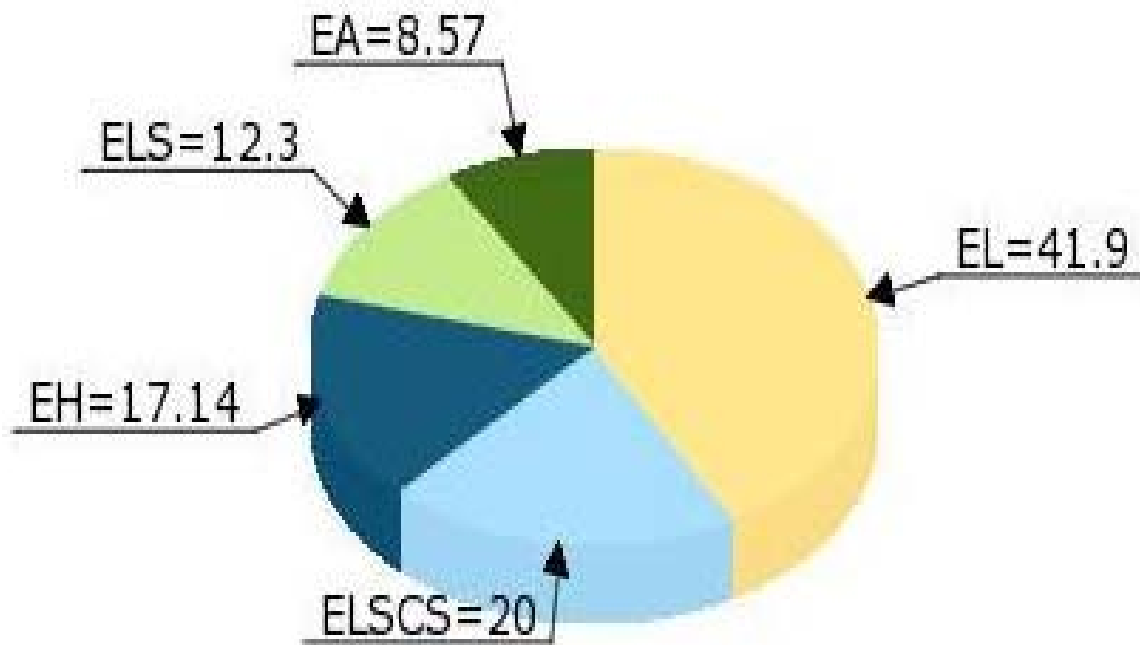
Table – 6 USG Abdomen Findings

S.No.	USG Abdomen Findings	No.of cases	Percentage
1.	Hernial sac with omentum as content	50	47.6%
2.	Hernial sac with omentum small Bowel as content	47	44.8%
3.	Edematous aperistalsis bowel loops	4	7.6%

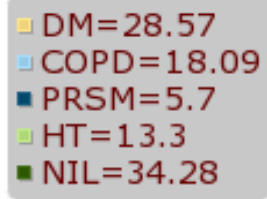
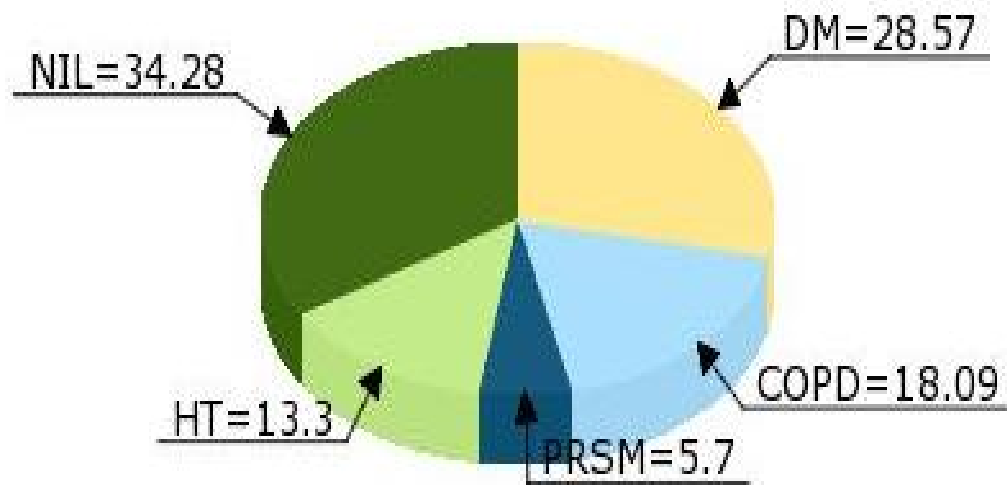
Table -7 Management

S.No	Management	No.of cases	Percentage
1.	Open anatomical repair	18	17%
2.	Open mesh repair	73	63.8%
3.	Laparoscopic mesh repair	6	5.7%
4.	Emergency laparotomy Resection & anastomosis with hernia repair	8	7.6%

ANALYSIS OF PREVIOUS SURGERY



ANALYSIS OF COMORBID FACTORS



ANALYSIS OF TREATMENT FOR IH

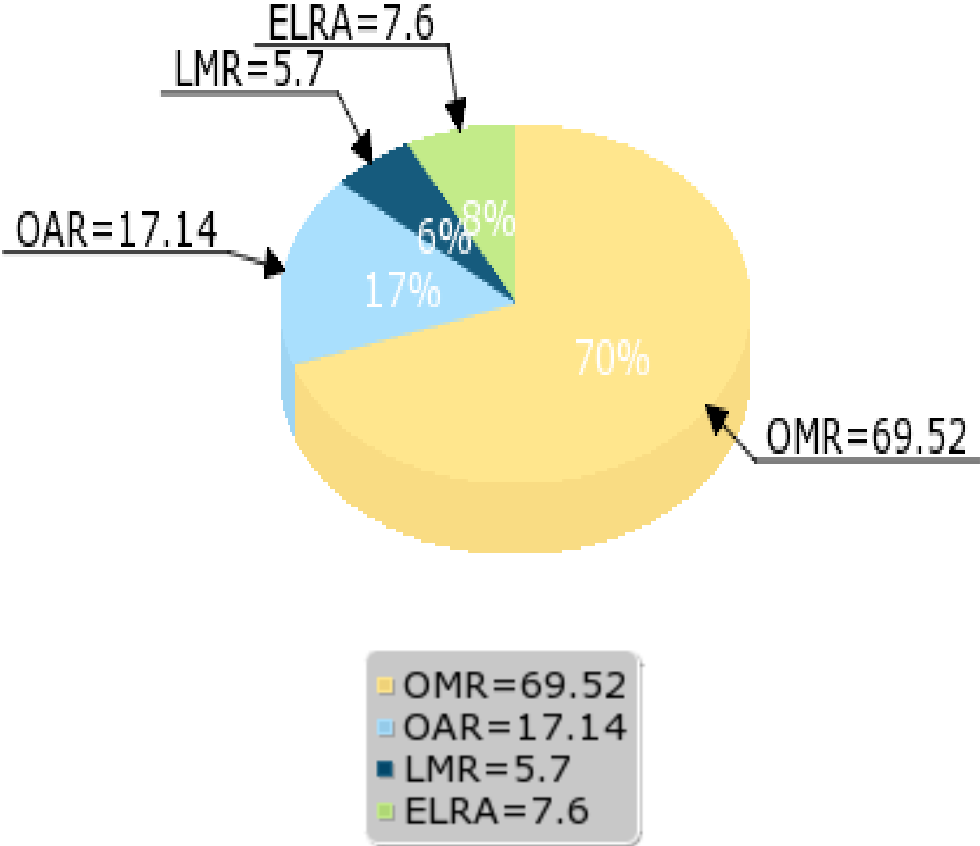


Table-8 Overall incidence and Incisional hernia

Study place	Percentage
Our study	6%
South india	8%
United states	2 to 11%
World	12%

DISCUSSION

The study included 105 consecutive cases of incisional hernia who were admitted and treated in all the seven surgical units of GRH Madurai Medical College, Madurai. The overall incidence of incisional hernia in our hospital was 6%.

The patient's details were entered in a typed proforma with necessary details for the study prospectively and were followed up post operatively till the time of discharge of patients and for two months henceforth. The rest of the data was provided by the medical records officer.

The incidence, age and sex incidence, urban and rural incidence, associated diseases, common clinical presentations, the different types of management were analysed and discussed in relevance to each of the patients. The various investigations that were available in our institution have been used, which include biochemical and radiological investigations. The radiological investigations included plain radiographs, ultrasonography and CT scan

The various treatment options were considered for each of the cases and each was provided the best optional treatment available in our institution. The incidence and further management of the postoperative complications that occurred are also discussed.

The incidence of Incisional hernia is found to be increased in our institution during the past few years. The age range of the patients admitted and treated for incisional hernia was between 31 to 70 years and the mean aged was 45 years.

The incidence of Incisional hernia was more in females than in the males, the ratio being 4:1. There were 87 females and 18 male cases of

The commonest presenting symptom was bulge in the lower abdomen with cough impulse & reducibility which was seen in 76 patients i. e 72 %. Pain over the swelling was present in 34 patients i. e 32.4%. Irreducibility present in 12 patients 12%. Obstructive features were seen in 4 patients 3.8 %. Four patients had strangulation 3.8%.

In 94 patients(89.5 %) the site of incisional hernia was Mid line. About 8 patients(7.6%) had Incisional hernia in Right lumbar region. In Only 3 patients (2.85%), the site was left lumbar region.

There was associated diabetes mellitus in 30 patients, COPD in 19 patients, hypertension in 14 patients; prostatism 6 patients. 98 patients were obese with BMI more than 30. 33 patients were multiparous, 12 patients were chronic smokers.

18 patients underwent open anatomical repair, 73 patients underwent open mesh repair, 6 patients underwent laparoscopic mesh repair. Emergency laparotomy and bowel resection anastomosis with hernia repair done in 8 patients.

SUMMARY

In my study of 105 patients, increased incidence of incisional hernia was observed between 41-50 years

And females were found to have increased incidence than males. 76 patients presented with reducible lower abdominal swelling, 34 patients had pain over the swelling, 4 patients had obstructive symptoms and 4 patients had strangulation.

In 94 patients(89.5 %) the site of incisional hernia was Mid line. About 8 patients(7.6%) had Incisional hernia in Right lumbar region. In Only 3 patients (2.85%),the site was left lumbar region

73 patients treated with open mesh repair, 18 patients open anatomical repair, 6 patients with laparoscopic mesh repair and 8 patients underwent emergency laparotomy.

Outcome of overall incidence of incisional hernia correlated with incidence in south India

CONCLUSION

- (1) Overall incidence of incisional hernia was 6% out of all admission in my study period.
- (2) The age incidence between 31-70 years with the peak incidence in the age group of 41-50 years.
- (3) Female preponderance of 4:1 was observed in my study.
- (4) Common presenting symptoms were Bulge in the lower abdomen at the previous scar site with cough impulse & reducibility, Pain over the swelling.
- (5) Common Risk factors include
 - (a) Previous surgery- emergency surgeries are more often followed by development of incisional hernia compared to elective surgeries. In my study 45 patients underwent emergency laparotomy, 17 patients had emergency hysterectomy, 20 patients had emergency caesarean, 9 patients emergency appendectomy. Only 14 patients had elective surgery.
 - (b) Post operative wound dehiscence, 87 patients had wound dehiscence
 - (c) Obesity- 98 patients were found to have BMI more than 30.
 - (d) Multiparity- 33 patients were multiparous.

- (e) Co morbid factors- in my study 30 patients were diabetic, 19 patients had COPD, 14 patients had hypertension, and 6 patients have prostatism.
- (f) Smoking- 12 patients were chronic smokers
- (6) The site of Incisional hernia was Midline in 94 patients (89.5%), right lumbar region in 8 patients(7.6%) and left lumbar region in 3 patients (2.85%)
- (7)Ultra sonogram was the investigation of choice because of simplicity safety, repeatability, and accuracy. It was used in all my cases in my study.
- (8)Open mesh repair was the widely followed method surgical treatment.

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ABBREVIATIONS

S.No	Abbreviations	Expansion
1.	IH	Incisional hernia
2.	ML	Mid line
3.	RL	Right lumbar
4.	LL	Left lumbar
5.	OMR	Open mesh repair
6.	OAR	Open anatomical repair
7.	ELRA	Emergency laparotomy resection anastomosis
8.	EL DU PERF	Emergency laparotomy for duodenal perforation
9.	EL ILEAL PERF	Emergency for ileal perforation
10.	EL BLUNT INJURY	Emergency laparotomy for blunt injury
11.	LSCS	Emergency lower segment caesarean section
12.	ES	Elective surgery
13.	BMI	Body mass index
14.	PRSM	Prostatism
15.	DM	Diabetes mellitus
16.	COPD	Chronic obstructive pulmonary disease
17.	HYPT	Hypertension

PROFOMA

S.No. Ward Address

Name

Age/Sex

IP No

Date of admission

Date of surgery

Date of discharge

Complaints

(1) Bulge in the lower abdomen over previous scar

(2) Pain in the lower abdomen

(3) Cough impulse & Reducibility

(4) Intestinal obstruction- Vomiting, constipation

(5) Strangulation

Past history

Diabetes mellitus/ hypertension / asthma

H/o Typhoid

H/o Ileal disease/resection/bypass surgery

Personal History

Mixed diet

High fat

Menstrual History

Marital History

General Examination

1. Height
2. Weight
3. Pulse rate
4. Blood pressure
5. Jaundice
6. Anaemia

Clinical Examination

Inspection

1. Abdomen shape
2. Moves with respiration
3. Visible lump

Palpation

1. Warmth
2. Tenderness
3. Guarding/Rigidity
4. Signs of peritonitis
5. Other findings

Investigation

1. Haemoglobin
2. Urine
 1. Albumin
 2. Sugar, deposit
3. Total Count
4. Differential count
5. ESR
6. Blood urea sugar creatinine
7. LFT
8. Lipid profile

9. X-Ray Abdomen
10. Ultrasound abdomen and pelvis
11. Upper GI Endoscopy

Treatment

1. Conservative
2. Surgery – Open/Lap
3. Operative findings
4. Biospy report

Follow up

MASTER CHART

S.NO	NAME	A G E	S E X	IP NO	DIAG NOSIS	SITE	TREA T MENT	PREV SURGERY	POST OP WOUND DEHISCENC E	OBSIT Y	MULT I PARIT Y	COMO RBID
1	KARUPAN	32	M	63234	IH	ML	OMR	EL- DU PERF	YES	BMI-30	NIL	DM
2	MURUGA	34	M	53833	IH	ML	OMR	EL- ILEAL PERF	YES	BMI-31	NIL	PRSM
3	SENTIL	39	M	22136	IH	ML	OMR	EL-BLUNT INJURY	YES	BMI-30	NIL	NIL
4	MALINI	33	F	23180	IH	ML	OAR	EL- DU PERF	YES	BMI-34	YES	COPD
5	MALATHI	35	F	62135	IH	ML	OMR	LSCS	YES	BMI-31	NIL	HYPT
6	SEGAPI	37	F	61131	IH	ML	OMR	EL – DU PERF	YES	BMI-34	NIL	COPD
7	THANAM	38	F	60232	IH	ML	OMR	LSCS	NIL	BMI-31	NIL	HYPT
8	DURGA	39	F	22144	IH	RL	OAR	HYSTRECTOMY	YES	BMI-33	YES	COPD
9	SEETHA	31	F	21342	IH	ML	LMR	EL- DU PERF	YES	BMI-34	NIL	HYPT
10	GEETHA	40	F	23862	IH	ML	OMR	LSCS	NIL	BMI-32	NIL	NIL
11	IRULAYEE	34	F	24566	IH	LL	OMR	EL – DU PERF	YES	BMI-31	NIL	DM
12	ALAMI	35	F	54362	IH	ML	OMR	LSCS	YES	BMI-33	YES	COPD
13	KARUPI	32	F	54216	IH	ML	OMR	HYSTRECTOMY	NIL	BMI-32	NIL	HYPT
14	VINOTHINI	31	F	63284	IH	ML	OMR	LSCS	YES	BMI-33	NIL	COPD
15	GNANAPOO	34	F	62165	IH	RL	OMR	EL – DU PERF	YES	BMI-34	YES	HYPT
16	KATHAMA	38	F	60831	IH	ML	OAR	ES- GASTRECTOMY	YES	BMI-31	NIL	COPD

17	IYSHA	39	F	25423	IH	ML	OMR	EL- ILEAL PERF	YES	BMI-33	YES	DM
18	RAJA	41	M	24226	IH	RL	LMR	APPENECTOMY	YES	BMI-34	NIL	HYPT
19	SAMI	44	M	23368	IH	ML	OAR	EL- ILEAL PERF	YES	BMI-32	NIL	COPD
20	MAYANDI	43	M	43256	IH	ML	OMR	EL-BLUNT INJURY	YES	BMI-31	YES	PRSM
21	VELU	46	M	43360	IH	ML	OMR	EL- DU PERF	NIL	BMI-30	NIL	COPD
22	SANKAR	48	M	43248	IH	ML	OMR	APPENECTOMY	NIL	BMI-33	NIL	PRSM
23	DHARMAN	49	M	43327	IH	ML	OMR	EL- DU PERF	NIL	BMI-32	YES	DM
24	DURAI	50	M	26367	IH	RL	OAR	EL- DU PERF	YES	BMI-30	NIL	COPD
25	VAISHU	41	F	60543	IH	ML	ELRA	EL-ILEAL PERF	YES	BMI-31	NIL	NIL
26	MUNIAMMA	41	F	61456	IH	ML	OMR	EL-ILEAL PERF	YES	BMI-34	NIL	HYPT
27	MENAKA	43	F	62540	IH	RL	OMR	APPENECTOMY	YES	BMI-32	YES	DM
28	MEGALA	45	F	68841	IH	ML	OMR	EL- DU PERF	NIL	BMI-30	NIL	COPD
29	RATHI	47	F	68903	IH	ML	OAR	EL- ILEAL PERF	YES	BMI-32	NIL	HYPT
30	BOOMA	49	F	64842	IH	ML	OMR	EL- DU PERF	YES	BMI-34	NIL	NIL
31	RENUKA	41	F	77764	IH	ML	ELRA	HYSTRECTOMY	NIL	BMI-30	NIL	COPD
32	REVATHI	42	F	63330	IH	ML	OAR	APPENECTOMY	YES	BMI-31	YES	NIL
33	BAKYAM	44	F	62265	IH	LL	OMR	ES- GASTRECTOMY	YES	BMI-33	NIL	DM
34	SATHYA	46	F	63640	IH	ML	OMR	LSCS	YES	BMI-30	NIL	COPD
35	ALIMABIVI	48	F	68815	IH	ML	OMR	EL- DU PERF	YES	BMI-31	NIL	HYPT
36	SULTANA	50	F	68821	IH	ML	OAR	EL- ILEAL PERF	YES	BMI-33	YES	COPD
37	REGINA	41	F	67736	IH	ML	OMR	EL- DU PERF	YES	BMI-30	NIL	NIL
38	SAROJA	44	F	67743	IH	ML	OMR	ES-COLON RESECT	YES	BMI-32		DM

39	SANKARI	46	F	67770	IH	ML	OMR	EL- DU PERF	NIL	BMI-34	YES	NIL
40	VEERAMA	48	F	66475	IH	RL	OMR	APPENECTOMY	NIL	BMI-30	NIL	HYPT
41	FATHIMA	49	F	66745	IH	ML	OAR	EL- DU PERF	YES	BMI-31	NIL	COPD
42	SUDHA	42	F	68328	IH	ML	OAR	ES- GASTRECTOMY	YES	BMI-33	YES	DM
43	SUNDARI	41	F	67347	IH	RL	OMR	ES-COLON RESECT	YES	BMI-30	NIL	HYPT
44	MARIYA	43	F	64740	IH	ML	OMR	EL-ILEAL PERF	YES	BMI-32	NIL	DM
45	MARKIA	45	F	64836	IH	ML	OMR	LSCS	YES	BMI-34		NIL
46	ANJALAI	46	F	64937	IH	ML	OMR	EL- DU PERF	NIL	BMI-30	YES	DM
47	TAMIZH	47	F	65945	IH	ML	OMR	EL- ILEAL PERF	YES	BMI-31	NIL	NIL
48	AKILA	48	F	64906	IH	ML	OMR	HYSTRECTOMY	YES	BMI-33	NIL	NIL
49	VIJI	43	F	64512	IH	ML	LMR	LSCS	YES	BMI-30		DM
50	BRINDHA	41	F	64532	IH	ML	ELRA	LSCS	YES	BMI-31	YES	HYPT
51	GOMATHI	45	F	64508	IH	ML	OAR	HYSTRECTOMY	NIL	BMI-33	NIL	DM
52	KOKILA	46	F	64841	IH	ML	OAR	LSCS	YES	BMI-32	YES	NIL
53	PREMA	49	F	23351	IH	ML	ELRA	HYSTRECTOMY	NIL	BMI-34	NIL	DM
54	DHANA	50	F	23618	IH	ML	OMR	LSCS	NIL	BMI-30	NIL	NIL
55	SHARMILA	42	F	23774	IH	ML	OMR	LSCS	YES	BMI-31	NIL	COPD
56	VELLAIAMA	43	F	23548	IH	ML	OMR	EL-DU PERF	YES	BMI-33	YES	DM
57	LAKSHMI	41	F	23551	IH	ML	OMR	LSCS	YES	BMI-31	NIL	HYPT
58	RAMAYEE	47	F	24458	IH	ML	OMR	HYSTRECTOMY	YES	BMI-33	YES	DM

59	MOOKAYEE	48	F	24659	IH	ML	OAR	LSCS	NIL	BMI-34	NIL	NIL
60	SELVI	44	F	24642	IH	ML	OMR	EL-DUPERF	YES	BMI-30	YES	DM
61	PETCHI	43	F	11235	IH	ML	LMR	EL- DU PERF	YES	BMI-31	NIL	NIL
62	USHA	45	F	12841	IH	ML	OMR	EL- ILEAL PERF	YES	BMI-32	NIL	DM
63	PUSHPA	46	F	13560	IH	ML	OMR	LSCS	NIL	BMI-33	YES	NIL
64	RANI	48	F	13652	IH	ML	OMR	EL-ILEAL PERF	YES	BMI-34	NIL	NIL
65	PUSHPAM	49	F	19819	IH	ML	OMR	HYSTRECTOMY	YES	BMI-30	NIL	DM
66	PONNI	41	F	19726	IH	ML	OAR	ES- GASTRECTOMY	YES	BMI-34	YES	COPD
67	AYYAMAL	42	F	19842	IH	ML	ELRA	HYSTRECTOMY	NIL	BMI-32	NIL	NIL
68	ESHWARI	43	F	18364	IH	LL	OMR	ES- GASTRECTOMY	YES	BMI-31	YES	HYPT
69	MAYAKA	47	F	17427	IH	ML	OMR	LSCS	YES	BMI-33	YES	DM
70	ARPUTHAM	48	F	17420	IH	ML	OMR	ES- GASTRECTOMY	YES	BMI-30	NIL	NIL
71	PUNITHA	49	F	15417	IH	ML	OMR	EL- BLUNT INJURY	YES	BMI-31	YES	NIL
72	MARRY	41	F	15355	IH	ML	OAR	EL- DU PERF	YES	BMI-33	NIL	DM
73	KALAIVANI	50	F	18808	IH	ML	LMR	EL- ILEAL PERF	YES	BMI-32	YES	COPD
74	KOTHAI	49	F	26606	IH	ML	OAR	EL- DU PERF	YES	BMI-34	NIL	NIL
75	VALLI	41	F	27707	IH	ML	OAR	LSCS	YES	BMI-30	YES	DM
76	SANTHI	42	F	32324	IH	ML	OMR	ES-COLON RESECT	YES	BMI-34	NIL	NIL
77	ARASEE	47	F	33496	IH	ML	OMR	EL – BLUNT INJURY	YES	BMI-30	YES	NIL
78	PORKODI	48	F	43984	IH	ML	OMR	HYSTRECTOMY	YES	BMI-34	NIL	COPD

79	MAHARANI	46	F	44863	IH	ML	OMR	EL – BLUNT INJURY	NIL	BMI-30	YES	DM
80	RAVI	51	M	55455	IH	ML	OMR	APPENECTOMY	YES	BMI-32	NIL	PRSM
81	BABU	56	M	54409	IH	ML	OMR	APPENECTOMY	NIL	BMI-30	YES	COPD S
82	BOSS	58	M	66336	IH	ML	OMR	EL- ILEAL PERF	YES	BMI-31	NIL	PRSM
83	DEPAK	54	M	53360	IH	ML	OMR	EL-BLUNT INJURY	YES	BMI-31	YES	DM
84	AYAVU	52	M	55534	IH	ML	OMR	APPENECTOMY	YES	BMI-32	NIL	NIL
85	SETHU	58	M	23649	IH	ML	OMR	ES- GASTRECTOMY	YES	BMI-33	NIL	NIL
86	RAJAN	57	M	21131	IH	ML	OMR	EL-ILEAL PERF	YES	BMI-30	YES	DM
87	MARIAMA	51	F	21838	IH	ML	OMR	HYSTRECTOMY	YES	BMI-31	YES	NIL
88	AZHAGI	53	F	23821	IH	ML	OMR	HYSTRECTOMY	YES	BMI-32	NIL	NIL
89	PETCHIAMA	55	F	34430	IH	ML	OAR	HYSTRECTOMY	YES	BMI-33	NIL	DM
90	PONNAMA	57	F	43322	IH	ML	ELRA	HYSTRECTOMY	YES	BMI-34	NIL	NIL
91	KALA	59	F	41418	IH	ML	OMR	HYSTRECTOMY	YES	BMI-30	YES	NIL
92	MALA	52	F	66512	IH	ML	OMR	LSCS	YES	BMI-32	NIL	DM
93	LATHA	54	F	67732	IH	ML	ELRA	ES- GASTRECTOMY	YES	BMI-33	NIL	NIL
94	MALAR	56	F	66374	IH	ML	OMR	EL- ILEAL PERF	YES	BMI-34	NIL	NIL
95	VALAMBAL	58	F	60410	IH	ML	OMR	HYSTRECTOMY	YES	BMI-31	NIL	NIL
96	VETHA	60	F	54127	IH	ML	OMR	LSCS	YES	BMI-32	NIL	DM
97	GIRIJA	56	F	58113	IH	ML	OMR	EL- DU PERF	YES	BMI-33	NIL	NIL
98	JULIET	57	F	59377	IH	ML	OMR	ES-COLON RESECT	YES	BMI-30	YES	NIL
99	PARIMALA	53	F	41014	IH	ML	OMR	ES-COLON RESECT	YES	BMI-33	NIL	DM

100	SUBBU	62	M	40372	IH	ML	OMR	APPENTECTOMY	YES	BMI-33	NIL	PRSM
101	MUNISREE	66	F	16306	IH	ML	LMR	HYSTRECTOMY	YES	BMI-31	NIL	NIL
102	MEENATCHI	67	F	17774	IH	ML	OMR	LSCS	YES	BMI-32	NIL	DM
10	MEERA	68	F	27249	IH	ML	ELRA	HYSTRECTOMY	YES	BMI-33	NIL	NIL
104	JULIE	70	F	28413	IH	ML	OMR	EL- ILEAL PERF	YES	BMI-34	NIL	NIL
105	ALAMU	68	F	33607	IH	RL	OMR	LSCS	YES	BMI-30	NIL	DM