"A COMPEHENSIVE STUDY ON INCIDENCE AND MANAGEMENT OF INCISIONAL HERNIAS"

Submitted For MS Degree Branch 1 (General Surgery)

K.A.P.V GOVT. MEDICAL COLLEGE
TRICHY

The Tamilnadu Dr MGR Medical University
Chennai

April 2013

CERTIFICATE

This is to certify that the dissertation titled **"A COMPREHENSIVE STUDY ON INCIDENCE AND MANAGEMENT OF INCISIONAL HERNIAS"** is the original work done by **Dr. N. Subha Lakshmi** Postgraduate in the department of general surgery K.A.P.V Govt. Medical college, Trichy to be submitted to the Tamilnadu Dr MGR Medical University Chennai towards partial fulfilment of the requirement for the award of MS degree general surgery April 2013.

Prof. Dr. A. KANAGASUNDARRAM MS.,
UNIT CHEIF & HEAD OF THE DEPARTMENT,
DEPARTMENT OF GENERAL SURGERY,
K.A.P.V MEDICAL COLLEGE,
TRICHY.

Dr. A. KARTHIKEYAN MD(FM).,
DEAN
K.A.P.V GOVT MEDICAL COLLEGE
TRICHY.

DECLARATION

I, **Dr. N. SUBHALAKSHMI**, solemenly declare that the dissertation titled **"A COMPEHENSIVE STUDY ON INCIDENCE AND MANAGEMENT OF INCISIONAL HERNIAS"** was done by me at K.A.P.V. Government Medical College, Trichy under the guidance & supervision of the Head of Department & Prof. of Surgery **Dr. A. KANAGASUNDARRAM M.S.** This dissertation is submitted to the Tamil Nadu Dr. M.G.R. Medical University Chennai, in partial fulfillment of the requirement for the award of MS degree in General Surgery.

Place: Trichy **Signature of Candidate**

Date: **Dr. N. SUBHALAKSHMI**

ACKNOWLEDGEMENT

I owe a special debt of gratitude to my unit chief, Head of the department of General surgery K.A.P.V Govt. medical college, Trichy for having helped me at every step in successfully completing this study and for granting me the permission for conducting this study.

I express my gratitude and respect to our honourable Dean, K.A.P.V Govt. medical college, Trichy **Prof. Dr.A.Karthikeyan MD,** for permitting me to use the facilities of the college and hospital for the purpose of this study.

I can never forget the constant encouragement and helpful advices at every stage of this study by my unit Assistants, **Prof.Dr.P.Rajendaran MS, MCH, Dr.G.Mohan Dhas MS**, **Dr.Mahalakshmi Ashokkumar MS, DGO**., under whom I had the great privilege of working as a post graduate student.

Last but not the least I would like to thank all the patients who were the building blocks of this study.

CONTENTS

INTRODUCTION

INTRODUCTION

Incisional hernia is the hernia that appears between the layers of the abdominal wall that develops in the scar of the surgical incision. Incisional Hernias make up about 80% of ventral hernias that surgeons encounter. The range of incisional hernias rates after laprotomy is from 2% to 11% which means that at least 150000 patients are going to develop this complication from abdominal surgery.

Once incisional hernia occurs, the natural history is for it to grow. Delay in repair complicates every single aspect of the surgery and leads to increase morbidity. So repair should be done as soon as possible as. As it grows the chances of complications such as incacerations and strangulation of viscera, atrophy of subcuteanous tissue, thinning of skin, ulceration of skin and loss of domain of the viscera occurs. The lateral abdominal muscles retract and become fibrotic and this enlarges the defect. All these things greatly complicate any repair and increase the chance of repair failure and prosthetic infection and wound problems. If the patient is obese weight loss makes the surgery easier. Closure is much easier with much lower recurrence rate. Excess skin and fat can be excised which pleases the patient.

If there is loss of domain of the intestines pneumo peritoneum done slowly as an out patient has been reported to be helpful in stretching the abdominal wall prior to surgery to aid in returning the bowel to the abdominal cavity. Incisional Hernia now constitute the second most frequent in surgery first being the inguinal hernia.

Incisional hernia otherwise called as post operative as described by Ian Arid is a diffuse extrusion of peritoneum and abdominal contents through a weak scar of an operation or accident wounds.

With the advent of laproscopic surgeries the incidence of ventral incisional hernias has decreased to some extent. However in laproscopic surgery perse predisposes to ventral port hernias but of minimum incidence.

In our study 50 cases of incisional hernias were treated over a period of 2 years from June 2010 to June 2012 in K.A.P.V govt medical college, Trichy.

AIM OF STUDY

AIM OF STUDY

- To identify the etiology, predisposing factors and contributing factors for the ventral incisional hernia.
- To find the incidence of incisional hernia following various abdominal incisions.
- Management of ventral incisional hernia.

ANATOMY OF ANTERIOR ABDOMINAL WALL

ANATOMY OF ANTERIOR ABDOMINAL WALL

The anterior abdominal wall consists of skin, subcutaneous tissue and muscular layer. The anterior abdominal wall has 3 layers of muscle, each running in different directions. The muscles become aponeurotic as they approach the mid lines and become the linea alba. The muscles of anterior abdominal wall include External oblique, Internal oblique, Transversus abdominis, Rectus Abdominis, and Pyramidalis.

Skin

The cleavage lines run transversely1. Incision through which gives a neat scar and the incision injures minimal nerve fibres.

Sub Cutaneous Tissue

The superficial fatty areolar tissue (Camper's fascia) and deeper membranous layer (Scarpa's fascia) constitute the subcutaneous tissue1.

Muscle Layer

Four pairs of major muscles and two pairs of minor muscles constitute the anterior abdominal wall6. The major muscles are

1. Rectus abdominis
2. External oblique

3. Internal oblique
4. Transversus abdominis

The minor muscles are

1. Cremaster
2. Pyramidalis.

The external oblique, internal oblique and transversus abdominis muscles are always under tonic contraction and exerts a lateral pull on the rectus muscle with the sheath, which in normal individuals in countered by their counterpart on the other side and kept in balance by the strong linea alba.

MUSCLES OF THE ANTERIOR ABDOMINAL WALL

(i) External Oblique Muscle

Attachments: Lower Eight Ribs, by Eight Digitations.

Runs Downwards, forwards, medially.

Anterior half of outer lip of Iliac crest.

Medially its aponeurotic Layers meets its fellow in opposite side from the anterior rectus sheath & linea alba.

Lower free border folded upon itself to form Inguinal Ligament.

(ii) Internal Oblique

Attachments: Lateral 2/3 of Inguinal Ligament, ThoracoLumbar fasicia, anterior 2/3 iliac crest,Runs upwards, forwards, medially, Medially its aponeurotic layer splits to Enclose Rectus Abdominis. Below the Umbilicus it ends as semicircular fold of Douglas (or) Arcuate line. Lower four ribs & their cartilages.

(iii) Transverse Abdominis

Attachment: Fleshy Attachment from Lateral 1/3 rd of Inguinal Ligament, Anterior 2/3rd inner lip of Illiac Crest, Thoracolumbar Fascia, InnerSurface of Lower Six costal Cartilages, Runs Horizontally forwards. Linea Alba, Pubic Crest, Pectineal Line of Pubic.

(iv) Rectus-Abdominis

Attachment: Two tendinous head, Lateral head from Lateral Part of Pubic Crest, Medial head From Anterior pubic ligament. Runs Vertically Upwards.

5th to 7th Costal Cartilages.

(v) Pyramidalis

Attachment: Pubic Crest

Runs Upwards & Medially

Linea Alba

(vi) Rectus Sheath

This is an aporenurotic sheath covering Rectus Abdominis muscle. It has two walls, anterior & posterior.

Anterior Wall: Complete, Firmly adherert to tendinous intersections, composition variable.

Posterior Wall: Incomplete, being deficient above the costal margin & below the arcuate line. Composition is Uniform.

COMPOSITION OF RECTUS SHEATH

Above the Coastal Margin

Anterior Wall: External Oblique Aponeurosis.

Posterior Wall: Defecient, directly on the coastal cartilage.

Between the Coastal Margin & Arcuate Line

Anterior Wall: External Oblique Aponeurosis, Anterior Lamine of Internal oblique.

Posterior Wall: Posterior lamina of the aponeurosis of the internal oblique, aponeurosis of transverse abdominis.

Below the arcuate line

Anterior wall: Aponeurosis of all three flat muscle.

Posterior wall: Deficient and rectus sheath lies on the transversalis fascia.

Since the posterior wall of the rectus sheath is weak below the umbilicus, surgery done below the umbilicus is more prone to development of incisional hernia.

(vii) Transversalis Fascia

It is an extensive connective tissue layer which lines entire abdominal cavity. So strictly speaking it should properly be called the endo abdominal fascia. It lies just superficial to the peritoneum. Superiorly it continues with the fascia on the inferior surface of diaphragm. Posteriorly it covers the psoas and quadratus lumborum. In the pelvis it covers levator ani muscle. The integrity of transversalis fascia is absolutely essential for the integrity of abdominal wall. If this layer is intact, no hernia exists. A hernia may, infact, be defined as a hole in the endo abdominal fascia or transversalis fascia. This definition applies to esophageal hiatus hernia, umbilical hernia, inguinal hernia and femoral hernia.

Linea Alba

It is a dense fibrous band extending from xiphoid process to the symphysis pubis. It is formed by the decussation and union of the fibres of the aponeurosis of external and internal oblique and transversus muscles of either side. Above the umbilicus the linea alba is half an inch

wide and below it is very narrow and so the reties are very close to each other. The transversalis fascia is adherent to the linea alba above the umblicus and some fatty areolar tissue is interposed between them below the umblicus. At the lower end the superficial fibres of linea alba passing over the medial head of recti are attached to the anterior part of pubic symphysis, while the deep fibres from the triangular lamellae are attached behind the recti to the posterior surface of the pubic crest. Due to the transverse direction of its fibres, some amount of lengthening is possible during movement of the spine. The linea alba is pierced by small blood vessels.

BLOOD SUPPLY

Arterial Supply

i. The intercostal and lumbar arteries supply the flank areas.
ii. The internal thoracic, superior epigastric and inferior epigastric arteries supply the rest of the abdominal wall.

Venous Drainage

By a network of veins away from the umbilicus to axillary veins above and to the great saphenous veins below the umbilicus.

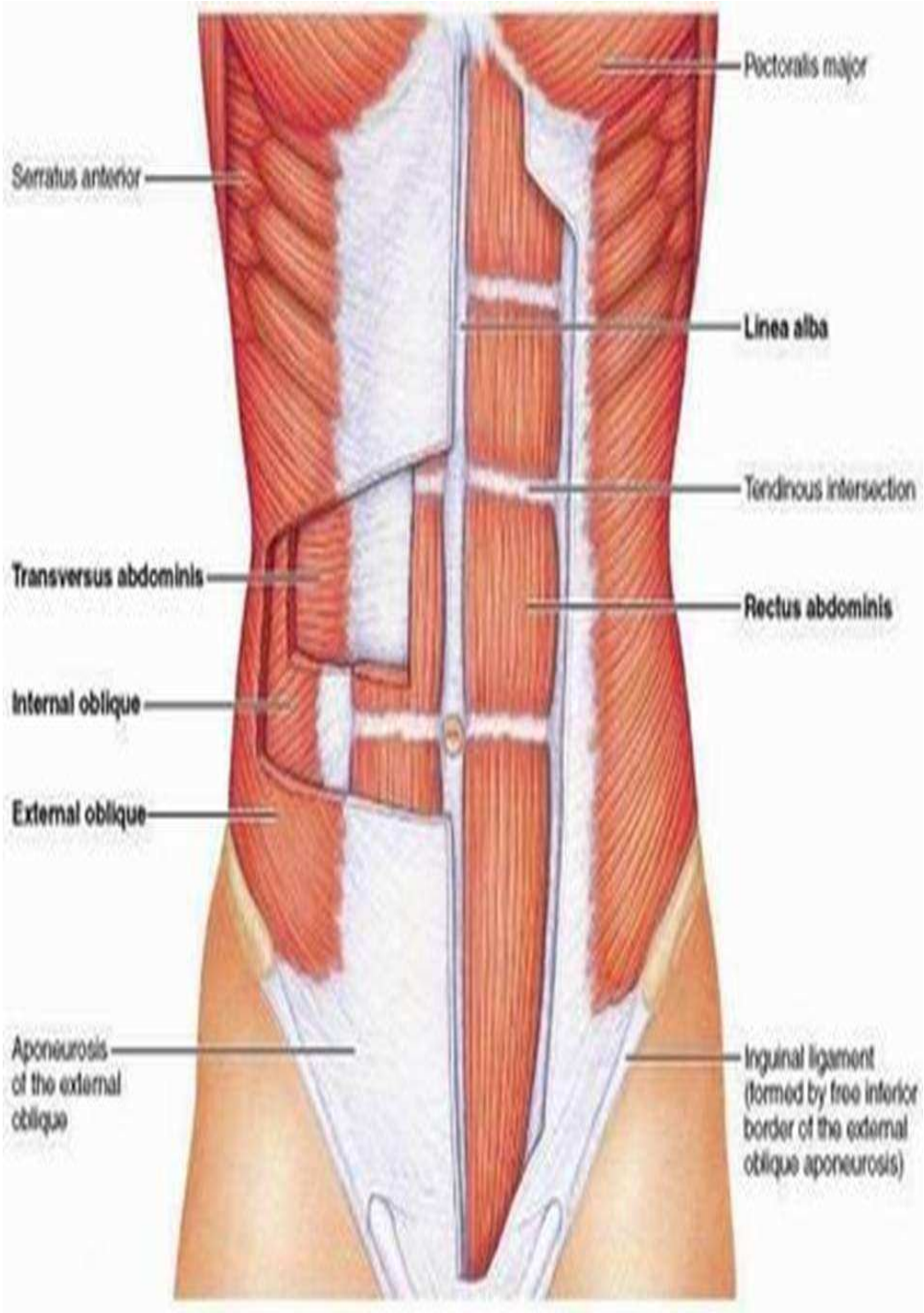
Lymphatic drainage

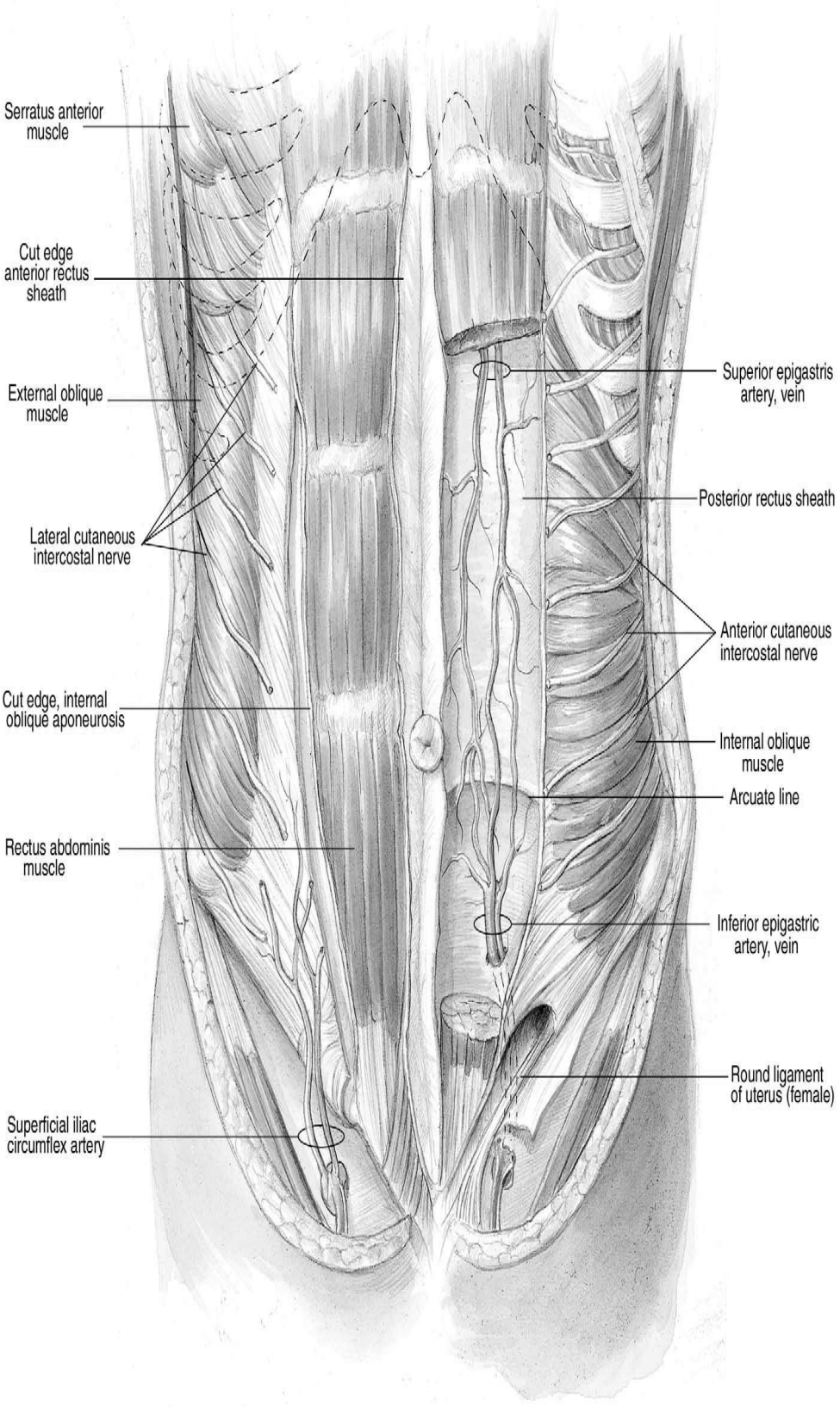
The lymphatic drainage of the abdominal wall follows a simple pattern.

* Above the umbilicus, the superficial lymphatic pathways drain into the ipsilateral axillary lymph nodes.
* Below the umbilicus, they drain into the superficial inguinal lymph nodes.
* Above the umbilicus the deep lymphatics drains upwards into the internal mammary lymph nodes. Below the umbilicus; they drain into the deep iliac nodes.
* Lymph vessels from the liver course along ligamentum teres and communicate with superficial lymphatics of anterior abdominal wall.

Nerve Supply

The cutaneous nerve supply of the abdominal wall is predominantly from the 6^{th} to 12^{th} thoracic nerves, which pass into the subcutaneous layer laterally at the mid axillary line and anteriorily near the midline. The ilio hypogastric and ilio inguinal nerves supply the infero lateral aspect of the abdomen. The inter costal nerves are both motor and sensory.


Pectoralis major
Serratus anterior
Linea alba
Tendinous intersection
Transversus abdominis
Rectus abdominis
Internal oblique
External oblique
Aponeurosis of the external oblique
Inguinal ligament (formed by free inferior border of the external oblique aponeurosis)


Serratus anterior muscle
Cut edge anterior rectus sheath
External oblique muscle
Lateral cutaneous intercostal nerve
Cut edge, internal oblique aponeurosis
Rectus abdominis muscle
Superficial iliac circumflex artery
Superior epigastris artery, vein
Posterior rectus sheath
Anterior cutaneous intercostal nerve
Internal oblique muscle
Arcuate line
Inferior epigastric artery, vein
Round ligament of uterus (female)

MATERIALS AND METHODS

MATERIALS AND METHODS

This prospective study was conducted in Mahatma Gandhi Memorial Hospital, Trichy for the period of 2010 - 2012. Study of 50 cases of incisional hernia has been carried out under the guidance of Prof.Dr.A.Kanagasundaram MS my chief in Mahatma Gandhi Memorial govt. Hospital, Trichy.

Patients were considered eligible if they had an incisional hernia defined as the palpable fascia or muscle defect at the site of the previous abdominal incision. Hernias were detected clinically and assessed by ultrasonography.

Certain aspects like obesity, anemia, diabetes, chronic bronchitis, hypertension and chronic constipation were particularly looked for.

Clinical observation and statistical analysis follow up, results of mesh repair were measured. The college ethics committee approved the study protocol. Routine laboratory investigations like urine, blood, chest screening, electrocardiogram were done.

WOUND HEALING AND FACTORS INFLUENCING WOUND HEALING

WOUND HEALING AND FACTORS INLFULENCING WOUND HEALING

TYPES OF WOUND HEALING

Primary healing (first intention)

It occurs in a clean incised wound or surgical wound. Wound edges a approximated with sutures. There is more epithelial regeneration than fibrosis. Wound heals rapidly with complete closure. Scar will be linear, smooth and supple.

Secondary healing (second intention)

It occurs in a wound with extensive soft tissue loss like in major trauma, burns and wound with sepsis. It heals slowly with fibrosis. It leads into a wide scar often hypertrophied and contracted. It may lead into disability.

Stages of wound healing

- Stage of inflammation
- Stage of granulation tissue formation and organisation. Here due to fiboblastic activity synthesis of collgen and ground substance occurs.
- Stage of epithelialisation
- Stage of scar formation and resorption
- Stage of maturation

PHASES OF WOUND HEALING

Inflammatory phase (lag or substrate or exudative phase)

- It begins immediately after wound healing. It lasts for 4-6 days.
- Features of inflammation are rubor, calor, tumour, dolor and loss of function.
- Macrophages secrete fibroblastic growth factor which enhances angiogenesis.
- Polymorphonuclear leucocytes appear after 48 hours which secrete inflammatory mediators and bactericidial oxygen derived free radicals.
- These cells also remove clots, foreign bodies and bacteria.
- Chemical mediators involved in wound healing are
- Growth factor- platelet derived, epidermal, transforming
- Interleukins
- Tumour necrosis factor
- Prostaglandins
- Collgenase
- Elastase

PROLIFERATIVE PHASE (collagen /fibroblastic phase)

- Collagen and glycosamines are produced by fibroblast.
- It begins in 7 days and last for weeks.
- Hydroxyproline and hydroxylysine are synthesised by specific enzymes using iron, alpha keto glutarate and vitamin C.
- Tropocollagen is produced which aggregates to form collagen fibrils.
- 80 -90% of their final strength (in post operative wounds) is achieved in 30 days.

REMODELLING PHASE (Maturation phase)

- It begins at 6 weeks and last for 2 years.
- There is maturation of collagen by cross linking which is responsibile for tensile strength of the scar.
- Collagen production is not present after 42 days of wound healing.

Healing by second intention differs from first intention in the following aspects.

1. Loss of greater amount of tissue.
2. Formation of larger amount of granulation tissue.

3. Necessity for removal of greater amount of inflammatory exduate and necrotic debris.
4. Contraction of surface wounds if there is mobility of the wound margin.
5. Production of large amount of scar.
6. Greater loss of skin appendages such as sweat gland, hair, sebaceous glands.
7. Slower completion of entire reparative process.

The most common organism is the staphylococcus aureas which forms about 53% of total wound. Infection next is coliform which forms about 17% of wound infection others are fusiform (bacteroides) pseudomonas and clostridium (tetani and welchii).

FACTORS INFLUENCING WOUND HEALING

Local factors

- Infection
- Presence of necrotic tissue and foreign body
- Poor blood supply
- Venous or lymph stasis
- Tissue tension
- Hematoma

- Recurrent trauma
- Large defect or poor opposition
- X-ray irradiated area
- Site of wound eg: wound over the joints and back has poor healing
- Underlying diseases like osteomyelitis and malignancy
- Mechanism and type of wound – incisied / lacerated / crush / avulsion

General factors

- Age, obesity, smoking
- Malnutrition, Vitamin C deficiency, anemia
- Steroids and cytotoxic drugs
- HIV and immunosuppressive diseases
- Malignancy
- Jaundice, Uraemia
- Diabetes, metabolic diseases

PREVENTION OF INCISIONAL HERNIAS

PREVENTION OF INCISIONAL HERNIAS

Initially incision type is significant for the prevention of incisional hernias. In this regard lateral paramedian incision is superior to the midline incision.

In addition to the incision type the abdominal wall closure method is important for the prevention of incisional hernias. A number of meta analyses have shown that mass closure with the continuous non or slowly absorbable suture is the best technique for preventing incisional hernias.

To arrive at a closure suture length of four times the incision length bites must encompass one centimetre of tissue at one centimetre intervals.

- Closure of the wound without undue tension with gentle handling of tissues and securing complete hemostasis without hematoma is of paramount importance.
- Preservation of nerves as far as possible.
- In the absence of infection non absorbable suture material should be preferred, in consideration of tensile strength.
- The drain must be placed through a separate incision but not through the main wound.
- Wound infection can be prevented by aseptic techniques and meticulous preparation of the patient, the theatre and the instruments.
- Weight reduction before surgery.

VARIOUS ABDOMINAL INCISIONS AND CLOSURE

VARIOUS ABDOMINAL INCISIONS and CLOSURES

Incisions through the abdominal wall should be based on the sound anatomic principles. Abdominal wound should be kept as strong as possible as there is high chance of abdominal contents to escape outside the abdominal cavity through a badly placed incision which will form a weak scar and results in incisional hernia.

PRINCIPLES

A well planned incision should satisfy the following features:

- Accessibility
- Extensibility
- Preservation of function
- Security

The choice of approach for entering the abdominal cavity depends upon:

- The accuracy of the pre operative diagnosis
- The location and extent of the disease
- Previous scars
- The requierement of the possible extension of the incision
- Anatomical structures such as skin, fascia, muscles, nerves and blood vessels. The abdominal wall should stay functional.

Whenever possible incisions are placed along the skin split lines also called as lines of langher and muscles and fascia are divided along their fibres

- Mark the incision prior to cutting to prevent malpositioning.

TYPES OF INCISIONS

- **Vertical:** Vertical incisions may be midline or paramedian. They may be supraumbilical or infraumbilical and can be extended superiorly or inferiorly in either direction. For optimal exposure of the entire abdominal cavity, as in the case of abdominal trauma, a midline vertical incision can be taken superiorly to the xiphoid process and inferiorly to the symphysis pubis.
- **Transverse and oblique:** These incisions can be placed in any of the four quadrants of the abdomen. Common incisions include the Kocher subcostal incision for biliary surgery, the Pfannenstiel infraumbilical incision for gynecologic surgery, the McBurney incision for appendectomy, and the transverse or oblique lateral incision for exposure of the colon.
- **Abdominothoracic:** This incision provides superior exposure of the upper abdominal organs by joining the peritoneal cavity, pleural space, and mediastinum into a single operative field. It is

particularly useful for extensive exposure of the liver and esophagogastric junction.

- Retroperitoneal and extraperitoneal. These incisions are ideal for surgery of the kidney, adrenal gland, aorta, and for renal transplantation.

DESCRIPTION OF INDIVIDUAL INCISIONS

Vertical Incisions

Midline Incision

The upper midline incision is made exactly in the midline of the abdomen and extends from the tip of xiphoid process to approximately 1cm above the umbilicus.

ADVANTAGES

- Can be extended into a median sternotomy
- Minimal blood loss
- No muscle fibres are divided
- No nerves are injured
- Is suitable for repeated celiotomies
- Offers best exposure in an emergency situation with unclear diagnosis.

PARAMEDIAN INCISION

Vertical incision that is made 2.5–5 cm from the midline on either the right or left side of the abdomen. Like the midline incision, the paramedian incision avoids injury to nerves and limits trauma to the rectus muscle. It provides a secure, anatomic closure with good restoration of function. When necessary, it can also be extended from xiphisternum to pubis, allowing excellent exposure of the abdomen. It is, however, considerably more time-consuming than a midline incision.

MEDIAL PARAMEDIAN INCISION

An upper paramedian incision is begun at the costal margin and carried to about 2–8 cm below the umbilicus. Additional access can be obtained by sloping the upper portion of the incision upward toward the xiphoid. The lower paramedian incision is similar and indeed can be continuous with an upper paramedian incision, enabling exposure of the abdomen from the costal margin to the pubis.

The lower paramedian incision differs in only two respects from the upper paramedian incision. The inferior epigastric vessels will be encountered in dissection and should be divided and tied where they run across the inferior portion of the incision. Additionally, the posterior

sheath of the rectus fascia is deficient inferior to the semilunar fold of Douglas in this region.

LATERAL PARAMEDIAN INCISION

The lateral paramedian incision is a modification of the standard paramedian incision. Originally described by Guillou, it entails a vertical incision placed at the junction of the middle and outer thirds of the width of the rectus sheath. The anterior sheath, at this level containing two layers, is dissected from the rectus muscle. As necessary to augment exposure, the upper margin or lower margin of the incision can be angled inward toward the xiphoid process or pubic symphysis.

TRANSVERSE AND OBLIQUE INCISION

Transverse and oblique incisions generally follow Langer's lines of tension and result in better cosmesis than vertical incisions. Sectioning of nerves is usually limited to one and rarely two nerves. A properly placed infraumbilical transverse incision can provide satisfactory exposure to the pelvic organs and the rectosigmoid and rectum. Exposure is limited, however, when pathology is located in both the upper and lower abdomen.

KOCHER SUBCOSTAL INCISION

A right subcostal incision is used commonly for open operations of the gallbladder and biliary tree. It is particularly valuable in obese or muscular patients with wide subcostal angles. The left-sided subcostal incision is used less often, mainly for elective splenectomy. The incision may be carried across the midline as a bilateral subcostal incision. This "arrowhead" or "bucket handle" incision provides excellent exposure of the upper abdomen and is frequently employed in extensive hepatic resections and liver transplantation, in performing total gastrectomy in obese patients, and for anterior access to both adrenal glands.

The standard subcostal incision commences in the midline about 2.5–5 cm below the xiphoid process (approximately one-third of the way between the xiphoid and the umbilicus). It is extended laterally and inferiorly about 2.5 cm below the costal margin for approximately 12 cm, although the length will vary with the build of the patient.

The rectus muscle has a segmental nerve supply and a transverse or slightly oblique incision passes between adjacent nerves without injuring them. Provided its anterior and posterior sheaths are closed, the rectus muscle can be divided transversely without major weakness of the abdominal wall because it is not deprived of the distal part of its

innervation. Healing of the incision results, effectively, in the formation of additional iatrogenic fibrous inscriptions of the muscle.

The major advantage of the subcostal incision over the upper midline incision are greater lateral exposure and less pain. The disadvantage is that the operation takes longer because there are more layers to close. The subcostal incision generally heals well with little risk of hernia formation.

J-SHAPED INCISION

The J-shaped incision is most frequently for surgery of the right liver. This incision provides a particularly a good access to the area between the inferior vena cava and right hepatic vein. The J-shaped incision can be extended laterally to a thoracotomy for better exposure.

MCBURNEY GRIDIRON AND ROCKEY-DAVIS MUSCLE SPLITTING INCISION

Originally described by Charles McBurney in 1894, the muscle-splitting right iliac fossa incision is well suited for appendectomy. The classic McBurney incision is made in an oblique direction. Most surgeons today use the Rockey-Davis incision. It is a modification of the time-honored McBurney incision that employs a cosmetically superior transverse incision in the line of the skin crease. McBurneys point is at

the junction of the middle and outer thirds of the line projecting from umbilicus to anterior superior iliac spine. Medial and lateral extension of the McBurney's incision bears the name Rutherford-Morrison incision.

PFANNENSTEIL INCISION

Used frequently for gynecologic operations and for access to the retropubic space in the male for extraperitoneal retropubic prostatectomy. The skin incision is placed in the curving interspinous crease that lies approximately 5 cm superior to the symphysis pubis. It usually carried out for about 12 cm in length. An advantage of this incision is that it leaves an almost invisible scar because it is placed in a skin crease and is partially hidden by pubic hair.

ABDOMINOTHORACIC INCISION

The thoracoabdominal incision provides excellent exposure by converting the peritoneal and pleural spaces into one common cavity. The left thoracoabdominal incision is particularly useful for access to the left hemidiaphragm, gastroesophageal junction, gastric cardia and stomach, distal pancreas and spleen, left kidney and adrenal gland, and aorta. The right thoracoabdominal incision is used effectively for operations on the right hemidiaphragm, upper esophagus, liver, hepatic triad, inferior vena cava, right kidney and adrenal gland, and the proximal pancreas. Some of the more commonly encountered anatomic complications to be avoided

included phrenic nerve injury with subsequent diaphragmatic dysfunction.

CLOSURE OF THE ABDOMINAL INCISION

The goal of wound closure is to restore function of the abdominal wall after a surgical procedure. The optimal method should be so technically simple that its results are as good for the hands of the trainee as they are for the experienced surgeon. It should leave the patient with a reasonably aesthetic scar, and most importantly, it should minimize the frequency of wound rupture, incisional hernia, wound infection, and sinus formation.

GENERAL

- The length of the suture material should be 4:1 to the length of the wound.
- Avoid excessive tension on the suture closure of the fascial edges,traction as it may compromise vascularisation of the wound edges.
- Below the umbilicus posterior fascia(rostral to the semi circular line caudal to which there is no posterior rectus fascia) and then the anterior fascia of the rectus abdominus muscle can be closed as separate layers.
- Grasp the needle with the tip of the instrument.

PERITONEAL CLOSURE

Is associated with the slightly longer operative time and more operative pain and there are suggestions that may cause increased formation of adhesions. The peritoneum get reepithelialised within 48-72 hrs. Surgical closure of peritoneum doesn't affect the incision strength or healing.

FASCIAL CLOSURE

The fascia is the most critical layer in wound closure since this tissue provides the greatest wound tensile strength during healing. Return of adequate tensile strength may take weeks so most surgeons select a delayed absorbable or non absorbable suture for fascial closure.

TECHNIQUE

Fascial closure should reapproximate the wound edges without undue tension or tissue ischemia. Previously interrupted closure was practised frequently. While these closures have the advantage of not relying on the security of a single knot, they are associate with significant tissue ischemia. Continous closure distributes tension evenly along the entire length of the incision allows superior tissue perfusion, saves time, requires fewer knots. Whether an interrupted or continous closure is

performed suture should be placed atleast 1cm from the fascial edge and no more than 1cm apart.

MASS CLOSURE

Continous mass closure with non absorbable or slowly absorbable suture has proven safe and equally effective as interrupted techniques. Sutures incorporate a small amount of subcutaneous fat, rectus muscle, rectus sheath, transversalis fascia and optionally the peritoneum. Further more randomised clinical trail comparing continuous fascial closure to interrupted reported no difference in the rate of wound complications including dehiscence or hernia formation at 6 months.

Optimum method of fascial closure appears to be a continous mass closure with slowly absorbable monofilament suture placed 1.5cm from the fascial edge and 1cm apart. The tissue should be reapproximated with low tension to prevent ischemia.

SUBCUTANEOUS CLOSURE

Closure of the subcutaneous tissue is optional. There is probably no benefit to subcutaneous closure in women with less than 2cm of tissue. Closure of the subcutaneous tissue with more than 2.5cm of subcutaneous fat resulted in a lower incidence of wound disruption. This suggest that

closure of subcutaneous tissue may prevent wound disruption by eliminating dead space as opposed to increasing wound tensile strength.

SKIN CLOSURE

Closure of the skin may be performed with stainless steel staples, subcuticular suture, surgical tapes or wound adhesive glues.

DRAINS

Prior to closure, it may be necessary to place temporay drainage systems. Drains are categorised as passive or active, meaning that they rely upon gravity or negative pressure suction, respectively. Examples of passive drains include the Penrose drain, foley catheter, word catheter, and Malencot catheter. Active drains may be open, such as the salem sump, or closed systems.

One disadvantage of the open system is the potential for bacterial contamination of the tubing. Therefore most surgeons prefer closed systems, such as the Jackson-Pratt drain, with negative pressure suction. Drains should be placed through a small incision separate from the primary incision.

The primary indication for the placement of a drain is the prevention of fluid collection and infection. Procedures that often are

associated with large collections of blood and serum may benefit from prophylactic drainage.

Complications from drains may include infection, hemorrhage, kinking, and hernia. Good surgical technique with adequate hemostasis, the elimination of dead space, and the use of prophylactic antibiotics, obviates the need for drains in most patients.

PLACEMENT

The drain must exit through a separate stab wound and not via the incision because infection can occur at the drain site, especially with passive drains. If a stab wound is placed laterally, injury to the epigastric vessels may result in significant hemorrhage. The drain should have a direct path to prevent kinking and subsequent obstruction. Normally an incision greater than 5mm but less than 10mm is ideal.

SUTURES

Features of ideal suture material:

- Adequate tensile strength
- Good knot holding property
- Should be least reactive
- Easy handling property

- Should have less memory
- Should be easily available and cost effective
- Should not be allergic or carcinogenic

CLASSIFICATION

ABSORBABLE

NON-ABSORBABLE

ABSORBABLE SUTURE MATERIAL

Catgut:

- Plain
- Chromic

  Catgut is derived from the submucosa of the jejunum of sheep and is absorbed by inflammatory reaction and phagocytosis. Absorption time for plain catgut is 7days and for chromic catgut is 21 days.

Vicryl(Polyglactic acid)

- Synthetic, multifilament
- Absorption is by hydrolysis
- Absorption time- 90 days

- Very good suture material for bowel anastomosis, suturing muscles, closure of the peritoneum

Dexon(Polyglycolic acid)

- Synthetic

Maxon(Polyglyconate)

- Monofilament

PDS(Poly Diaxonone Suture material):

Monocryl(Polyglecaprone)

- Monofilament

Biosyn(Glycomer)

- Monofilament

Absorbable suture material should not be used for vascular anastomosis.

NON-ABSORBABLE

Silk

- Natural
- Multifilament
- Derived from cocoon of silk worm larva

Polypropylene(prolene)

- Synthetic
- Monofilament
- Has got high memory
- Memory of suture material is recoiling tendency after removal from the packet.

Polyethylene (ethylene)

- Synthetic
- Monofilament

Cotton

- Natural, multifilament Steel, Polyester, Polyamide, Nylon are other non absorbable suture materials

USES OF NON ABSORBABLE SUTURE MATERIALS

- In hernioraphy for repair
- For closure of abdomen after laprotomy
- For vascular anastomosis(6-0), nerve and tendon suturing
- For tension suturing in the abdomen
- For suturing the skin

CLINICAL FEATURES AND INVESTIGATIONS

CLINICAL FEATURES and INVESTIGATIONS

Ventral hernias are often noted by the patient as an abdominal bulge. They can be exacerbated by any action that rises intraabdominal pressure such as coughing, lifting weights, valsalva manoeuvre or by head or leg rising. Rest or reduction of the incarcerated hernia may offer temporary relief. Smaller hernias are often assymptamatic or produce intermittent dragging pain. Discomfort of the ventral bulge is the most common initial symptom. But bowel obstruction can also be the first symptom that forces the patient to seek medical attention. Incarceration and strangulation are more common if the hernia neck defect is small. Skin may undergo pressure ischaemic necrosis.

INVESTIGATIONS

BLOOD

Hb%, TC, DC, ESR, Blood Grouping & Typing

RBS, Blood Urea, Serum creatinine.

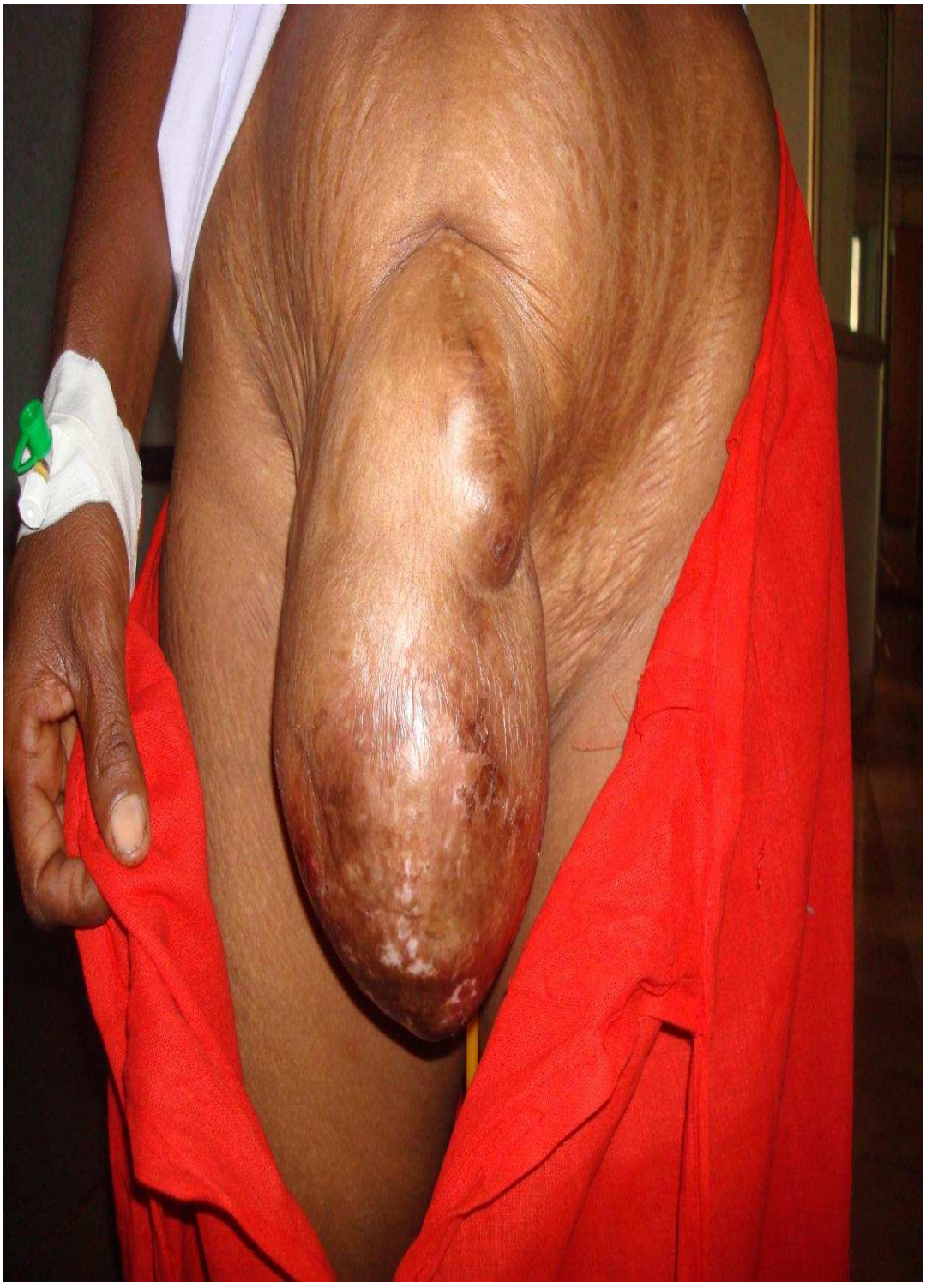
PULMONARY FUNCTION TEST

URINE

Albumin, Sugar, Deposit

CHEST X-RAY, PLAIN X-RAY ABDOMEN (erect)

ECG: ULTRASOUND ABDOMEN, CT ABDOMEN



MANAGEMENT

MANAGEMENT

- **PRE-OPERATIVE**
- **OPERATIVE**
- **POST-OPERATIVE**

PRE-OPERATIVE

- Thorough H/o and physical examination should be undertaken
- Pulmonary, cardiac co-morbid conditions,diabetes and other medical problems need to be identified and addressed.
- As much as information as possible about the original or previous operations should be obtained including the type of surgery, any post operative wound complications and if the patient has a recurrent hernia, the previous hernia size, location and type of prosthetic mesh should be obtained.
- Obese patients have a higher risk of recurrence and should be considered for weight loss techniques or counselling before or around the time of hernia repair.
- Massive incisional hernia after reduction may cause IVC compression, paralytic ileus and diaphragmatic elevation with respiratory embarrassment(abdominal compartment syndrome). It is prevented by prior increasing the capacity of the peritoneal

cavity by creating pneumoperitoneum using carbon-di-oxide so as to increase the peritoneal pressure by 12-15cm of water daily for 3-6weeks. Later definitive surgery is done.

- At the time of surgery most patients would receive a first generation cephalosporin which should be dose adjusted according to the patient weight and repeated if the operation lasts longer than 2hrs.
- Compression stockings or another form of deep venous thrombosis prophylaxis is warranted. Low molecular weight heparin can be used as an additional adjunct in patients with greater than average risk.
- Placement of gastric or bladder catheter should be considered

OPERATIVE

- **Primary (Anatomical) repair**
- **Prosthetic mess repair**

ANATOMICAL REPAIR

CRITERIA

- Size of the defect should be less than 5cm
- Good muscular tone
- Non recurrent incisional hernia
- Relative contraindicated patients for mesh repair

TYPES

- Primary closure
- Primary closure with relaxing incision (shoe lace technique)

PROCEDURE

The operation is best performed with the patient under general anesthesia to achieve full relaxation of the abdominal wall musculature. The skin is opened through the previous incision and dissection is performed through the subcutaneous tissues. Care should be taken as the level of the anterior rectus sheath is approached since portions of the sac and its contents may lie at this level. The sac is identified and cleared of its attachments to the fascia using electrocautery. In this way, any peritoneal attachments to the anterior abdominal wall in the vicinity of the hernia are taken down and the sac is fully reduced into the abdominal cavity. The fascia is then cleared of soft tissue both anteriorly and posteriorly for at least a 3â€“4 cm margin. This allows for a margin of healthy fascia to bring together in the midline with suture closure.

The fascia is then closed using an interrupted layer of nonabsorbable suture by taking large bites of the clean fascia on both sides of the defect. The sutures are usually placed sequentially and then tied after the entire layer of suture has been placed. The fascia is then

inspected to confirm that no additional defects are present and that the repair sutures are not pulling through the tissue due to excessive tension. The skin is closed over the fascia using either staples or a running subcuticular layer. If the hernia contents have created a large pocket in the soft tissue above the anterior fascia, placement of a closed suction drain for evacuation of early seroma fluid can be considered.

SHOELACE TECHNIQUE

Useful in midline defects where the abdominal muscles can no longer pull each other in a balanced fashion. This technique corrects in two steps- first by incising the linea alba 0.5 cm from the margin on both sides and continue suturing of medial cut edges. The second step is with approximation of anterior rectus using prolene sutures.

MESH REPAIR

TYPES

- Inlay(outer to peritoneum)
- Under lay (under the peritoneum over the contents)
- Over lay or Onlay (outer to musculo aponeurotic layer)
- Rive Stoppa's Wantz retro rectus mesh repair

TYPE OF MATERIAL

- Prolene (Polypropelen)
- Dacron (Polyester)
- Nylon (Polyamide)
- Teflon (Polytetrafluropolyethelene)
- Ivonlon sponge (Formalised polyvinyl alcohol)

PRINCIPLES

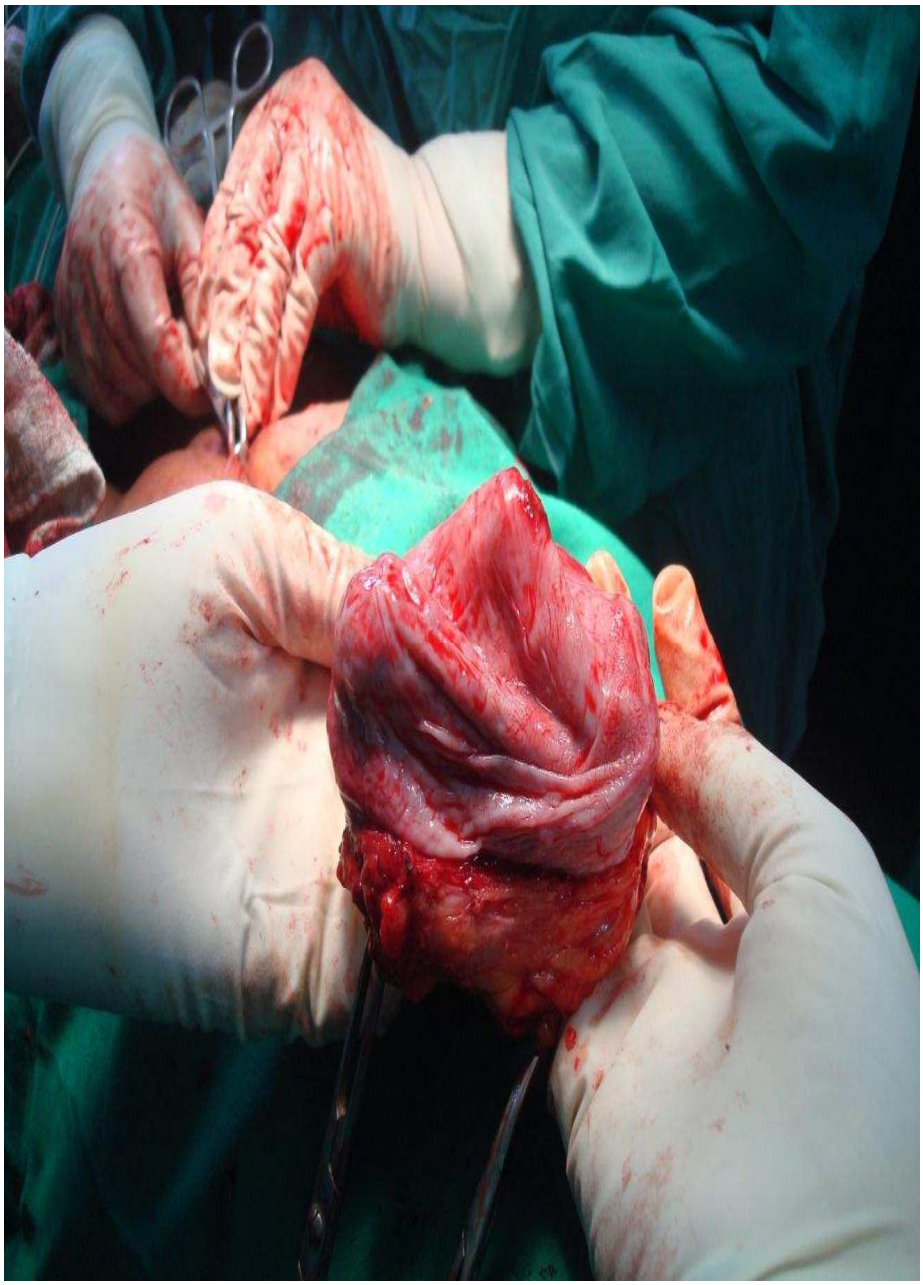
- Mesh should extend 2-3cm beyond the defect margin
- Mesh should be fixed in position by synthetic monofilament non absorbable suture material
- In intraperitoneal mesh the contents should be covered by a layer of omentum.

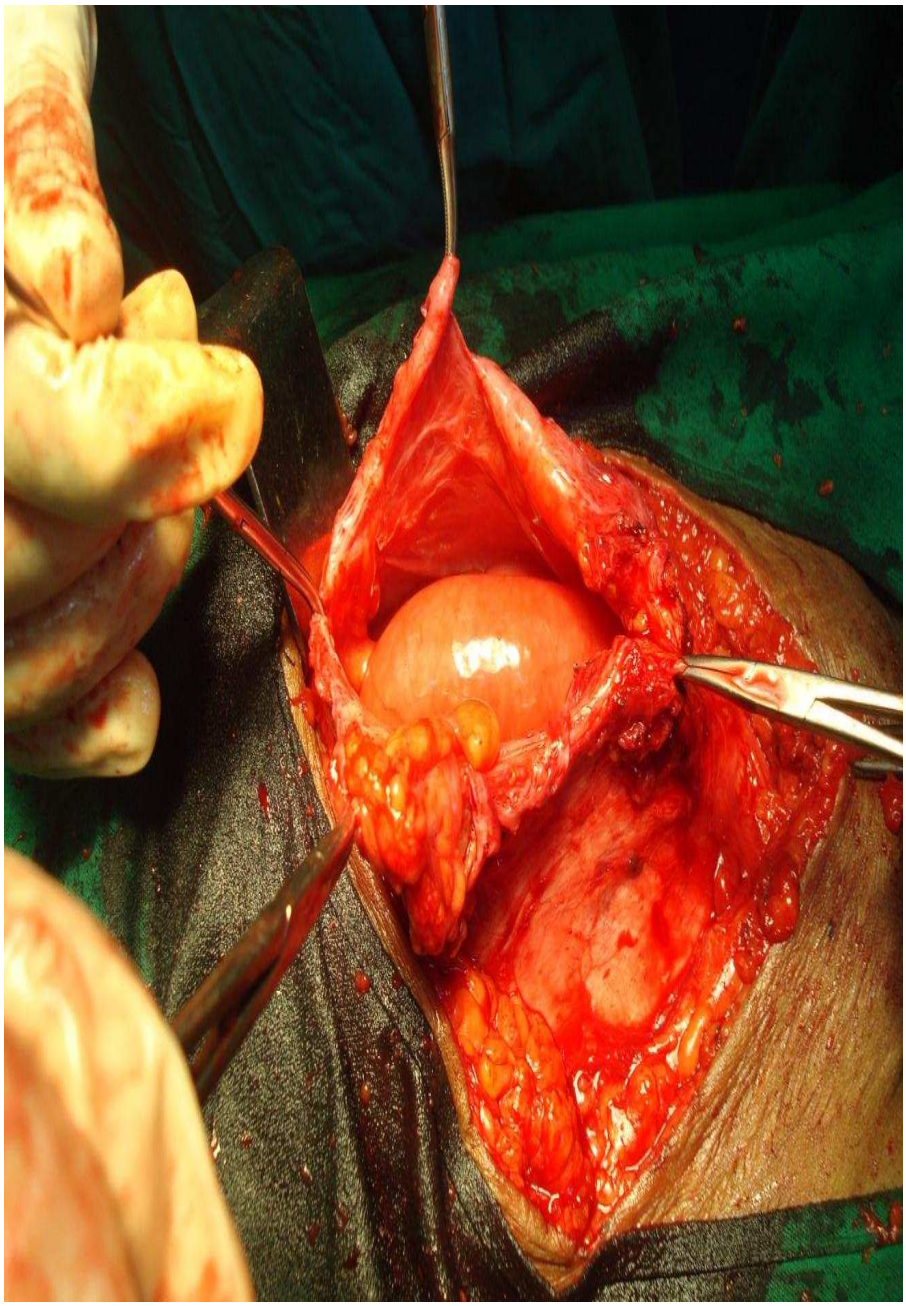
TECHNIQUE

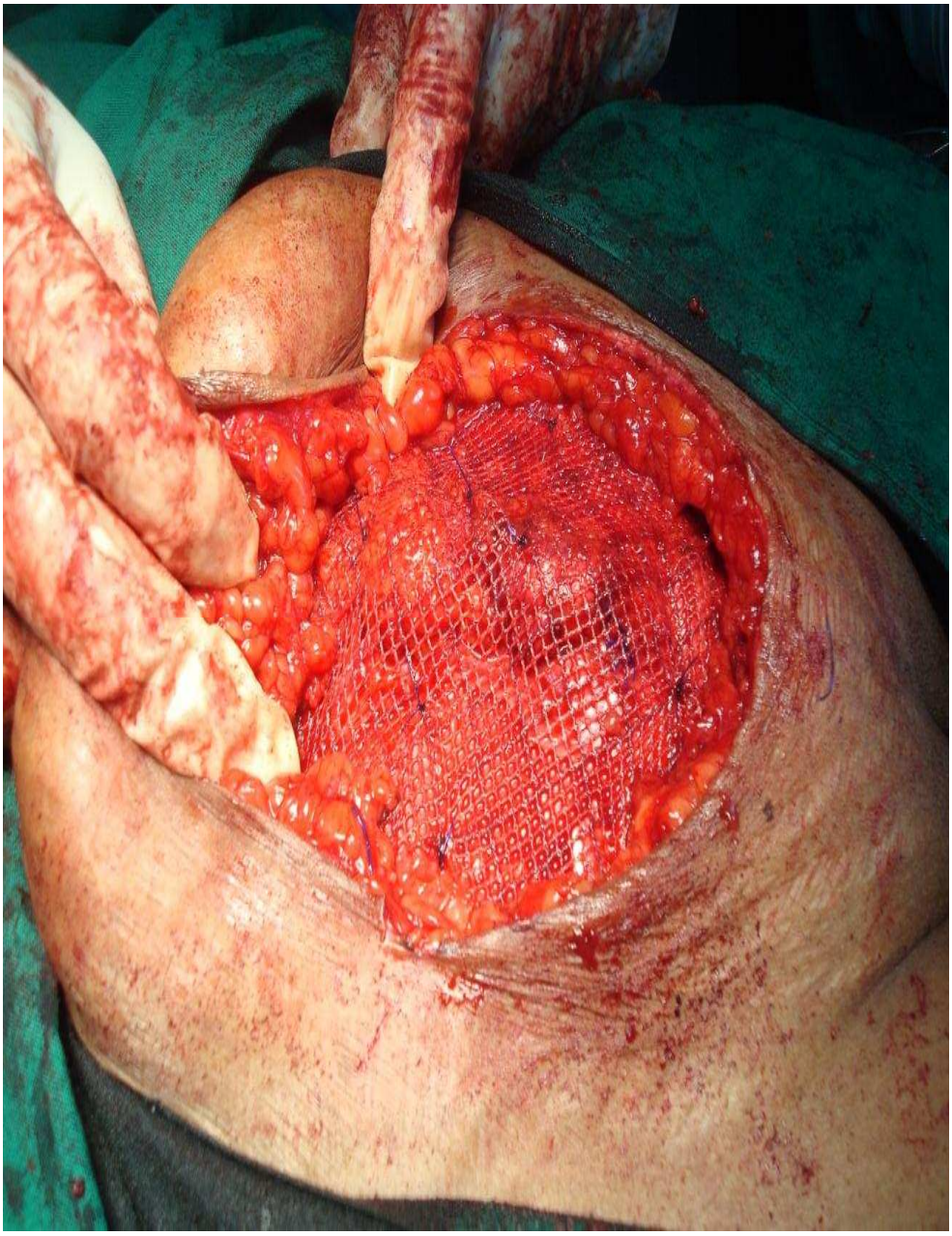
The operation is performed under general anesthesia. The old scar is incised and the soft tissue dissected down to the level of the anterior rectus sheath. Here the defect is identified and the fascia is cleared of surrounding soft tissue attachments to allow a 3â€“4 cm rim of healthy fascia circumferentially. The sac is then freed from the fascia in order to reduce the hernia contents and prevent recurrence. This portion of the

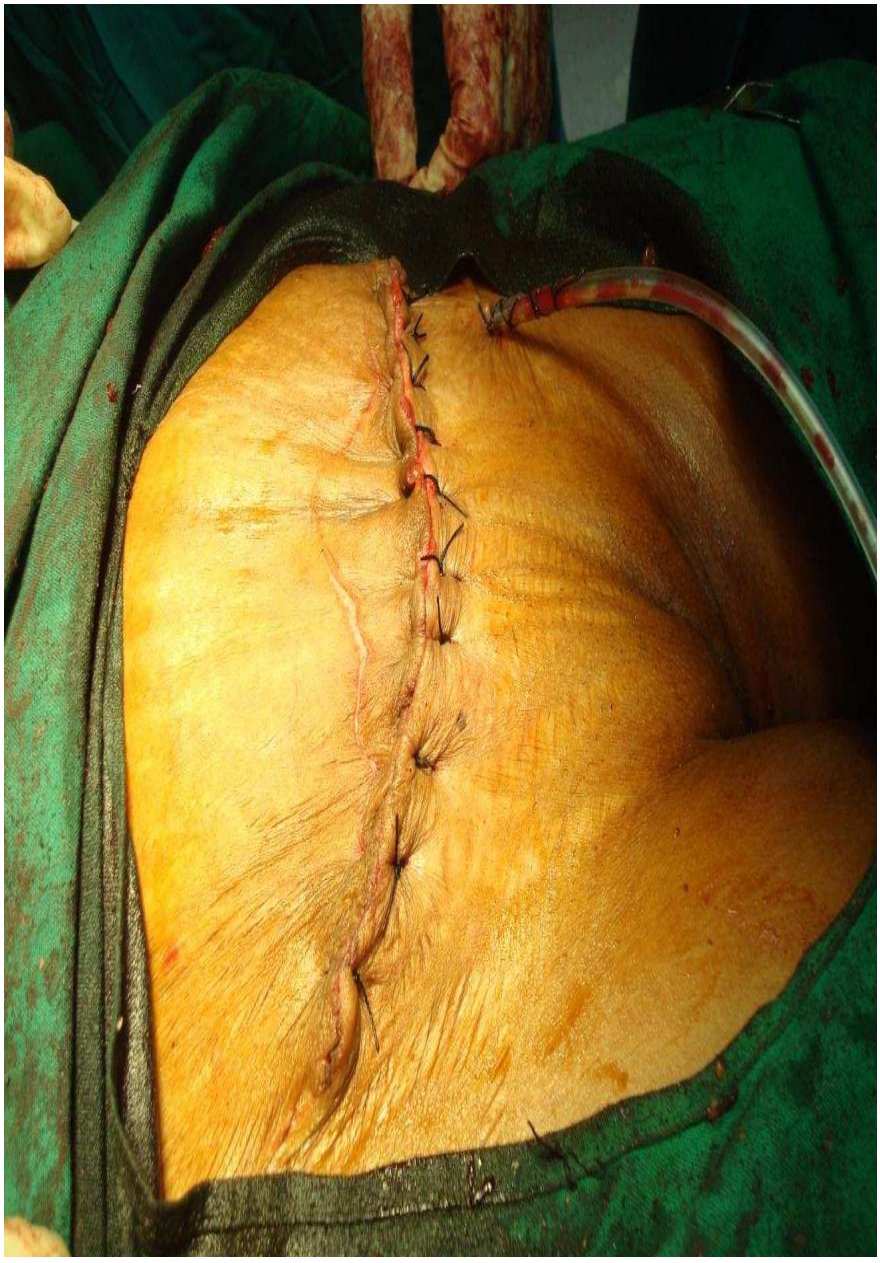
operation is often technically challenging, as significant adhesion formation may have occurred following the initial operation. It is often impossible to stay in an extraperitoneal plane in this situation, and dissection within the abdominal cavity may be necessary to fully excise the sac and reduce its contents. The mesh can now be placed either anterior to the fascia or posterior from within the intra-abdominal cavity. Effort should be made to protect the bowel from direct contact with the mesh patch, and a layer of omentum can often be placed between them. The mesh is sutured in an interrupted fashion in multiple sites throughout the entire circumference of the patch to ensure that any tension is distributed throughout the entire area of the repair. Large, nonabsorbable suture is used to affix the mesh to the fascia layer. Vaccum drains are inserted through two separate wounds. Excess of fat and skin are excised.

A mesh of size 23x35 cm spread to the inner aspect of the abdominal wall and on the inner surface of the peritoneum and fixed with interrupted monofilament polypropelene sutures. Omentum should be interposed between the bowel and mesh.









Laproscopic mesh repair

Placing a mesh unde the defect laparoscopically in intraperitonial plane. The only problem of this underlay placement is chances of adhensions an gastroinstestional fistula formation but still it is found to be safer laproscopic preperitional mesh placement is also done for smaller defects. Now dual mesh (PTFE) or four layered mesh are available. Here mesh is placed unde the peritoneum deep to the defect after reducing the contents. Mesh is fixed with sutures and tacks. In four layered mesh deepest first layer is absorbable cellulose which allows new peitonium to creep underneath. Second layer is PDS / PTFE mesh. Third layer is polypropylene mesh and the last fourth layer is again PDS / PTFE mesh. It is ideal but costly.

OTHER SURGICAL PROCEDURES

Cattell's operation

When the defect is less than 3cm and if the patient is having adequate abdominal muscle tone, layer by layer anatomical repair is done using monofilament non absorbable suture material like polypropylene / polyethylene. Ideally with interrupted sutures. Sac should be dissected, ligated and excised prior to repair. Peritoneum and posterior rectus sheath is opposed as first layer and anterior rectus sheath as second layer.

Keel's operation

Is done in large defect. Scar is excised and is dissected beyond the margin of the defect. Sac is never open unless there is obstruction of the content. Sac is inverted using continuous/ interrupted inverting non absorbable sutures layer by layer until the defect margins are opposed together which is then again sutured with interrupted sutures. Keel is inverted beam of the ship.

Nuttall's operation

Is done for lower midline incisional hernia. Recti attachments are detached from the pubic bones and are crossed over to the opposite pubic bones so as to create a firm abdominal wall support by crossed recti muscles.

POST-OPERATIVE CARE

- Antibiotics
- Analgesics
- Nasogastric aspiration
- Abdominal binder for support
- Prevention of paralytic ileus
- Control of obesity and other precipitating factors

- Stop smoking and treat other associative factors
- Early ambulation
- Fluid management, catherisation
- Drain should be kept until drainage becomes minimal
- Abdominal binder is used to support abdominal wall during recovery period.

POST OPERATIVE COMPLICATIONS

POST OPERATIVE COMPLICATIONS

IMMEDIATE

- Primary Hemorrhage:

Post operative increase in blood pressure-replace blood volume and may require return to theatre to reexplore the wound.

- Basal Atelectasis or minor lung collapse.
- Shock, Blood loss, acute myocardial infarction.
- Low urine output- Inadequate fluid replacement intra or post operatively.

EARLY

- Nausea and vomiting
- Secondary hemorrhage as a result of infection
- Pneumonia, Fever
- Acute retention of urine, UTI
- Wound dehiscence, Wound infection
- Seroma, Paralytic ileus, DVT

LATE

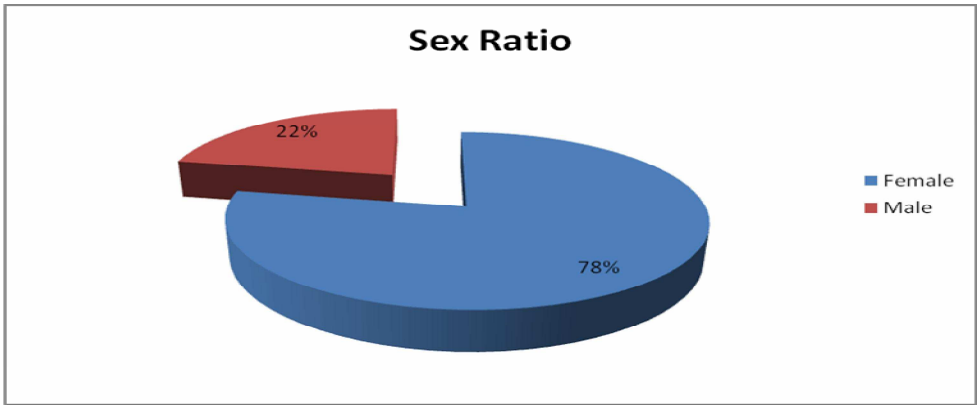
- Bowel obstruction due to fibrous adhesions
- Persistent sinus
- Mesh migration, recurrence

THE STUDY

THE STUDY

Sex ratio:

No. Of Patients	Male	Female
50	11	39

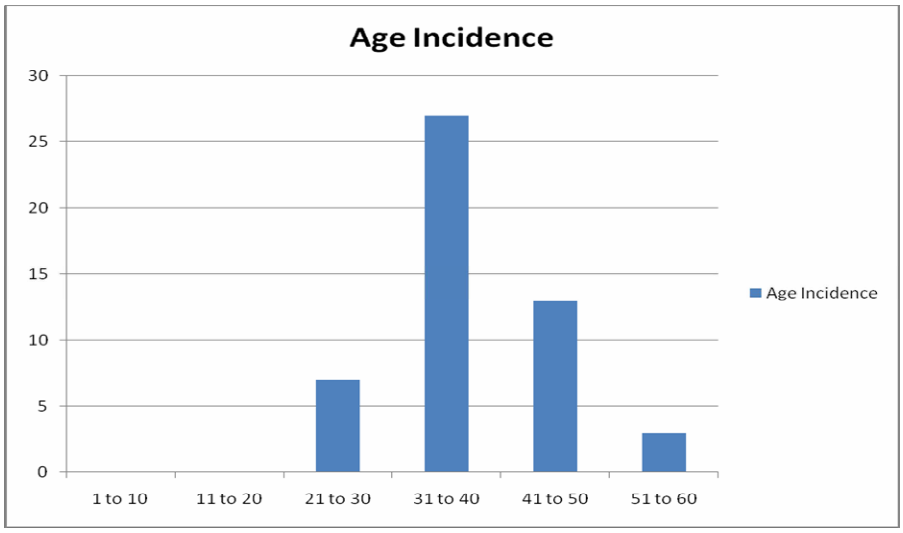


In our study of 50 patients 39 patients were female this was because of higher incidence of caecaseren section done on younger patients. lower segment caecasaren section and hysterectomy done though lower midline incision was the reason for incisional hernias

Age Incidence

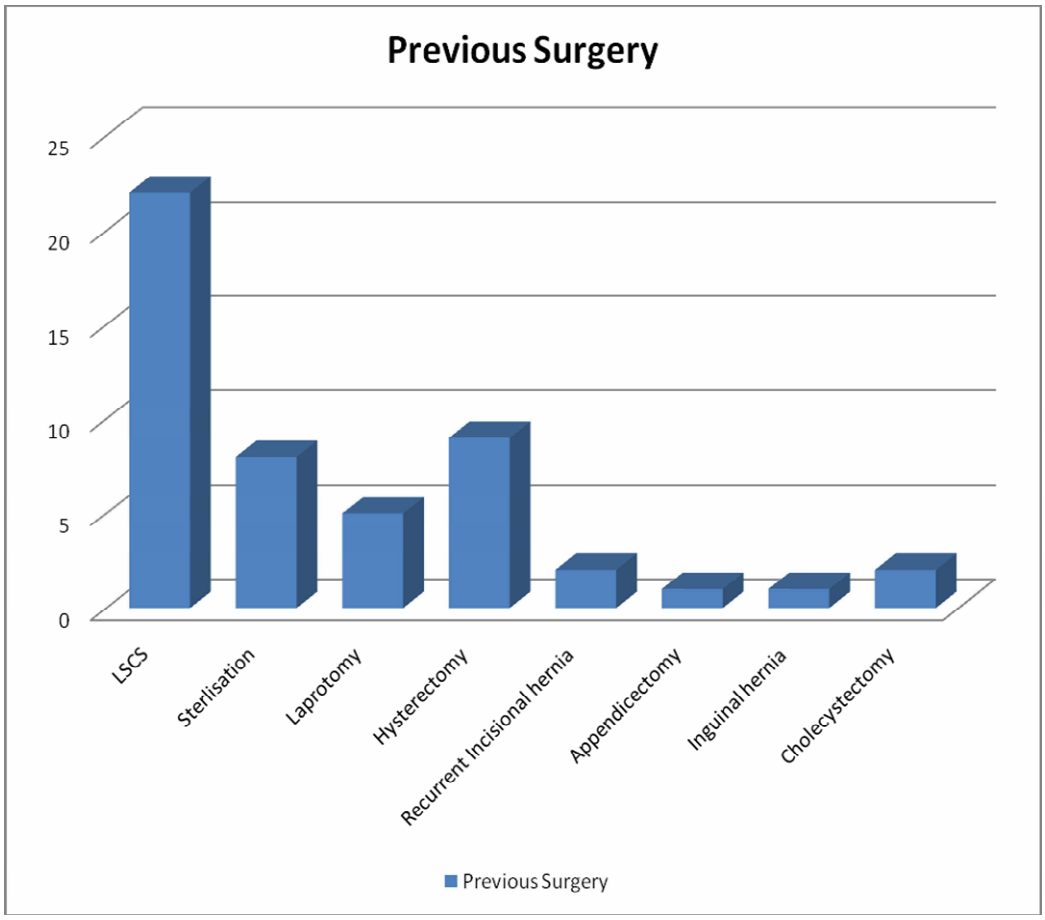
In our study the commonest age group is between 30-50 yrs. No case was reported below 20 years.

Age (years)	1-10	11-20	21-30	31-40	41-50	51-60
	0	0	7	27	13	3



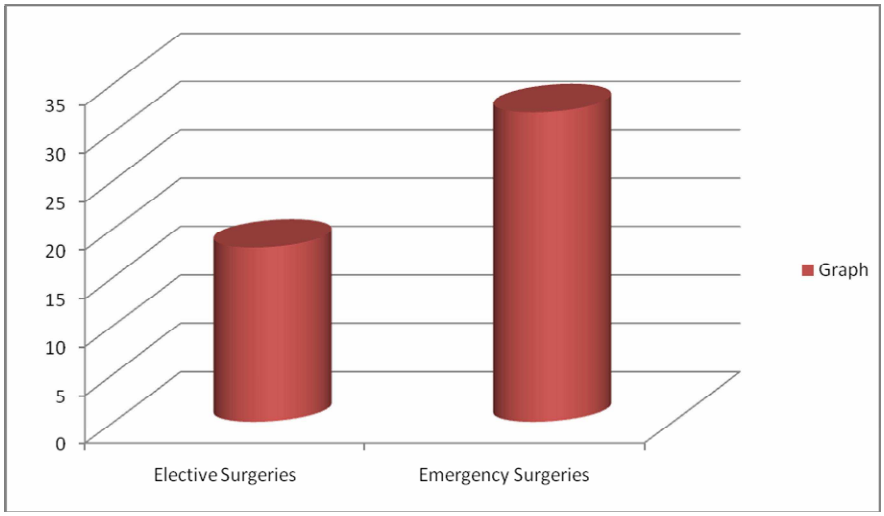
Previous Surgery

S. No	TYPE OF SUGERY	No. Of Patients
1.	LSCS	22
2.	Sterlisation	8
3.	Laprotomy	5
4.	Hysterectomy	9
5.	Recurrent Incisional hernia	2
6.	Appendicectomy	1
7.	Inguinal hernia	1
8.	Cholecystectomy	2
TOTAL		50


Previous Surgery
25
20
15
10
5
0
LSCS
Sterlisation
Laprotomy
Hysterectomy
Recurrent Incisional hernia
Appendicectomy
Inguinal hernia
Cholecystectomy
Previous Surgery

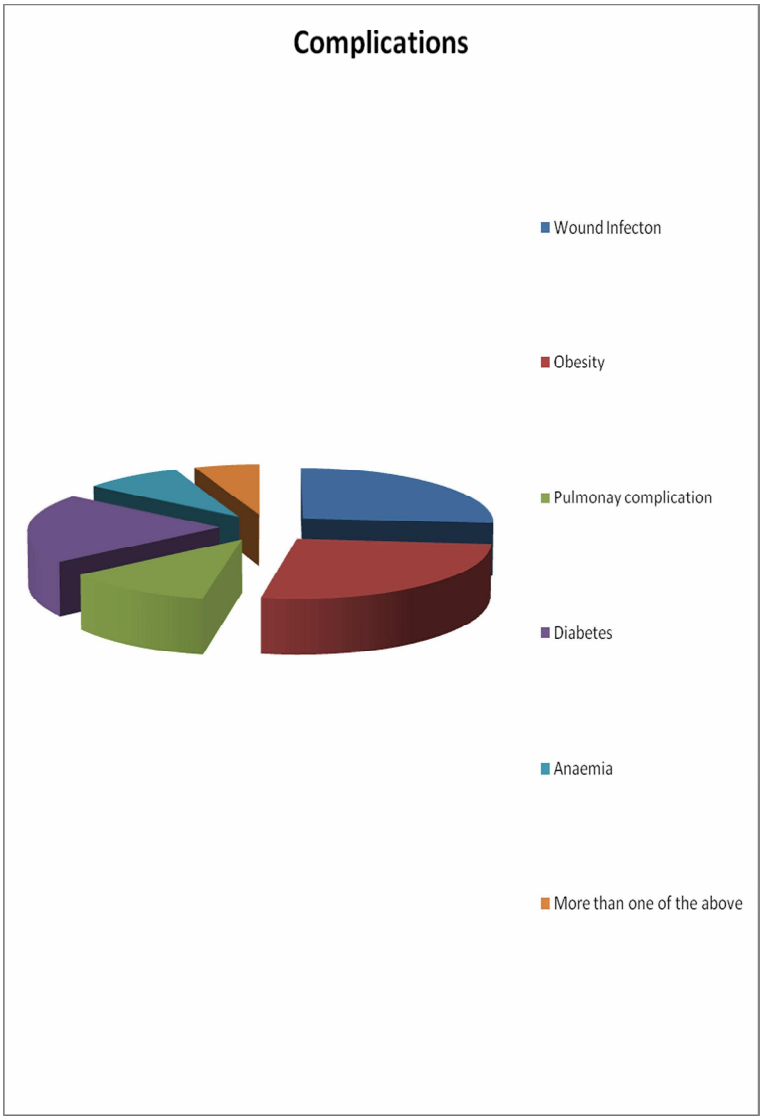
Emergency and Elective Surgery Risk Ratio

Elective Surgeries	Emergency Surgeries
18	32



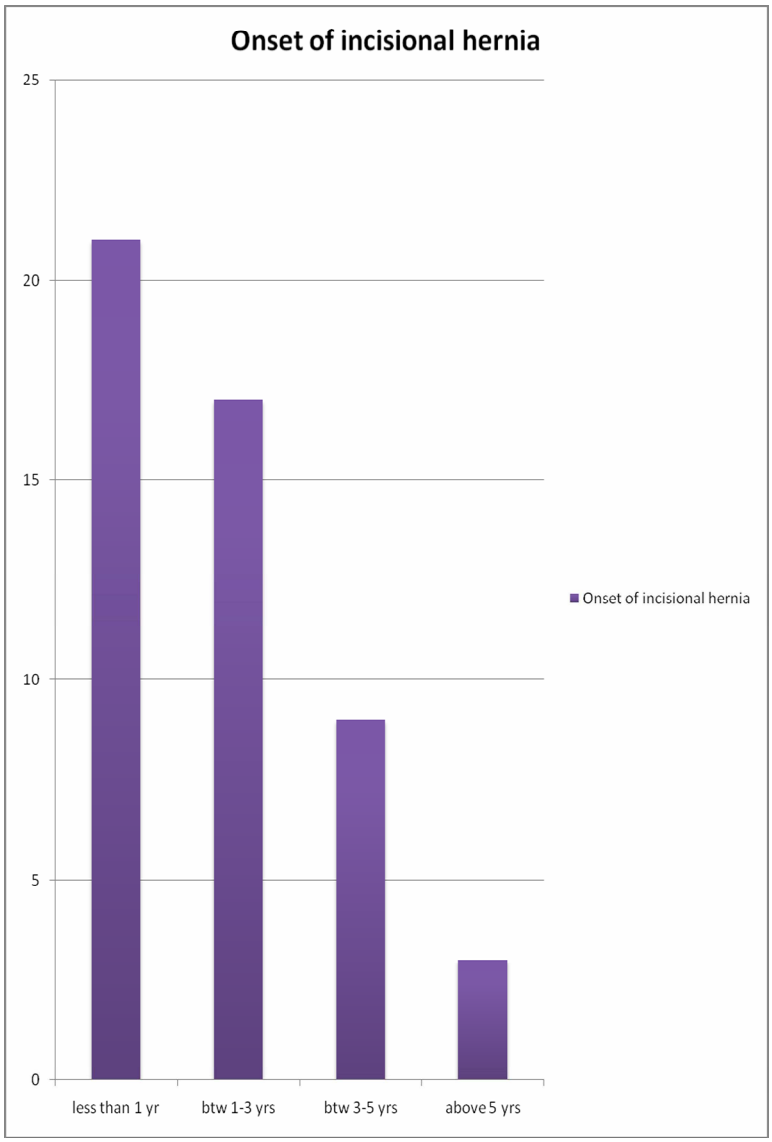
Complications

S.No	Predisposing Factors	No. Of Cases
1.	Wound Infection	9
2.	Obesity	9
3.	Pulmonary complication	4
4.	Diabetes	7
5.	Anaemia	3
6.	More than one of the above	2


Complications
Wound Infecton
Obesity
Pulmonay complication
Diabetes
Anaemia
More than one of the above

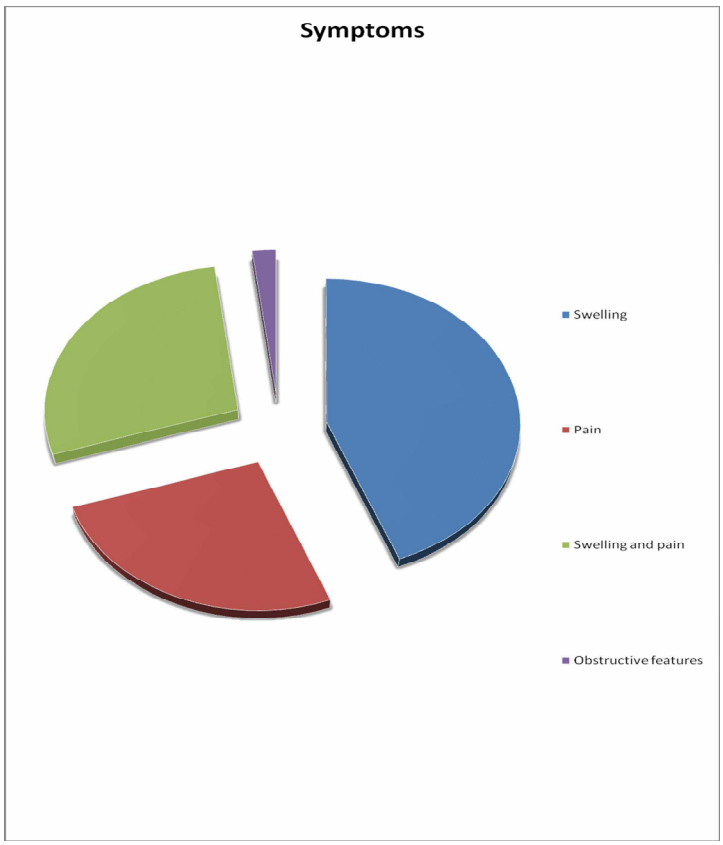
Time of occurrence of incisional Hernia

Duration	No of cases
Less than 1 year	21
Between 1-3 yrs	17
Between 3-5 yrs	9
Above 5 yrs	3


Onset of incisional hernia
25
20
15
10
5
0
less than 1 yr
btw 1-3 yrs
btw 3-5 yrs
above 5 yrs
Onset of incisional hernia

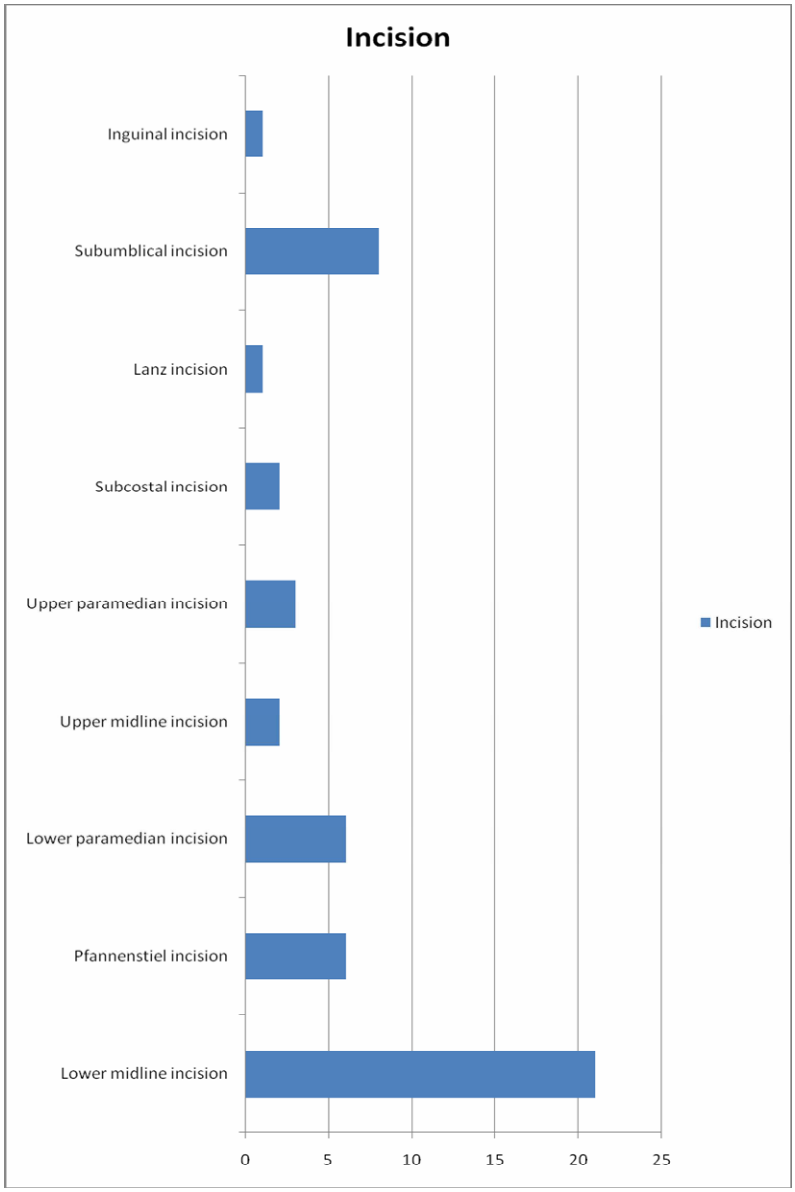
Symptoms:

Symptoms	No. Of patients
Swelling	22
Pain	13
Swelling and pain	14
Obstructive features	1



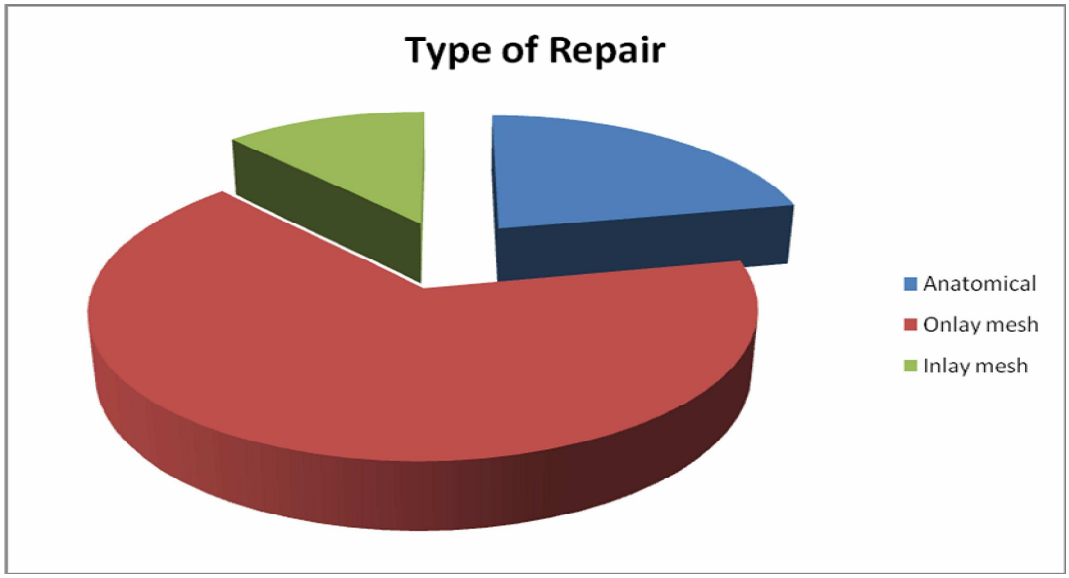
Incision :

Incision	***No. Of patients***
Lower midline incision	*21*
Pfannenstiel incision	*6*
Lower paramedian incision	*6*
Upper midline incision	*2*
Upper paramedian incision	*3*
Subcostal incision	*2*
Lanz incision	*1*
Subumblical incision	*8*
Inguinal incision	*1*


Incision
Inguinal incision
Subumblical incision
Lanz incision
Subcostal incision
Upper paramedian incision
Upper midline incision
Lower paramedian incision
Pfannenstiel incision
Lower midline incision
0
5
10
15
20
25
Incision

Type of Repair

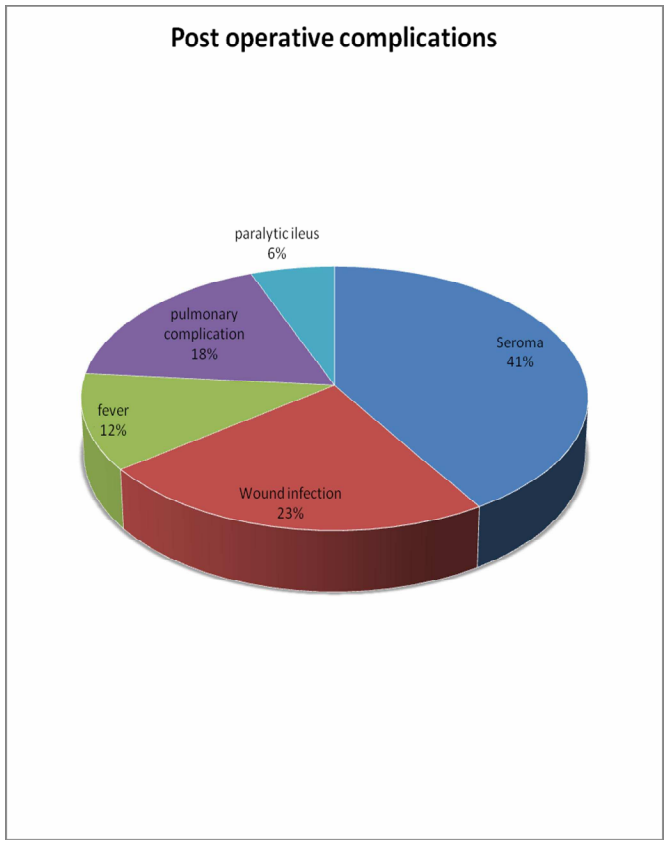
S.No	Type of Repair	No. Of Patients
1.	Anatomical repair	11
2.	Onlay mesh repair	33
3.	Inlay mesh repair	6



Only two types of repair is being done in our hospital although various typeshas been discussed in our textbooks. Because of the availability of meshes and the recurrence rate is less following mesh repair it is being practicsed more.

Post Operative complications :

S.No	Complications	No. Of Cases
1.	Seroma	7
2.	Wound Infection	4
3.	Fever	2
4.	Pulmonay complication	3
5.	Paralytic ileus	1



Out of 50 patients 17 patients develops post operative complications the commonest being seroma formation which occurs commonly after mesh repair.

OBSERVATIONS AND DISCUSSIONS

OBSERVATIONS AND DISCUSSIONS

In our study 50 cases were studied over a period of 2 years. High incidence of incisional hernias is seen in females when compared to males .Since lower segment caesarean section is the most commonly done surgery in females.

Most of the incisional hernias is seen in middle age around 30 – 50 years since these people was subjected to more surgeries and more amount of stress like lifting heavy weight and also due to collagen disorders

Since most of the incisional hernias occur through LSCS scar and the incision is below the umbilicus and the defiency of the posterior rectus sheath predisposes to this and also more common among emergency procedures

Wound infection in the post operative period is the most common complication met in repair of incisional hernia since the seroma is the cause for the same due to excessive handling of subcutaneous tissue . occurrence of the incisional hernia is seen in the first three years of previous surgery since the lack of adequate rest is the reason for this occurrence 22 patients presented with swelling and 13 patients presented with pain in our study .

Most of the repair done in our hospital are onlay mesh repair since the rate of recurrence is less after mesh repair when compared to anatomical repair.

CONCLUSION

CONCLUSION

Careful analysis of the current surgical literature including four recently published meta analyses indicates that a consistent conclusion can be made regarding an optimal technique. The abdominal closure technique should be fast, easy and cost effective while preventing both early and late complications. The technique involves mass closure incorporating all the layers of abdominal wall (except skin) as one structure in a simple running technique using 1-0 or 2-0 absorbable monofilament suture material with a suture length to wound length ratio of 4:1.

Use of mesh has drastically reduced the rate of recurrence of incisional hernia. Mesh repair is the gold standard for the treatment of incisional hernias.

We should all remember that incisional hernia is a preventable surgical complication.

PROFORMA

PROFORMA

NAME: AGE: SEX:

IP NO: DOA:

OCCUPATION: DOS: DOD:

CLINICAL FEATURES:

H/O Previous surgery:

Elective or Emergency

Number of previous surgeries

Complications of previous surgery

Post Operative cough or vomiting

Past H/O:

Diabetes, COPD, Malignancy

Personal H/O:

Smoking, Alcohol abuse

GENERAL EXAMINATION:

Obesity, Anemia, Malnutrition, Respiratory Rate

LOCAL EXAMINATION:

INSPECTION:

Size of the swelling,

position, extent

skin over the swelling,

visible pulsations or peristalsis,

reducibility,

impulse on coughing

scars of previous surgery

PALPATION:

Warmth

Tenderness

Position and extent

Consistency

Reducibility

Impulse on coughing

Size of the defect

PERCUSSION:

Dull/Resonant

AUSCULTATION:

Bowel sounds heard or not

EXAMINATION OF THE TONE OF ABDOMINAL MUSCLES:

P/V and P/R Examination:

SYSTEMIC EXAMINATION:

Respiratory System:

Rhonchi/Rales

Relevant investigations:

TYPE OF REPAIR:

Anatomical or Mesh repair

COMPLICATIONS OF SURGERY:

FOLLOW-UP:

ADVICE:

Reduction of weight

MASTER CHART

MASTER CHART

S. No	Name	Age/ Sex	I.P. No	Previous Surgery	Previous Incision	Risk-factor	Type of repair	Duration of Surgery	Post operative complication
1	Senthil kumar	38/M	6261	cholocytectomy	Subcostal incision	Obesity	Onlay mesh repair	1-3 yrs	Unevenful
2	Veeamani	42/M	7892	Laprotomy	Upper midline incision	Pulmonary complicati on	Inlay mesh repair	< 1 yr	Unevenful
3	Mumtaj	44/F	9400	Hysterectomy	Lower paramedian incision	DM	Onlay mesh repair	< 1 yr	Wound infection
4	Azaghurani	35/F	9998	Sterlisation	Subumblical incision	-	Anatomical repair	3-5 yrs	Unevenful
5	Kanniyammal	45/F	10515	LSCS	Lower paramedian	Anaemia	Onlay mesh repair	< 1 yr	seroma
6	Chandra	51/F	16057	Hysterectomy	Lower midline	Obesity	Onlay mesh repair	1-3 yrs	Uneventful
7	Anjali	33/F	18514	LSCS	Pfannenstiel	-	Onlay mesh repair	3-5 yrs	Uneventful
8	Sarasu	37/F	20003	LSCS	Pfannenstiel	Obesity	Onlay mesh repair	< 1 yr	Wound infection
9	Rajendran	48/M	16993	Appendicectomy	Lanz incision	DM	Inlay mesh repair	< 1 yr	Wound infection
10	Durgadevi	36/F	20338	LSCS	Pfannenstiel	--	Onlay mesh repair	>5 yrs	Wound infection
11	Nagavalli	38/F	24202	Hysterectomy	Lower midline incision	--	Anatomical repair	3-5 yrs	unevenful
12	Rajam	35/F	26688	LSCS	Pfannenstiel	Anaemia	Onlay mesh repair	< 1 yr	seroma
13	Kalathayee	35/F	28400	LSCS	Lower midline incision	--	Onlay mesh repair	1-3yrs	Unevenful
14	Thanagraj	39/M	32431	LSCS	Lower paramedian incision	--	Anatomical repair	>5 yrs	Unevenful
15	Kannammal	40/F	34357	Sterilisation	Subumbilical incision	Obesity	Onlay mesh repair	<1 yr	Unevenful
16	Karunanidhi	50/M	37918	Inguinal hernia repair	Inguinal incision	Obesity	Onlay mesh repair	<1 yr	Unevenful
17	Chitra	34/F	38910	Sterilisation	Subumbilical incision	--	Anatomical repair	>5yrs	Unevenful
18	Saroja	39/F	39993	Sterilisation	Subumbilical incision	--	Anatomical repair	1-3yrs	Unevenful
19	Srirangamma	58/F	51211	Sterilisation	Subumbilical incision	--	Anatomical repair	3-5 yrs	Unevenful
20	Puspha	40/F	52276	LSCS	Lower midline incision	obesity	Onlay mesh repair	<1 yrs	Unevenful
21	Sarabee	55/F	56299	LSCS	Lower midline incision	--	Onlay mesh repair	3-5 yrs	Unevenful
22	Gomathy	31/F	58701	LSCS	Pfennensteil	--	Onlay mesh repair	1-3 yrs	Unevenful
23	Vijaya	34/F	53705	LSCS	Lower paramedian	--	Onlay mesh repair	3-5yrs	Unevenful
24	Shantha kumar	40/F	1156	cholecystectomy	Subcostal incision	DM	Onlay mesh repair	<1yr	Wound infection
25	Meenakshi	38/F	9801	Hysterectomy	Lower midline incision	Pulmonary complicati on	Onlay mesh repair	1-3 yrs	Fever

26	Vasantha	25/F	10481	LSCS	Lower paramedian	--	Onlay mesh repair	<1 yr	Uneventful
27	Mary	28/F	9052	LSCS	Pfennensteil	Anaemia	Onlay mesh repair	<1 yr	Seroma
28	Pavunammal	40/F	17044	Hysterectomy	Lower midline incision	--	Onlay mesh repair	1-3 yrs	Uneventful
29	Kalimuthu	45/M	39706	laprotomy	Upper paramedain	DM	Inlay mesh repair	< 1yr	Seroma
30	Krishnaveni	45/F	11401	Sterilisation	Subumbilical incision	--	Onlay mesh repair	1-3yrs	Uneventful
31	Meena	32/F	10009	LSCS	Lower midline incision	--	Onlay mesh repair	1-3 yrs	Uneventful
32	Sebastiyammal	40/F	11187	Hysterectomy	Lower midline incision	Obesity	Onlay mesh repair	< 1yr	Pulmonary complication
33	Ponnusamy	40/M	57111	Laprotomy	Upper midline incision	--	Anatomical repair	1-3 yrs	Paralytic ileus
34	Anbuselvi	37/F	16992	LSCS	Lower midline incision	--	Onlay mesh repair	1-3 yrs	Uneventful
35	Chellamal	29/F	17222	LSCS	Lower midline incision	Obesity	Onlay mesh repair	<1 yr	Uneventful
36	Geetha	35/F	18789	LSCS	Lower midline incision	--	Anatomical repair	1-3 yrs	Unevenful
37	Fathima	30/F	26062	LSCS	Lower midline incision	--	Onlay mesh repair	1-3 yrs	Uneventful
38	Parkavi	37/F	16799	Sterilisation	Subumbilical incision	--	Anatomical repair	1-3yrs	Uneventful
39	Kamalam	44/F	20191	Sterilisation	Subumbilical incision	DM	Onlay mesh repair	< 1yr	Seroma
40	Amala mary	50/F	23632	Recurrent incisional hernia	Lower midline incision	--	Onlay mesh repair	1-3 yrs	Pulmonary complication
41	Devasena	44/F	28477	LSCS	Lower midline incision	--	Onlay mesh repair	1-3 yrs	Uneventful
42	Kausalya	37/F	30826	Hysterectomy	Lower midline incision	--	Onlay mesh repair	1-3 yrs	Uneventful
43	Angumani	39/M	32895	Laprotomy	upper paramedian incision	Pulmonary complicati on	Anatomical repair	< 1yr	Fever
44	Pushpavalli	28/F	27880	LSCS	Lower midline incision	--	Onlay mesh repair	3-5 yrs	Uneventful
45	Ponammal	35/F	28768	LSCS	Lower midline incision	--	Onlay mesh repair	3-5 yrs	Uneventful
46	Rasol beevi	48/F	23099	LSCS	Lower midline incision	Obesity	Inlay mesh repair	< 1yr	Pulmonary complication
47	Selvaraj	47/M	37207	Recurrent incisional hernia	Lower midline incision	DM	Onlay mesh repair	< 1yr	Seroma
48	Manimuthu	39/M	49989	Laprotomy	upper paramedian incision	Pulmonary complicati on	Inlay mesh repair	< 1yr	Uneventful
49	Kalpana	45/F	50188	Hysterectomy	Lower midline incision	--	Anatomical repair	3-5 yrs	Uneventful
50	Appavu	41/M	18060	Laprotomy	upper paramedian incision	DM	Inlay mesh repair	< 1yr	Seroma

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Riou JP, Cohen JR, Johnson H-Factors influencing wound dehiscence, Am.J Surg.1992-163: 324-330.
2. Irvin JJ, Stoddard CJ, Creancy MJ, Abdominal wound healing a prospective clinical study. Br Med.J 1977,2: 351-352.
3. Luijendijk R.W Incisional hernia: risk factors, prevention and repair. Eramus university, Rotterdam Drukkarji Edauw and Johannissen, 2000.
4. Pearl,ML, Rayburn, WF, choosing abdominal incision and closure techniques- J.Reprod Med 200 49:662.
5. Nygaar, IE, Squatrito,RC , Abdominal incisions from creation to closure. Obtet gynecal Surg. 1996 51:429.
6. Farquatarson's text book of operative surgery.
7. M.A Lee Mc Gregor.
8. Bailey and Love's short practice of Surgery 25th edition.
9. Rodney Maingot- Abdominal Operations Vol – I.
10. Surgery for ventral Hernia M. Mohan Rao. Recent Advances in surgery vol II.
11. Problem General surgery 1997: 12: 75. Rational for the selection of prosthetics bio material.

12. Open Rives- Stoppa ventral hernia repair Hearstill L, Richards ML et all, Department of surgery, University of texas health science center at San Antonio.

13. Nybus and Condon : Hernia Lippincot company, 4th edition- 1992.

14. World Journal of surgery- 2000 factors affecting recurrence following incisional hernioraphy.

15. Mudge M.Hughes LE, incisional Hernia: a 10 year prospective study of incidence and attitudes. Br.J. Surg 1985; 72(1): 70-1.

16. Hodgson NC, Malthanes RA, Ost bye.T The search for an ideal method of abdominal fascial closure: a meta-analysis. Ann Surg 2000;231(3);436-42.

17. Read Rc, Yoder G. Recent trends in the management of incisional herniation. Arch surg 1989; 124(4) 485-8.

18. Anthony T, Bergen Pc, Kim LT et all factors affecting recurrence following incisional hernioraphy word J- Surg 2000 24(1): 95-100 Discussion 101.

19. Van der linden FT, van vroonhoven JJ Long term results after surgical correcton of incisional hernia Neth J.Surg 1988; 40(5): 12-9.

20. Mc. Lanahan D. King LT, weems C et all. Retrorectus prosthetic mesh repair of midline abdominal hernia. Am J surg 1997;173(5);445-9.

21. Leber GE, Garb JL, Alexander AI, Reed WP. Long term complications associated with prosthetic repair of incisional hernias. Arch surg. 1998;133(4): 378-82.

22. Morris-stiff GJ Hughes LE. The outcomes of non-absorbable cavity: literature review and clinical experience.J Am coll Surg 1998;186(3) 352-67.

23. Franz MG,Kubn MA, Nguyen K, Early biomechanical wound failure,a mechanism for ventral incisional hernia formation wound rep reg 2001;9:140-141.

24. Pollock AV, Evans M. Early prediction of late incisional hernias Br. J. Surg 1989;76:953-954.

25. Carlson MA. Acute wound failure wound healing. Surg.Clin. North Am 2501;77:607-635.

K.A.P.VISWANATHAM GOVT.MEDICAL COLLEGE

TRICHY-1

INSTITUTIONAL ETHICS COMMITTEE

CERTIFICATE OF CLEARANCE

CHAIRMAN

DR.PHILIP THOMAS

MEMBER SECRETARY

DR.S.DHANAPAUL

MEMBERS

DR.F.FLORENCE SHALINI

PROF.K.RU CKMANI

DRJ.KALIAMURTHY

This is to certify that the project work titled **"A COMPREHENSIVE STUDY ON THE INCIDENCE AND MANAGEMENT OF INCISIONAL HERNIA"**proposed by DR.N.SUBHALAKSHMI of K.A.P.V.Govt.medical college, Trichy as part of fulfillment of M.S course in the subject of GENERAL SUGERYfor the year 2012-13 by The Tamilnadu Dr.MGR medical university has been cleared by the ethical committee.

DR.J.Florence shalini,
Lecturer ,
Dept. of Social Work,
Bishop Heber College,
Trichy.

Dr. J. FLORENCE SHALINI
Assistant Professor
PG Department of Social Work
Bishop Heber College
TRICHY- 620 017.

Prof.K.Ruckmani,
Head of the Department,
Pharmaceutical Engineering & Tech,
Anna University,
Trichy.

Dr. K. RUCKMANI
Prof & Head
Department of Pharmaceutical Technology
Anna University
Regional office, BIT Campus
Tiruchirappalli - 620 024

D R. J .Kaliamurthy,
Institute of Ophthalmology,
Joseph Eye Hospital, Trichy.

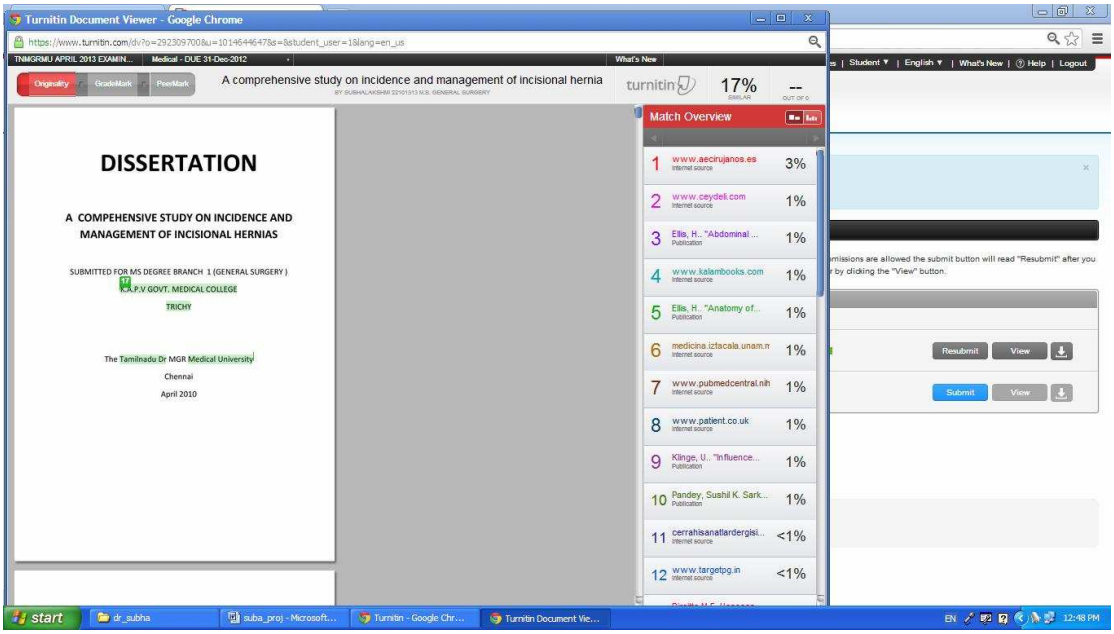
Dr.J. Kaliamurthy Msc, PhD
Associate Professor
Dept.of.Microbiology
Institute of Ophthalmology
Joseph Eye Hospital
Trichy - 620 001

DR.S.Dhanapaul,
Prof & H.O.D,
Dept of Microbiology,
K.A,P.V.Medical College,
Trichy.

DR. S. DHANAPAUL. M.D
Prof & Head
Dept. of Microbiology
K.A.P.V. Govt Medical College
Trichy

CHAIRMAN
DR. Philip Thomas
Institute of Ophthalmology
Joseph Eye Hospital, Trichy

Dr.PHILIP A. THOMAS,M.B.B.S.,M.D.,Ph.D.
M.A.M.S.,F.A.B.M.S.,F.I.M.S.A.,
PROFESSOR AND HEAD DEPT. OF OCULAR MICROBIOLOGY,
HEAD, DEPT. OF RESEARCH AND DEVELOPMENT,
INSTITUTE OF OPHTHALMOLOGY,
JOSEPH EYE HOSPITAL,
TIRUCHIRAPPALLI - 620 001


Turnitin Document Viewer - Google Chrome
A comprehensive study on incidence and management of incisional hernia
17%
Match Overview
DISSERTATION
A COMPEHENSIVE STUDY ON INCIDENCE AND MANAGEMENT OF INCISIONAL HERNIAS
SUBMITTED FOR MS DEGREE BRANCH 1 (GENERAL SURGERY)
P.V GOVT. MEDICAL COLLEGE
TRICHY
The Tamilnadu Dr MGR Medical University
Chennai
April 2010
1 www.aecirujanos.es 3%
2 www.ceydeli.com 1%
3 Ellis, H.. "Abdominal ... 1%
4 www.kalambooks.com 1%
5 Ellis, H.. "Anatomy of... 1%
6 medicina.iztacala.unam.m 1%
7 www.pubmedcentral.nih 1%
8 www.patient.co.uk 1%
9 Klinge, U.. "Influence... 1%
10 Pandey, Sushil K. Sark... 1%
11 cerrahisanatlardergisi... <1%
12 www.targetpg.in <1%
Resubmit
View
Submit
View
start