

INCISIONAL HERNIA, ITS INCIDENCE, ETIOLOGY AND MANAGEMENT IN A TERTIARY CARE HOSPITAL -A PROSPECTIVE STUDY

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Abstract

Background: Incisional hernia, following abdominal surgery is a common condition. 2% to 20% of any abdominal surgeries will present with Incisional Hernia and the rate of incidence varies greatly from one series to another. This study is intended to study the incidence, risk factors, and preventive measures for ventral Incisional hernia. An incisional hernia is defined as a hernia protruding through an incompletely healed abdominal surgical wound. Management of INCISIONAL HERNIA can be preventive (avoidance of infection and suture line tension, proper abdominal wound closure) or operative (anatomical reconstruction or repair with synthetic non-absorbable mesh either by open or laparoscopy method). **Material & Methods:** A prospective observational study on 25 patients with ages >15 years was conducted in the Department of General Surgery, Kanyakumari Medical College and Hospital, Nagercoil from May 2022 to 31st March 2023. The diagnosis was made with clinical history, physical examination, X-ray abdomen and USG abdomen, and CT abdomen. The patients underwent surgical procedures depending on the size of the defect, the patient's consent, and the expertise available. Post-operative complications were noted and patients were followed up to 3 months for any recurrence. **Results:** 5 males and 20 females were included, with a female preponderance of 80%. The most common etiology of Incisional hernia in this study was previous surgery wound infections with 44%. Second most and third most respectively are obesity 28% and COPD 12%, and Others 12%. In our setup, incisional hernia repair outcomes are relatively good, and the long-term prognosis is also good. **Conclusions:** Prevention of Incisional hernia is to be taken care of, by avoiding infection during index operation with thorough peritoneal toileting, proper surgical techniques, and felicitous use of antibiotic.

INTRODUCTION

A hernia is defined as an abnormal protrusion of viscous or a part of viscous through a normal or abnormal opening in the wall of its containing cavity.^[1]

A ventral hernia is any hernia protruding through the abdominal wall, while an Incisional hernia (IH) is a hernia protruding through an operational scar.^[2] According to various studies abdominal surgeries have an 11% to 19% chance of developing IH.^[3,4] Hernia repair has undergone a lot of evolutionary changes from mass closure to minimally invasive surgery. Surgeons have embarked on an incessant search for the “optimal approach” to repair Incisional hernias, driven perhaps by their patients’ frustration as well as their own when faced with a failed repair after what initially looked like the “perfect surgery.”

These efforts have led to remarkable accomplishments in hernia surgery. With the unacceptable rates of hernia recurrence seen with primary fascial repairs, the first revolution in hernia surgery came with the concept of tension-free fascial closure with mesh. It has become the universal consensus, that, mesh repair is the gold standard for elective ventral hernia repair. However, in the search for predicting the ideal method of surgical therapy as there was recurrence even when the mesh is used. Drs Rene Stoppa, Jean Rivesand George Wantz explored the Retro muscular and preperitoneal planes of the abdominal wall, contributing to significant refinements in surgical techniques.

An incisional hernia is a ventral hernia, however, it occurs through the previous surgical incision in the abdominal wall. Midline incisional hernias are more common than hernias at other sites. This condition

can present as a complete hernia with all of the typical components, including a hernia sac and content, or as a weakness in the abdominal wall with a shallow sac and occasional bulging of content. Incisional hernias are a common surgical issue and patients with this condition are often evaluated by surgeons due to potential symptoms. The most common symptom is a bulge with a positive cough impulse at the site of the incision. Patients with incisional hernias are also at risk for complications such as incarceration, obstruction (if the content is bowel), or strangulation. This article aims to provide an overview of the assessment and management principles for incisional hernias

Although most cases of an Incisional hernia are diagnosed with a history and physical, imaging is sometimes warranted like in early stages, obese patients, or complex cases. The use of different imaging modalities like ultrasonography (USG), computerized tomography (CT), and magnetic resonance imaging (MRI) yields a higher incidence of IH.^[5]

Computed Tomography (CT) scanning focused on the abdominal wall is not only helpful in confirming the diagnosis when it is not clear but helps in planning the surgical approach and extent of repair. In some cases, patients may be diagnosed with small incisional hernias during abdominal surgery, particularly if the incision is made in the same location as a previous surgery or using a laparoscopic approach. These hernias may present as fascial defects with occasional entrapment of adipose tissue."

Various studies were conducted to compare the incidence of Incisional Hernia in the median incision, paramedian incision, and transverse incision.^[6-7] During the COVID pandemic period the access to hospital for regular clinical examinations were delayed and it resulted in increased incidence of neglected hernias in individuals.^[8]

Several meta-analyses and studies show that mass closure of the abdomen with continuous non-absorbable or slowly absorbable suture material is the best technique for preventing IH.^[9-12] Although there is no strong evidence from randomized controlled trials, various studies emphasize the need for suture length: wound length ratio of at least 4:1 when one bite must encompass 1 cm of tissue at 1 cm intervals.^[13-14]

An incisional hernia can occur when the abdominal wall protrudes at the site of previous surgery, especially when there is increased pressure in the abdomen. Symptoms may range from none to discomfort, pain, or complications like bowel obstruction or strangulation. Hernias can limit physical activities due to symptoms or as a precautionary measure. A physical exam can reveal the hernia and estimate its size, allowing for discussion with the patient about surgical options.

Major patient-related risk factors are obesity, chronic lung diseases, type 2 DM, male gender, age, smoking, malnutrition, steroids, chemotherapy, anaemia,

collagen vascular disorders, wound infections, etc, while surgeon related are wound closure methods, suture material selection, etc.^[15-16]

Laparoscopic hernia repair mainly practiced today is the intra-peritoneal inlay technique with the placement of mesh that is secured with a tagging device or trans-abdominal sutures.^[17-21] Extra-peritoneal (TEP) repair and extended view TEP is also gaining popularity.

Incisional hernias are a challenging condition to treat in any medical setting due to the potential for negative outcomes, such as surgical site infections, skin tissue death, and fluid accumulation. This research aims to assess the causes, symptoms, and treatment options for incisional hernias in our particular medical setting.

Abdominal wall reconstruction surgery is an advanced surgical procedure that strengthens a weakened or damaged abdominal muscle and restores the normal function of the abdominal wall. It is a procedure recommended for patients with advanced hernias and requires specialized surgical expertise.

A prospective observational study on 25 patients with age >15 years was conducted in the Department of General Surgery, Kanyakumari Medical College and Hospital, India from May 2022 to March 2023.

MATERIALS AND METHODS

Inclusion Criteria

- Individuals who were over 15 years old and had experienced herniation in the area of a previous surgical scar.

Exclusion Criteria

- On investigation found not to have Incisional hernia
- Patients who refused to give consent for study.

The Duration of surgery, ease of operation, complications arising in the wound, mesh infections, hospital stay, morbidity, and recurrence were all evaluated through observations. The diagnosis was established through clinical examination, abdominal ultrasonography, and abdominal X-rays, computed tomography (CT) scan of the abdomen. Prior to the surgery, intraoperatively, and postoperatively, all patients were evaluated, and their outcomes were documented in a pre-defined format.

For all patients included in the study, their demographic and therapeutic parameters such as age, gender, and Body Mass Index (BMI), mean operation time, length of hospital stay, pre-operative investigations, surgical technique, and post-operative complications were collected. The patients underwent different surgical procedures like anatomic reconstruction, open hernioplasty or laparoscopic hernioplasty depending on size of defect, patients consent and expertise available. Patients were followed up to 6 months and recurrence was observed.

RESULTS

Sex Distribution

The study comprised of 5 males and 20 females with female preponderance ratio of 1:4 as shown in the [Table 1 Figure 1].

Table 1: Distribution of cases according to sex

SEX	NUMBER OF PATIENTS	%
MALE	5	20%
FEMALE	20	80%

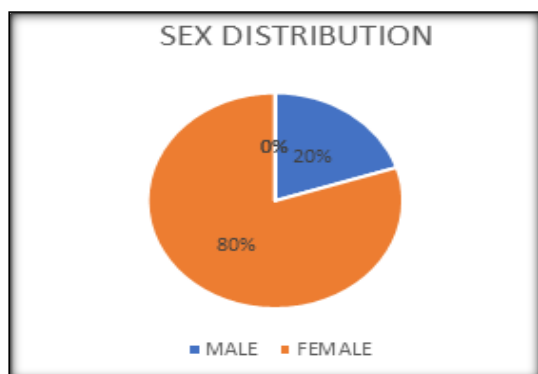


Figure 1: Distribution of cases according to sex

Age Distribution

The mean age of the study was 57.6years. The youngest patient was 24 years of age and oldest being 78 years of age. Maximum number of patients in the study belonged to age group of 61 to 70 years (40%). Most of the study population was between 20 and 80 years in [Table 2 Figure 2].

Table 2: Table showing the age distribution over patients

AGE IN YEARS	NUMBER OF PATIENTS
20-30	1
31-40	1
41-50	5
51-60	6
61-70	10
71-80	2

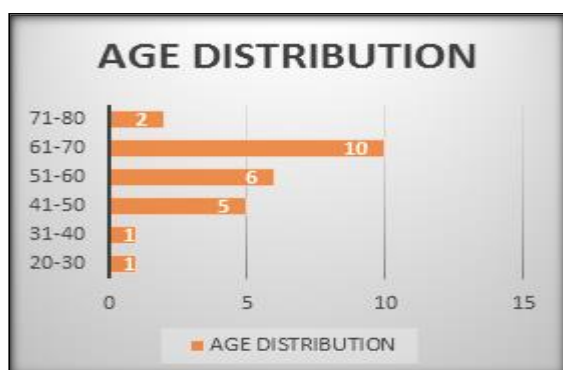


Figure 2: Age distribution over patients

Body Mass Index

Majority of the patients with INCISIONAL HERNIA came under overweight group with BMI of 25-29.9, i.e., 12 out of 25 cases (48%). Only 6(24%) patients

came under normal group with BMI of 18-24.9. The number of cases with BMI <18 and >30 were 0 and 7(28%) respectively. The mean BMI of patients with INCISIONAL HERNIA was 27.45. (Figure 3)

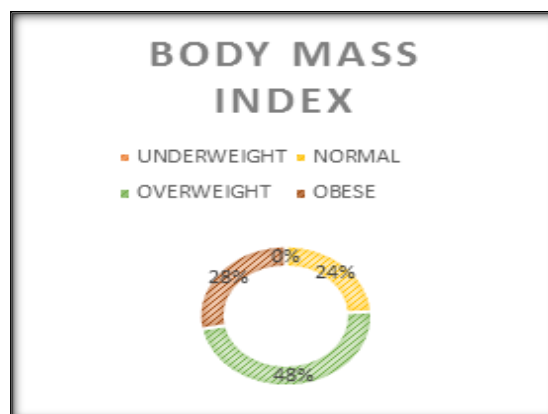


Figure 3: Body mass index of the patients

Distribution of Incisional hernia according to type of previous surgery

Previous emergency surgery led to 21 out of 25 number of Incisional hernia cases making share of previous emergency surgery about 84% in incidence of Incisional hernia. Only 4 out of 25 cases occurred after elective surgery which amounted to 16% of Incisional hernia cases [Table 3].

Table 3: Table showing distribution of incisional hernia according to type of surgery

TYPE OF PREVIOUS SURGERY	NUMBER OF CASES	%
Emergency	21	84%
Elective	4	16%

Distribution of INCISIONAL HERNIA according to etiology

The most common cause of INCISIONAL HERNIA was post-operative wound infection 11 out of 25 patients (44%). The second cause was obesity 7 out of 25 patients (28%) subsequently by COPD 4 out of 25 patients (12%), other causes like improper rest, increased abdominal pressure contributed 4 out of 25 patients (16%). Some of the cases had got multiple etiological factors [Table 4, Figure 4].

Table 4: Table showing distribution of incisional hernia cases according to etiology

CAUSE	NUMBER OF CASES	%
Post op wound infection	11	44%
Obesity	7	28%
COPD	3	12%
Others	4	16%

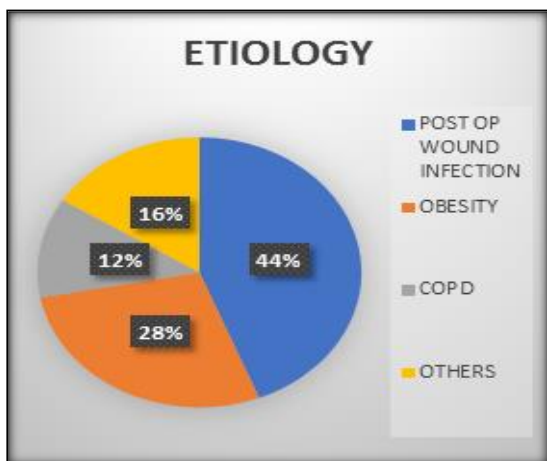


Figure 4: incisional hernia cases according to etiology

Distribution of INCISIONAL HERNIA according to pathology:

Most common pathology during previous surgery was Caesarean section for childbirth 15 out of 25 patients (60%) followed by intestinal obstruction 4 out of 25 patients(16%), open appendectomy 2 out of 25 patients (8%), pyelolithotomy 1 out of 25 patients(4%), other surgeries for malignancy and open cholecystectomy had 3 out of 25 patients(12%) [Figure 5].

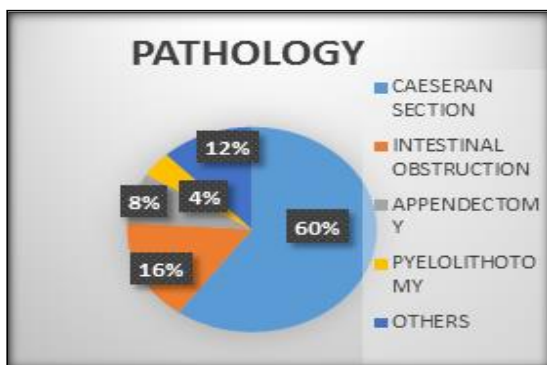


Figure 5: Distribution of incisional hernia according to pathology

Distribution of INCISIONAL HERNIA according to type of incision

Pfannenstiel incision leads to maximum number of INCISIONAL HERNIA 15 out of 25 patients (60%). Midline incision also had a major share with 4 out of 25 patients(16%) of cases while other incisions leading to INCISIONAL HERNIA, Mc Burney's incision had 2 out of 25 patients(8%), subcoastal incision 2 out of 25 patients(8%) other incisions contributed to (8%) [Table 5].

Table 5: Distribution of incisional hernia according to type of incision

TYPE OF INCISION	NUMBER OF PATIENTS	%
PFANNENSTIEL	15	60%
MIDLINE	4	16%
MCBURNEY'S	2	8%
SUBCOASTAL	2	8%

OTHERS	2	8%
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Distribution of INCISIONAL HERNIA according to size of defect

In most of cases size of defect was about 2 to 4 cm i.e., 13 out of 25 cases amounting to 52% cases of INCISIONAL HERNIA. About 8 cases out of 25 making about 32% cases of INCISIONAL HERNIA had defect of more than 4 cm. About 4 cases out of 25 amounting to 16% cases of INCISIONAL HERNIA had less than 2 cm size defect [Table 6, Figure 6].

Table 6: Table showing distribution of incisional hernia according to size of defect

SIZE OF DEFECT	NUMBER OF PATIENTS	%
> 4 CM	8	32%
2-4 CM	13	52%
< 2 CM	4	16%

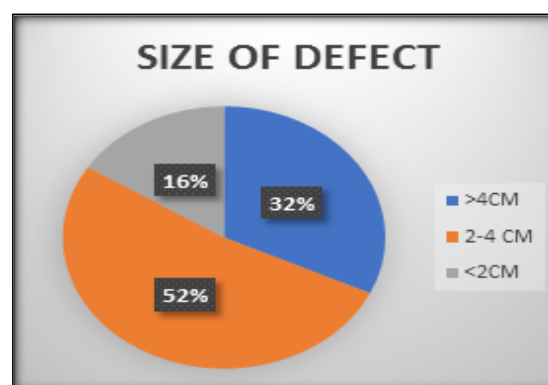


Figure 6: Distribution of incisional hernia according to size of defect

Distribution of INCISIONAL HERNIA cases according to index surgery vs type of institution:

In most of the cases where index surgery performed in the government institutes 15 out of 25 patients (60%) amounted to Incisional hernia of which 9 out of 15 cases were operated in government teaching institute and 6 out of 15 cases from government non-teaching institutes. 10 out of 25 patients (40%) operated from private hospitals amounted to Incisional hernia [Table 7].

Table 9: Table showing distribution of incisional hernia cases according to index surgery vs type of institution

S.NO	TYPE OF INSTITUTION	NUMBER OF PATIENTS	%
1	GOVERNMENT	15	60%
2	PRIVATE	10	40%

Distribution of INCISIONAL HERNIA according to type of Management

22 out of 25 were managed by open mesh hernioplasty and 3 out of 25 patients was managed by abdominoplasty (perforator preserving anterior component release).

Complications

Recurrence after open mesh hernioplasty was 4 cases out of 25, making it 16% of cases operated on with open mesh repair.

DISCUSSION

Abdominal incisional hernia is a complication of previous surgeries and occurs with an incidence of 3% to 20.6%. However when the infection sets in the incision resulting in delayed healing, the incidence can be increased up to 23% to 40%. An abdominal incisional hernia will lead to the splitting of the fascia layer and the formation of abdominal wall mass for intra-abdominal tissues or organs sticking out from the split, which will severely affect the patient's life. However, different areas have different incidences.

From May 1, 2022 to March 31, 2023, 25 cases of incisional hernia were studied at a tertiary care hospital in the Kanyakumari district of India. This study shows female preponderance at 80% compared to the other studies. Zhang et al. [22]. However in his study Kurmann et al. [23] has shown 72.5% males in the laparoscopic group and 67.5% in the open group. The mean age of our study participants was 57.6 years, with 40% being between the ages of 61 and 70, and approximately 24% being between the ages of 51 and 60. In Zhang et al. [22] the mean age of the study was 45.5. Roland et al. studied the mean age of patients in the suture repair group at 63 and the mesh repair group at 57 years.

Muscle fibre strength can prevent the occurrence of incisional hernias, and it is mainly provided by nutrition and proper exercise. In this study, 48% of patients are overweight and mostly female, while 28% are obese.

Pfannenstiel incision leads to the maximum number of hernias (60%) in this study, and midline incision contributes 16% of the cases. Subcostal incisional hernia are generally rare, as abdominal muscles can prevent herniation. But in this study, two cases of incisional hernia were observed after a 8% subcostal incision. McBurney's incision accounts for 8 percent of incisional hernias in our study. Purushotham et al. showed 80% of incisional hernia cases after previous lower midline incision and 11.5% after upper midline incision. McBurney's incision also leads to 8.5% incisional hernias, according to their study.

In this study, the most common aetiology of incisional hernias was previous surgery wound infections, accounting for 44% of cases. Second most and third most, respectively, are obesity (28%), COPD (12%), and other 12% causes are lack of rest, improper exercises, and co-morbid conditions, which cause increased abdominal pressure and connective tissue disorders. Shaikh et al. studied the commonest cause of IH to be post-operative infection, which accounted for 45.5% of cases; other causes were respiratory tract infections, COPD, abdominal distension, urinary infection, and constipation. [26]

In this study, emergency surgery caused the greatest number of incisional hernias (84%) and elective surgery caused only 16%. According to Purushotham et al, emergency surgery was performed in 57% of cases of IH, while elective surgery was performed in 43% of cases. Since emergency surgeries were done without preoperative preparations, it may lead to postoperative complications like wound infections, which is the most common aetiology for IH.

The size of the hernia is also important in deciding the treatment. In this study, 52% of the cases had a defect larger than 4 cm, 32% had a defect two to four cm in size, and 16% had a defect smaller than two cm. Kurmann et al. discovered that 1.5% of cases in the laparoscopic group were less than 4 cm, 47.8% were 4-10 cm, and 36.2% were more than 10 cm, whereas 8.9% of cases in the open repair group were less than 4 cm, 30.4% were 4-10 cm, and 19.6% were more than 10 cm. [23]

Most common pathology during previous surgery was Caesarean section for childbirth in 15 out of 25 patients (60%) followed by intestinal obstruction in 4 out of 25 patients (16%), open appendectomy in 2 out of 25 patients (8%), pyelolithotomy in 1 out of 25 patients (4%), other surgeries form a ligancy, and open cholecystectomy in 3 out of 25 patients (12%).

In this study, 22 out of 25 patients were managed by open mesh hernioplasty, and 3 out of 25 patients were managed by abdominoplasty (perforator preserving anterior component release). Kurmann et al. [23] studied 125 cases, in which 69 cases were managed laparoscopically and 56 cases via open repair. Roland et al. studied 154 cases, of which 80 were managed with suture repair and 74 with mesh repair.

Most cases that have been operated on in government institutes 15 out of 25 patients (60%) had incisional hernias, of which 9 out of 15 cases were operated on in government teaching institutes and 6 out of 15 cases in government non-teaching institutes. 10 out of 25 patients operated on in private hospitals had an incisional hernia.

Recurrence is one of the most important complications of IH repair. In this study, the recurrence rate after open mesh hernioplasty was 4 cases out of 25, making it 16% of cases operated on with open mesh repair. Roland et al. and Patnaik et al. studied the recurrence of mesh repair and suture repair and found 43% recurrence in the suture repair group and 24% in the mesh repair group. [24,25,26] Compared Nowadays, laparoscopic mesh repair is gaining pop.

CONCLUSION

Incisional hernia is one of the most common complications of abdominal surgeries, especially when done in an emergency. The most common aetiology of incisional hernia in this study was previous surgery wound infections with 44%; second and third most common, respectively, are obesity and

COPD; others are not taking proper rest after surgery.)

In comparison to males, the female preponderance is almost quadruple (1:4). Incisional hernia is very common in those institutions where the index operation is done in the teaching hospital. Early diagnosis and appropriate treatment using the newer principles of Abdominal Wall reconstructions are important. The Anterior component separation by preserving perforators is a safe method for larger incisional hernia.

In our setup, incisional hernia repair outcomes are relatively good, and the long-term prognosis is also good.

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