

# A Clinical Study on Epidemiology and Management of Incisional Hernia

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## ABSTRACT

### BACKGROUND

Incisional hernia is one of the common complications encountered following abdominal surgery and is an important cause of morbidity. It can be repaired by following anatomical, mesh or laparoscopic methods. The incidence of these hernias is high even with recent advances in surgery, anaesthesiology, antibiotics, and suture materials used. We wanted to study the epidemiology, aetiology, mode of presentations, modalities of treatment and its outcome, of incisional hernia.

### METHODS

This study was done from July 2017 and June 2019, 50 patients with incisional hernia who got admitted in the Department of Surgery at Sri Venkateshwaraa Medical College and Research Center, Ariyur were subjected to anatomical or mesh repair depending on the surgeon's choice and size of defect. A total of 50 cases were studied and followed for a period of 6- to 18-months. Patients of age 12 years and above of both sexes who presented with incisional hernia post abdominal surgery were included in this study. Age below 12 years and those presented with other hernias like inguinal/ventral hernias were excluded. Data was collected and analysed by various statistical methods.

### RESULTS

Incisional hernia was found to be the second most common type of hernia. The incidence was more common in females, who underwent gynaecological procedures by lower midline incisions. It was found to be more common in the age group 30-60 years. Predominant risk factors being wound infection and obesity. Infraumbilical midline incision (50%) was found to be more common compared to other incisions. Majority of patients who underwent emergency surgery developed incisional hernia. Postoperative complications noted were mainly due to wound infections and seroma.

### CONCLUSIONS

Mesh repair results in less recurrence than anatomical repair for incisional hernia. The incidence of incisional hernia is more common in women than men due to abdominal wall weakness secondary to multiple pregnancies, increased number of caesarean sections and gynaecological surgeries. Sterile aseptic technique and appropriate use of pre-operative antibiotics is necessary to reduce the occurrence of incisional hernia.

### KEY WORDS

Incisional Hernia, Anatomical Repair, Mesh Repair, Hernia Defect, Complications.

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## BACKGROUND

Incisional hernia is defined as any abdominal wall defect with or without swelling in the area of a postoperative scar palpable by clinical examination or imaging.<sup>1</sup> Every year there are approximately 4 million abdominal operations are being performed and the reported incidence of incisional hernia following abdominal surgery ranges from 11-20%.<sup>2</sup> Unlike other abdominal wall hernias, which occur through anatomical points of weakness, incisional hernias occur through a weakness at the site of abdominal wall closure.<sup>3</sup> The incidence of these hernias is high even with the recent advances in surgery, anaesthesiology, antibiotics, suture materials used. Incidence of incisional hernia is next to inguinal hernia and may be higher than reported, since most of them are asymptomatic. Among abdominal incisions, highest incidence is found with lower midline abdominal incisions because it is through this incision most of the gynaecological and lower abdominal surgeries are being done. The postulated predisposing factors for incisional hernia are obesity, diabetes mellitus, steroids, smoking, sub-optimal surgical technique, old age, malnutrition, multiple laparotomies, chronic pulmonary disease, type of incision and closure including suture material used and the most important wound infection.<sup>4</sup> The pressure in the lower abdomen is more than upper abdomen and the posterior rectus sheath is deficient below umbilicus, any stress and strain on lower abdomen predisposes to hernia formation. Among the various etiological factors responsible for incisional hernias, raised intra-abdominal pressure and post-operative wound infections were found to be most common causes. So while planning surgery for the repair of incisional hernias utmost care should be taken in selecting the method of repair, suture material and Mesh used for preventing further recurrence. There are various methods used for repair of incisional hernias like anatomical repair, onlay mesh pair, laparoscopic repair etc. After Usher reported his experience with use of polypropylene suture, Prolene mesh, modern era of prosthetic hernia repair began in 1958 being widely used for wide defects in incisional hernias with considerably good results.<sup>5,6</sup> Laparoscopic techniques of hernia repair have revolutionised the treatment of incisional hernia repair by reducing the morbidity and less hospital stay. Advantages of laparoscopic incisional hernia repair are no re-incision, less painful, safe, speedy recovery and less recurrence.<sup>7</sup> Present study aims to assess and analyse various factors leading to development of Incisional hernias, post-operative complications, different modalities of surgical repair and their outcomes.

## METHODS

The study was a retrospective study and study group was patients admitted in Sri Venkateshwaraa medical College and Research Center from July 2017 to June 2019. Institutional ethical committee approval was obtained, informed and written consent was taken from the patients. Out of 235 cases of various types of hernias operated a total of 50 cases of incisional hernias were studied and followed for a period varied from 6 months to 18 months. Patients of age 12 years

and above of both sexes who presented with incisional hernia post abdominal surgery were included in this study. Age below 12 years and those presented with other hernias like inguinal/ ventral hernias were excluded. In this series patients admitted in surgical wards under all surgical units were examined to assess the abdominal wall defects, etiological and predisposing factors. A detailed case history and thorough clinical examination was done to determine the type and cause of hernia and necessary investigations were done according to proforma. After detailed physical examination of patients, clinical diagnosis was established including the associated etiological and predisposing factors. A final decision was made regarding method of repair to be done individually for every case depending on the need of surgery. Fifty cases underwent surgery and patients were preoperatively prepared to be medically fit to withstand the surgery. All cases were evaluated to look for immediate and late postoperative complications. Data was analysed to find out predisposing factors, advantage of various operative techniques, complications developed, need of good post-operative care and outcome of the various operations done.

## Statistical Analysis

The statistical analysis was done by using SPSS software version 10.0 was used. Data was analyzed descriptively and tabulated using mean and standard deviation.

## RESULTS

During the period of our study, a total of 235 patients have been operated for various types of hernia, out of these 50 cases were incisional hernia. Inguinal hernia was most common type accounting for 59.5%, next common hernia was incisional hernia (21.2%) remaining rare type of hernias constituting 19.2% of total cases studied. (refer table-1).

Type	No. of Cases	Percentage
Inguinal	140	59.5
Incisional	50	21.2
Femoral	10	4.2
Umbilical	14	6.0
Paraumbilical	13	5.5
Epigastric	8	3.5
<b>Total</b>	<b>235</b>	<b>100</b>

*Table 1. Incidence of Incisional Hernia*

Maximum number of cases in middle age group (30-60 yrs.) constituting 80% (refer table-2). Incisional hernia was found to be more common in females with male female ratio of 1:2.3.

Age	No. of Patients	Percentage
12-20	1	2
21-30	1	2
31-40	10	20
41-50	16	32
51-60	14	28
61-70	5	10
71-80	3	6
<b>Total</b>	<b>50</b>	<b>100</b>

*Table 2. Age Wise Incidence of Incisional Hernia*

Incisional hernia occurred in 24% of cases in the first postoperative year, about 50% of cases occurred in 2nd to 4th postoperative year, 26% of cases developed incisional

hernia after 4th postoperative year. Obesity and anaemia were the most common predisposing factors. Chronic bronchitis, asthma, diabetes were less common etiological factors (refer table-3).

Findings	No. of Cases	Percentage
Obesity	19	38
Anaemia	21	42
Diabetes mellitus	7	14
Hypertension	7	14
Bronchial asthma	4	8
Chronic bronchitis	2	4

**Table 3. Predisposing Factors**

Majority of patients who underwent emergency surgery developed incisional hernia (refer table-4), Gynaecological surgeries were the most common cause for incisional hernias accounting for 70% of the cases. (refer table-5).

Nature	Number of Cases	Percentage
Emergency	29	58
Elective	21	42
<b>Total</b>	<b>50</b>	<b>100</b>

**Table 4. Nature of Operation**

Cause	Number of Cases	Percentage
Abdominal hysterectomy	12	24
Abdominal sterilization	10	20
Caesarean section (LSCS)	12	24
Acute intestinal obstruction	1	2
Appendicular perforation	4	8
Duodenal perforation	6	12
Ileal perforation	1	2
Epigastric hernia	1	2
Ovarian cystectomy	1	2
Open cholecystectomy	2	4
<b>Total</b>	<b>50</b>	<b>100</b>

**Table 5. Indication for Surgery**

Infraumbilical midline incision (50%) was found to be more common compared to other incisions (refer table-6) Wound infection (18%) and wound dehiscence (32%) were found to be more common postoperative complications after previous surgeries. Only 6 cases were repaired by anatomical repair. Most of the cases have been repaired by onlay mesh repair. Out of 50 cases studied, 15 had complications, wound seroma is most common complication accounting for 20% and is more common in Prolene mesh repair than anatomical repair.

Type	Number of Cases	Percentage
Infraumbilical	25	50
Supraumbilical	11	22
Mid Midline	1	2
Right paramedian	1	2
Pfannenstiel	12	24
<b>Total</b>	<b>50</b>	<b>100</b>

**Table 6. Incision Used in Previous Surgeries**

## DISCUSSION

The incidence of Incisional hernia in this study was 21.2% which was second only to inguinal hernia (59.5%). According to a study done by Mutwali et al<sup>8</sup> the incidence was 11 – 20% which was slightly lesser when compared to the present study. Incisional hernia is a common complication due to patient or wound related factors in spite of the good technique adopted by the surgeons.

In the present study the most common group involved was 40 - 50 years (32%) with male to female ratio was 1:2.3. Ellis et al<sup>9</sup> in their study reported that 48 % of patients developing incisional hernia belonged to the age group of 31-40 years with male to female ratio 4.8:1. In the study by Agrawal et al,<sup>10</sup> male to female ratio was 1:1.6. The incidence of female patients with incisional hernia in this study was 70% which was higher than the study done by Millbourn et al<sup>11</sup> whose incidence was 64.6%. The reason for higher incidence of incisional hernia in females in this study could be due to increased incidence of gynaecological surgeries and weakness of abdominal muscles in women due to multiple pregnancies. In the present study obesity and anaemia were the most common predisposing factors, chronic bronchitis, asthma, diabetes were less common factors. Obese patients were advised weight reduction and abdominal exercises to increase the tone of abdominal muscles. Anaemia was corrected with blood transfusion and iron infusion. Obesity has been described as one of the main aetiological factors in incisional hernia. In the present series 38 % of patients are moderate to extremely obese. In Shouldice study, 87% were obese and in Agbakwuru's study<sup>12</sup> 27.3 % were obese. Obesity was associated with a threefold increase in herniation in Bucknell's study. In a study done by Bose et al<sup>13</sup> which documented the common risk factors as wound infection in 53.63% of cases, obesity in 30% and COPD in 20.9%. In the study done by Agrawal et al,<sup>10</sup> most common cause for incisional hernia was found to be postoperative infection (47%), followed by cough (10%) and early return to work (2%). In the present study risk factors promoting incisional hernias were wound infection accounted for 40%, Obesity in 30% and COPD in 8% of cases.

In the present study incisional hernia occurred in 24% of cases in the first postoperative year, about 50% of cases occurred in 2nd to 4th postoperative year, 26% of cases developed incisional hernia after 4th postoperative year, compared with study done by Bucknell et al,<sup>7</sup> 42% patients of presented with incisional hernia 1-5 years after primary surgery and around 68% patients who had lower midline abdominal incisions developed incisional hernia followed by 18% patients with upper midline incision, 10% patients with right paramedian and 4% patients with left paramedian incisions. Similarly, Millbourn et al<sup>11</sup> and Carlson<sup>14</sup> also found that this type of hernia is common in females undergoing gynecological surgeries in which lower abdominal incisions are made. In this study 52% of the incisional hernia occurred over lower midline incisions this could be due to raised intra-abdominal hydrostatic pressure in lower abdomen compared to upper abdomen and due to absence of posterior rectus sheath below arcuate line. This incision is commonly used in gynaecological surgeries where patients may already have poor abdominal wall musculature. In the present study Wound infection (18%) and wound dehiscence (32%) were found to be more common postoperative complications after previous abdominal surgeries. In several studies wound infection following surgery was the main factor for the development of incisional hernia. Out of 50 cases studied, 15 had complications, wound seroma is the most common complication accounting for 20% and is more common in Prolene mesh repair than anatomical repair.

Khaira H.S et al<sup>15</sup> reported seroma formation in 6 out of 35 patients and wound infection in 1 out of 35 patients. In a

study done by Tulaskar et al<sup>16</sup> 9 cases (14%) had surgical site infection, 4 cases (6.25%) had seroma formation and 2 cases (3.1%) had wound gaping. In this study 4 methods were used for the repair of incisional hernia among which polypropylene mesh repair was used in 63% of patients, laparoscopic hernia repair (17%), double breasting method (12%) and anatomical repair (8%). In the present study there were no recurrences until 18 months of follow up. Usher<sup>6</sup> reported zero percent recurrence in 48 patients who were treated by polypropylene mesh repair. Jacobus W. A et al<sup>17</sup> reported a 10 year cumulative rate of recurrence of 63% in anatomical repair and 32% in mesh repair. The recurrence rate may vary according to the method of repair, but majority of studies recommend mesh repair to decrease the recurrence rate. Jenkins<sup>18</sup> reported in their study of 154 patients, established the superiority of mesh repair over anatomical repair with regard to recurrence of hernia.

### CONCLUSIONS

Incisional hernia is more common in women than men due to abdominal wall weakness secondary to multiple pregnancies, increased number of caesarean sections and gynaecological surgeries. Infraumbilical midline incisions should be restricted to the surgeries where access to the lower abdomen and pelvis organs is a must. Sterile aseptic technique and appropriate use of pre-operative antibiotics is necessary to reduce the occurrence of incisional hernia. Suction drains must be used in both anatomical and mesh repairs to reduce the post-operative complications like seroma, wound infection and wound gapping, thereby reducing the recurrence of incisional hernia. Mesh repair has less rate of recurrence when compared to anatomical repair; hence, mesh repair should be preferred over anatomical repair. Laparoscopic hernia repair should be the first line of treatment for recurrent incisional hernias.

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