



## Original Research Article

## A study on clinical profile and risk factors in incisional hernia patients

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## ABSTRACT

**Introduction:** Incisional hernias of the abdominal wall are a frequently encountered complication in cases of open abdominal surgeries like midline laparotomies, caesarian sections etc. Wound infections, obesity, poor healing due to malnutrition etc., were thought to be the important causative factors in the development of incisional hernia.

**Objective:** To study the clinical profile of incisional hernia patients with respect to various etiological factors, distribution of cases in relation to age and sex, details of previous surgical procedures undergone.

**Materials and Methods:** 52 patients admitted in Department of General Surgery were included in the study. Study was conducted during the period from August 2018 to August 2020 including all patient with incisional hernia. Pediatric cases were excluded from the study. Data of all the patients were collected from the hospital records and were compiled in a predesignated proforma which included patient details, clinical examination, investigations, and previous surgical history. Informed consent was obtained from each patient.

**Study Design:** Retrospective observational study.

**Results:** There were 32 females (61.54%) and 20 males (38.46%) with female to male ratio was found to be 1.6:1. Majority of the patients presented with abdominal swelling (n=30, 58%) followed by both abdominal swelling and pain (n=20, 38%). Among the females now presented with incisional hernias the mean parity was 2.69. Majority of the cases developed hernias within 1 year (n=29, 55.77%) and about 26.93% of the patients developed hernia in 1 to 3 years. Most of cases of incisional hernia in our study occurred over midline (n=22, 42.3%) at the site of incisions made for midline laparotomy (n=20.38.5%) Risk factors favouring incisional hernia formation were post-operative wound infection (n=45, 84.9%) and obesity (n=21, 40.38%).

**Conclusions:** Incisional hernia is more common in females who undergo emergency midline laparotomy and emergency caesarean section. Majority of the cases presented within 1 year of surgery. Post-operative wound infection, obesity and anemia were the crucial factors for the development of incisional hernias.

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## 1. Introduction

A hernia is a protrusion of a viscus or part of a viscus through an abnormal opening in the walls of its containing cavity. Incisional hernias arise through a defect in the

musculofascial layers of the abdominal wall in the region of a post-operative scar. Thus they may appear anywhere in the abdominal surface.<sup>1</sup> Incisional hernias of the abdominal wall are a frequently encountered complication in cases of open abdominal surgeries like midline laparotomies, caesarian sections etc.<sup>2</sup> Overall Incidence ranges from 2 to 11% following abdominal surgeries and majority

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of them (80-95%) occur within 6 months after initial surgery.<sup>3</sup> Wound infections, obesity, poor healing due to malnutrition, immunosuppression or steroid therapy and surgical factors like inappropriate suture materials or incorrect suture placement were thought to be the important causative factors in the development of incisional hernia.<sup>4</sup> In this study we aim to assess the profile of these patients with respect to various etiological factors, demographics, hernial defect features and the details of previous procedure undergone.

## 2. Objectives

To study the clinical profile of incisional hernia patients with respect to various etiological factors, distribution of cases in relation to age and sex, hernial defect characteristics, details of previous surgical procedures undergone and its complications.

## 3. Materials and Methods

52 patients admitted in Department of General Surgery were included in the study. Study was conducted during the period from August 2018 to August 2020 including all patient with incisional hernia. Pediatric cases were excluded from the study. Data of all the patients were collected from the hospital records and were compiled in a pre-designated proforma which included patient details, clinical examination, investigations, previous surgical history and its post-operative complications.

### 3.1. Study design

Retrospective study.

### 3.2. Statistical analysis

Statistical analysis was done by SPSS software v.22. Chi square test and student's t-test were used for measuring statistical significance.

## 4. Results

A total of 52 cases were included in this study. Age group in this study ranges from 25 years to 80 years with a mean age of 48.23(SD-14.52). There were 32 females (61.54%) and 20 males (38.46%) with female to male ratio was found to be 1.6:1. Average weight of the study sample was 62.96 kg. With respect to the haemoglobin levels majority had normal levels. Eight patients (15.38%) had haemoglobin levels less than 10 gm/dL.

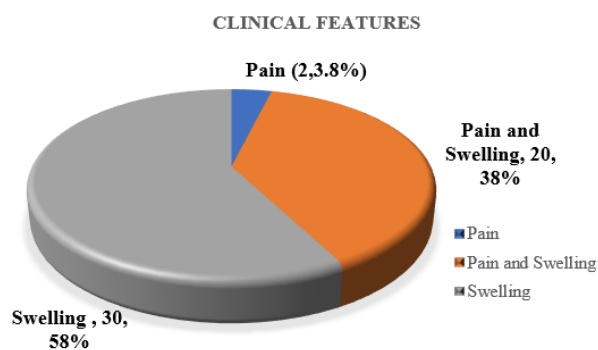
All the cases were evaluated ultrasonographically to assess the defect size. Average size of the defect was 7.3x6.5 cm. No gender difference was observed in the defect size. Average area of the defect was 47.45 cm<sup>2</sup>. Minimum duration for the first symptom to occur after the initial surgery was 6 months and the greatest duration was of 16

years with an average duration of 1.9 years in our study and majority of the cases had the occurrence of hernia within 1 year (n=29,55.77%). (Table 1)

**Table 1:** Time of presentation of hernia after surgery.

Duration	No of Cases	Percentage
Till 1 year	29	55.77
1 to 3 years	14	26.93
3 to 6 years	5	9.63
After 6 years	4	7.69
Total	52	100

Most common symptom of presentation was swelling seen in 30 cases (57.7%) as shown in the Graph 1.



**Graph 1:** Clinical features

Majority of the patients in our study did not show any history of addictions (n=40, 76.9%). Most common addiction found in the study was tobacco chewing (n=6, 11.5%) followed by alcoholism and smoking each of n=4, 7.6%. In the past illness majority of the patient suffered from Hypertension (n=22, 42.3%) followed by Diabetes Mellitus (n=12, 23.08%) and Hypothyroidism was found in 6 of the patients (11.54%) close to the prevalence of hypothyroidism in general population.<sup>5</sup>

All the females in our study had at least 1 child birth and highest parity was 5. Mean parity was 2.69. Among them about 57.7% (n=30) of the cases had given birth to two or more children.(Table 2)

**Table 2:** Obstetric history (32 patients).

Parity	No. of Cases	Percentage
1	2	3.8
2	16	30.8
3	8	15.4
4	2	3.8
5	4	7.7
Total	32	61.5%

Most common site to be involved was in the midline (n=22, 42.3%) followed by infraumbilical (n=10,19.2%) as given in the Table 3.

**Table 3:** Site of incisional hernia

Site	Frequency	Percentage
Ileostomy Site	2	3.8
Infraumbilical	10	19.2
LSCS Site*	8	15.4
LTL Site**	2	3.8
Midline (Infra and supraumbilical)	22	42.3
R Subcostal	2	3.8
R Iliac fossa	6	11.5
Total	52	100.0

\*Lower Segment Caesarian Section.

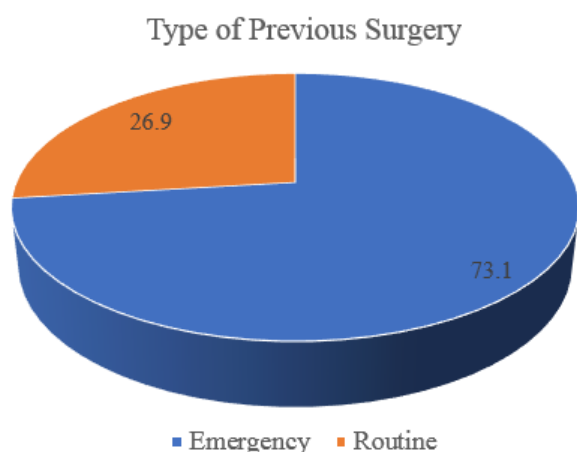
\*\*Laparoscopic Tubal Ligation.

Most common previous surgery associated with incisional hernia in our study was midline laparotomy (n=20, 38.5%) as given in Table 4.

**Table 4:** Previously associated surgery.

Previous surgery	Frequency	Percentage
Midline Laparotomy	20	38.5
Abdominal Hysterectomy	10	19.2
LSCS	10	19.2
Appendectomy	2	3.8
Epigastric Herniorrhaphy	2	3.8
Ileostomy Closure	2	3.8
LTL	2	3.8
Lumbar Hernia	2	3.8
Pyelolithotomy	2	3.8
Total	52	100.0

In majority of the cases in our study the previous surgery performed was Emergency type (n=38,73.1%) and routine procedures were 14 cases (26.9%) as shown in Graph 2.



Graph 2: Type of previous surgery

Majority of the above mentioned previous surgeries were performed under Spinal Anaesthesia (n=30, 57.7%) and the

rest were under General Anaesthesia (n=22, 42.3%).

With respect to the previous surgery in our cases most common post-operative complication was surgical site infections seen in about 84.9% of the cases (n=45) and this also corresponds to the incisional hernia defect size of which all the cases with larger defect sizes had previous surgical site infections (Table 5)(p value-0.001). The next factor favoring incisional hernia formation was found to be obesity seen in 21 cases (40.38%) mainly among females (n=19, 36.54%).

**Table 5:** Relation between surgical site infection and defect size.

Defect Size (cm)	Surgical Site Infection		Total
	Absent	Present	
3	2	2	2
4	3	4	4
5	2	4	4
6	0	2	2
7	0	6	6
8	0	12	12
10	0	16	16
12	0	4	4
15	0	2	2
Total	7	52	52

The procedure which was commonly associated to surgical site infection presenting now as an incisional hernia was Emergency midline laparotomy procedure (n=17, 32.69%) as shown in Table 6 (p value-0.001).

**Table 6:** Relation between surgical site infection and previous associated surgery

Previous Surgery	Surgical Site Infection		Total
	Absent	Present	
Midline Laparotomy	3	17	20
Abdominal Hysterectomy	0	8	8
LSCS	1	9	10
Appendectomy	0	2	2
Epigastric Herniorrhaphy	0	2	2
Ileostomy Closure	1	1	2
LTL	2	0	2
Lumbar Hernia	0	2	2
Pyelolithotomy	0	2	2
Total	7	45	52

## 5. Discussion

This is a retrospective study on 52 incisional hernia patients to assess the presenting factors and various aspects of clinical features done for a duration of two years in our institute.

There were 32 females (61.54%) and 20 males (38.46%) with female to male ratio was found to be 1.6:1. Similar results were found in study by Kumar SJG<sup>6</sup> where females outnumbered males to the ratio of 4:1 and in Regnad et al<sup>7</sup> it

was 6:1 in favour of females as also in Garg et al.<sup>8</sup>

**Table 7:** Sex Distribution In incisional Hernia

Sex	Garg et al <sup>8</sup>		Present study	
	No of patients	Percentage	No of patients	Percentage
Male	11	37	20	38.46
Female	19	63	32	61.54

The reason for female preponderance may be due to lax abdominal muscles because of multiple pregnancies and increased obesity in females.<sup>9</sup> Carlson MA et al in meta-analysis of 6266 published cases of minimally invasive ventral hernia surgery observed a mean of 55 years,<sup>10</sup> whereas in our study it was 48.23 years. Ellis, Gajraj and George<sup>9</sup> noticed a mean age of 49.4 years similar to that obtained in our study. The youngest patient in our study was 25 years and oldest was 80 years.

Majority of the patients presented with abdominal swelling (n=30, 58%) followed by both abdominal swelling and pain (n=20,38%). In study by Garg et al all the patients presented with swelling followed by pain and swelling (24%) similar to that in our study.<sup>8</sup> In study by Prasad et al too where 68% presented with swelling and 24 percent presented with both pain and abdominal discomfort.<sup>11</sup> Among the females now presented with incisional hernias the mean parity was 2.69 with highest being 5 suggestive of increased risk among multiparous women due to lax abdominal musculature as previously mentioned. About 57.7% of the females in our study group has a parity of 2 and above. Similar result was seen in study by Inamdar et al on 31 patients where more than 50% of the cases had three or more children.<sup>12</sup> Average defect size and average defect area are 7.3x6.5 cm and 47.45 cm<sup>2</sup> respectively. In studies by Subramanian A et al<sup>13</sup> and Huda F et al<sup>14</sup> the average area of the defect observed where 37.9±4.9 cm<sup>2</sup> and 35.63 cm<sup>2</sup> respectively similar to but less than that obtained in our study.

The average duration of hernia to occur after the primary surgery was 1.9 years in our study of which majority of the cases developed hernias within 1 year (n=29,55.77%) and about 26.93% of the patients developed hernia in 1 to 3 years. In study by Garg et al<sup>8</sup> 77% of incisional hernias developed within 3 years and of which 37% developed within 1 year. According to Viljanto and Vanttinen majority of the incisional hernias develop within 1 year of previous surgery and rarely after 2-3 years as proven in our study.<sup>5</sup>

In our study the associated medical conditions were found to be hypertension diabetes mellitus, and hypothyroidism with 42.3%, 8% and 11.54% respectively. These comorbid diseases puts these patients at a greater risk of intra as well as post-operative complications which later favours development of incisional hernia.<sup>15,16</sup>

Most of cases of incisional hernia in our study occurred over midline (n=22, 42.3%) (Panning both infra and supraumbilical regions) at the site of incisions made for midline laparotomy (n=20,38.5%) followed by isolated infraumbilical region(n=10,19.2%), similar findings were obtained in studies by Goel TC et al<sup>17</sup> (44.6%) and Qadri et al in which lower midline incisions were the most common site.<sup>18</sup> In the study by Le Huu Nho et al the incidence of incisional hernia after laparotomy was 9.9% and incidence was found to be higher for midline incisions than transverse incisions (11% vs 4.7%).<sup>19</sup> Garg et al also have obtained comparable results in which 53% and 27% of the patients underwent explorative laparotomy and LSCS respectively.<sup>8</sup> Most of the cases where of emergency in nature (73.1%). Umeshchandra DG et al had 70% of the cases develop incisional hernia following emergency surgery<sup>20</sup> and also by Bose et al(50%).<sup>21</sup>

In considering the risk factors favouring incisional hernia formation wound infection accounted for about 84.9% of the cases (n=45) in our study and this also corresponds to the incisional hernia defect size of which all the cases with larger defect sizes had previous surgical site infections. This result was comparable with the study by Bose et al in which wound infection was seen in 53.63% of cases.<sup>21</sup> Fischer et al placed it at 88%<sup>22</sup> and Molley et al also noted a higher incidence of post-operative wound infection(52%).<sup>23</sup> The procedure which was commonly associated with surgical site infection presenting now as an incisional hernia was Emergency midline laparotomy procedure(n=17, 32.69%) followed by LSCS (n=9,17.31%) . Other studies like George et al,<sup>24</sup> Rutkow et al,<sup>25</sup> White et al<sup>26</sup> and Paudel et al<sup>27</sup> also provides similar findings.

Another risk factor found to be associated with incisional hernia formation was obesity seen in 21 cases (40.38%). Similar results were obtained in studies by Bose SM et al<sup>21</sup> (n=33,30%) and Garg et al<sup>8</sup> (n=11,37%). Study by Musca et al infers obesity accounting for herniation in 55.5%.<sup>28</sup> Other studies by Bedi et al.,<sup>29</sup> Itatsu et al,<sup>30</sup> Murray et al<sup>31</sup> also underscores the relation between obesity and incisional hernia formation.

## 6. Conclusions

Incisional hernia is more common in females who undergo emergency midline laparotomy and emergency caesarean section. Majority of the cases presented within 3 years and that too within 1 year of surgery. Swelling followed by pain and swelling both were the most common complaints. Post-operative wound infection, obesity and anemia were the crucial factors for the development of incisional hernias. It is an avoidable iatrogenic malady which can be prevented by proper preoperative management of patients like weight reduction and control of medical conditions, meticulous surgical technique and mainly prevention of postoperative wound infection.

## 7. Limitations of the study

This study does not take into considerations on all aspects of Incisional hernia. The study sample is small and post-operative follow-up was done only for a short duration of time. Long history of the conditions was also a hindrance in assessing the factors of the previous surgery and the patient status at the time of previous surgery due to insufficient record availability.

We are of the opinion that a long term cohort study with sufficient sample size with regular follow-up will be able to give a better picture with respect to the risk factors and progression of condition.

## 8. Source of Funding

None.

## 9. Conflict of Interest

None.


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