

## Evaluation and Management of Incisional Hernia in Patients with Previous Laparotomy

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### Abstract

**Introduction:** Incisional hernia is a protrusion of abdominal viscera through the site of previous surgery or traumatic wound of the abdominal wall except hernial site. Incisional hernia is one of the common complication of abdominal surgery, reported in up to 11% of patients generally and in up to 23% of those who develop post op wound infection. **Materials and Methods:** The Material composed of detailed study of 100 cases of incisional hernia admitted and treated in Bapuji Hospital and Chigateri District Hospital, Davangere, For a Period from November 2017 To September 2019. With patient unfit for surgery, age more than 80 years, without the knowledge of previous surgery, recurrent incisional hernias as Exclusion Criteria. Patients with complaints related to incisional hernia, with age group of 20 to 80 years, with properly known previous surgery history as Inclusion Criteria. **Results:** This study shows that maximum number of cases were in the age group of 41 to 50. With mean age group of 46.9±11.7 years. Male to Female Ratio 1.0:2.7. Among males it is more between the age group of 41 to 50 years and of 51 to 60 years in females with significant p value of 0.046. Seventy percent of patients in this series are mild to moderate workers like house wife, office works. The commonest symptom was swelling at previous operated site (51%). 73% underwent previous emergency laparotomy compared to 27% with previous elective laparotomy. 55% patients are following emergency surgical cases compared to gynaecological cases (45%). LSCS (30%) is the most common previous surgery. Anemia, diabetes and obesity are the major comorbidities (risk factors) and more in lower midline incisions. Surgical site infection (47%) is the most common post op complication in the previous surgery. 92 of them underwent open mesh repair and only 8 patients underwent anatomical repair. **Conclusion:** Incisional hernia is a common avoidable iatrogenic complication of laparotomies. Though mortality is minimum, the morbidity is sufficiently enough to incapacitate the patient to some extent. Proper preoperative management of the patients, meticulous surgical technique, careful closure of the abdominal wound and post-operative care helps in preventing the occurrence of incisional hernia.

**Keywords:** incisional hernia, laparotomy, swelling, anemia, iatrogenic, repair

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### Introduction

Incisional hernia is a protrusion of abdominal viscera through the site of previous surgery or traumatic wound of the abdominal wall except hernial site.<sup>1</sup> Incisional hernia is one of the common complication of abdominal surgery, reported in up to 11% of patients generally and in up to 23% of those who develop post op wound infection[1].

They arise through the defect in the musculofascial layers of the abdominal wall in the region of a postoperative scar[2]. Thus they may appear anywhere on the abdominal surface. Even with the recent advances in surgery, antibiotics, suture materials, the incidence of incisional hernia has been at least 10 to 50% of laparotomy incisions and 1 to 5% of laparoscopic port site incisions. Incidence of incisional hernia is next to inguinal hernia[3].

Among the incisions the lower abdominal incisions are associated with highest incidences of incisional hernia. It is through this incision most of the gynaecological surgeries are done. The pressure in the lower abdomen is more compared to upper abdomen, also the posterior rectus sheath is deficit below the umbilicus, so the stress and strain on the lower abdomen leads to herniations[4].

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There are number of aetiological factors for the development of incisional Hernia. The increased intra abdominal pressure and the surgical site infections are the most important causes[5]. Despite of so many recent advances in surgery the incisional hernia is not a rare problem. Most of the incisional hernia presented with large defects following post-operative wound infections[6]. There are cases who undergone previous anatomical repair resulting in wider defect with scarring. To prevent further recurrences the prolene mesh had to be used. So it was felt worthwhile to study the results of repair using prolene mesh and Anatomical Repair in incisional hernia.

### Material and Methods

The Material composed of detailed study of 100 cases of incisional hernia admitted and treated in Bapuji Hospital and Chigateri District Hospital, Davangere, For A Period From November 2017 To September 2019. With patient unfit for surgery, age more than 80 years, without the knowledge of previous surgery, recurrent incisional hernias as Exclusion Criteria. Patients with complaints related to incisional hernia, with age group of 20 to 80 years, with properly known previous surgery history as Inclusion Criteria.

In this series, the patients who were admitted in surgical wards under all surgical units were examined to assess the tissue defects, aetiological causes, precipitating factor, etc. Any associated conditions were identified and treated preoperatively. A detailed case history, clinical examination and necessary investigations were carried out according to proforma. After detailed physical examinations of patients, clinical diagnosis was established including

the associated aetiological, precipitating and predisposing factors. Detailed history regarding previous laparotomy surgery collected based on patient’s history and examination and previous hospital discharge cards. Final decision was made for every case regarding the method of repair depending on the need of the case. After all necessary investigations, the patients were prepared preoperatively and made medically fit to withstand the procedure. All 100 patients underwent surgery. All cases were analysed to find out the advantages of various operative technique and post op complications. Master chart dealing with all aspects has been designed and presented. With Statistician help Figs and tables are made. The analysed data was compared with other series in literature and discussed. The following proforma has been used for the study purpose – refer annexure.

**Sample Size Calculation:** With 95% confidence level and margin of error of ±10%, a sample size of 96 subjects per group will allow the “Evaluation And Management Of Incisional Hernia In Patients With Previous Emergency And Elective Laparotomy” with finite population correction.

Total sample size is 96

By using the formula:

$$n = \frac{z^2 p(1-p)}{d^2}$$

where

where

Z= z statistic at 5% level of significance

d is margin of error

p is maximum anticipated prevalence rate

**The study Period:** Between November 2017 to September 2019.

**Type of Study:** Prospective cross-sectional study

**Statistical analysis:** All characteristics were summarized descriptively. For continuous variables, the summary statistics of mean± standard deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries and diagrammatic presentation. Chi-square ( $\chi^2$ ) test was used for association between two categorical variables.

The formula for the chi-square statistic used in the chi square test is:

$$\chi^2_c = \sum \frac{(O_i - E_i)^2}{E_i}$$

The subscript “c” are the degrees of freedom. “O” is observed value and E is expected value.

If the p-value was < 0.05, then the results were considered to be statistically significant otherwise it was considered as not statistically significant. Data were analyzed using SPSS software v.23.0. and Microsoft office 2007.

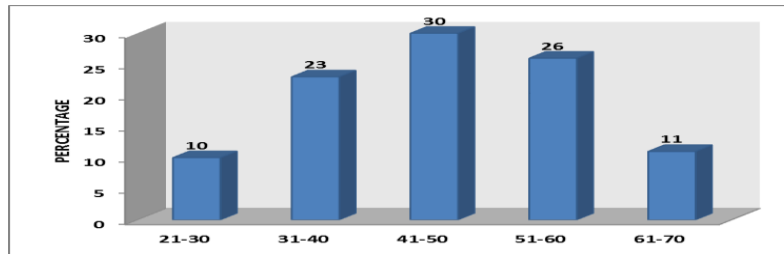
**Results**

Following observations were made in 100 cases under this study.

**Table 1: Distribution of cases according to Age (years)**

Age (Years)	N	%
21-30	10	10
31-40	23	23
41-50	30	30
51-60	26	26
61-70	11	11
Total	100	100

	Range	Mean±SD
Age (Years)	23-70	46.9±11.7



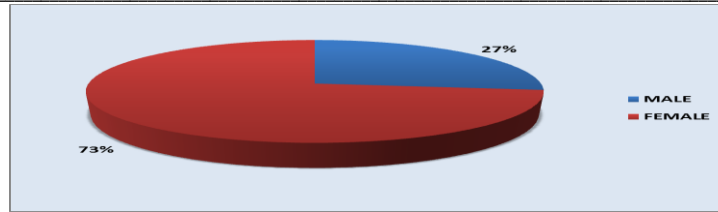
**Fig 1: Distribution of cases according to age**

It shows that maximum number of cases were in the age group of 41 to 50 .With mean age group of 46.9±11.7 years. Youngest case -23 years, Eldest Case -70 years.

**Table 2: Distribution of cases according to Sex**

Sex	N	%
Male	27	27
Female	73	73
Total	100	100

Male to Female Ratio 1.0: 2.7



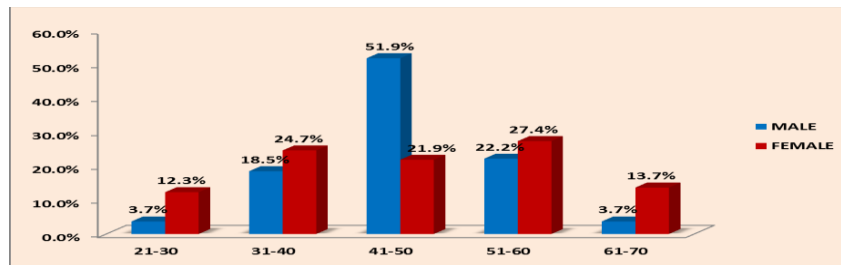
**Fig 2: Distribution of cases according to sex**

Out of 100 cases 73 were females and 27 were males.

**Table 3: Association of Age and Sex**

Age (Years)	Male		Female		P value
	N	%	N	%	
21-30	1	3.7%	9	12.3%	0.046*
31-40	5	18.5%	18	24.7%	
41-50	14	51.9%	16	21.9%	
51-60	6	22.2%	20	27.4%	
61-70	1	3.7%	10	13.7%	
Total	27	100.0%	73	100.0%	

Note: \* significant at 5% level of significance (p<0.05)

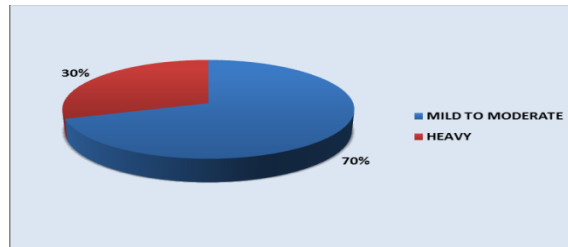


**Fig 3: Association of Age and Sex**

Among males it is more between the age group of 41 to 50 years and of 51 to 60 years in females with significant p value of 0.046.

**Table 4: Distribution of cases according to the Occupation**

Occupation	N	%
Mild to moderate	70	70
Heavy	30	30
Total	100	100



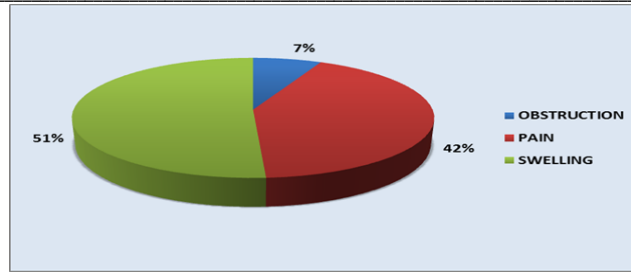
**Fig 4: Distribution of cases according to the Occupation**

Seventy percent of patients in this series are mild to moderate workers like house wife, office works and non heavy lifting works, compared to manual heavy workers or Laborers who are about 30%.

It is generally believed that severe straining and heavy lifting are more frequently associated with development of incisional hernia, but in this study it is more common in mild to moderate group of workers.

**Table 5: Distribution of cases according to present chief Complaints**

Complaints	N	%
Obstruction	7	7
Pain	42	42
Swelling	51	51
Total	100	100

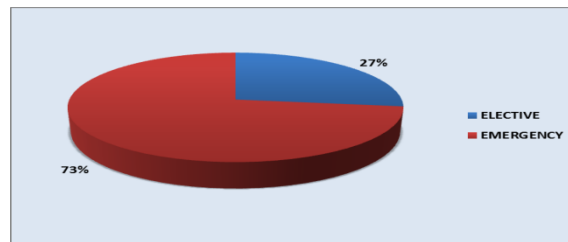


**Fig 5: Distribution of cases according to present chief Complaints**

The commonest symptom was swelling (51%), followed by pain (42%). Swelling was visible on standing or exertion. The pain was dragging and some with intermittent colicky (was suggestive of adhesions). Around 7% patients presented with obstructive symptoms i.e., abdomen distension(2%) vomiting (3%) and constipation (2%).

**Table 6: Distribution of cases according to previous laparotomy**

Previous Surgery	N	%
Elective	27	27
Emergency	73	73
Total	100	100

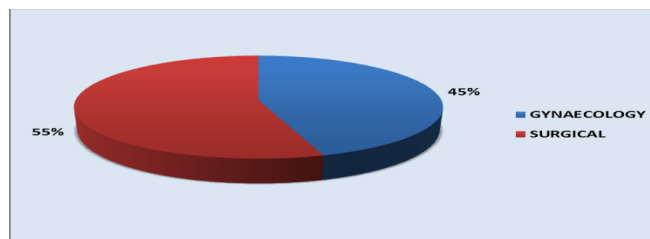


**Fig 6: Distribution of cases according to previous laparotomy**

Among 100 patients 73% underwent previous emergency laparotomy compared to elective laparotomy which is around 27%.

**Table 7: Distribution of cases according to type of Previous Surgery**

Previous surgery	N	%
Gynaecology	45	45
Surgical	55	55
Total	100	100



**Fig 7: Distribution of cases according to type of previous surgery**

Among 100 patients 55% developed incisional hernia following emergency surgical cases compared to gynaecological cases (45%).

**Table 8: Distribution of cases according to previous surgery procedure**

Previous Surgery	N	%
Gynaecology		
LSCS	30	30
Abdominal hysterectomy	12	12
Ovarian cyst excision	3	3
SURGICAL		
Appendectomy	13	13
Appendectomy and abscess drainage	12	12
Resection and anastomosis	11	11
Cholecystectomy	8	8
Gastric perforation cloure	4	4

Duodenal perforation closure	2	2
Hydatid cyst excision	3	3
Right hemicolectomy	2	2
Total	100	100

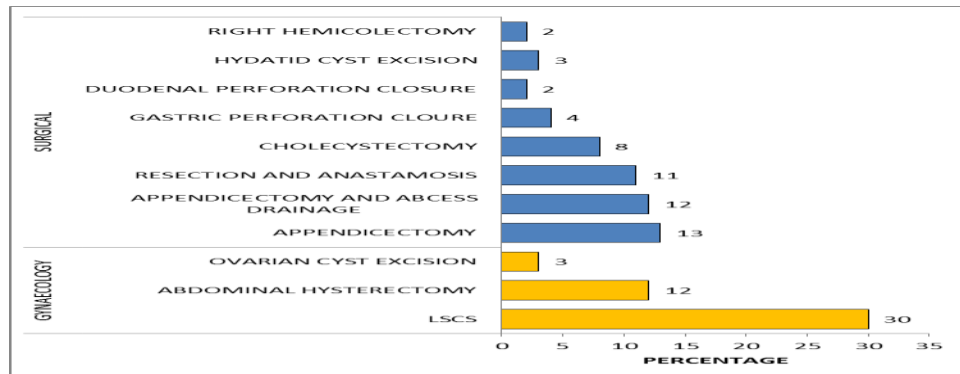


Fig 8: Distribution of cases according to previous surgery procedure

LSCS (30%) is the most common previous surgery, followed by appendicular and ovarian surgeries (12% each) causing the development of incisional hernia.

Table 9: Distribution of cases according to number of previous surgery

No. Of previous surgery	N	%
1	27	27
2	45	45
3	28	28
Total	100	100

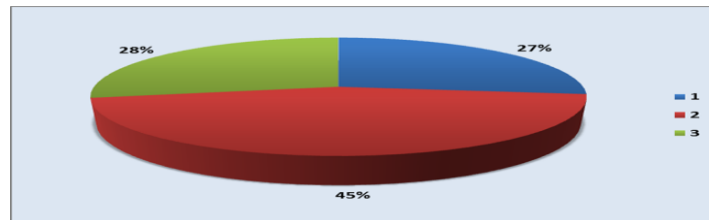


Fig 9: Distribution of cases according to number of previous surgery

Patients with more number of previous surgeries are prone to develop incisional hernia. In this study most of the patients underwent 2 surgeries before they present with incisional hernia (45%).

Table 10: Distribution of cases according to parity

Parity	N	%
1	3	4.1
2	22	30.1
3	33	45.2
4	13	17.8
5	2	2.7
Total	73	100.0

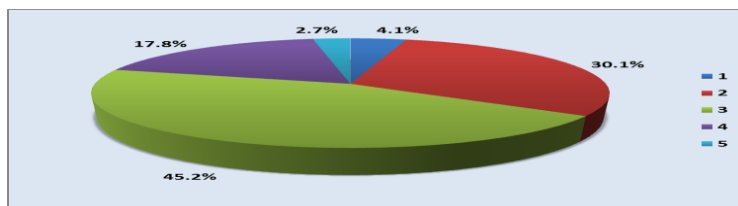
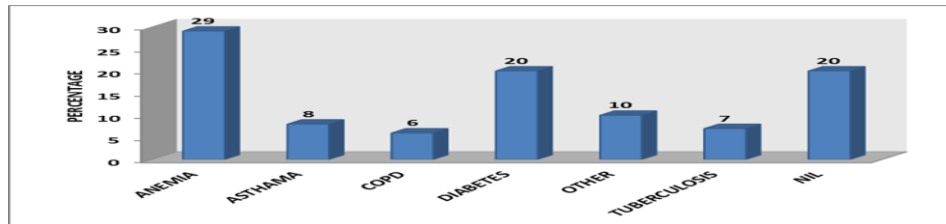


Fig 10: Distribution of cases according to parity

Incisional hernias are more in multiparity women, which causes laxity of the anterior abdominal wall.

**Table 11: Distribution of cases according to Comorbidity**

Comorbidity	N	%
Anemia	29	29
Asthma	8	8
COPD	6	6
Diabetes	20	20
Other	10	10
Tuberculosis	7	7
Nil	20	20
Total	100	100

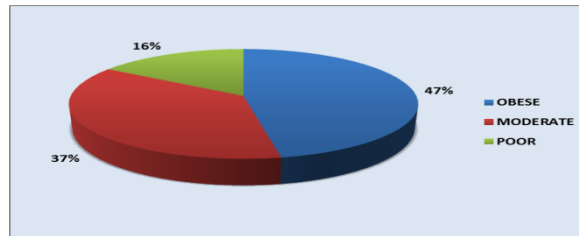


**Fig 11: Distribution of cases according to Comorbidity**

Anemia and diabetes are the major comorbidities (risk factors) compared to asthma, COPD, tuberculosis and others (BPH, Hypertension, Chronic liver or kidney diseases), 20% patients are healthy individuals without any comorbidities.

**Table 12: Distribution of cases according to Nourishment**

Nourishment	N	%
Obese	47	47
Moderate	37	37
Poor	16	16
Total	100	100

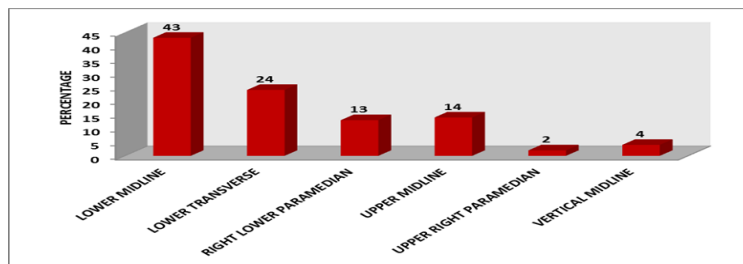


**Fig 12: Distribution of cases according to nourishment**

It is more among obese individuals (Based on BMI).

**Table 13: Distribution of cases according to previous surgery incision scar**

Previous surgery incision scar	N	%
Lower midline	43	43
Lower transverse	24	24
Right lower paramedian	13	13
Upper midline	14	14
Upper right paramedian	2	2
Vertical full length midline	4	4
Total	100	100

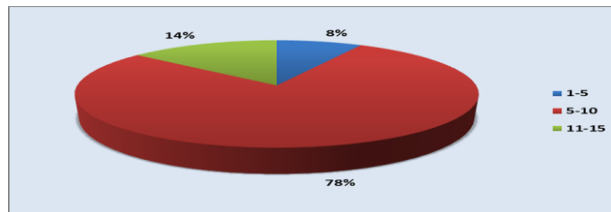


**Fig 13: Distribution of cases according to previous surgery incision Scar**

Incisional hernia is more in lower midline incisions followed by lower transverse incisions.

**Table 14: Distribution of cases according to interval between previous surgery and present symptoms**

Interval between previous surgery and present symptoms ( in years)	N	%
1-5	8	8
5-10	78	78
11-15	14	14
Total	100	100

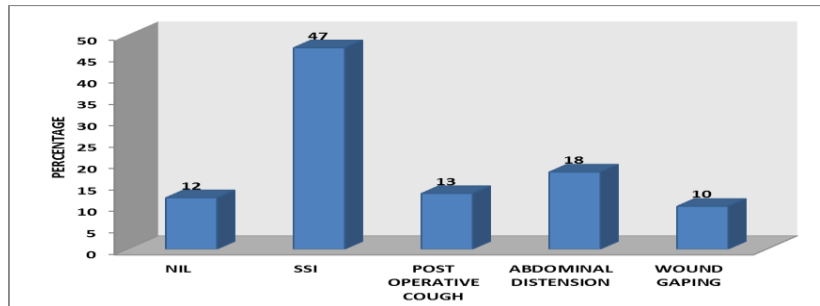


**Fig 14: Distribution of cases according to interval between previous surgery and present symptoms**

Around 78% of patients approached to the hospital with present symptoms between 5 to 10 years following previous surgery.

**Table 15: Distribution of cases according to previous post op complication**

Previous Post Op Complication	N	%
Nil	12	12
SSI	47	47
Post operative cough	13	13
Abdominal distension	18	18
Wound gaping	10	10
Total	100	100

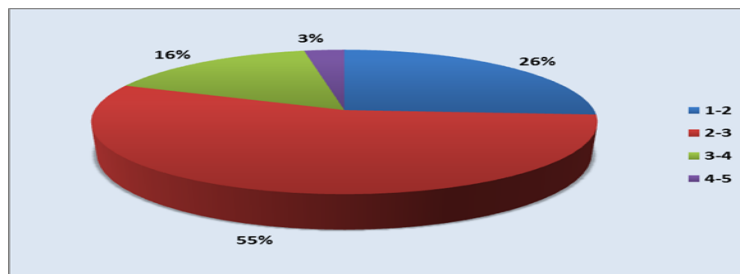


**Fig 15: Distribution of cases according to previous post op complication**

Surgical site infection (47%) is the most common post op complication in the previous surgery predisposing to present incisional hernia compared to other complications.

**Table 16: Distribution of cases according to size of the defect in USG.**

Size of the defect in USG (in cm)	N	%
1-2	26	26
2-3	55	55
3-4	16	16
4-5	3	3
Total	100	100

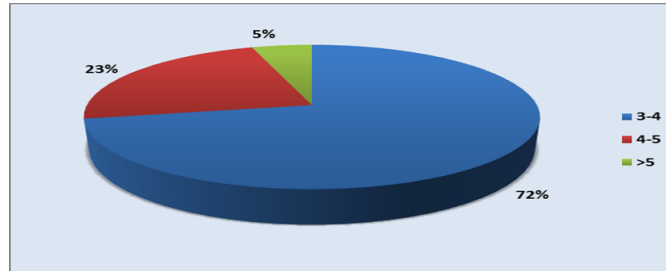


**Fig 16: Distribution of cases according to size of the defect in USG**

55 patients came with USG report showing incisional hernia with defect size of 2 - 3cm.

**Table 17: Distribution of cases according to size of the defect intra operatively**

Size of the defect intra Op (in cm)	N	%
3-4	72	72
4-5	23	23
>5	5	5
Total	100	100

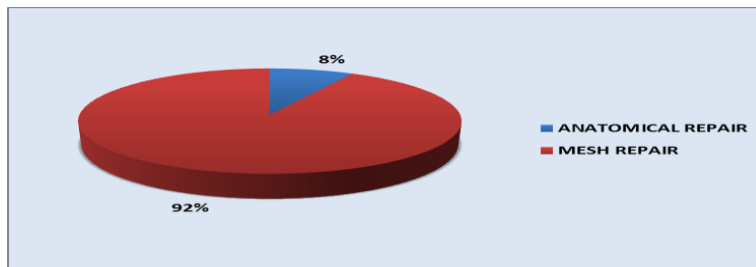


**Fig 17: Distribution of cases according to size of the Defect intra operatively**

Majority of the patients, around 72% found to had defect size of around 3 to 4 cms during intraoperatively.

**Table 18: Distribution of cases according to present surgical management**

Surgery	N	%
Anatomical repair	8	8
Mesh repair	92	92
Total	100	100

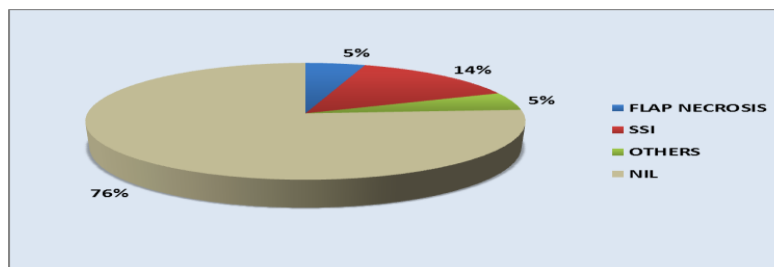


**Fig 18: Distribution of cases according to present surgical management**

Out of 100 patients 92 underwent open mesh repair and only 8 patients underwent anatomical repair. no laparoscopic repair done during this study.

**Table 19: Distribution of cases according to present Post Op Complication**

Present Post Op Complication	N	%
Flap Necrosis	5	5
SSI	14	14
Others	5	5
Nil	76	76
Total	100	100



**Fig 19: Distribution of cases according to present Post Op Complication**

After the present mesh repair of incisional hernia, 76 % went home without any complication, around 14 % patients developed surgical site infection, 5% flap necrosis,5% other complications like seroma, abdomen distension.

**Discussion**

Many surgeons consider Incisional hernia is rare nowadays because of the excellent technique adopted by surgical team, but many incisional hernias may be detected if carefully and specifically examined for its presence.100 cases of Incisional hernia admitted to Bapuji Hospital and Chigateri District Hospital, Davangere For



Treatment Between November 2017 to September 2019 are presented in this dissertation. In this study Maximum age incidence was found between 23-70 years with youngest case at the age of 23 years. With maximum between 41 to 50 years in males and 51 to 60 years among females with significant p value of 0.046 in association of age and sex, with mean age group of 46.9+/- 11.7 years. Archana Shukla, Sameer Ahmed in their study noticed the age group of the patients varied from 19 to 80 years. Incidence was highest in the age group ranging from 30 to 50 years. Ellis, Gajraj and George in their study noticed a mean age group of 49.4 years. Daware A et al showed got Mean age of occurrence of incisional hernia was as 48.3 years[6]. In my study Incisional hernia was found to be more common in females with male to female ratio of 1:2.7. Archana Shukla, Sameer Ahmed in their study out of 47 patients, 40 patients were female and 7 were male. Ellis, Gajraj and George obtained 64.6% of female patients in their study of 383 patients. Goel and Dubey series showed male to female ratio of 1:1.25. It is found to be more in female patients who are mild to moderate by occupation in this study. Archana Shukla, Sameer Ahmed in their study out of 40 female's majority of them were house-wives. In my study most of the patients presents with swelling, followed by pain at operated site, with only 7% people with obstructive features. Archana Shukla, Sameer Ahmed noticed most of the patients presented with swelling, followed by pain and swelling in about 13 of them, pain alone in 9 cases and rest (3) with associated symptoms of constipation. Only two out of 47 came with features suggestive of intestinal obstruction. Patients with more number of previous surgeries are more prone to develop incisional hernia, in this study most of the patients underwent 2 surgeries before they present with incisional hernia (45%). In Archana Shukla, Sameer Ahmed study, four patients (8.5 %) had undergone more than one operation previously which is also one of the risk factors. Brenden Devlin, states that repeated wounds in the same region or just parallel to each other will often lead to the development of herniation[7]. In this study out of 100 cases 73 patients underwent previous emergency laparotomies compared to elective laparotomies (27%). Badar Murtaza, Saira Saeed. et al showed the postoperative complications are more common after emergency laparotomies as compared to the elective laparotomies. The local wound complications apart from wound infections are the wound dehiscence and incisional hernia, which directly affect the outcome of the disease. In that study as many as 11% of laparotomies are complicated by the development of incisional hernia. This figure rises to 26% in those who develop wound infection. Thus the wound infection, wound dehiscence and incisional hernia go side by side and controlling one[8]. While studying the predisposing factors for the development of incisional hernia it was found that multi-parity and obesity, anemia and diabetes were the important predisposing factors with Anemia 29%, Diabetes 20% are the major comorbidities compared to others in this study. Archana Shukla, Sameer Ahmed got nutritional anemia was the commonest co-morbidity amongst the patients (63 %) studied followed by diabetes in 10 patients (21%). In the present study 55% patients developed incisional hernia following surgical procedures (appendectomy in 13 cases, Appendectomy with abscess drainage 12 cases and Resection and Anastomoses in 11 cases and others) compared to gynecological procedures. Ponka in his study found 36 % and Goel and Dubey noted 28.76% incidence among gynecological procedures. In our study most incisional hernias occurred following surgical operations, even though previous LSCS (30%) surgery is dominating among individual surgery. In my study 78% of the cases developed incisional hernia symptom between first to ten years after previous operation. About 8% developed within 5 years and about 14% developed after 11 years, which is contradictory to Akman's series in which more than 65% of incisional hernia occurred within 1 year after the surgery. Daware A et al showed The mean duration of occurrence of Incisional Hernia after initial laparotomy was 15.3±6.43 years[9]. In this study around 45.2%

female are having parity 3, as multiparity is one the risk factor for the development of incisional hernia. Daware A et al showed Multiparity was one of the major risk factor observed in his study. (64.06%) and these results are consistent with other literature. Out of 100 Patients admitted for incisional hernia repair, 92 cases were selected for prolene mesh repair. The criteria for selection being wider defects, predisposing factors and recurrence after anatomical repair. Rest of the cases underwent anatomical repairs. Santora TA et al, believes that the size of the fascial defect and the appearance of the fascia should dictate the selection of the most appropriate method of hernia repair. Abrahamson J, believes that mesh repair is excellent method of repair for large ventral abdominal hernias but has not specified the size of the defect. Pre-operatively the obese patients were asked to reduce their weight. The abdominal exercises were advised to increase the tone of the abdominal muscles. Diabetics were controlled with Insulin. Hypertension was controlled. Chest infections were treated. Nutritional status and anemia were corrected. All the investigations were done. The cases were put on prolene mesh. The abdomens were closed with Romovac drains. Foley's catheter was put to decompress the bladder throughout the operation and was removed on the second day. Nasogastric aspiration was done for 24 hours. Broad spectrum antibiotics were used. The drains were removed on the 4<sup>th</sup> or 5<sup>th</sup> day. Sutures were removed on the 10th day. After the present mesh repair of incisional hernia, 76 % went home without any complication, around 14 % patients developed surgical site infection, 5% developed flap necrosis, 5% developed other complications like seroma, abdomen distension and urinary retention. Khaira HS et al, reported seroma formation in 6 out of 35 patients and wound infection in 1 out of 35 patients. Daware A et al showed Only mesh repair was done in 22 (34.37%) patients. Of them, 9 (40.9%) patients developed seroma, 4 (18.15%) patients had SSI and cuticular necrosis in 1 (4.5%) patient. Wound infections when they occurred were treated by drainage and suitable antibiotics after culture and sensitivity. In 5 cases necrosed flaps were trimmed and waited for approximation and later secondary suturing done. There was no rejection of mesh in any case. The final wound healing was good. Compared to anatomical repair wound infection rate was more in mesh repairs but the infections were controlled[10]. The patients were discharged with the advice not to do any strenuous work, advised for abdominal binder minimum for 3 months. Analgesics and oral antibiotics for 5 days. Advised specifically regarding comorbidities. Except for the cost, the results of prolene mesh repair were excellent. Laparoscopic repairs are not included in this study. Among 100 operated cases in this study period, only one case came with recurrence, who underwent anatomical repair previously.

#### Conclusion

Incisional hernia is a common avoidable iatrogenic complication of laparotomies. Though mortality is minimum, the morbidity is sufficiently enough to incapacitate the patient to some extent. Proper preoperative management of the patients, meticulous surgical technique, careful closure of the abdominal wound and post-operative care helps in preventing the occurrence of incisional hernia. If at all it occurs the only treatment is surgery which should not be delayed and the same should be carried out at the earliest. Proper treatment for comorbidities, avoiding strenuous work and proper nutrition after laparotomy surgery avoids incidence of incisional hernia. Among patients with lower midline abdominal incisional hernias, mesh repair is superior to suture repair with regard to the recurrence of hernia, regardless of the size of the hernia.

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