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## Etiology and risk factors of incisional hernia – A prospective study

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### Abstract

**Background:** Incisional hernia is an iatrogenic defect in the abdominal wall that occurs in the site of previous incision. The study was conducted to analyze the etiology and risk factors of incisional hernia.

**Materials and Methods:** The study was conducted in our hospital in the Department of General Surgery from October 2018 to September 2020. All patients who attended the outpatient department with incisional hernia were admitted based on inclusion and exclusion criteria and evaluated. The etiology and risk factors such as age, sex, Precipitating factors, nature of previous surgery were evaluated with proper history and investigations and results were correlated with other studies.

**Results:** The incisional hernia patients commonly presented in the age group of 31 to 50 years of age and among them female has increased propensity. Obesity is considered as a major risk factor for both males and females accounts for 84% of our study and 32% of patients with incisional hernia are smokers who are entirely males. The incidence of incisional hernia has been increased following gynecological procedures (66%) and lower midline scar (32%) following previous surgery. The wound infection being an important risk factor for incisional hernia, in our study, only 12% of cases had a history of wound infection following previous procedure. Other risk factors includes Diabetes mellitus (28%), Anemia (26%), immunosuppression also predispose to incisional hernia were observed and all these factors have strong association with incisional hernia and p-value less than 0.05 which is significant. Patient treated with onlay meshplasty had showed better outcome. No recurrence during follow up period.

**Conclusion:** Incisional hernia must be kept in mind in all abdominal surgeries and care must be taken prior to occurrence of incisional hernia by assessing the risk factors and correcting the modifiable risk factors prior to any surgeries. Meshplasty is the management of choice with less recurrence.

**Keywords:** Obesity, smoking, lower midline scar

### Introduction

Abdominal hernia broadly classified as Ventral hernia and Groin hernia. Inguinal hernia is most common cause of hernia and second most common is INCISIONAL HERNIA. Incisional hernia is protrusion of abdominal contents through weak scar of previous surgery or post traumatic scar<sup>2</sup>. The incidence occurs between 2 and 11%<sup>[1-6]</sup>. Various factors predispose to incisional hernia. These include age, sex, body weight, comorbidities like Diabetes mellitus, immune compromised state like chemotherapy, steroid use, smoking. Both technical and patient related factors predispose to incisional hernia<sup>[2, 5]</sup>. Incisional hernia is considered as challenging disease to treat so various techniques have been developed and currently incisional hernia is repaired with least morbidity and recurrence rate with advent of Laparoscopic techniques and Polypropylene mesh<sup>[7]</sup>. The aim of this study is to analyze the etiology and risk factors of Incisional hernia.

### Methods and Materials

The study was conducted in our hospital in the Department of General Surgery from October 2018 to September 2020. All patients who attended the outpatient department with incisional hernia were admitted and evaluated.

**Inclusion criteria:** Age more than 18 year, both complicated and uncomplicated incisional hernia, Port site hernia

**Exclusion criteria:** Incisional hernia with age less than 18years, Pregnant women with incisional hernia and other associated hernias.

The etiology and risk factors such as age, sex, Precipitating factors, nature of previous surgery were evaluated with proper history and investigations. All patients planned for meshplasty with polypropylene mesh. Postoperative follow up was done regularly and results are correlated with various other studies.

**Results**

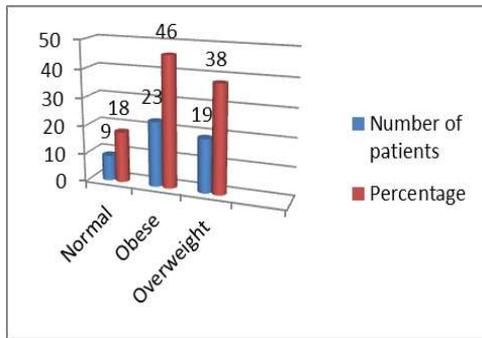
This study mainly focused on risk factors predisposing to occurrence of incisional hernia.

**Demographic Distribution:** In this study, patient age may range from 26 to 80 years of age and most of the patients with incisional hernia are in the age group of 31-50 years of age and 68% were females and 32% were males.

**Table 1: Demographic Distribution**

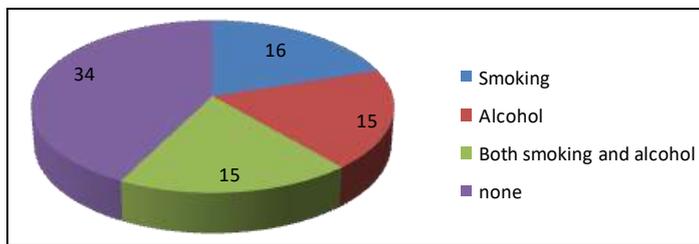
Age in years	Male	Female	Total in number	Percentage%
	Number (Percentage)	Number (Percentage)		
Below 20	-	-	-	-
21-30	2 (4%)	4 (8%)	6	12%
31-40	-	14 (28%)	14	28%
41-50	7 (14%)	12 (24%)	19	38%
51-60	3 (6%)	4 (8%)	7	14%
Above 60	4 (8%)	-	4	8%

**Body Mass index (BMI):** Incisional hernia being more among obese individuals whose BMI more than 25. Out of 50 patients in our study, 42 patients were obese and 8 patients had normal weight.



**Fig 1: Body mass index**

**Smoking:** Smoking being an important risk factor, in our study 34 cases were female and 16 patients were males. Among these 16 males, all cases were smokers and 15 patients were alcoholic. 68% of cases were non smokers in our study due to female predominance.



**Fig 2: Smoking**

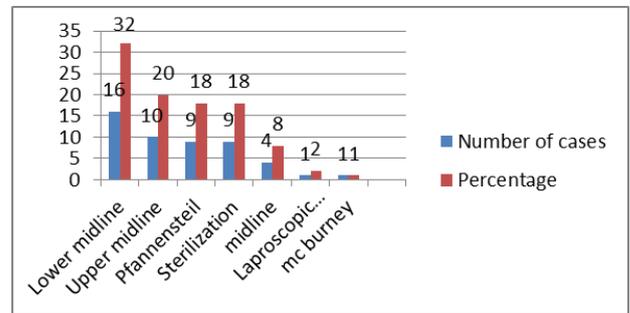
**Previous operative scar type**

In our study 60% cases of incisional hernia occurs through midline defect, among these 32% through infraumbilical midline scar and 20% through supraumbilical midline scar. Among these, the major reason for surgery is gynecological procedures (66%).

**Table 2: Previous Operative Procedure**

Procedure	Number of patients	Percentage%
Caesarean section	13	26
Hysterectomy	11	22

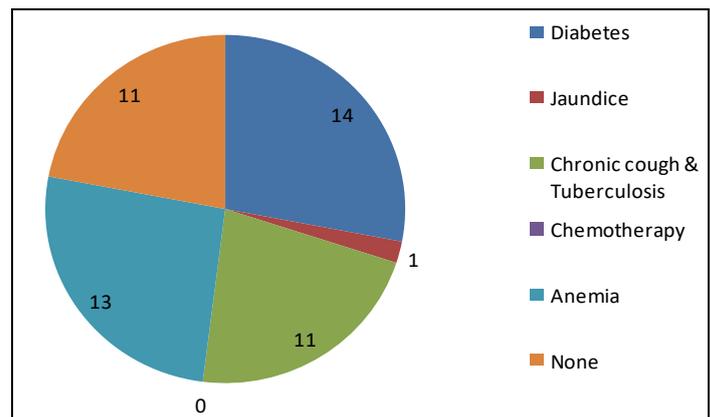
Hollow viscus perforation	10	20
Sterilization	9	18
Resection and anastomosis	4	8
Recurrent Incisional Hernia	1	2
Laparoscopic surgery	1	2
Appendectomy	1	2
Total	50	100



**Fig 3: Previous operative scar site**

**Postoperative complications following previous surgery and comorbidity**

In our study 38 cases (76%) showed no complication during previous surgery. Wound infection being an important predisposing factor but, in our study, wound infection is around 12% only. Other risk factors includes Anemia, Diabetes mellitus, Malnutrition, Jaundice associated with incisional hernia. In our study 28% of patients have diabetes, 26% were anemic and 22% have respiratory problems.



**Fig 4: Co morbidity**

### Management and Followup

All patients are planned for operative management and meshplasty was done. Out of 50 cases, all cases underwent meshplasty except one in which she has pendulous abdomen (BMI more than 35), for which we proceed with meshplasty and abdominoplasty with neoumbilicus creation. Only 10 cases had postoperative complications following meshplasty like seroma formation and wound infection. All cases improved well postoperatively and followed up for a period of 1 year and showed no recurrence.

### Discussion

In our study patient age may range from 26 to 80 years of age and most of the patients with incisional hernia are 3rd, 4<sup>th</sup> and 5<sup>th</sup> decade. Ellis, Gajraj and George *et al.* [8] and in Tulaskar *et al.* [9] noticed that incisional hernia were common among 49.4 years and 41.8 years of age respectively and 64.6% and 81.2% of female predominance respectively. In our study also 68% were females. Incisional hernia being more among obese individuals. Out of 50 patients, 42 patients were obese whose Body mass index were more than 25. In Amanulla shaik<sup>1</sup> study 32% were moderate to extremely obese and in Bose *et al.* study<sup>10</sup> 30% were obese. Smoking being an important risk factor, in our study 34 cases were female and 16 patients were males. Among these 16 males, all male patients were smokers and 15 patients were alcoholic. 68% of cases were non smokers in our study due to

female predominance. Smoking is a risk factor for surgical site infections, wound dehiscence. Smoking is an important risk factor for incisional hernia which is explained by Lars Tue Sorenson *et al.* [11] in their study observed that smokers had four fold higher risk for IH followed by relaprotomy, postoperative wound complications, older age and male sex.

It is observed that 60% of incisional hernia occurs through midline defect, among these 32% through infra umbilical midline scar and 20% through supra umbilical midline scar. Among these, the major reason for surgery is gynecological procedures (66%). In Tulaskar *et al.* [9] study 71.8% occurred in lower midline incision and 78% incidence were due to gynecological procedures. Cesarean section was commonest preceding surgery for incisional hernia resulted in Farhanul Hude *et al.* study [12]. In lower abdomen, intraabdominal hydrostatic pressure (20 cm of water) is higher than upper abdomen (8cm of water) in erect posture and absence of posterior rectus sheath were the reason for frequent site of incisional hernia. In our study 38 cases (76%) showed no complication during previous surgery. Wound infection being an important predisposing factor but in our study wound infection is around 12% only. It is compared with Bose *et al.* studies [10] 53.63% cases have wound infection. Other risk factors includes anemia, diabetes mellitus, malnutrition, jaundice associated with incisional hernia. In our study 28% of patients have diabetes, 26% were anemic and 22% have respiratory problems.

**Table 3:** Risk factor comparison

Incisional hernia risk factors	Diabetes		Obesity		Anemia		Lower midline scar		Wound infection	
	Num of cases (n)	Percent %	Num of cases (n)	Percent %	Num of cases (n)	Percent %	Num of cases (n)	Percent %	Num of cases (n)	Percent %
IH	14	28%	42	84%	13	26%	16	32%	6	12%
IH without that particular risk factor	36	72%	8	16%	37	74%	34	68%	44	88%

The chi – square statistic is 66.0723. The p - value is less than 0.00001 and the result is significant at p less than 0.05.

All patients are planned for operative management and meshplasty was done. Out of 50 cases, all cases underwent meshplasty except one in which she has pendulous abdomen whose BMI more than 35, for which we proceed with meshplasty and abdominoplasty with neoumbilicus creation. Only 10 cases had postoperative complications like seroma formation and wound infection. All cases improved well postoperatively and followed up for a period of 1 year and showed no recurrence. Jack Abrahamson [13] believes that mesh repair is always a better option and excellent method for large ventral hernia repairs. In Khaira H.S *et al.* [4] out of 35 patients, 6 patients developed seroma formation and one patient developed wound infection.

### Conclusion

This study mainly focus on etiological factors predisposing to occurrence of incisional hernia.

1. The incidence of incisional hernia is more common in 31 to 50 years of age.
2. The incidence of incisional hernia is more common in females and among obese individuals whose BMI more than 25.
3. Incisional hernia is common after gynecological procedures like caesarean section, hysterectomy and more common along lower midline infra umbilical incision scar site.
4. Wound infection is one of the important risk factor following previous surgery.

5. Mesh repair using polypropylene mesh gives good results.

Incisional hernia must be kept in mind in all abdominal surgeries and care must be taken prior to occurrence of incisional hernia by assessing the risk factors and correcting the modifiable risk factors prior to any surgeries. Meshplasty is the management of choice with less recurrence.

### Declaration of Conflict of Interest

There is no conflict of interest.

### Sources

No funds.

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