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Specific Risk Factors for Incisional Hernia

KEYWORDS

Dr.M.Ilaiah	Dr.K.Vijaya Kumar	Dr.V Siva Mohana Naidu
Professor I/C, Department of General Surgery, Osmania Medical College and Hospital, Dr. NTR University of Health Sciences, India	Assistant Professor, Department of General Surgery, Osmania Medical College and Hospital, Dr. NTR University of Health Sciences, India	PGY3, Department of General Surgery, Osmania Medical College and Hospital, Dr. NTR University of Health Sciences, India

ABSTRACT *Incisional hernia is iatrogenic and its incidence has increased with each increment of abdominal surgical intervention. An incisional hernia is the most perfect example of a "surgeon-dependent variable". Laparoscopic surgery also added a new entity:"port site" hernia.*

This study aims at determining the association of incisional hernia in isolation, or in various combinations of specific risk factors such as sex, obesity, history of previous wound infection, the type of incision used and the number of previous operations.

Methods : *Fifty patients with incisional hernia admitted to Surgical wards of Osmania General Hospital form the material of this study.*

This is a longitudinal study. The study period is from September 2013 to September 2015.

Patients were selected randomly.

Detailed history with specific reference to previous surgery / surgeries and the postoperative period is elicited from the patient and verified with the previous records which are available with the patient.

Results : *Occurrence of incisional hernia appears to be multifactorial and these factors are inter-related. Association of one or more factors increases the predisposition to the incisional hernia. An attempt is made to study this inter relationship of these factors to the incidence of hernia using the Chi square test.*

Obese females have a specific predilection towards occurrence of incisional hernia as the P ~ 0.05. Our study sample is relatively small we feel a larger study is needed to emphasize this association more strongly.

Obese patients are prone to wound infection, as 66.66 % of obese people had history of wound infection, as against 34 % of non- obese people.

Obesity and wound infection show an association to incisional hernia with $p < 0.05$.

Obese people with lower midline incision constitute 96.3% of cases and non obese with lower midline constitute 52% of cases. There appears a strong association between lower midline incision in an obese person to the occurrence of incisional hernia ($p < 0.05$).

Repeat surgery done through a lower midline incision resulted in incisional hernia in 68.4% of patients in our study where as repeat surgery done through other incisions resulted in 16% of cases, showing a strong association [$P < 0.005$).

Conclusion :

- *Highest incidence of incisional hernia in the present series is between 31 -- 40 years.*
- *Most of our patients were females.*
- *Etiology is Multifactorial.*
- *Postoperative wound infection at previous surgery seems to be a common predisposing factor.*
- *Lower midline incision appears to have a special predilection towards incisional hernia.*
- *Repeated surgery through the same incision has a role in theoccurrence of incisional hernia.*
- *All these factors are interrelated. Presence of more than one factor ina patient shows increased predisposition to the incidence of incisional hernia.*
- *Obese female have an increased predilection towards incisional hernia (p - 0.05)*
- *Obesity is associated with more risk of postoperative wound infection and both resulted in an increased incidence of incisional hernia ($p < 0.05$)*
- *Lower midline incision in obese people have a predilection or incisional hernia ($P < 0.005$)*
- *Repeated surgery done through a lower midline incision carries an increased incidence of incisional hernia ($P < 0.005$)*

Volume : 5 | Issue : 11 | November 2015 | ISSN - 2249-555X

INTRODUCTION

Hernia is a protrusion of a viscus or part of viscus through an abnormal opening in the wall of its containing cavity.[3]

A postoperative ventral abdominal or incisional hernia is the result of failure of the lines of closure of the abdominal wall following laparotomy. The approximated tissues separate, and abdominal organs, mainly bowel bulges through the gap, which is covered from inside outwards with peritoneum, scar tissue and skin.

Incisional hernia is a serious post operative complication of laparotomy. Its incidence following abdominal surgery ranges from 2 to 11 percent.[22]

A number of predisposing factors have been identified that may be related to specific patient characteristics, and underlying pathological process or iatrogenic factors.

This study is undertaken to review the various factors and circumstances leading to the development of incisional hernia in each case and hence may be able to minimize its occurrence.

Objectives of study

This study aims at determining the association of incisional hernia in isolation, or in various combinations of specific risk factors such as sex, obesity, history of previous wound infection, the type of incision used and the number of previous operations.

Materials and Methods

Fifty patients with incisional hernia admitted to Surgical wards of Osmania General Hospital form the material of this study.

This is a longitudinal study. The study period is from June 2004 to July 2006. Patients were selected randomly.

Detailed history with specific reference to previous surgery / surgeries and the postoperative period is elicited from the patient and verified with the previous records which are available with the patient.

The following risk factors are studied

a) Sex
b| Obesity - Body mass index above 25 is taken as obesity in this study.
C| Wound Infection - History of any purulent discharge from the wound is considered as wound infection, also from the records obtained from the patient.
d| Second Surgery through the same incision.

The association of incisional hernia with these risk factors both independently and in combination are studied.

Statistical Analysis :

Data is analysed manually.

The correlation between various factors is analysed by Chi-square test.

$P < 0.05$ is taken as statistically significant.

OBSERVATIONS AND RESULTS

The total number of cases studied in this series is 50.

AGE AND SEX DISTRIBUTION

Age Group (Yrs)	Sex F	M	Total No. of cases	Percentage
< 20	-	-	Nil	-
20 - 30	1	11	12	24
30 - 40	3	19	22	44
40 - 50	1	9	10	20
> 50	3	3	6	12

In this series incisional hernia is common 3rd, 4th and 5th decade.

In this series incisional hernia is seen in 84% of female and 16% of males and male to female ratio being 1 : 5 showing a clear prediliction towards female sex.

INITIAL OPERATIVE PROCEDURE

Procedure	No. of cases	Percentage
Hysterectomy	18	36
LSCS*	12	24
Tubectomy	6	12
incisional Hernia repair	2	4
Acute abdomen	12	24

* Lower segment caesarian section.

72% of the hernias followed operations on female pelvic organs. 4% followed after incisional hernia repair and 24% cases followed after acute abdominal procedures. No case of incisional hernia followed an elective abdominal surgery.

SITE OF PREVIOUS INCISION

Type of Incision	No. of cases	Percentage
Sub umbilical Midline	38	76
McBurney's	2	4
Mid midline	4	8
Upper midline	6	12

76% of incisional hernias occurred in subumbilical midline incisions.

NO. OF PREVIOUS SURGERIES

No. of Surgeries	No. of cases	Percent age
1	22	44
2	13	26
> 2	15	30

Incisional hernia occurred in 56% of cases following a second surgery.

WOUND INFECTION :

Wound infection is present in 26 cases amounting to 52 % of incisional hernias, based on the records obtained from the patient.

The correlation between incisional hernia and various factors is established employing **Chi square test**.

OBESITY AND SEX

	Female	Male	Total	Rate of incidence
Obese	25	2	27	92.5%
Non obese	17	6	23	73.9%
Total	42	8	50	

P - 0.05

Volume : 5 | Issue : 11 | November 2015 | ISSN - 2249-555X

In our study among the obese people 92.5 percent were females P value is close to 0.05 and shows a clear association between obesity and female sex. It needs a larger study to further strengthen the association.

OBESITY AND WOUND INFECTION

	Wound infection	No wound Infection	Total	Incidence
Obese	18	9	27	66.66%
Non obese	8	15	23	34.78%
Total	26	24	50	

$P < 0.05$

Among the obese people 66.66% had wound infection during previous surgery. The P value is 0.05 showing a strong association between obesity and wound infection to the occurrence of incisional hernia.

OBESITY AND SUBUMBILICAL MIDLINE INCISION

	SUML	Other incisions	Total	Incidence
Obese	26	1	27	96.3%
Non obese	12	11	23	52.1%
Total	38	12	50	

$P < 0.005$

Obese people with SUML constitute 96.3 % and non-obese with SUML were 52.1%. P value is < 0.005 showing a very strong correlation between obesity and sub umbilical midline incision to result in incisional hernia.

SUB UMBILICAL MIDLINE INCISION AND MORE THAN ONE SURGERY

	≥ 2 surgeries	One Surgery	Total	Rate of incidence
SUML incision	26	12	38	68.42%
Other incision	2	10	12	16.67%
Total	28	22	50	

$P < 0.005$

Lower midline incision compared to other incisions with repeated surgeries through the same scar, the incidence of incisional hernia is 68.42 % and 16.67% respectively.

This study shows a very strong correlation ($P < 0.005$) between repeat surgery through lower midline incision to the occurrence of incisional hernia.

DISCUSSION

Fifty patients participated in this prospective study done during a time span of 25 months from September 2013 to September 2015

AGE AND SEX DISTRIBUTION

Age group in years	Geol Dubey (1981)	Harikrishnan & Karr (1991)	Bhutia et al (1993)	Present series
< 20	4%	-	1.4%	-
21 - 30	23%	16%	23.1%	24%
31-40	30%	37%	31.3%	44%
41 - 50	28%	25%	30.5%	20%
> 50	15%	22%	13.7%	12%

Incisional hernia usually appears from 3rd decade onwards, the peak incidence is in the 4th decade.

Goel and Dubev, Harikrishnan and Bhutia et al also found more incidence in the 3rd , 4th and 5th decades.

Sex	Dasilva and Patroianu	W. T. Bhutia	Present series
Male	19%	11%	16%
Female	81%	89%	84%

In this study 84% were females and male, female ratio being I : 5.

Dasilva and W.T. Bhatia (1: 5) also found more incidence among females.

High incidence of incisional hernia is seen in young and middle aged. Where as the same incidence is not seen in males. This can be explained by multiparity and repeated surgeries on female pelvic organs.

INITIAL OPERATIVE PROCEDURE

Procedure	Agarwal et al (1985)	Harikrishnan (1991)	Present series
Hysterectomy	9.38%	24.1	36%
LSCS	46.87%	42%	24%
Tubectomy	31.25%	11.1%	12%
Acute Abdomen	6.24%	13.3%	24%
Incisional hernia Repair	-	-	4%

In our study 72 % of the incisional hernias occurred following operations on female pelvic organs. Harikrishnan and J. K. Karr have also found operations on female pelvic organs were being the commonest surgeries which lead to the development of incisional hernia (77.8%).

Agarwal in his series found 87 % of incisional hernia were after female pelvic organ surgeries.

SITE OF PREVIOUS INCISION

Type of incision	J.B. Shah (1971)	Goel & Dubey (1981)	Present Series
Sub umbilical Midline	42%	48%	76%
McBurney's	4%	5%	4%
Upper midline	28%	29%	12%
Mid Midline	-	-	8%

In our present study 76% of incisional hernias appeared in the subumbilical midline incisions. Bhutia ct al also found that 71.8 % of their cases occurred through lower midline incisions.

J.B Shah found 42 % incisional hernias through lower midline incisions. Goel A Dubey found 48% of incisional hernias were through infra umbilical midline incision.

WOUND INFECTION

	T.E.Bucknall et al (1987)	Ponka (1980)	Agarwal et al (1985)	Present Series
Wound infection	48%	58%	2 1 .88%	52%

In our present study infection was present in 52 percent of cases.

T.E. Bucknall and colleagues reported that the index op-

Volume : 5 | Issue : 11 | November 2015 | ISSN - 2249-555X

eration has been complicated by post-operative wound infection in 48 percent of patients who subsequently developed incisional hernia.

OBESITY

	J.L. Ponka(1980)	Present Study
Obesity	40%	54%

In our study 54% patients with incisional hernia found to be obese.

J.L. Ponka attributed 40% of incisional hernias to obesity.

In our study, repeated surgery through the same incision resulted in an incisional hernia in 56 % of cases.

Ellnish & Lamont found the incidence of incisional hernia was 6% after freshly made incisions and the incidence increased after both re-incision (12% P< 0.05) and incisional hernia repair. (44 % P < 0.0 1).

Occurrence of incisional hernia appears to be multifactorial and these factors are inter-related. Association of one or more factors increases the predisposition to the incisional hernia. An attempt is made to study this inter relationship of these factors to the incidence of hernia using the Chi square test.

Obese females have a specific predilection towards occurrence of incisional hernia as the P ~ 0.05. Our study sample is relatively small we feel a larger study is needed to emphasize this association more strongly.

Obese patients are prone to wound infection, as 66.66 % of obese people had history of wound infection, as against 34 % of non- obese people.

Obesity and wound infection show an association to incisional hernia with p < 0.05.

Obese people with lower midline incision constitute 96.3% of cases and non obese with lower midline constitute 52% of cases. There appears a strong association between lower midline incision in an obese person to the occurrence of incisional hernia (p <0.05).

Repeat surgery done through a lower midline incision resulted in incisional hernia in 68.4% of patients in our study where as repeat surgery done through other incisions resulted in 16% of cases, showing a strong association [P < 0.005).

CONCLUSIONS

- Highest incidence of incisional hernia in the present series is between 31 -- 40 years.
- Most of our patients were females.
- Etiology is Multifactorial.
- Postoperative wound infection at previous surgery seems to be a common predisposing factor.
- Lower midline incision appears to have a special predilection towards incisional hernia.
- Repeated surgery through the same incision has a role in theoccurrence of incisional hernia.
- All these factors are interrelated. Presence of more than one factor ina patient shows increased predisposition to the incidence of incisional hernia.
- Obese female have an increased predilection towards incisional hernia (p - 0.05)
- Obesity is associated with more risk of postoperative wound infection and both resulted in an increased incidence of incisional hernia (p < 0.05)
- Lower midline incision in obese people have a predilection for incisional hernia (P < 0.005)
- Repeated surgery done through a lower midline incision carries an increased incidence of incisional hernia (P < 0.005)

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