

Incisional Hernia: Precipitating factors and Prevalence of Recurrency at King Fahd Hospital of University

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Abstract— Introduction and objectives: A hernia is a protrusion of an organ or part of it through the wall that normally contains it. It is a common complication of abdominal surgery with an incidence rate 11%-26%. After the primary surgery, 50% of the incisional hernias develop within the first two years and 74% develop after three years. Therefore, our study was designed to identify the precipitating factors associated with incisional hernia and the prevalence of recurrence. Methodology: A retrospective cohort study including all patients presented with incisional hernia and managed by the department of General Surgery over a period of 15 years starting from 1st of January 2000 till 1st of January 2015. The variables which are included in the study are the demographic data, co-morbidity, number of pregnancy, primary surgery, duration of hospital stay, type of hernia repair, and surgical site infection. Other types of hernias are excluded from this research. The variables were collected from the patients' files. The study was approved by Institutional Review Board (IRB) of our hospital. Results: The sample of the study is 96 patients with mean age 45 years, out of which 63 were females, 33 were males. BMI above 30 is the commonest group which developed incisional hernia (52.3%). Regarding Co-morbidity, 21% of patients with incisional hernia were diabetic. Commonest surgery associated with incisional hernia development is C-section 26.9% followed by Laparoscopic Cholecystectomy 19.4%. 12.8% of the primary surgeries that were complicated by incisional hernia were associated with surgical site infection. The prevalence of recurrent Incisional hernia was 22.1%, and the highest number of recurrence was 3 hernias in the same incision. Conclusion: Recurrence of incisional hernia is high and can be avoided. Current evidence suggests that the use of mesh, good wound care and the establishment of minimal invasive procedures have a significant role in reducing recurrence rate and decreasing the burden on the patients.

Index Terms—Incisional hernia, ventral hernia, recurrent hernia, mesh repair, laparoscopic hernia repair, primary surgery, c-section, laparotomy.

1 INTRODUCTION

A hernia is a protrusion of an organ or a part of it through the body wall that normally contains it. Incisional hernias are a type of ventral hernia that develop at sites of a previous abdominal procedure incision [1]. It is a common complication of abdominal surgery with an incidence rate of around 11%, which can rise up to 26% if associated with Surgical site infection. As such, incisional hernia repair surgery is one of the most common operations performed in daily clinical practice [2,7,12].

After primary surgery, almost 50% of incisional hernias develop within the first two years and 74% after three years. After primary repair, more than 50% have a recurrence of incisional hernia.

The introduction of prosthetic materials (mesh) has decreased the recurrence rate of incisional hernia to 10-23%. However, open hernia repair is a major procedure and has a significant morbidity because of infectious complications [12]. Age, gender, co-morbidities, obesity and surgical site infection are known risk factors [3,4].

More than one half of incisional hernia patients discover the hernia by its appearance, discomfort or pain within three years after the initial surgery, although it might take up to 10 years to be discovered if the hernia is small and/or the patient is obese, and might be missed during physical examination [5][6]. Incisional hernia can be

repaired either by laparoscopic or open techniques. Laparoscopic repair offers several benefits over open techniques, including decreasing length of hospital stay and postoperative pain [8].

Although years after years understating of abdominal wound care is increasing and expanding, the percentage of wound closure failure still high in the past 75 years [9]. As such, our study was designed to identify precipitating factors associated with incisional hernia at King Fahd Hospital of the University as well as prevalence of recurrence. This study was carried out to identify the factors associated with incisional hernia in our region as well as factors affecting recurrence.

2 METHODOLOGY

Ethical approval was gained obtained from the Institutional Review Board committee (IRB) at King Fahd Hospital of the University (KFHU). Investigators undertook a coordinated retrospective cohort study of all Incisional Hernia Repair procedures managed by the department of General Surgery, undertaken over a period of 15 years starting from 1st January 2000 to 1st January 2015. Data were anonymized and stored on hospital-approved patients' files.

The variables included demographic data, co-morbidity, smoking, pregnancy, primary surgery (i.e., previous abdominal surgery which

was done and developed incisional hernia), duration of hospital stay, site of incision, type of hernia repair and surgical site infection. Other types of hernias excluded from this research included direct hernia, indirect hernia, umbilical hernia, femoral hernia, etc. These data were collected by hard copy using a data collection sheet. Subsequently, the information was transferred to a soft copy spreadsheet (Excel).

The co-morbidities included in our research are HTN, Dyslipidemia, SCD, Asthma, COPD and DM.

The sample size comprised 96 patients, of which 33 were males and 63 females, and 55 were Saudi patients and 41 Non-Saudi patients. The data were analyzed by Statistical Package for Social Science 20 (SPSS).

3 RESULTS

The study sample comprised 96 patients, 63 females and 33 males with mean age when the developed incisional hernia was found was 45 years. The prevalence of incisional hernia in the Saudi population (57.3%) was higher than Non-Saudi (42.7%). The group of patients with a Body Mass Index of (30-40) were the most common group to have incisional hernia (52.3%). Twenty-one percent of all patients with incisional hernia were diabetic, followed by 18% with high blood pressure, (9.7%) asthma, (6.5%) dyslipidemia, (1.1%) SCD, and (1.1%) COPD. **Table 1** presents demographic information.

-Primary surgery

We compared different primary surgeries done to patients that later developed Incisional hernia. The results found that 26.9% of C-section surgery, 19.4% of Laparoscopic cholecystectomy, 15.1% of Laparotomy surgery, 11.8% of Paraumbilical hernia repair surgery, 8.6% of Appendectomy surgery and 3.2% of Open cholecystectomy surgeries are associated with incisional hernia. Among male patients presented with Incisional hernia 37.5% were post laparotomy followed by 21.9% that were post Laparoscopic cholecystectomy.

In comparison, among female patients presented with Incisional

hernia, 41.0% were post C-section followed by 19% that were post laparotomy. Additionally, 52.9% of primary surgery admissions were elective cases (C-section was the highest followed by Laparoscopic cholecystectomy) and 47.1% were emergency cases (Laparotomy was the highest followed by appendectomy). Moreover, 12.8% of the primary surgeries that were done during this period and complicated by incisional hernia were associated with surgical site infection. **Table 2** presents primary surgery data.

-Incisional Hernias

Regarding incisional hernia admissions, we found that most of the incisional hernia cases (79.1%) were repaired electively, and (20.9%) were repaired as emergency cases. The repair was by open surgery in 89.7% of cases and by laparoscope in 10.3%. Mesh was used in 46.3% of all cases. Of these, 15.8% had recurrency, whereas 20.5% of patients managed without mesh had recurrency. Surgical site infection developed in 2.4% of patients post incisional hernia repair. Moreover, 12.5% of female patients who presented with incisional hernia were pregnant at that time. **Table 3** presents incisional hernia data.

-Recurrent Incisional Hernias

The prevalence of recurrent incisional hernia was 22.1% (62% females and 38% males). The site of incision with the highest recurrency was the transverse lower abdomen at 28.6%, followed by portal site at 23.8%. 80% of recurrent incisional hernias were managed electively. However, 20% were taken as emergency cases. A total of 94.1% of recurrent incisional hernia were repaired by open technique, while 5.9% were repaired by laparoscope. Mesh was used in 64.3% of all repairs. An 11.8% of patients with recurrent incisional hernia repair developed surgical site infection.

Interestingly, we have found that (4.8%) of patients developed three recurrences of incisional hernias, (14.3%) had two recurrences and the majority (81.0%) had only one recurrence. **Table 4** presents Recurrent incisional hernia data.

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Table 1. Patient Demographics

Variable	Number of patients	Percentage %
Body Mass Index of (30-40)	46	52.3
Diabetes	20	21
Hypertension	17	18
Asthma	9	9.7
Dyslipidemia	6	6.5
COPD and SCD	2	2.2
Pregnancy	7	12.5

Variable	Number of patients	Percentage %
Type of Primary Surgery		
1-C-section	25	
2-Laprosopic Cholecystectomy	18	
Emergency Admission	32	47.1
Elective Admission	36	52.9
Surgical site infection Post Primary Surgery	5	12.8

Table 3. Incisional Surgery Data

Variable	Number of patients	Percentage %
Emergency Repair	18	20.9
Elective Repair	68	79.1
Open Surgery	78	89.7
Laparoscopic Surgery	9	10.3
Mesh used	38	46.3
Surgical site infection	2	2.4

Table 2. Primary Surgery Data

Table 4. Recurrent Incisional Hernia Data

Variable	Number of patients	Percentage %
Prevalence of Recurrence	21	22.1
Site of Incision with Highest Recurrence (Transverse Lower abdomen)	6	28.6
Emergency Repair	4	20
Elective Repair	16	80
Open Surgery	16	94.1
Laparoscopic Surgery	1	5.9
Surgical site infection	2	11.8

Recurrent Incisional hernia		N	Mean	Std. Deviation
Age when Primary surgery was done	Yes	17	39.29	12.474
	No	63	38.38	1.818
Duration between Primary surgery and Incisional hernia	Yes	17	4.76	4.994
	No	63	6.16	7.371
Length of stay when incisional hernia was done	Yes	15	8.07	3.990
	No	71	10.83	7.898
Duration between incisional hernia and recurrence	Yes	17	4.94	5.124
	No	0		
Age when recurrence occurred	Yes	20	46.40	11.695
	No	0		

Table 5. Mean and Standard Deviation

Chart 1

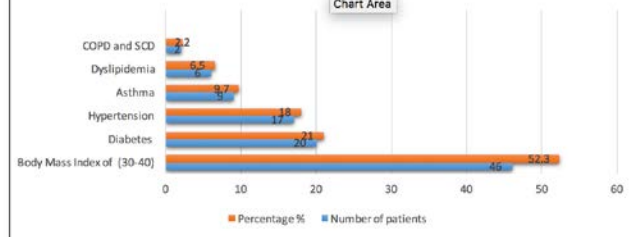


Chart 2

Chart 2: Percentage of Saudi and Non-Saudi patients.

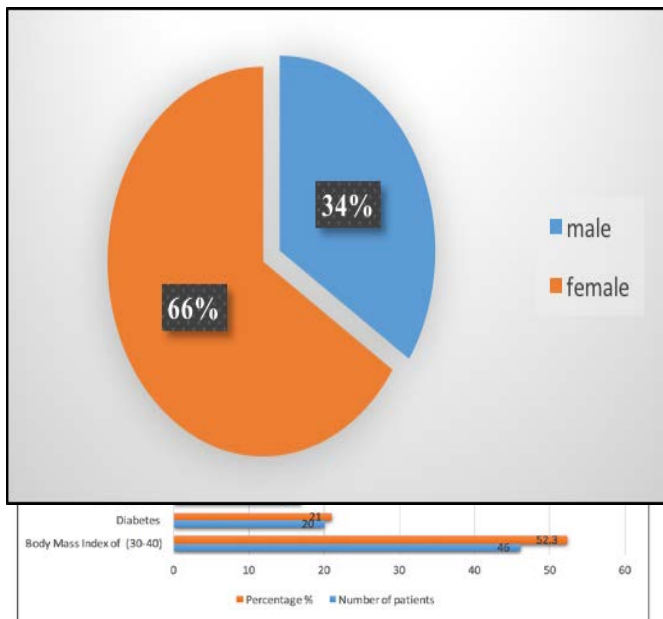


Chart 3

4 Discussion

While some might think that incisional hernia is a simple complica-

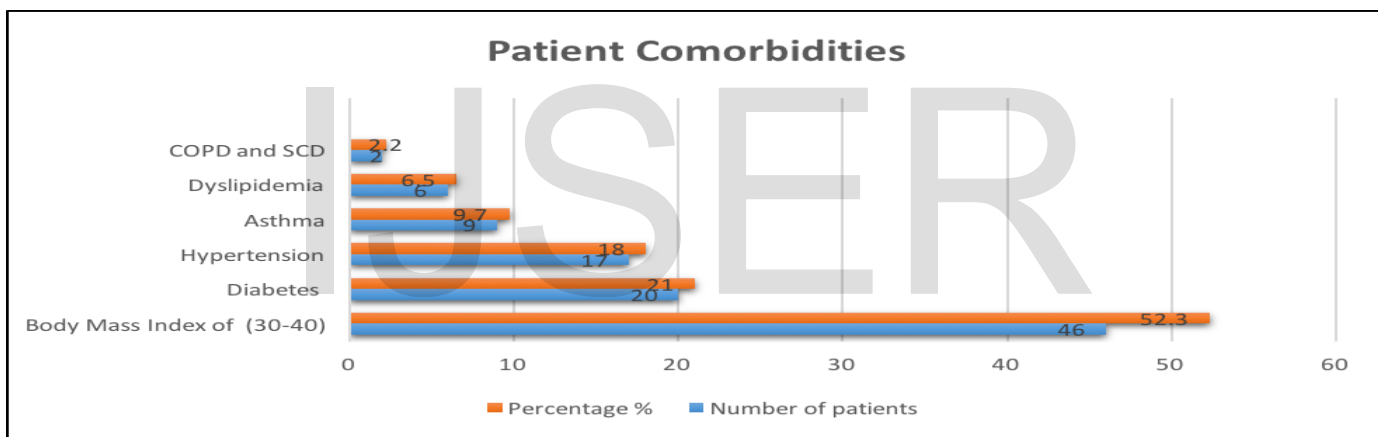
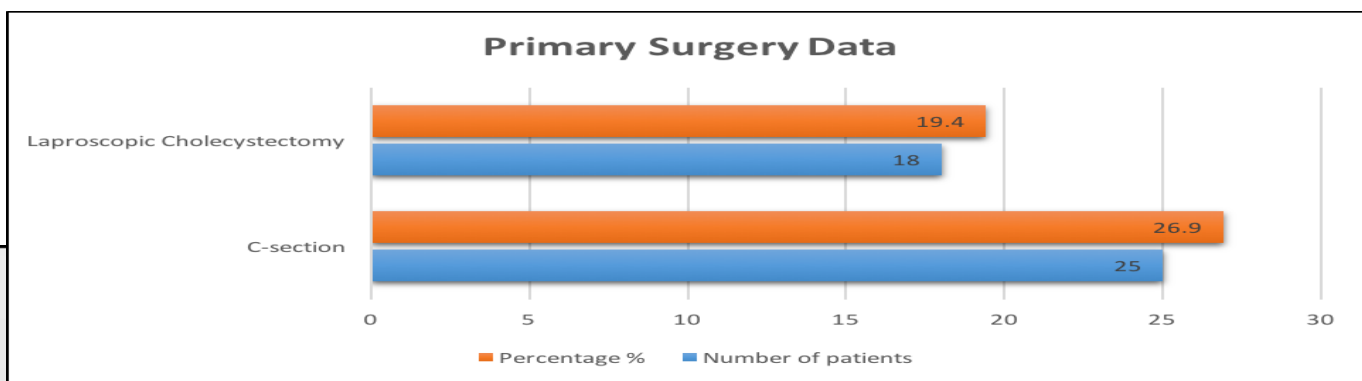


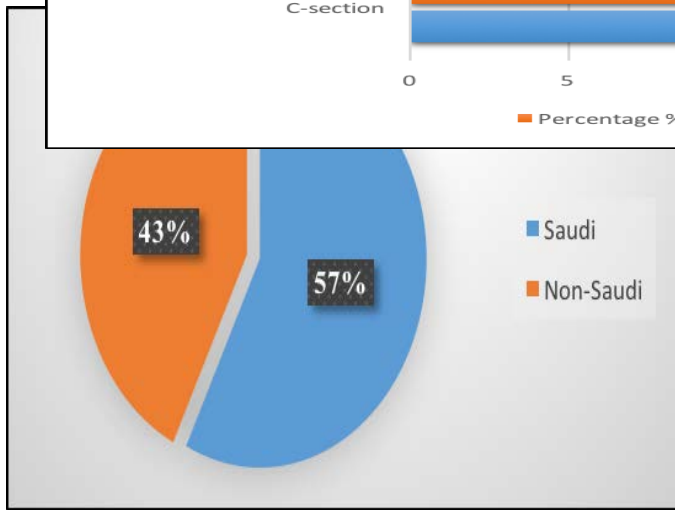
Chart 4

tion of abdominal surgery, the literature review shows otherwise. In actuality, this complication requires the patient to experience yet



another stressful operation, and it also carries a significant risk of developing life-threatening conditions such as bowel obstruction or strangulation. This could lead to drastic lifestyle changes or an inability to continue with work, resulting in a significant economic and social impact [13,14,15].

We designed a retrospective analysis to investigate incisional hernia



and recurrence over a 15-year period from 2000 until 2015 to determine prevalence and participating factors. Surgical site infection is known to be a major risk factor for developing hernia [3,7], however in our study the Surgical site infection rate was low, which might be due to efforts to decrease the infection rate by administration of pre OP antibiotics and the practice of changing gloves when dealing with mesh.

Our review of 96 patients and statistical analysis of risk factors found that poor wound care and infection can attribute to recurrence of incisional hernia, while with improved wound care the recurrence rate was significantly low. Therefore, we encourage surgeons, medical staff and patients to adopt a comprehensive approach in wound care to minimize the recurrence rate. It is important to apply and utilize proper aseptic technique when closing the wound.

We emphasize the correlation between Body Mass Index (BMI) and the recurrence of incisional hernia; interestingly, the group with a BMI in the range of 30-40 was associated with the highest recurrence rate. Thus, we advise any patient with a BMI of more than 30 to increase physical activity, improve their quality of life and control diet to reach a normal BMI (18.5 – 24.9), which showed better outcomes and a low recurrence rate.

In the literature, smoking increases 4-fold high risk of developing incisional hernia [10]. However, our study showed a higher incidence with non-smokers, which was because our sample had a high number of females (non-smokers) and low number of males (smokers). In Saudi Arabia, The prevalence of smoking in females are very low reaches 1% comparing to males which is considerably higher [16].

Considering comorbidities, Saudi Arabia is known to have a high prevalence of Diabetes mellitus and is considered one of the top 10 countries worldwide [11]. Prevalence reaches up to 30% and uncontrolled diabetes mellitus results in poor wound healing and higher chance of infection; eventually increasing the incidence of recurrence of incisional hernia.

Concerning primary surgery and its association with recurrence of incisional hernia, our study suggests that Cesarean section and Laparoscopic cholecystectomy where the highest among all other procedures. However, a Laparoscopic cholecystectomy procedure had a high association with recurrent incisional hernia in our study because of the clear majority of our sample that underwent this procedure.

5 Conclusion

Recurrence of incisional hernia is high and can be avoided. Current evidence suggests that the use of mesh in repairing the incisional hernia, good wound care, and the establishment of minimal invasive procedures have a significant role in reducing recurrence and de-

creasing the burden on patients

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