



EVALUATION OF RISK FACTORS AND CLINICAL PRESENTATION OF VENTRAL INCISIONAL HERNIA PATIENTS UNDERGOING LAPAROTOMY

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ABSTRACT

Incisional hernia is the second most common type of hernia after inguinal hernia. It is a complication of abdominal surgery, reported in up to 11% of patients generally and in up to 20% of those who developed post-operative wound infection. The list of predictive factors associated with development of incisional hernia is obesity, diabetes mellitus, steroid, smoking, old age, malnutrition, COPD and type of incision. This hospital based cross sectional observational study aimed to evaluate the risk factors and clinical presentation of incisional hernia to reduce its occurrence by developing a preventive strategy to patients undergoing laparotomy. It was carried out from February 2018 to October 2019 in surgery department of Al-shahid Al-Sadr General hospital-Baghdad / Iraq on 80 patients diagnosed with incisional hernia. Results in the present study showed that the mean age of study subjects was 51.25 ± 10.54 years. Around two-third 67.5% were females. 46.3% of perforation and 32.4% of LSCS cases later developed to incisional hernia. Risk factors profile showed that 6.2% were alcoholic, 28.7% smokers, 48.7% overweight and 4.7% were obese, 23.7% were hypertensive, 51.2% diabetic, and 12.4% had constipation. 26.3% had prolonged cough, 37.5% had surgical site infection and 42.6% had anemia. Clinical presentation of study subjects showed that 60% had swelling, 34% had swelling and pain and 6% had obstruction. It can be concluded that incisional hernia is more common in female than males and in cases above the age of 45 years. It is more common in patients who underwent the previous surgery on an emergency basis especially in perforation and obstruction and LSCS cases. Risk factors associated with incisional hernia are smoker, alcoholic, obesity, hypertension, diabetes, constipation, prolong cough and anemia.

KEYWORDS: Incisional hernia, Prevalence, Risk factors, Clinical presentation.

INTRODUCTION

Incisional hernia is the hernia occurring through the operative scar. It is the result of failure of the line of closure of the abdominal wall following laparotomy. Incisional hernia (IH) is defined by the European hernia society as "any abdominal wall gap with or without a bulge in the area of postoperative scar perceptible or palpable by clinical examination or imaging".^[1]

Incisional hernia is the second most common type after inguinal hernia and is a complication of abdominal surgery, reported in up to 11% of patients generally and in up to 20% of those who developed post-operative wound infection.^[2,3] It is an important source of morbidity. Treatment involves further major surgery and the result may be poor, with recurrence rates of up to 49%. Incisional hernias after laparotomy are mostly

related to failure of the fascia to heal and involve technical and biological factors. Approximately 50% of all incisional hernias develop or present within the first 2 years following surgery, and 74% occur within 3 years.^[4]

In spite of the frequency of the condition and its potential morbidity, no consensus on the best method of repair has been established. A wide spectrum of surgical techniques has been developed ranging from sutured techniques to the use of various types of prosthetic mesh. This has created uncertainty and confusion among surgeons regarding the optimum method of repair.

The list of predictive factors associated with development of incisional hernia is obesity, diabetes mellitus, steroid, smoking, old age, malnutrition, COPD, type of incision, type of suture material and SSI post

laparotomy.

METHODS

This hospital-based cross-sectional observational study was carried out from February 2018 to October 2019 on 80 patients with incisional hernia at the surgery department of Al-shahid Al-Sadr general hospital.

All patients with incisional hernia above 18 years of age and patients who were willing to give consent to be part of the study were included, while patients who did not give consent for study, seriously ill patient and pregnancy with incisional hernia were excluded from the study.

All the patients were investigated about the duration of hernia, progression and the main associated symptoms like pain, vomiting, cough, dysuria, reducibility of the swelling, association with pregnancy. Past-history pertaining to previous surgery as its nature, duration, type of surgery and closure was recorded. Patients were also asked about wound infection of previous surgery. Recording about the scar of the previous surgery, the hernia defect its position, size, shape, cough impulse, reducibility and the overlying skin over the defect were

made. Other co-morbidities like anaemia, jaundice, hypertension, obesity, physical stress were recorded. Behavioral aspects like smoking, alcohol and tobacco uses were also asked to the patients.

Statistical analysis

Data were analyzed using SPSS version 20 program. Logistic regression analysis was done to predict the odds of being the risk factor to develop incisional hernia in different earlier surgeries. P value <0.05 was considered as statistically significant.

RESULTS

In the present study, a total of 80 patients were enrolled with the mean age of study subjects was 51.25±10.54 years. Table (1) showed that around two-third 67.5% were females, and 38.8% of the study subjects were living in rural areas and 61.2% were in urban areas. Socioeconomic status showed that 25% belonged to lower class of socioeconomic profile (as per modified GB Prasad), 37.5% belonged to lower middle class and 37.5% belonged to middle class. Occupational status showed that 71.3% were house wives and 15% were farmers.

Table (1): Socio-demographic information of the study subjects.

	Frequency	Percentage (%)
Age (in years)		
20-40	30	37.5
41-60	40	50.0
61-80	10	12.5
Sex		
Male	26	32.5
Female	54	67.5
Socioeconomic class		
Lower class	20	25.0
Lower middle class	30	37.5
Middle class	30	37.5
Occupation		
Farmer	12	15.0
Housewife	57	71.3
Informal work	4	5.0
Formal work	7	8.7
Total	80	100

Table (2) showed that 46.3% cases were perforation and obstruction, 32.4% were LSCS, 8.6% were hysterectomy and 3.6% were cholecystectomy. Nature of surgery

showed that 25.0% of the surgery were elective and 75.0% of the surgery was emergency.

Table (2): Type of surgical procedure later developed to incisional hernia and nature of surgery.

	Frequency	%
Type of surgical procedure		
Surgery for perforation and obstruction	37	46.3
Cholecystectomy	3	3.6
Hysterectomy	7	8.6
Incisional hernia	1	1.3
Iliostomy closure	1	1.3

LSCS	26	32.4
Sigmoid volvulus	1	1.3
Umbilical hernia	1	1.3
Deroofing hydratid cyst	1	1.3
Gastrojejunostomy	1	1.3
Bilateral ovarian mass excision	1	1.3
Total	80	100
Nature of surgery		
Nature		
Elective	20	25.0
Emergency	60	75.0
Total	80	100

Table (3) showed different risk factors in the study subjects. Behavioral risk factors profile showed that 6.2% were alcoholic, 28.7% were smokers. Modifiable risk factors profile showed that, 48.7% were in overweight category of BMI, 3.7% were obese class I of obesity scale. Hypertension status in the study subjects showed that 2.5% had high normal, 8.7% had grade I hypertension, 11.2% had grade II hypertension and 1.3% had Grade III hypertension. Diabetic profile showed that 51.2% of the study subjects were diabetic and 12.4% were having constipation.

Medical risk factors in the study subjects showed that 62.5% of females were having pregnancy, 26.3% had

history of prolong cough, 37.5% had surgical site infection, 36.3% had mild anemia and 6.3% had moderate anemia.

Physical risk factors profile showed that only 1.3% of the study subjects were exposed to radiation, 7.5% were exposed to heavy physical stress, 36.3% were exposed to moderate physical stress and 56.2% were exposed to sedentary work.

Clinical presentation of the study subjects showed that 60% had swelling, 34% had swelling/pain and 6% had obstruction.

Table (3): Risk factors profile in the study subjects.

Risk factors	Frequency	%
Behavioral risk factors profile in study subjects		
Alcohol	5	6.2
Smoking	23	28.7
Modifiable risk factors in study subjects		
BMI		
Normal weight (BMI 18.5- 24.9)	38	47.4
Overweight (BMI 25-29.9)	39	48.7
Obese class I (BMI 30-34.9)	3	3.7
Hypertension		
High normal (130-139/85-89)	2	2.5
Grade I (140-159/90-99)	17	8.7
Grade II (160-179/100-109)	9	11.2
Grade III ($\geq 180 / > 110$)	1	1.3
Diabetes	41	51.2
Constipation	10	12.4
Medical risk factors in study subjects		
Pregnancy	50	62.5
Prolong cough	21	26.3
Surgical site infection	30	37.5
Anemia		
Mild (9-11 gm/dl)	29	36.3
Moderate (7-9 gm/dl)	5	6.3
Physical risk factors in study subjects		
Exposure to radiation	1	1.3
Physical stress		
Heavy	6	7.5
Moderate	29	36.3
Sedentary	45	56.2

Table (4) showed the risk factor for developing incisional hernia in perforation cases. Risk factors which have high odds ratio were smoking (OR 21.310, p value 0.049), anemia (OR 3.710, p value 0.151) and moderate

physical stress (OR 2.897, p value 0.321). Among all risk factors, smoking was statistically significant (p value 0.05).

Table (4): Risk factor for developing incisional hernia in perforation and obstruction cases.

Risk factors for perforation	Odds ratio	Std. Err.	P value	95% CI	
Alcohol use	1.380	1.635	0.545	0.165	11.497
Smoking	21.310	29.955	0.049	1.009	154.087
Tobacco use	0.498	0.699	0.597	0.121	8.251
Overweight	0.251	0.209	0.041	0.054	0.727
Obese	0.592	0.765	0.529	0.061	8.534
Diabetes	1.189	0.792	0.805	0.297	3.537
Hypertension	2.299	1.801	0.311	0.497	9.347
Constipation	1.602	1.786	0.590	0.211	12.364
Prolong cough	1.911	1.009	0.546	0.469	5.950
Anemia	3.710	2.297	0.151	0.904	12.963
Surgical site infection	0.642	0.399	0.697	0.201	2.208
Moderate physical stress	2.897	1.951	0.321	0.697	10.197
Heavy physical stress	1.003	1.297	0.997	0.118	13.007
Cons	0.098	0.109	0.042	0.054	0.499

Table (5) showed the risk factor for developing incisional hernia in LSCS cases. Risk factors which have high odds ratio included obese (OR 10.758, p value 0.189), overweight (OR 2.312, p value 0.354) and

constipation (OR 1.394, p value 0.921). Among all the risk factors, hypertension and prolonged cough were statistically significant (p value <0.05).

Table (5): Risk factors for developing incisional hernia in LSCS cases.

Risk factors for LSCS	Odds ratio	Std. err.	P value	95% CI	
Overweight	2.312	1.599	0.354	0.605	8.951
Obese	10.758	15.254	0.189	0.514	190.954
Diabetes	0.791	0.615	0.709	0.257	3.467
Hypertension	0.097	0.047	0.037	0.017	0.297
Constipation	1.394	1.592	0.921	0.191	11.699
Prolong cough	0.219	0.181	0.094	0.091	1.151
Anemia	0.313	0.251	0.091	0.052	1.317
Surgical site infection	1.119	0.691	0.793	0.318	5.295
Moderate physical stress	0.717	0.507	0.591	0.193	3.012
Cons	6.518	5.719	0.043	1.209	30.111

Table (6) showed the risk factors for developing incisional hernia in cholecystectomy cases. Risk factors which have high odds ratio were exposure to radiation

(OR 21.495, p value 0.091), tobacco uses (OR 2.591, p value 0.789) surgical site infection (OR 1.307, p value 0.795) and overweight (OR 1.091, p value 0.894).

Table (6): Risk factor for developing incisional hernia in cholecystectomy cases.

Risk factors for cholecystectomy	Odds ratio	Std. Err.	P value	95% CI	
Alcohol use	0.798	1.691	0.789	0.091	45.157
Smoking	0.613	1.618	0.946	0.018	91.597
Tobacco	2.591	5.599	0.789	0.113	181.315
Overweight	1.091	1.311	0.894	0.136	11.002
Diabetes	0.690	0.846	0.791	0.171	6.547
Hypertension	0.681	1.127	0.713	0.045	12.919
Prolong cough	0.793	0.793	0.816	0.091	7.195
Anemia	0.919	1.307	0.899	0.112	11.117
Surgical site infection	1.307	1.411	0.795	0.191	11.061
Exposure of radiation	21.495	31.951	0.091	0.715	651.158

Moderate physical stress	1.006	1.959	0.891	0.121	17.995
Cons	0.091	0.089	0.051	0.011	0.871

Table (8) showed the risk factors for developing incisional hernia in hysterectomy cases. Risk factors which have high odds ratio were hypertension (OR 20.195, p value 0.023), prolong cough (OR 1.541, p

value 0.465) and anemia (OR 1.201, p value 0.899). Among all the risk factor, hypertension was statistically significant (p value <0.05).

Table (7): Risk factors for developing incisional hernia in hysterectomy cases.

Hysterectomy	Odds ratio	Std. Err.	P value	95% CI	
Overweight	0.512	0.464	0.514	0.091	3.018
Diabetes	0.431	0.418	0.540	0.061	3.495
Hypertension	20.195	21.875	0.023	1.584	195.959
Constipation	0.657	1.151	0.987	0.119	15.195
Prolong cough	1.541	1.508	0.465	0.239	8.649
Anemia	1.201	1.251	0.899	0.182	7.989
Surgical site infection	0.699	0.499	0.896	0.167	3.499
Moderate physical stress	0.309	0.387	0.534	0.033	3.499
Cons	0.149	0.185	0.201	0.031	1.310

DISCUSSION

In the present study, the mean age of the study subjects was 51.25±10.54 years. Maximum 50% of study subjects were b/w 41-60 years age group and 67.5% of the study subjects were female. Kumar et al did a similar study and patient age group of 30-60 years found to have highest incidence, females outnumbered the males with the ratio of 4:1. Liaguna et al found that mean age was 62 years and 52% were males.^[5,9]

The type of major surgical procedure later develops to incisional hernia showed that 46.3% cases were perforation, 32.4% were LSCS, 8.6% were hysterectomy and 3.6% were cholecystectomy. Agbakwuru et al reported that index surgeries leading to the hernias were emergency Caesarean section (59.1%), emergency exploratory laparotomy (13.6%), and elective surgeries (27.3%).^[7] In the current study, out of 80 ventral incisional hernia cases, 25% of the surgeries were elective and 75% were emergency. Sidhu et al reported that there were equal numbers of elective and emergency operations developed incisional hernia.^[3]

The behavioral risk factors profile of study subjects showed that out of 80 study subjects 6.2% were alcoholic and 28.7% were smokers. Smoking (OR 21.310, p value 0.049) was the major risk factor for developing incisional hernia in (37/80) perforation cases. Obesity was the major risk factor (OR 10.758) for incisional hernia in LSCS cases. Surgical site infection was also found in 37.5% of study subjects. In the present study 26.3% of the study subjects had history of prolonged cough. Prolonged cough (OR 1.541) was the risk factor for development of incisional hernia in hysterectomy cases. Risk factor for developing incisional hernia in cholecystectomy cases which have high odds ratio were exposure to radiation (OR 21.495), tobacco uses (OR 2.591) surgical site infection (OR 1.307) and overweight (OR 1.091).

Weissler et al evaluated the development of incisional hernia risk model after colectomy significant risk factors were obesity (odds ratio=1.49; p<0.0001), and alcohol abuse (odds ratio=1.39; p=0.010). Shah et al found that obesity, smoking, cough and diabetes were implicated as the common etiological factors for the development of ventral hernias. Sorensen et al reported that smokers had a 4-fold higher risk of incisional hernia (odds ratio (OR), 3.93 (95% confidence interval (CI), 1.82-8.49)) independent of other risk factors and confounders.^[6,8,13]

Nagaraju et al revealed that obesity is a common predisposing factor. Obese females have increased predilection toward incisional hernia. Obesity is associated with more risk of post-operative wound infection and both resulted in an increased incidence of incisional hernia.^[12] Walming et al also reported that BMI 30-35 was a risk factor for incisional hernia.^[14] Degloorkar et al reported that wound infection was the risk factor in 26% patients. Repeated surgery history was given by one patient.^[15]

In our study, modifiable risk factors profile of the study subjects showed that 36.3% of them had high blood pressure, 51.2% were diabetic and 12.4% had constipation and 42.6% had anemia. Hypertension (OR 2.299), anemia (or 3.710), constipation (OR 1.394) and diabetes (OR 1.189) were the risk factors for development of incisional hernia in perforation cases. Constipation (OR 1.394) was also the risk factor for development of incisional hernia in LSCS cases. Hypertension (OR 20.195) and anemia (OR 1.201) were also the risk factor for development of incisional hernia in hysterectomy cases. Sidhu et al revealed that on univariable analysis diabetes (OR=2.73, p value=0.004) and hypertension (OR=2.17, p value=0.016) were identified as independent risk factors for ventral hernia development.^[3] A study by Beltrán et al to identify risk factors for development of incisional hernia were female

gender ($p=0.011$), diabetes ($p<0.0001$) and wound infection ($p=0.034$).^[10] Hornby et al reported that *Diabetes mellitus* (3.54; 1-12.56) significantly increased the risk of incisional hernia.^[11] Jaykar et al did a clinical study on ventral hernia, and found that obesity and constipation were found to be the major predisposing risk factors.^[16]

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