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A comprehensive study on the incidence and management of incisional hernia

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ABSTRACT

Background: Incisional hernia is a frequent complication of abdominal surgery. The reported incidence of incisional hernia following abdominal surgery ranges from 2-20%. It may be caused by flawed operative techniques, by postoperative complications such as wound infection, by increased abdominal wall tension or by a metabolic connective tissue disorder.

Methods: The present study was conducted on patients of incisional hernias admitted in various surgical wards of the department of surgery, associated group of hospitals attached to Dr. Sampurnanand Medical College, Jodhpur over a period of 10 years extending from 2005 to 2015. Detailed history and clinical examination of all patients were obtained from the case sheets. Other risk factors like obesity, hypertension, diabetes mellitus and malignant disease were recorded. Routine investigations were also documented. Patients were closely monitored in pre, intra and postoperative periods. The data collected were systemically recorded and statistically analysed.

Results: Maximum incidence (67.21%) of incisional hernia seen in 31-60years of age and mean age was 48.54years with twice common in female sex. Abdominal swelling was the commonest (90.57%) presenting symptom. 80% of patients present within 1 year. Of previous surgery, 50% of them were gynaecological. Midline vertical incision (70%) was most notorious to develop in incisional hernia. Wound infection (50%) was major risk factor. Mesh repair (laproscopic 3.68% & open 92%) was the procedure of choice.

Conclusions: Incisional hernia is twice common in women than in men with gynaecological procedures mainly caesarean section contributing for half of the cases of incisional hernias. It more frequently develops in vertical midline incision and post-operative wound infection is the most important predisposing factor. Incisional hernia usually appears within 1 year of previous operation. Mesh repair of incisional hernia has of late become popular amongst surgeons.

Keywords: Incisional hernia, Mesh repair, Previous surgery

INTRODUCTION

Incisional hernia is a frequent complication of abdominal surgery. The reported incidence of incisional hernia following abdominal surgery ranges from 2-20%.1-6 In the United States alone, approximately 200,000 incisional repairs are performed annually.^{7,8} disappointing results of incisional hernia repair add further to the magnitude of the problem. The cause of this

frequent, sometimes serious, complication of abdominal surgery is yet to be determined. It may be caused by operative techniques, by postoperative complications such as wound infection, by increased abdominal wall tension or by a metabolic connective tissue disorder. 9,10 This study has been undertaken to assess the magnitude of this problem, various factors leading to the development of this condition and different modalities of treatment practiced in our set up.

METHODS

The present study was conducted on patients of incisional hernias admitted in various surgical wards of the department of surgery, associated group of hospitals attached to Dr. Sampurnanand Medical College, Jodhpur, Rajasthan India over a period of 10 years extending from 2005 to 2015.

Exclusion criteria

- Strangulated and incarcerated
- Associated with pregnancy
- In paediatric (<10 years) age group
- In patients with severe co-morbid conditions viz severe cardio pulmonary disease, uncontrolled ascitis etc.

Inclusion criteria

- All patients above 10 years of age with incisional hernia
- Both the sexes.

Detailed history and clinical examination of all patients were obtained from the case sheets. Other risk factors like obesity, hypertension, diabetes mellitus and malignant disease were recorded. Routine investigations were also documented. Patients were closely monitored in pre, intra and post-operative periods. The data collected were systemically recorded and statistically analysed.

RESULTS

The incidence of incisional hernia is maximum in the age group of 31-60 years (67.21%). In this study, the youngest patient was 17 while the oldest was 85 years of age (Table 1).

Table 1: Distribution of patients according to age.

Age group (in years)	No. of patients	Percentage
11-20	4	1.63
21-30	29	11.88
31-40	50	20.49
41-50	56	22.95
51-60	58	23.77
61-70	39	15.98
71-80	6	2.45
>80	2	0.81
Total	244	100.00

Out of a total of 244 patients, 34.42% were male while 65.57% were female patients with overall M: F ratio 1:2 approx. confirming female preponderance of incisional hernia (Table 2).

90.57% of the patients presented with abdominal swelling alone while 8.19% presented with abdominal swelling

and pain in the abdomen. 0.81% of the patients presented with intestinal obstruction while 0.41% had pain in abdomen alone at the time of presentation (Table 3).

Table 2: distribution of patients according to sex.

Sex	No. of patients	Percentage
Male	84	34.42
Female	160	65.57
Total	244	100

Table 3: Distribution of patients according to mode of presentation.

Mode of presentation	No. of patients	Percentage
Swelling	221	90.57
Swelling and pain	20	8.19
Swelling, pain and vomiting	2	0.81
Pain	1	0.41
Total	244	100.00

In this study, 38.11% of the patients presented within 6 months of previous surgery while 43.03% reported between 6-12 months after surgery. 16.39% of the patients presented between 1- 2 years and 1.22% each within 2-3 years and >3 years of previous surgery (Table 4).

Table 4: distribution of patients according to duration of presentation.

Duration (in months)	No. of patients	Percentage
<6	93	38.11
6-12	105	43.03
12-24	40	16.39
24-36	3	1.22
>36	3	1.22

In the present study, 40.57% underwent previous elective surgery while 57.78% had been operated in emergency (Table 5).

Table 5: Distribution of patients according to mode of surgery.

Mode of previous surgery	No. of patients	Percentage
Elective	99	40.57
Emergency	141	57.78
Not known	4	1.63

Approximately 50% of the patients who developed incisional hernia had undergone a gynaecological procedure amongst which caesarean section was the commonest followed by abdominal hysterectomy. Gastrointestinal surgeries account for 33.19% while incisional hernia followed appendicectomy,

cholecystectomy, nephrolithotomy and suprapubic prostatectomy in 6.96, 1.22, 2.04 and 2.45% cases respectively. 9.8% patients developed incisional hernia after miscellaneous procedures (Table 6).

Table 6: Distribution of patients according to previous surgeries.

Name of procedure	No. of patients	Percentage
Abdominal hysterectomy	38	15.57
Caesarean section	55	22.54
Abdominal tubectomy	15	6.14
Exploratory laparotomy with gastrointestinal surgery	81	33.19
Appendicectomy	17	6.96
Cholecystectomy	3	1.22
Nephrolithotomy	5	2.04
Suprapubic prostatectomy	6	2.45
Miscellaneous	24	9.8
Total	244	100.00

47.13% of the patients had undergone previous operation by lower midline vertical incision. In 24.18 and 10.24% of the patients, upper midline vertical and right paramedian incisions were used for surgeries respectively. Pfannenstiel and Grid Iron incisions were used for operations in 8.6 and 6.55% of the patients respectively (Table 7).

Table 7: distribution of patients according to previous incision used.

Name of incision	No. of patients	Percentage
Lower midline vertical	115	47.13
Upper midline vertical	59	24.18
Right paramedian	25	10.24
Pfannenstiel	21	8.60
Grid iron	16	6.55
Miscellaneous	10	4.09
Total	244	100.00

Wound infection following previous surgery was the major risk factor accounting for 50.0% of the patients. 16.80 and 13.93% of the patients were suffering from obesity and diabetes mellitus respectively. Chronic respiratory illness causing chronic cough was present in 5.70% of the patients who develop incisional hernia (Table 8).

96.31% of the patients underwent open procedures for hernia repair while in 3.68% with laparoscopic onlay mesh repair was done. Among open procedures, 4.91% patients underwent repaired with anatomical repair of the hernia while onlay, underlay and both types of mesh repair were performed in 88.52, 2.45 and 0.81% cases respectively (Table 9).

Table 8: distribution of patients according to risk factors.

Risk factors	No. of patients	Percentage
Wound infection in previous surgery	122	50.00
Obesity	41	16.80
DM	34	13.93
Chronic respiratory illness*	14	5.70

Table 9: distribution of patients according to anatomical versus mesh repair.

Typ rep		procedure and	No. of patients	Percentage
	Op	en procedure	235	96.31
	1.	Anatomical repair	12	04.91
A.	2.	Mesh repair (i) Onlay	216	88.52
		(ii) Underlay	06	02.45
		(iii) Onlay and underlay	02	0.81
	Lap	paroscopic procedure	09	3.68
B.	1.	Mesh repair (i) Onlay	09	3.68

70.49% patients had uneventful recovery. 13.93% patients developed wound infection after present surgery while 4.91% patients had wound dehiscence. Another 8.19% patients had seroma formation (Table 10).

Table 10: distribution of patients according to postoperative complications.

Complications	No. of patients	Percentage
Wound infection	34	13.93
Seroma	20	08.19
Wound dehiscence	12	04.91
Others	6	02.45
NIL	172	70.49
Total	244	100.00

Table 11: distribution of patients according to postoperative complications in patients undergoing anatomical repair.

Complications	Anatomical repair	Percentage
Wound infection	3	25.00
Seroma	1	8.30
Wound dehiscence	1	8.30
No complications	7	58.40
Total	12	100.00

A total of 12 patients underwent anatomical repair of incisional hernia and 25% of them developed wound

infections during post-operative period, 8.3% each developed seroma and wound dehiscence, while post-operative period was uneventful in 58.40% of the patients (Table 11).

In this study, a total of 232 patients underwent mesh repair of the hernia. 13.47% of them developed wound infections during post-operative period, while seroma and wound dehiscence were reported in 8.11 and 4.70 % of the patients respectively. Post-operative period was uneventful in 73.72% of the patients (Table 12).

Table 12: distribution of patients according to postoperative complications in patients undergoing mesh repair.

Complications	Mesh repair	Percentage
Wound infection	31	13.47
Seroma	19	8.11
Wound dehiscence	11	4.70
No complications	171	73.72
Total	232	100.00

DISCUSSION

In this study, the incidence of incisional hernia is maximum in the age group of 31-60 years (67.21%) and mean age of patient with incisional hernia in our study was 48.54 years. The youngest and oldest patient in the study was 17 and 85 years old females respectively. Patients under 10yrs of age were excluded from the study. Ellis, Gajraj and George in their study noticed a mean age of 49.4 years. ¹¹

In this study, 34.42% were male while 65.57% were female patients with overall M:F ratio 1:2 approx. confirming a female preponderance of incisional hernia. This is because of laxity of abdominal muscles in female due to multiple pregnancies. There is also an increased incidence of obesity in females. Ellis, Gajraj and George obtained an incidence of incisional hernia in 64.6% of female population in their study of 383 patients.¹¹

In this study, 90.57% of the patients presented with abdominal swelling alone while 8.19% presented with abdominal swelling and pain in the abdomen. 0.81% of the patients presented with intestinal obstruction while 0.41% had pain in abdomen alone at the time of presentation.

In this study, 38.11% of the patients presented within 6 months of previous surgery while 43.03% reported between 6-12 months after surgery. 16.39% of the patients presented between 1- 2 years and 1.22% each within 2-3 years and >3 years of previous surgery. Bhutia et al, noted almost the same incidence in their study with 2/3rd cases occurring within a year of primary surgery and only 10.8% after 1 year of previous operation. 12

In the present study, 40.57% underwent previous elective surgery while 57.78% had been operated for emergency procedure.

In this study, it is inferred that 47.13% of the patients had undergone previous operations by lower midline vertical incisions. In 24.18 and 10.24% of the patients, upper midline vertical and right paramedian incisions were used for surgeries respectively. Pfannenstiel and Grid Iron incisions were used for operations in 8.6 and 6.55% of the patients respectively. 72.31% of the patients who developed incisional hernia had undergone previous operation by midline vertical incisions.

The increased incidence of incisional in midline vertical incision is probably due to the fact that contraction of abdominal wall muscles retracts the wound edges laterally and the avascular nature of the midline incision may impair wound healing. Also, the fibers of linea alba, which are continuous with abdominal wall muscle aponeurosis, cross the midline mostly in transverse or oblique directions. Therefore, a vertical incision cuts most of them perpendicularly.

In this study, approximately 50% of the patients who developed incisional hernia had undergone a gynaecological procedure, among which caesarean section was the commonest operation followed by abdominal hysterectomy. Geol and Dubey 28.76% incidence amongst these gynaecological procedures. ¹³

In this study, wound infection was the major risk factor accounting for 50.0% of the patients, obesity and diabetes mellitus account for 16.80 and 13.93% of the patients respectively. Chronic respiratory illness viz includes COPD, bronchial asthma and chronic cough were responsible in 5.70% of the patients. Molloy et al also noted nearly same incidence of wound infection (52%). 14

In this study, 96.31% of the patients underwent open procedures for hernia repair while in 3.68% with laparoscopic on-lay mesh repair was done. Among open procedures, 4.91% patients underwent repaired with anatomical repair of the hernia while on-lay, underlay and both types of mesh repair were performed in 88.52, 2.45 and 0.81% cases respectively. In this study polypropylene mesh and the suture material of the same type was used to repair the incisional hernias and the technique of the repair was decided by the size of the hernia defect, abdominal muscle tone, whether hernia defect could be approximated without tension and general condition of the patient.

Incisional hernia repairs using suture techniques bring the defect edges together, which may lead to excessive tension and subsequent wound failure, due to tissue ischemia and sutures cutting through the tissues. Prosthetic mesh allows defects of any size to be repaired without tension. In addition, polypropylene mesh, by

inducing an inflammatory response, sets up scaffolding that, in turn, induces collagen synthesis.

In this study, out of a total of 244 patients, 13.93% patients developed wound infection after present surgery while 4.91% patients had wound dehiscence. Another 8.19% patients had seroma formation. 70.49% patients had uneventful recovery. Rubio et al noted wound infection and seroma collection in 5.5% of cases after incisional hernia repair. 15 Infection did not lead to polypropylene mesh removal but was a risk factor for recurrence. Therefore. including broad spectrum induction of anaesthesia is antibiotics at the recommended. This reduces infection rates16 and recurrence rates. Abramov et al, showed that single dose cephalospor in prophylaxis administered 30 minutes before umbilical or incisional hernia repair significantly reduced the wound infection rate. 16 Prophylactic antibiotics may therefore also prevent subsequent herniation.

From this result, authors recommend adhesion of the prosthesis to the backside of the defect with as large as possible overlap. Suturing of the mesh should probably be best with a stitch interval of no more than 1-2 cm, either continuous or interrupted, with monofilament sutures placed in healthy fascia. Bulging must be prevented but the mesh should not be implanted under tension.

With through patient evaluation, pre-operative skin preparation, meticulous operative technique, use of non-absorbable sutures for musculoaponeurotic tissue, use of suction drain, use of perioperative broad-spectrum antibiotics, nasogastric aspiration, early ambulation and chest physiotherapy, complication rates may be minimized.

CONCLUSION

It can be concluded that incisional hernia is twice common in women than in men with gynaecological procedures mainly caesarean section contributing for half of the cases of incisional hernias. It more frequently develops in vertical midline incision and post-operative wound infection is the most important predisposing factor. Incisional hernia usually appears within 1 year of previous operation & the patients commonly present with swelling alone. Mesh repair of incisional hernia has of late become popular amongst surgeons.

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