Original Article

General Assessment For Predisposing Factors Of Incisional Hernia, Simple Or Mesh Repair

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Summary:

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Background*:Incisional hernia is frequently occurring post operative complication after general surgery with occurance rate 2%-----11%,, it is either appear soon after operation or late occurring incisional hernia..*

Patient &methods: *This is a prospective study that was conducted on 84 patients who were admitted at Baghdad Teaching Hospital during the period from Oct. 1999 to Aug. 2001 for repair of incisional hernias. Their ages were ranging from 24-74 years with mean age of (48 ±12). Sixty-nine patients were elective and 15 patients were urgent. Assessment of the patients for the predisposing factors influencing the development of incisional hernia was done and in our study these factors were: -*

Results:*.Wound infection in 66%, midline incision in 58.3%, obesity 55%, chronic obstructive pulmonary disease (COPD), with, respiratory tract infection (RTI) in 44%, multiparty with gynecological and obstetric procedures were 42.9%, diabetes mellitus (D.M) 28.9%, Old age in 21.4%, contaminated bowel surgery 21.4% & finally wound dehiscence with re-suturing in 7.1%. Simple repair was performed in 57 patients and prolene mesh repair was used for 27 patients and follow-up was continued for 6 months except for 8 patients who were lost from follow-up.*

Results of simple repair was associated with many complications including recurrence in 4 patients, wound infection in 10 patients, seroma in 3 patients deep venous thrombosis (DVT) in one patient.

Whereas Mesh repair was followed with minimal complications of seroma in 3 patients and deep venous thrombosis (DVT) in one patient and no recurrence was recorded.

Conclusion*: wound infection,,obesity,emergency surgery ,type of suture material & type of wound all areimportant factors leading to I.H.*

Key word*: incisional hernia causes,,simple or mesh repair.*

Introduction:

Incisional hernia (I.H.) is defined as a breakdown of the musculo-apenurotic layers of a surgical scar with a creation of a potential sac that protrude as a result of increased intraabdominal pressure through the fascial defect. The full healing of the skin incision is used to make a convenient distinction between wound dehiscence and incisional hernia [1]

Incisional hernia is the only ventral wall hernia that is truly iatrogenic[2] and is a frequently occurring post-operative complication after general surgery with occurrence rate remains high for major abdominal operations ranging from 2%-11%[3].

Types of Incisional hernias: -

Incisional hernias are of two types: -

-Early occurring incisional hernia, which appears soon after operation.

-Late occurring incisional hernia, Studies showed that two-thirds of IH appear within the first 5 years and 1/3rd appears at 5-10 year after the operation [4]

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Clinical types of Incisional hernias: -

There are two distinct clinical types of incisional hernias:

Incisional hernia with a wide defect in the appeneurotic or muscular layer of abdominal wall with smooth and regular margins, which are easily defined. It reduces spontaneously as soon as the patient lies down and carries low risk of strangulation.

Incisional hernia in which the defect is relatively small, irregular and two or more such defects may be present in the same scar and contents of omentum and bowel are matted together and are often adherent to a localized peritoneal sac. Partially or wholly irreducible. The hazard lies in the risk of strangulation [5] .

Factors influencing or contributing to the development of incisional hernia: -

Patient-related factors of age,gender, obesity, D.M., constipation, C.O.P.D, uremia, anaemia, avitaminosis, jaundice, malnutrition ,steroid therapy, malignancy, TB.,,increase in intra-abdominal pressure, prostatic hypertrophy, constipation, chronic cough and cytotoxic.

Operation-related factors: which include technique of the operation, type of sutures used in wound

closure, type of operation whether elective or emergency, type of closure technique of previous operation (mass closure or layered closure), contamination (pus or fecal), wound infection, use of drain, wound complications, & re-operation & gynecological or obstetric procedures.

Among these Predisposing factors, the most important are:

Wound infection, which is the important single factor in the development of incisional hernia or wound dehiscence [6]

Obesity is associated with a high percentage of incisional hernia development and recurrence following their repair [7].

Dehiscence of the wound the incidence ranging from 0.3—5.8 with significantly high incidence in midline than in transverse incisions [8]

Type of incisions vertical pararectus incision along the outside of the lateral border of rectus sheath destroys the nerve and vascular supply to the tissues medial to the incision, causing them to atrophy [4]. It is believed that incisional hernias and its recurrence are more common in vertical incisions and less common in transverse and oblique incisions [9].

Poor surgical technique

***-Layered closure*:** are followed by a greater incidence of postoperative hernia than are the wounds closed by single-layer mass closure technique [4].

***-Suturing technique*:**

Small tightly tied suture causes ischemia & necrosis of the tissues it contains [4].

***-Tension*:** Closing wounds with tension is a bad surgery that creates an area of pressure necrosis, which is a primary cause of incisional hernia or wound dehiscence [10].

The ideal closure technique is by tension free continuous; suture it is quicker cheaper and safe [11].

-Inappropriate suture material:

The sutures are responsible for the integrity of the wound for the first six months so any material that does not survive and maintain most of its strength is not suitable for wound closure. The ideal suture is non-absorbable monofilament [11], . They are the least reactive sutures and provide more tensile strength than absorbable suture materials. Nylon and prolene have excellent tensile strength with their disadvantage of slippery of knots and therefore many knots are required to maintain a secure suture. They are the materials of choice [8].

Drainage Tube: Drainage tubes brought out through the operation wound are a potent cause of post-operative hernias & wound infection. [12].

Gynecologic & obstetric procedures: With reoperation is a predisposing factor for the development of incisional hernia up to 58% of all abdominal operations in women, its maximum incidence seen at the lower mid line incision rather than pfennenstiel incision [13].

Old Age: Is one of the predisposing factors of incisional hernia formation in-patient of 60 years or more.

Patients And Methods:

This is a prospective study conducted at Baghdad teaching hospital during the period from October 1999----to August 2001.

Eighty four patients were admitted for repair of incisional hernias. The ages of the patients ranges from 24---74 years with mean age (48 ± 12) 60 patients were female & 24 patients were male. Detailed of history with clinical examination as well as lab oratory blood tests, E.C.G. & CXR, were done, for every patient Xray abdomen erect & supine were done if there was possibility of intestinal obstruction ,, abdomen ultrasound were done , (to some cases) & was recorded in special formula.

Repair of the incisional hernia was done either by prolene simple repair 57 patients

Or by polypropylene (prolene) mesh repair 27 patients.

All operations were conducted under general anesthesia with muscle relaxant agents & preoperative resuscitation was done to the emergency patients.

Regarding the Operative Repair of an Incisional Hernia

. By Simple Repair:

A. The old scar is excised by a vertical elliptical incision and carefully separated from the hernial sac.

B. The skin flaps on each side are dissected of the rectus sheath and the apponeurosis and muscles.

C. The sac is opened vertically along the midline and its inner surface as well as the peritoneal surface of the anterior abdominal wall is cleared of all adherent omentum and bowel [4]. Sometimes there was no need to open the sac and the layers are repaired by non-absorbable suture material.

. Prosthetic Mesh Repair:

A sheet of polypropylene mesh is inserted between the posterior rectus sheath and the muscle fibers and anchored in place but if below the umbilicus, the mesh is placed in the preperitoneal space because the posterior wall of rectus sheath is absent below the arcuate line [4] [14].

Hospital stay was 3—5 days for most of the patients, except for those with post operative complications it was longer (2-4) weeks.

Follow up continued for 6 months except 8 patients were missed.

Statistical analysis;

P value of < 0.05 was considered to be significant.

Results:

In this study 84 patients with incisional hernias repaired. Their ages ranged from 24—74 years with mean age of (48 ±12), 60 female patients & 24 male

patients, so I.H. was more in female patients 71.4% & it was 28.6% in male patients. As shown in table one, it was also found that I. H. were common in the age group (40—59 years) 35.6% among female patients & 10.8% male patients of the same age group. Table one.

Table 1: Distribution of patients by age & gender

Age (Years)	Male		Female		Total	
	No/	%	No.	%	No.	%
20-39	3	3.5	24	28.6	27	32.1
39-60	9	10.8	30	35.6	39	46.4
61 +	12	14.3	6	7.1	18	21.4
Total	24	28.6	60	71.4	84	100

P < 0.0005 highly significant, more female patients in young age group than male.

Regarding the mode of admission for I.H. repair. 69 patients were elective & 15 patients were urgent.

The majority of patients had mid line incisional hernia 49 patients, while patients with subcostal incisional hernia were only 5 patients. As shown in table 2.

Table 2: Type of incisions of original operations

Type of incision	Number of incisional hernia	
	No.	%
Midline Incision (MLI)	49	58.3
Para median Incision (PMI)	18	21.4
Sub costal Incision (SCI)	5	6.1
Grid Iron Incision (GII)	6	7.1
Caesarean Section (CS)	6	7.1
Total	84	100

The criteria of the previous original operations were assessed & showed that in 18. Patients the previous wound was contaminated, table 3.

Table 3: Distributions, Types of previous operations

Types of previous operation	Total	
	No.	%
Clean	34	40.5
Clean/Contaminated	32	38.1
Contaminated	18	21.4
Total	84	100

Table 4 shows that mid line & paramedian incisional hernias were associated with incidence of obstruction or strangulation as compared to other types of incisional hernias.

Table 4: Complications related to the types of incision

Type of Incision	No. of Hernias	Obstructed	Strangulated
MLI	49	8	3
PMI	18	4	-
SCI	5	-	-
CS	6	-	-
GII	6	-	-
Total	84	12	3

Assessment of the possible predisposing factors to the development of incisional hernia has shown that wound infection was most common represent 56 (66.6%) patients, followed by mid line incision 49 (58.3%),, obesity in 46 (55%) patients. The least predisposing factor was wound dehiscence with resuturing in 6 patients table 5.

Table 5: Predisposing factors for the development of I.H

Factors	No.	%
Wound Infection	56	66.7%
Type of vertical incision		
Midline incision	49	58.3%
Paramedian Incision	18	21.4%
With re-incision (multiple operations)	16	19%
Obesity	46	55%
COPD with RTI	37	44%
Multiparity	36	42.9%
DM	24	28.9%
Old Age	18	21.4%
Operative wound (contaminated)	18	21.4%
Wound dehiscence with resuture	6	7.1%

The size of the hernial defect was large in 30. Patients, medium sized in 45 patients & small defect in 9 patients.

Result of the repair:

Simple repair was performed for 57 patients & mesh repair for 27 patients table 6.

Table 6.Type of repair of incisional hernia used in relation to the size of defect.

Size (cm)	Simple	Mesh	Total
Small (1-5)	9	-	9(10.7)
Medium (6-16)	36	9	45(53.7)
Large (>16)	12	18	30(35.7)
Total	57	27	84(100)

Simple repair was associated with many complications including recurrence in four patients, wound infection in 10 patients, seroma in 3 patients & D.V.T. in one patient.

While mesh repair had less complication, 3.patients had seroma & 1. Patient had D.V.T. & no recurrence was recorded.

Complications was higher following moderate & large sized I.H. repair,, than following small I.H. repair..

I.H.repair was associated with high rate of postoperative complications among elderly patients (50%). Least postoperative complications were reported among age group 20-29.

Discussion

I.H. is an iatrogenic disease, there are many factors in its etiology.these include:

.Wound infection:

Abdominal wound infection is important factor predisposing to I.H.in our study 66.7% of patients had postoperative wound infection, which is similar to the result obtained by George [15]. While Bucknall [16] reported a rate of 56% & Fisher & Turner [17] reported a rate of 88%.

.Obesity:

It is one of the leading factor of I.H.formation.so obesity seem to have an important role with similar results done by other workers [16] [18]

.Type of incision:

Incisional hernias were common following vertical incision than oblique (kocher) incision, while transverse incisions were the safest our results were similar to other workers [4], [9].[18]

.Reincision:

Another factor is reincision through the same scar with similar results as reported by other auther (4). In a study done by Lamont & Ellis, ([19], the incidence of I.H.was 6% after the first incision but, the incidence was increased to 14% after a second incision.

.Respiratory tract infection. R.T.I:

Post operative R.T.I.was detected in 37 patients with I.H. cough increases intra abdominal pressure which have an effect on the freshly sutured laprotomy wound, our study is supported by previous workers [4][7]. Pulmonary complications are more common after emergency operations, special hazard were seen by pre existing C.O.P.D.& smoking.

.Multiparity with gynecological & obstetric procedures:

In our study, operations performed for gynecological & obstetric patients via lower mid line incision was found to have increasing incidence of I.H. women have a higher incidence of ventral hernias than men it is due to the fact that I.H. Is more frequently seen following hysterectomy caesarean section & appendicectomy[8].

.Diabetus mellitus (D.M.):

D.M.were present in 24 patients who developed I.H. our findings was similar to other workers [4] [20].

.Old age:

In our study, we found a significant association between increasing age & I.H. formation our result is similar to results done by other workers Bucknall TE, COX & ELLIS [7] &[21] Wound healing usually is slower & less solid in the geriatric patients as protein turnover is reduced with advanced age [14].

.Type of operation & operative wounds:

In our study 21.4 % patients had history of emergency bowel surgery with contaminated wounds, this findings was similar to other workers [16] [19]certain operations have a tendency to be followed by I. H. ,like laprotomy for peritonitis as in perforated peptic ulcer, appendicitis, diverticulitis & acute pancreatitis.

.Burst abdomen:

A history of burst abdomen was present in 6. (7.1%) patients with I. H. while the result of other worker showed dehiscence in 2% followed by I.H. after one year in 7% [6] while Reitane & moller [22] showed the incidence of I.H. after resuture was 1% while Tweedie [23] mentioned a higher incidence up to 28%.

Incisional hernia .is multifactorial problem & the causative factors seem to have an additive effect & in our study 38.2% of patients had 4 factors &40.4% of patients had 2—3 factors our findings are similar to the finding done by other workers [24] & rarely a single predisposing factor occur alone.

The result of the repair of incisional hernia:

For many years, repair of I.H.was associated with ahigh recurrence rate, but in recent years the introduction of prosthetic materials has provided the opportunity to perform tension free repair there by reducing the rate of recurrence, with correct preparation of the patient better result can be obtained, so the application of mesh to reinforce the tissues has shown reduction in the recurrence rate [25].

In our study simple repair had recurrence in 4 (7%) patients. While other study showed recurrence rate of 23.2 %[24].

Regarding mesh repair in our study no recurrence was recorded among 27 patients. While other study showed recurrence rate 12.9%--29%. [26].

Lastly it was found the recurrence is more after emergency operations as compared to elective operations. [27]

Conclusions

Wound infection is important factor leading to I.H.so every effort must be done to avoid it & broad-spectrum antibiotics can be prescribed specially to high-risk group of patients.

Obesity is a risk factor for I.H. development so it is better to advise the patient for weight reduction before surgery, & repair of I.H.

It is advisable to use oblique or transverse incision when ever possible especially in gynecological & obstetric operations.

Closure technique of incision should be meticulous by using nonabsorbable monofilament suture.

An alternative incision is preferable if feasible when operating on patients with previous scar.

Prosthetic mesh repair is the method of choice for I. H. repair because of low rate of complications.

There is high rate of complications in emergency surgery due to wound contamination, but with correct preparations to the patients, a better result can be obtained.

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