
The Low Transverse Abdominal Pfannenstiel Incision and the Prevalence of Incisional Hernia

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Abstract:

Background: Pfannenstiel incision is the commonest type of incision performed in the gynecological operations, although post operative incisional hernia is low, but should not be underestimated.

Objective: To determine the prevalence of incisional hernia in patients with a low transverse Pfannenstiel incision.

Design: Prospective study on patients from January 2007-to December 20008.

Setting: Elwiyah Maternity Teaching Hospital.

Patients & Methods: All adult women, operated on, between January 2007 to December 2008 using a Pfannenstiel incision by many gynecologist and obstetricians, were studied for general and local risk factors of incisional hernia development and were followed for two years at the out patients department or private clinic, all patients were subjected to physical examination focusing on the presence of incisional hernia.

Results: (1.76%) of the patients developed incisional hernia in a period of 6-24 months.

Conclusion: Incisional hernia is a rare complication of Pfannenstiel incision, besides it's cosmetically more acceptable than the lower midline incision.

Key words: Incisional hernia, prevalence in a low transverse abdominal Pfannenstiel incision.

Introduction:-

It is probably no exaggeration to state that in abdominal surgery wisely chosen incision and correct methods of making and closing such wounds are factors of great importance.

The incidence of incisional hernia depends on how the condition is defined.^[1]

It can be defined as any abdominal wall gap with or without a bulge, that is perceivable on clinical examination or imaging (by ultrasound, magnetic resonance imaging and, computerized tomography) after the index operation, if a visible bulge is made part of the definition, the incidence of incisional hernia will be underestimated.^[1]

The incidence of incisional hernia after midline laparotomy range from 3% to 20% and doubles if the index operation was associated with infection.

Incisional hernia is due to failure of lines of closure of the abdominal wall following laparotomy. The approximated tissue separate and abdominal organs usually bowel or omentum bulge through the gap, which is covered from inside outwards with peritoneum, scar tissue and skin, a many factors , singly or in various combinations, may cause failure of the wound to heal satisfactorily and lead to the development of incisional hernia^[2]

The early occurring type, which appears within 5 years (two third of cases) after original laparotomy closure, is due mainly to poor surgical techniques (surgeon failure) or sepsis^[2]

The late occurring hernia which appears five, ten, or even more years after the original operation (one third of cases) is due to tissue

failure and collagen abnormalities (patients failure).^[2]

After the first incisional hernia repair, recurrence rate is up to 53% have been described^[3]. Therefore, preventing an incisional hernia is mandatory, and surgical methods should be developed and used to lower the incidence of incisional hernias.^[3]

In 1900, Hermann Johannes Pfannenstiel (was a German gynecologist 1862-1904, who was a native of Berlin) described a low transverse abdominal incision to prevent incisional hernia development.^[4,5] The incision that bears his name is the incision of choice for a variety of gynecological and surgical operations(6-10). An aesthetically more pleasing "bikini-line"^[5,6,8,11,12] scar and less postoperative complications are mentioned as additional advantages of this technique. Nerve entrapment, however, can be a disadvantage.

In this study we evaluate the prevalence of incisional hernia after Pfannenstiel incision or its modification in a large series.

Patients and Methods:-

During the period from Jan. 2007 and Dec. 2008, 1924 patients subjected to surgical treatment using a low transverse Pfannenstiel incision(muscle separating) or it's modification, such as Maylard's incision (muscle cutting) (19) or Cherney's incision (tendon cutting)(19) in the gynecological and obstetrical department in Al-Elwiyah Maternity Teaching Hospital.

These patients were examined in the outpatient clinic or private clinic after surgery seeking for lumps or localized tenderness .Information were collected about the age

,parity ,the number of previous surgical operations, the type of the operations whether they were (caesarean section ,abdominal hysterectomy (histopathological examination revealed benign diseases) ,ovarian cystectomy, ectopic pregnancy

Myomectomy), and whether the previous surgery was elective or emergency or developed wound infection after the operation.

Patients with a lump or localized pain in previous lower abdominal transverse scar were included. Those patients explored through lower vertical incision were excluded. Clinical assessment is used to diagnose incisional hernia. All hernias were simple (localized pain or lump).

The surgical operation was done by different gynecologists and obstetricians working in this hospital.

The patients were followed post-operatively for a period of 6-24 months (mean 15 months) by the same surgeon in the same hospital or in his or her private clinic.

Thirty four patients developed incisional hernia during this period. Their ages ranged from 20-55 years with mean age 32 year

Operative Techniques:-

The Pfannenstiel incision was made 2-3 cm above the symphysis pubis at the border of the pubic hair. The incision, 8-12 cm long, extended through skin, subcutaneous fat, and rectus sheath and laterally through the fascia of the external, internal oblique and transverses muscles. Thereafter, the anterior rectus fascia and linea alba was separated from the underlying rectus and pyramidelis muscles, from symphysis to umbilicus. Then, the muscles were separated in the midline (dividing the fascia transversalis and, crainly from the arcuate line, the posterior rectus fascia), and finally also the peritoneum was divided. The incision was closed in layers, the peritoneum with a continuous suture (cat gut), the rectus muscles, when appropriate, with one to three interrupted approximating sutures (cat gut). The transversely incised fascia was closed with one continuous suture (cut gut,

vicryl, closure or polypropylene). The technique of closure of the skin varied with the surgeon's preference.

Post-operative care:

Observation chart and intravenous fluid were arranged for the first 12 hours. Antibiotic was given for all patients, narcotic (pethidine 100mg) or non narcotic analgesia (Diclofenac 75mg) were used.

Ambulation and oral fluids were started 12 hours postoperatively then soft diet in the first or second postoperative day.

The patients were discharged from hospital On the second postoperative day.

Removal of stitches was performed in the tenth postoperative day. All patients were given an appointment for follow up examination within 6 weeks, thereafter depend on if the patient has any medical complaint or for family planning advices.

Results:-

Out of 1924 patients, thirty four patients (1.76%) developed incisional hernia in a period of 6-24 months.

Table (1) shows that, 28 patients (82%) had a palpable facial defect of sizes from 5 CM to 10 CM and was located in the scar of previous surgery. 4 patients (11.8%) a palpable facial defect 2-3 CM² was located just beneath the umbilicus (probably due to trauma of anterior rectus sheath during dissection of upper flap). In the remaining two patients (5.9%), the facial defect involved the whole length of Pfannenstiel incision. In those two patients, partial wound dehiscence was developed during immediate post operative period which was managed conservatively at that time to develop incisional hernia later on. Twenty five (73.53%) patients presented with abdominal discomfort or pain, the remaining 9 (26.47%) were presenting because of abdominal swelling. In all patients, a bulge on the abdomen was visible on physical examination, as shown in **table no. (2)**

Table (1) Size and location of facial defect

Size and Location of facial defect	frequency	%
5 CM - 10 CM	28	82
2CM ⁰ - 3CM	4	11.8
Whole length of Pfannenstiel incision.	2	5.9
Total	34	100

Table (2) Presentation of patients

Presentation	frequency	%
Abdominal pain	25	73.53
Abdominal swelling	9	26.47
Total	34	100

Twenty four patients (70.58%) were grand multiparous (Para 5 or more), the remaining ten (29.41%) were Para 4 or less, as shown in **table no. (3)** Twenty six patients had history of

previous three laparotomies or more (76.5%), and 8 (23.5%) have history of previous 1-2 laparotomies as shown in **table no. (4)**.

Table (3) Parity of the patients

Parity	frequency	%
1-4	10	29.41
5 and more	24	70.58
Total	34	100

P<0.001

Table (4) No. of laparotomies

No. of laparotomies	frequency	%
1-2	8	23.52
3 and more	26	76.48
Total	34	100

P<0.001

Ten patients developed hernias in a period less than 12 months (29.41%), while the 24 patients (70.59%) developed hernias in a period between 14-24 months as shown in **table no. (5)**

In eleven patients (32.35 %), the operation was done for elective indications, in twenty three patients (67.65 %) with incisional hernias the indications was emergency as shown in **table (6)**.

Out of 34 patients, 23(67.64%) patients had risk factors, obesity, diabetes, chronic air way obstructions, wound infection, and wound hematomas. Obesity only identified as a risk factor in six patients (17.64%), wound

infection only identified as a risk factor in seven patients (20.58%), chronic cough only identified as a risk factor in another two patients (5.88%), four of the patients were heavy smoker(> 40 cigarette / day) (11.76 %) four of the patients got history of diabetes mellitus on hypoglycemic treatment (11.76%).

Eleven patients have got no risk factors,(32.35%),ten patients had more than one risk factors(29.41%).**table (7)**.

In most of the patients Vicryl (synthetic absorbable suture) was used to suture the rectus sheath and some were sutured using chromic catgut sutures, that's depends on the availability of sutures in the hospital.

Table (5) Periods of developing hernia

Period of developing hernia	frequency	%
< 12 months	10	29.41
14-24 months	24	70.59
Total	34	100

P<0.001

Table (6) Type of operation

Type of operation	frequency	%
Elective operation	11	32.35 %
Emergency operation	23	67.65 %
Total	34	100%

P<0.001

Table (7) Risk factors

Risk factors	frequency	%
No Risk factor	11	32.35
Diabetes mellitus	4	11.76
Obesity	6	17.64
Wound infection	7	20.58
Heavy smoker	4	11.76
Chronic cough	2	5.88
Total	34	100

Discussion:-

In this study, the Pfannenstiel incision has an incisional hernia of 1.76% compared to other studies.

Green all et.al found that there was no statistical difference in developing hernias after transverse or midline incision ⁽¹¹⁾, while

Lip et. al reported an incisional hernia rate of 14% for midline incision and 1% for transverse incision (p <0.05) (7).

The rate of incisional hernia in studies

study	No. of patient	Follow up/months	Midline incision %	Transverse incision %
Thompson	1363	18	3	1
Greenall	557	6	8	6
Lip(7)	149	12	14	1
Johnson(30)	233	12	5	7
Lord(23)	329	12	17	13
The current study	1924	24		1.76

Wound dehiscence rate

study	No. of patient	Midline incision %	Transverse incision %
Thompson (23)	1363	2.5	0.5
Greenall(11)	557	0.3	0.0
Waldhausen(19)	2785	1.7	0.25
Stone(35)	551	4	3
The current study	1924	Not involved in this study	0.1

Another study done by Thompson et al.^(2,12,23) found that incisional hernia rate in midline incision is 2.5% ,and 0.5% in transverse incision.

In midline laparotomy, hernia percentages reported in literature ranged from 20 to 35%^[1].

Obviously, in the current study, this distribution of age, gender, and disease is quite different from most studies on midline incisions. Therefore conclusions from study must be interpreted with care, with respect to incisional hernia; however, we think that the difference is striking. Other series on the Pfannenstiel incision also suggest a low prevalence, with incisional hernia rates from

0.0% to 0.5 %^(4,6,8,20). What we need is more time of follow up to know the rate of incisional hernia more accurately. Three cases of incisional hernia (1.65%) were found just caudal to the umbilicus. In the Pfannenstiel incision, the anterior rectus fascia is separated from the underlying muscle, up to the umbilicus and so the rectus fascia may be damaged at the umbilical level. Various factors may contribute the fact that the Pfannenstiel incision or its modifications performs better with respect to occurrence of incisional hernias. It has more sound anatomical and physiological properties of the incision ^[21],

compared to vertical incision. Burger et al suggested that:

First when a transverse incision is used, larger's lines of cleavage are followed, as well as the direction of most oblique and transverse muscle fibers, nerves and segmental blood vessels.^[21]

Second contraction of the abdominal wall muscle (coughing, vomiting) does not increase tension on the wound as these forces parallel to the transverse operation wound.^[20]

Third unlike the midline incision wound, the transverse incision wound is situated in richly vascularized muscular tissue which may benefit wound healing.^[21]

There are possible explanations for the high incisional hernia rate after mid line laparotomy.^[19]

Firstly, contractions of abdominal wall muscles retract wound edges laterally.

Secondly, the vascular nature of the mid line incision may impair wound healing.

Thirdly, the fibers of the 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.^[23]

A large number of biological factors related to the patient's preexisting disease and its systemic effects have a suspected role in the aetiology of incisional hernia. What they have in common is that they exert a direct or indirect influence on wound healing and thus on satisfactory scar development.^[22]

Incisional hernias in patients with additional (endogenous or exogenous) risk factors, suggest a multifactorial biological basis for the pathogenesis of incisional hernia. The causal mechanisms are still in need of further investigation.^[24]

Despite the low mortality and morbidity of major obstetric and gynecologic surgeries, women undergoing these procedures may suffer from chronic post operative pain in the incision or in the suprapubic or groin regions.^[25]

After exclusion of intra-abdominal or pelvic pathology, neuromas might be considered as the etiology.^[27]

The Clinical evaluation of the patient with postoperative pain needs to be evaluated by obstetrician. The differential diagnosis of post operative pain within the first 6 months includes pain from local scar formation, local infection, incisional hernia, foreign body reaction against retained material (sutures), and isolated secondary pathology (such as unrelated malignancy).^[26]

In contrast, patients whose postoperative pain exceeds 6 months, the differential diagnosis are processes independent of the surgery like abdominal or pelvic masses (malignancy), endometriosis and peripheral nerve related disorders (neuroma).^[27]

Conclusion:-

Wherever feasible, we recommended the use of the Pfannenstiel incision or its modification in lower abdominal surgery, because incisional hernia is rare complication and the incision allows for excellent cosmetic results. Complications of nerve damage however are not uncommon, and should be recognized. When possible, nerves should be identified and preserved, especially when extending the incision more laterally (Maylard's incision) or when Pfannenstiel incision is made too low, the inguinal canal may be damaged on one side on both sides causing post Pfannenstiel groin hernia.

The use of non absorbable sutures in suturing the rectus sheath is recommended as well as better surgical technique.

Treating preexisting diseases like anemia, diabetes, chronic obstructive airway disease (COAD), before surgery may reduce the risk to develop incisional hernia.

Prophylactic uses of antibiotic after laparotomy reduces the rate of wound infection and then reduce the rate of hernias.

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