

## Original Research Article

# Desarda repair versus Lichtenstein repair for treatment of inguinal hernia

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## ABSTRACT

**Background:** Inguinal hernias remain an important medical problem. The definitive treatment of all hernias is surgical repair. Desarda's technique is a tension-free, mesh-free repair method that pays attention to the physiology of the inguinal region.

**Methods:** This prospective comparative study was conducted in general surgery department at Al-Zahraa University Hospital and Damanhour Medical National Institute in the period between March 2019 and March 2021. It included 50 patients who were randomly divided into two equal groups: A (Desarda technique) and B (Lichtenstien technique).

**Results:** The mean operative time in group A was 70.36 minutes and in group B was 64.88 minutes. Seroma formation occurred in 1 patient in group A (4%) while it occurred in 2 patients in group B (8%). The other postoperative complications were comparable in both groups during 1 year of follow-up, hernia recurrence occurred in 1 patient in group B (4%).

**Conclusions:** Desarda repair of inguinal hernia is a good alternative to Lichtenstein repair.

**Keywords:** Desarda repair, Lichtenstein repair, Inguinal hernia, Mesh repair

## INTRODUCTION

Inguinal hernias remain important medical problem due to their high incidence among population. The estimated lifetime risk for inguinal hernia is 27% for men and 3% for women. Annual morbidity rates in various countries vary from 100 to 300 per 100,000 citizens.<sup>1</sup>

In the European Hernia Society (EHS) guidelines, mesh-based techniques (the Lichtenstein technique) in particular and endoscopic methods are recommended for treatment of symptomatic primary inguinal hernia. In a departure from this firm opinion presented by the EHS, the Shouldice method has been acknowledged to be acceptable as well.<sup>2</sup>

However, Lichtenstein technique has some postsurgical complications such as foreign body hypersensitivity, discomfort, abdominal wall stiffness, surgical site infections, and mesh migration. Intense chronic inflammation may also result in meshoma or plugoma at the site of mesh placement, and it has become a new surgical challenge.<sup>3</sup>

In 2001 Desarda published a series of 400 patients who were treated with a novel tissue-based repair that carried his name. The impressive results of Desarda technique with only one case of recurrence and a single reported complication after more than 10 years of follow-up drew growing attention for this technique which does not require complex dissection nor placement of prosthetic materials.<sup>4</sup>

Desarda repair avoids the use of mesh and gives the desired results. This repair is based on the concept of providing a strong and physiologically dynamic posterior wall to the inguinal canal. An undetached strip of the aponeurosis of the external oblique muscle replaces the absent aponeurotic element in the posterior wall and the weakened conjoint muscle receives additional strength from the external oblique muscle to keep it physiologically dynamic.<sup>5</sup>

The aim of this study is to compare Desarda technique with tension free mesh (Lichtenstien) technique in repair of inguinal hernia and throw some light on different methods of tension free repair of inguinal hernia.

## METHODS

This prospective study was done on a consecutive sample of 50 patients and satisfied the inclusion and exclusion criteria to be enrolled in the study during the period between March 2019 and March 2021. All patients participated in the study after taking informed consent according to the ethical committee of both hospitals.

### Inclusion criteria

Male patients with inguinal hernia, fitness for surgery and Patient agreement to undergo the operation with either Lichtenstein repair or Desarda repair.

### Exclusion criteria

Recurrent hernia, female patient, complicated hernia, refusal to the type of repair, unfit for anesthesia.

All patients were subjected preoperatively to: detailed history taking, clinical examination, routine pre-operative laboratory investigation and abdominal ultrasonography. The 50 patients were randomly divided into two equal groups (A and B). Patients in group A were treated with Desarda repair, whereas patients in group B were treated with Lichtenstein repair. All cases were done under spinal anaesthesia. A single dose of broad-spectrum antibiotic was given at induction of anaesthesia.

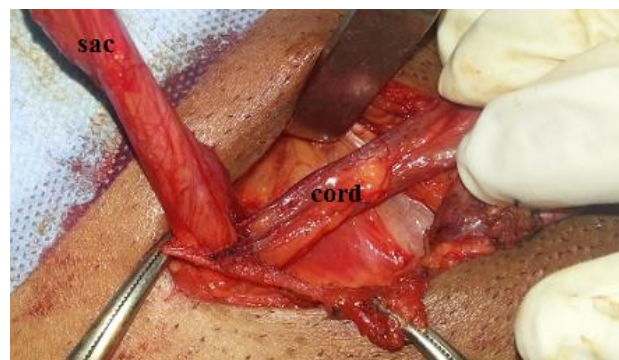
### Surgical techniques

Oblique inguinal incision is used in all. Assessment of the strength of the external oblique aponeurosis is done. Adequate dissection and exposure of the hernial sac. The sac is either opened, contents reduced and excess sac excised (herniotomy) or it can be reduced without opening in case of direct hernia.

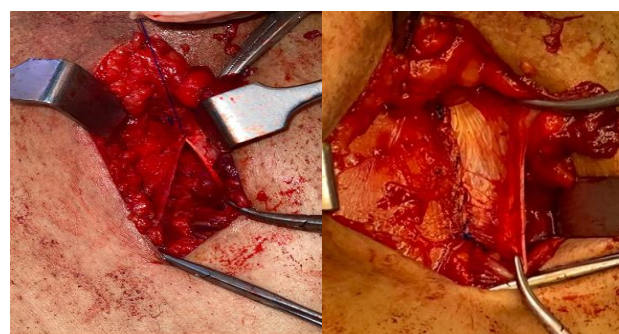
#### In group A (Desarda tissue-based repair)

External oblique aponeurosis will be divided in line with the upper crux of superficial inguinal ring. Cremasteric muscle fibers will be incised and the hernial sac will be dealt with (either herniotomy or reduction inversion)

(Figure 1). The medial leaf of external oblique aponeurosis will be sutured to the inguinal ligament using nonabsorbable 2/0 suture in an interrupted manner beginning from the site of fusion between external oblique aponeurosis and anterior rectus sheath until narrowing the internal ring without constricting the cord (Figure 2). Each suture should take first the inguinal ligament then transversalis fascia ending with external oblique aponeurosis.



**Figure 1: Mobilization of the cord and herniotomy.**

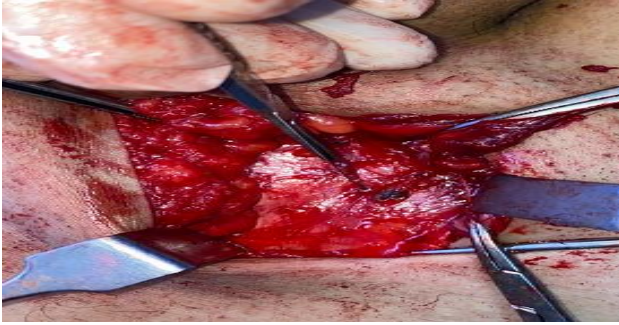


**Figure 2: Suturing of medial leaf of external oblique aponeurosis to the inguinal ligament.**

A splitting incision will be made in the medial leaf of external oblique aponeurosis partially separating a strip with a width equal to the gap between the muscle arch and the inguinal ligament. This incision would go up from the symphysis pubis till 1 to 2 cm beyond the internal ring (Figure 3). The upper free border of the resultant strip of EOA (with its lower border already sutured to the inguinal ligament) will be sutured to the overlying internal oblique aponeurosis (or conjoint muscle) using nonabsorbable 2/0 suture in an interrupted manner. The bites are taken in the aponeurotic part of internal oblique muscle whenever possible unless tension is observed. Thus, an additional layer is created to strengthen the posterior wall of the inguinal canal from this strip of EOA (Figure 4). The spermatic cord is then allowed to fall back on the strengthened posterior wall of the inguinal canal.

The inguinal canal which is closed by suturing the newly formed medial leaf of external oblique aponeurosis to its lateral leaf with nonabsorbable 2/0 suture (Figure 5). Superficial fascia and skin were closed as usual.

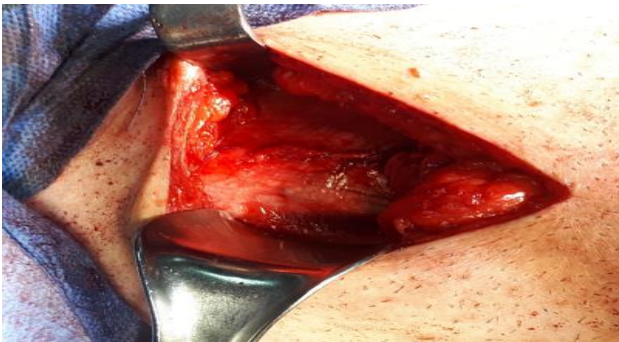




**Figure 3: Asplitting incision in the medial leaf of external oblique aponeurosis.**



**Figure 4: The upper free border of the resultant strip of sutured to the overlying internal oblique aponeurosis (or conjoint muscle).**



**Figure 5: Suturing the newly formed medial leaf of external oblique aponeurosis to its lateral leaf.**

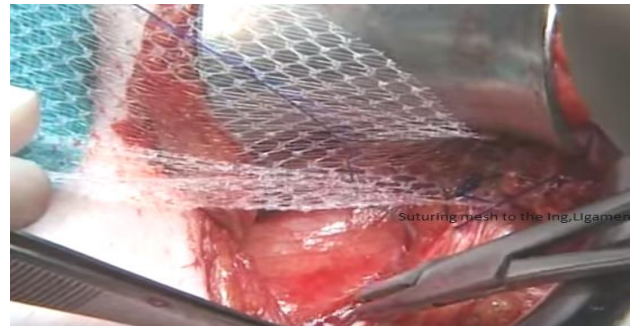
***In group B (Lichtenstein mesh-based repair)***

Polypropylene mesh (6 to 11 cm) will be fashioned to fit the posterior wall of the inguinal canal. The mesh will be sutured to the fibro-periosteum of the pubic bone (Figure 6) and continued laterally, suturing the inferior edge of the mesh to the shelving edge of the inguinal ligament using nonabsorbable interrupted 2/0 sutures to a point 2 cm lateral to the internal ring (Figure 7). Laterally, 2 cm slit will be made through the mesh to accommodate the cord (Figure 8). The superior edge of the mesh is then secured to the internal oblique aponeurosis, while the two tails are sutured to create a new deep ring made of mesh. The spermatic cord will be returned in the inguinal canal which

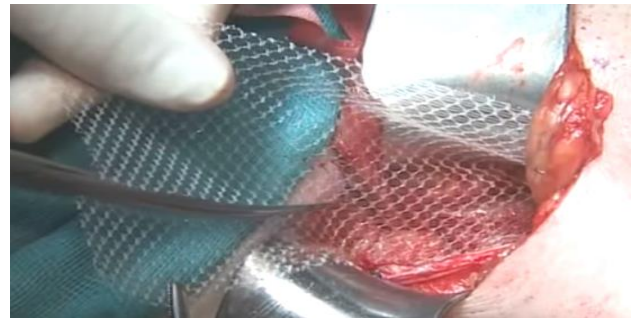
will be closed by suturing the two edges of external oblique aponeurosis. Superficial fascia and skin are closed as usual (Figure 9).



**Figure 6: The mesh will be sutured to the fibro-periosteum of the pubic bone.**



**Figure 7: Suturing the inferior edge of the mesh to the shelving edge of the inguinal ligament.**



**Figure 8: 2 cm slit will be made through the mesh to accommodate the cord.**



**Figure 9: Mesh covering the posterior wall of the inguinal canal behind spermatic cord.**

The following operative data was recorded: type of repair, operative time and intraoperative complications as injury of the contents of the sac or spermatic cord.

### **Postoperative management**

Each patient will be assessed in the postoperative period before discharge for early complications such as: hematoma and testicular edema.

The duration of postoperative hospital stay will be recorded.

All patients were asked to follow up every week for one month then every 3 months for one year to evaluate the outcome of the operation and detect the delayed postoperative complications.

Evaluation of the two different techniques of repair was done according to the following parameters: operative time, postoperative hospital stays, early pain sensation, incidence of hematoma or seroma formation, wound infection, recurrence rate, numbness or paraesthesia in the operative field, in the groin or towards the scrotum, time to return to basic activity and other complications e.g. foreign body sensation, testicular atrophy, and chronic pain.

### **Statistical analysis of the data**

Data were fed to the computer and analyzed using IBM statistical package for the social sciences (SPSS) software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using number and percent. The Shapiro-Wilk test was used to verify the normality of distribution quantitative data were described using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Significance of the obtained results was judged at the 5% level.

### **Used tests**

#### **Chi-square test**

It was used for categorical variables, to compare between different groups.

#### **Fisher's exact or Monte Carlo correction**

It was used for correction for Chi-square when more than 20% of the cells have expected count less than 5.

#### **Student t-test**

It was used for normally distributed quantitative variables, to compare between two studied groups.

### **Mann Whitney test**

It was used for abnormally distributed quantitative variables, to compare between two studied groups

In all these tests, the significance of the obtained results was judged at the 5% level ( $p \leq 0.05$ ).

## **RESULTS**

The ages of the 50 patients ranged from 20 to 60 years with a median age of 40. The mean age of the cases was 40.16 (Table 1).

Smoking was the most frequent risk factor for development of inguinal hernia found in 36% of the cases, the next was obesity (body mass index, BMI>30) that was present in 14% of the patients, history of benign prostatic hyperplasia was present in 8% of the patients. Other risk factors were chronic constipation (6%), heavy physical work (2%) and organomegally (2%) (Figure 10).

The operative time was significantly longer in group A than in group B. The mean operative time in group A was 70.36 minutes while in group B was 64.88 minutes (Table 2).

### **Early and late postoperative complications**

Hematoma occurred in 1 patient in group B (4%). The case was managed by surgical evacuation with good response to the treatment. Wound infection occurred in 1 patient in group A (4%). The case showed good response to conservative treatment with broad spectrum antibiotics and frequent dressings. Seroma formation occurred in 1 patient in group A (4%) while it occurred in 2 patients in group B (8%). In 1 out of these 3 cases, the seroma resolved spontaneously within 1 to 2 weeks without sequelae. In the other 2 cases, the seroma was large and persistent, so that it was treated by repeated aspiration under complete aseptic conditions until complete evacuation. Stiffness of abdominal wall occurred in 1 patient in group A (4%) while it occurred in 3 patients in group B (12%). Foreign body sensation occurred in 2 patients in group B (8%). Stitch sinus occurred in 1 case in group B (4%). He was treated by exploring the sinus and removing the offending suture material. During the one year follow up period, hernia recurrence occurred in 1 patient in group B (4%) and not recorded in group A. There was no statistically significant difference between both groups regarding all the early and late postoperative complications ( $p > 0.05$ ) (Table 3).

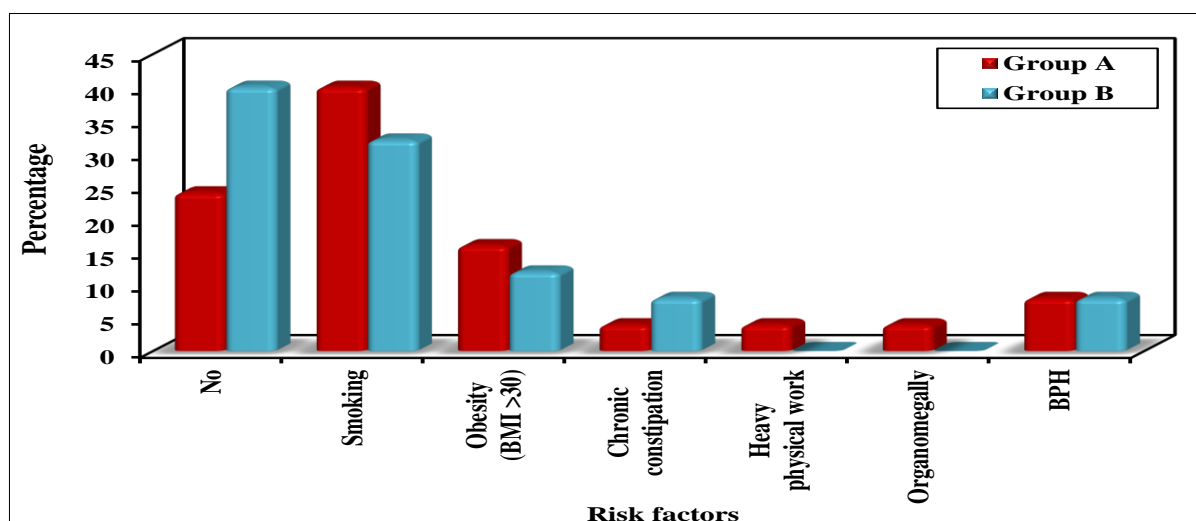
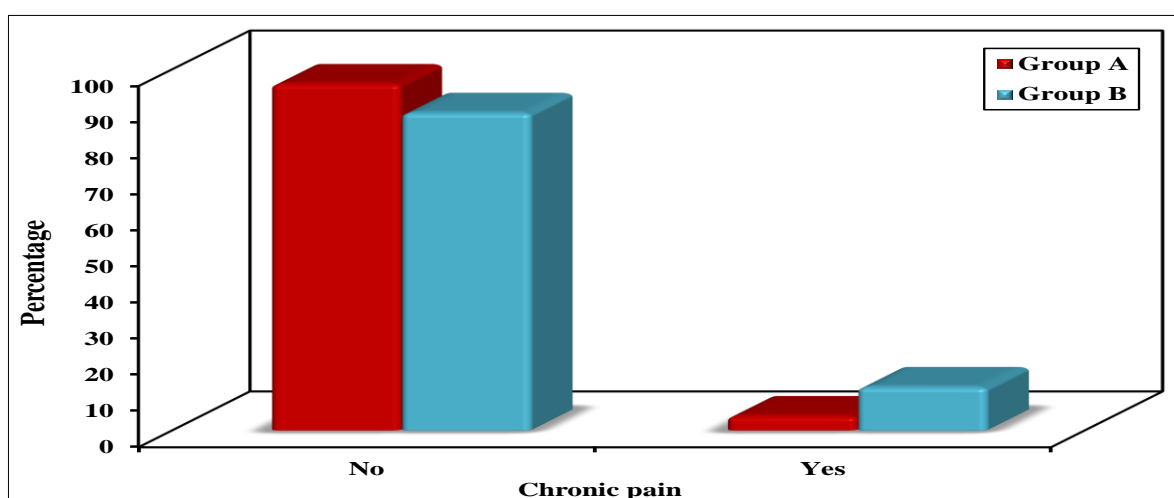
As regard to chronic pain, there was no statistically significant differences between the two groups  $p = 0.609$  (Figure 11).

**Table 1: Distribution of the studied cases according to demographic data.**

Age (years)	Group A (n = 25)		Group B (n=25)		Total (n=50)	
	N	%	N	%	N	%
20 to <30	4	16.0	4	16.0	8	16.0
30 to <40	7	28.0	4	16.0	11	22.0
40 to <50	9	36.0	12	48.0	21	42.0
50 to <60	5	20.0	3	12.0	8	16.0
≥60	0	0.0	2	8.0	2	4.0
Minimum–maximum	20.0–59.0		22.0–60.0		20.0–60.0	
Mean±SD	39.28±10.27		41.04±10.15		40.16±10.14	
Median (IQR)	40.0 (35–42)		42.0 (37–43)		40 (35–43)	

**Table 2: Distribution of the studied cases according to operative time.**

Operative time (minutes)	Group A (n=25)	Group B (n=25)	U	P
Minimum–maximum	50.0–90.0	45.0–85.0		
Mean±SD	70.36±9.24	64.88±10.39	193.50*	0.021*
Median (IQR)	70.0 (65–73)	64.0 (58–66)		

**Figure 10: Comparison between the two studied groups according to risk factors.****Figure 11: Comparison between the two studied groups according to chronic pain.**



**Table 3: Comparison between the two studied groups according to postoperative complications.**

Postoperative complications	Group A (n=25)		Group B (n=25)		$\chi^2$	MC <sub>p</sub>
	N	%	N	%		
Early complications						
Wound infection	1	4.0	0	0.0	1.020	1.000
Heamatoma	0	0.0	1	4.0	1.020	1.000
Seroma	1	4.0	2	8.0	0.355	1.000
Late complications						
Stiffness of abdominal wall	1	4.0	3	12.0	1.087	0.609
Stitch sinus	0	0.0	1	4.0	1.020	1.000
Foreign body sensation	0	0.0	2	8.0	2.083	0.490
Recurrence	0	0.0	1	4.0	1.020	1.000

## DISCUSSION

The Desarda technique for inguinal hernia repair is a new tissue-based method. Despite the objections presented by some authors, application of the external oblique muscle aponeurosis in the form of an undetached strip (which makes the posterior wall of the inguinal canal stronger) has been established as a new concept in tissue-based hernia repair. The technique is original, new, and satisfies the principles of “no tension” presented by Lichtenstein, and is different from the historical methods using the external oblique aponeurosis.<sup>6</sup>

In the present study, the mean age of the studied cases was 40.16 years. The highest incidence (42%) was among patients with an age range from 40 to 50 years.

This is similar to the results obtained by Afzal et al in a study on 70 patients in 2018. They found that the mean age of their cases was 42.86 years.<sup>7</sup>

In their study on 100 patients with inguinal hernia, Bhatti et al reported that the majority of the cases were in their 6th decade with the mean age was 53.25 years.<sup>8</sup>

In the present study the hernia was indirect in 32 patient (64%), direct in 24 patient (22%) and pantaloon hernia in 7 patient (14%).

In their study on 101 cases of inguinal hernia, Manyilira et al reported that the hernia was indirect in 79 patient (78.2%), and direct in 22 patient (21.8%).<sup>9</sup>

In the present study, smoking was the most frequent risk factor for development of inguinal hernia found in 36% of the cases, the next was obesity (BMI>30) that was present in 14% of the patients, history of benign prostatic hyperplasia was present in 8% of the patients.

In their study on 208 cases of inguinal hernia, Szopinski et al reported that in 25% of the cases were smokers and 3% of the cases were obese.<sup>1</sup> Abbas et al found that obesity was present in 9% and BPH in 6% in their study on 100 cases of inguinal hernia.<sup>10</sup>

In our study, the operative time was significantly longer in group A than in group B. The mean operative time in group A was 70.36 minutes while in group B was 64.88 minutes.

Similar to our results Rodríguez et al reported that, the mean operative time in the Desarda group was 48 minutes while in the Lichtenstein group was 39 minutes, and this difference is statistically significant ( $p<0.01$ ).<sup>11</sup>

In contrary, Afzal et al reported that, the mean operative time is significantly shorter in the Desarda group (60.2 minutes) than in the Lichtenstein group (72.3 minutes).<sup>7</sup>

Regarding the postoperative hospital stay, all cases stayed less than one day except one case in group B who stayed for 3 days due to presence of hematoma that required surgical evacuation and follow up.

In the original study done by Desarda and Ghosh the mean stay in their technique was 1.22 days while it was 3.59 days in the Lichtenstein group. This difference is significant ( $p<0.001$ ).<sup>12</sup>

In another study, Abbas et al reported that the mean hospital stay in Desarda's technique was  $2.58\pm0.70$  days while it was  $3.90\pm0.86$  days in Lichtenstein's group. This difference is extremely significant.<sup>10</sup>

In our study chronic pain was present after 3 months in only one patients in (group A) (4%). While, it was present in 3 patients in group B (12%). There was no statistically significant difference between the two groups while  $p=0.609$ .

These results were similar to result obtained by Manyilira et al in their study on 101 patient which 4 patient develop chronic pain in group B and only one patient in group A.<sup>9</sup>

Regarding post-operative complications, there were no statistically significant differences between the 2 study groups during a 1-year follow-up of adult male patients with a primary inguinal hernia operated on with either the Desarda or the Lichtenstein technique. The most frequently reported complications were hematoma,

seroma, surgical site infection, stiffness of abdominal wall, and recurrence.

In our study, hematoma occurred in 1 patient in group B (4%). The case was managed by surgical evacuation with good response to the treatment.

The same result was reported by Youssef et al in their study on 194 patients.<sup>13</sup>

In our study, seroma developed in one patient in the Desarda group (4%) and 2 patients in Lichtenstein group (8%), in the patient of group A, the seroma resolved spontaneously within 1 to 2 weeks without sequelae. In the other 2 cases of group B, the seroma was large and persistent, so that it was treated by repeated aspiration under complete aseptic conditions until complete evacuation.

This is consistent with the results of Szopinski et al who reported seroma formation after drain removal in (3.8%) of cases in the Desarda group and in only 5.8% in the Lichtenstein group ( $p=0.027$ ).<sup>1</sup>

Bhatti and Ishaqu reported a higher incidence of seroma formation after drain removal but still much less in the Desarda group than in the Lichtenstein group with statistically significant difference ( $p=0.001$ ). The incidence was (6%) and (10%) in Desarda and Lichtenstein groups respectively.<sup>8</sup>

In our study wound infection was recorded in only 1 patient in group A (4%). The case showed good response to conservative treatment with broad spectrum antibiotics and frequent dressings.

In contrast, Abbas et al recorded no wound infection in their study on 50 patients with inguinal hernia repaired with the 2 technique.<sup>10</sup>

As regard to recurrence, in (group A) no recurrence occurred in any patient in this group. While in (group B) only one patient had recurrence during the 1 year follow up period. that patient was a heavy smoker, we advised him to stop smoking pre operatively but he did not respond, subsequent preparation of the patient for recurrent inguinal hernia repair with transabdominal preperitoneal approach was done. There were no statistically significant differences between the two groups while  $p=1.00$ . In their study Szopinski et al reported two (1.9%) recurrences in each study group during the 3-year time period ( $p=1.000$ ). In the D group, one recurrence was found above the re-created deep inguinal ring in the triangle between the inguinal ligament, the strip of external oblique aponeurosis, and the spermatic cord. The second recurrence in the D group was found as a weakening of the posterior wall of the inguinal canal. The recurrences in the L group were found in their typical localization, close to the pubic tubercle.<sup>1</sup>

In our study, other late post-operative complications were recorded such as stiffness of abdominal wall which occurred in 1 patient in group A (4%) while it occurred in 3 patients in group B (12%) and foreign body sensation occurred in 2 patients in group B (8%).

This result is also recorded by Youssef et al in their study on 194 patients which found that 14% of Desarda group and 16% of Lichtenstein group complaining of stiffness of abdominal wall while 9.8% of Desarda group and 12% of Lichtenstein group complaining of foreign body sensation.<sup>13</sup>

This study has two main limitations. The first limitation is the small number of participants, the second one is short period of follow up for recurrence of the hernia. So, we recommend carrying out further larger population studies with longer periods of follow up for more accurate evaluation.

## CONCLUSION

Desarda repair of inguinal hernia is a good alternative to Lichtenstein repair.

Finally, and based on these results, the technique has the potential to enlarge the number of tissue-based methods available to treat inguinal hernias. The most evident indications for use of the Desarda technique include use in young patients, in contaminated surgical fields, in the presence of financial constraints, or if a patient disagrees with the use of mesh.

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