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Open inguinal hernia repair Comparative study between external oblique aponeurosis flab herniorrhaphy versus lichtenstein tension free hernioplasty

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Abstract

Background; The prevalence of inguinal hernias means that they continue to provide a significant medical challenge. Inguinal hernias are 27% more likely to occur in males than in women during the course of their lifetimes. The global range of annual morbidity rates is 100–300 per 100,000 people.

The goals of this study are [1] to compare the Desarda technique for inguinal hernia repair with the tension-free mesh (Lichtenstien) approach, and [2] to provide light on the various techniques of tension-free repair of inguinal hernia. Topics and approaches; This randomised controlled experiment was performed at the Benha University Hospital's Department of General Surgery. A total of eighty adult males with primary inguinal hernias participated in the current trial, and they were randomly assigned intraoperatively to receive either the Desarda tissue-based repair (D) or the traditional Lichtenstein mesh repair (L). Even patients who have hernias on both sides are not excluded, albeit they will only have one side repaired at a time. The time it took for people in the DT group to go back to their regular routines was significantly shorter than those in the control group (Independent sample t test, P .005). Independent sample t test: P =.285; no statistically significant difference between groups in terms of time to return to work activities. Desarda repair was shown to be the best option since it required less time in surgery, resulted in lower pain ratings thereafter, and allowed patients to quickly resume their pre-injury level of function. Desarda repair eliminates the need for removal of the mesh, which eliminates the risk of infection, discomfort, and the feeling of having a foreign object in the body. Desarda maintenance is more cost-effective than Lichtenstein maintenance.

Keywords: Desarda tissue-based repair (D), the classic Lichtenstein mesh repair (L).

1. Introduction

The prevalence of inguinal hernias means that they continue to provide a significant medical challenge.

Inguinal hernias are 27% more likely to occur in males than in women during the course of their lifetimes.

From one country to another, annual morbidity rates might range from 100 to 300 per 100,000 people.[1].

Prior to 2009, when the European Hernia Society (EHS) released its recommendations based on a review of the literature and the outcomes of clinical trials, there were no documented surgical guidelines for the treatment of hernias.

Guidelines from the European Hernia Society (EHS) propose mesh-based treatments (the Lichtenstein technique in particular) and endoscopic approaches for the treatment of symptomatic primary inguinal hernia in adult males.

To the contrary of the EHS's provided view, the Shouldice approach has been shown to be valid as well [2].

Most commonly used inguinal prosthesis are made of synthetic materials, which may lead to a host of new clinical issues, including but not limited to a foreign body feeling in the groyne, pain, and abdominal wall rigidity [3].

When mesh is used to repair a hernia, there is an increased risk of infection at the incision site.

One of the most serious side effects is the mesh moving away from where it was originally implanted in the abdomen (4.5).

A new surgical difficulty arises in the treatment of meshoma or plugoma tumours, which are the result of an intense chronic inflammatory response often linked with foreign body reactions surrounding the mesh prosthesis.

Having a mesh implanted to repair a hernia also has negative effects on a patient's ability to reproduce and engage in sexual activity [6].

During his talk at the 2011 EHS Congress in Ghent, Schumpelick highlighted the usefulness of the Shouldice approach.

Given these details, a few questions arise:

Do only excellent clinical outcomes be guaranteed by nonmesh methods, or is the Shouldice procedure unique?

Can inguinal hernias be repaired with any other tissue-based methods? [7].

Many researchers have been motivated to find novel hernia repair procedures or to modify existing ones as a result of the high rates of complications and postoperative dysfunction that have been documented.

The Desarda technique is an example of such an attempt; it was first published in 2001 and since then has become a viable surgical alternative for repairing groyne hernias using tissue alone.[8]

An innovative suturing method, the Desarda approach is on the rise.

Compared to Shouldice and Lichtenstein, it seems to be less complicated and quicker to execute.

While it produces comparable recurrence outcomes as Lichtenstein, it has the major advantage of not introducing any foreign body material that will remain in the system permanently.[9].

In other words, there is no tension or mesh involved in this method.

The Desarda technique is an innovative hemia repair approach that uses an undivided strip of external oblique aponeurosis and takes into account the physiological dynamics of the inguinal area [10].

The research was conducted to shed light on the various ways of tension free repair of inguinal hernia by comparing the Desarda technique with the tension free mesh (Lichtenstien) approach.

2. Patients and Methods

The patients are recruited from the Department of General Surgery Faculty of medicine, Benha University Hospital.

The present study included a total of 80 adult male patients with primary inguinal hernias randomly allocated intraoperatively to undergo one of the two repairs: external oblique aponeurosis flab herniorrhaphy (Desarda tissue-based repair) (D) or the classic Lichtenstein mesh repair (L). Patients with bilateral hernias are also included, but only one side is attacked at a time.

Enrollment of eligible patients began on March 2020 and took place until June 2022. Follow up is designed for 12 months duration.

The final inclusion criterion includes the assessment of the condition of the external oblique aponeurosis.

Preoperative exclusion criteria will include Patients with recurrent or strangulated hernias or mental disorders..Patients with score >3 on American Society of Anesthesiologists (ASA) scale those assessed on the scale at >3 are also excluded.

ASA physical status classification system is a system for assessing the fitness of cases before surgery.

Intraoperative exclusion criteria will include patients with ill developed, divided, tiny, or weak external oblique aponeurosis.

The participants who agree to share in this clinical study will give informed consent after being fully informed about the technique and its circumstances.

The study was conducted after approval of the ethical and research comitte, Faculty of Medicine Benha University

Preoperative assessment

Clinical parameters:

All patients will undergo complete history taking and clinical examination.

Routine preoperative work up including

- Pelvi abdominal ultrosonography.
- Complete bloob picture.
- Liver and kidney functions tests.
- Coagulation profile.
- ECG and ECHO when needed.

Management

After routine preoperative work up, using a standard protocol, all patients are will be given sedative premedication and one shot of antimicrobial prophylaxis before surgery). In accordance with the patient's preference or the anesthetist's opinion, all operations will be carried out under spinal or general anesthesia. The operations will be performed by staff surgeons using the same technique and rules.

Statistical Analysis

The collected data were summarized in term of meant Standard Deviation (SD) and range for quantitative data and frequency and percentage for qualitative data. Comparison between the difference study groups were carried out using the Student's t-test to examine mean difference between two groups. The test of proportion(2 test to compare difference between two proportion s and the Chi-square test and fisher exact Test were used to compare more than two proportions as appropriate.

After the calculation of each of the test statistics, the corresponding distrihuaiion i.ahles were consulted to get the "P (probability value). significance was accepted at P value<0.05(S). A p value < 0.001 was considered highly significant (HS) while a P value>0.05 was considered non significant (NS).

Beneficiaries

1. All patients that are involved in this study will have direct benefi from the operation in the form of repair of their hernias
2. Economic benefits through saving the price of the mesh

Dissemination of results

The results and recommendations will be sent to the library of our faculty and our university, as well as the corresponding departments in the other universities. Lastly our outcome and recommendations will be published in the pear reviewed journals

Statistical Analysis

Description of means and standard deviation for quantitative variables and frequencies and percentage for qualitative variables were calculated using SPSS Version 22.0 (IBM Corp, Armonk, NY). Data were found to follow a normal distribution using Shapiro-wilk test.

Chi-square test was used for comparison of categorical variables, while independent sample t-test was used for numerical variables. *P* value less than .05 was considered to declare statistical significance.

3. Results:

Table (1) Comparing Hernial Characteristics Between Groups (N = 80)

	DT (n=40)	**LT (n=40)**	***P* value**
Duration of Hernia (months) *	44.5 ± 8.5	44.7 ± 7.6	.913 [a]
Laterality **			.692 [b]

Unilateral	36 (90)	37 (92.5)	
Bilateral	4 (10)	3 (7.5)	
Operated Side **			.639 [b]
Right	25 (62.5)	27 (67.5)	
Left	15 (37.5)	13 (32.5)	
Type of Hernia **	18 (45)	22 (55)	.592 [b]
Indirect	32 (80)	30 (75)	
Direct	8 (20)	10 (25)	
Reducibility **			.531 [b]
Reducible	35 (87.5)	33 (82.5)	
Non-reducible	5 (12.5)	7 (17.5)	
Size of Hernial Orifice (cm) *	3.4 ± 0.8	3.1 ± 1.6	.460 [a]
Operating Time (minutes) *	59.3 ± 7.5	67.2 ± 11.3	.001 [a]

* Data are presented as mean ± standard deviation; ** Data are presented as number (percentage).
[a] Independent sample t test; [b] Chi-square test.

The mean duration of hernia was 44.5 ± 8.5 months (range, 30.3 to 59.7) in the DT group, and 44.7 ± 7.6 months (range, 30.5 to 59.9) in the LT group. No statistically significant difference was found between groups regarding duration of hernia (Independent sample t test, *P* = .913).

In the DT group, 36 (90%) cases were unilateral, and 4 (10%) were bilateral. The right side was operated in 25 (62.5%) cases, while the left side was operated in 15 (37.5%) cases. Thirty-two (80%) patients had indirect inguinal hernia, while eight (20%) had direct hernia. The hernia was irreducible in five (12.5%) patients. In the LT group, 37 (92.5%) cases were unilateral, and 3 (7.5%) were bilateral. The right side was operated in 27 (67.5%) cases, while the left side was operated in 13 (32.5%) cases. Thirty (75%) patients had indirect inguinal hernia, while 10 (25%) had direct hernia. The hernia was irreducible in seven (17.5%) patients. No statistically significant difference was found between group's n terms of laterality, side, type, or reducibility (Chi-square test, *P* > .05).

The mean size of hernial orifice was 3.4 ± 0.8 cm (rang, 2 – 5) in the DT group, and 3.1 ± 1.6 cm (range, 1 – 6) in the LT group. No statistically significant difference was observed between groups regarding hernial size (Independent sample t test, *P* = .460) (**Table 1**).

One week later, the mean VAS reduced to 1.3 ± 1.2 and 1.3 ± 1.1 in the DT and LT groups, respectively. At 2-week follow-up, the mean VAS was 0.5 ± 0.5 in the DT group, and 0.4 ± 0.4 in the LT group. No statistically significant difference was observed between groups in terms of postoperative VAS at different time points (Independent sample t test, P > .05) (**Table 2**).

Table (2) Comparing Postoperative VAS for Pain Between Groups (N = 80)

	DT (n=40)		**LT (n=40)**		***P* value**
	Mean	**SD**	**Mean**	**SD**	
3 hours	1.2	0.7	1.1	0.8	.583
24 hours	1.9	0.7	2.2	0.7	.200
48 hours	3.8	0.8	3.5	1.1	.129
7 days	1.3	1.2	1.3	1.1	.924
14 days	0.5	0.5	0.4	0.4	.184

Data are presented as mean ± standard deviation.
Independent sample t test

A statistically significant difference was found in time to return to basic and home activities in favor for DT group was found (Independent sample t test, P < .005). However, no statistically significant difference was found between groups regarding time to return to work activity (Independent sample t test, *P* = .285) (**Table 3**).

Table (3) Comparing Time to Return to Function Between Groups (N = 80)

	DT (n=40)		**LT (n=40)**		***P* value**
	Mean	**SD**	**Mean**	**SD**	
Return to Basic Activity	4.6	1.1	5.3	1.1	.005
Return to Home Activity	9.9	5.1	16.1	7.8	.000
Return to Work Activity	51.3	23.1	45.6	24.6	.285

Data are presented as mean ± standard deviation.
Independent sample t test

As shown in **Table 4**, no statistically significant difference was found between groups in terms of postoperative complications (Chi-square test, *P* > .05). However, at 30 days, seroma was more frequent in the LT group (20%), whereas none developed wound seroma in the DT group at 30 days (Chi-square test, *P* = .003).

Table (4) Comparing Postoperative Complications Between Groups (N = 80)

	DT (n=40)		LT (n=40)		*P* value
	Frequency	**Percentage**	**Frequency**	**Percentage**	
Ilioinguinal Nerve Injury	0	0	1	2.5	.314
Iliohypogastric Nerve Injury	2	5	0	0	.152
Testicular Edema					
7 days	7	17.5	6	15	.762
30 days	3	7.5	3	7.5	
6 months	0	0	0	0	
Testicular Atrophy	0	0	0	0	
Inguinal Hematoma	7	17.5	6	15	.762
Ecchymosis	4	10	5	12.5	.723
Seroma					
7 days	5	12.5	6	15	.745
30 days	0	0	8	20	.003
Surgical Site Infection	3	7.5	4	10	.692

Chi-square test.

4. Discussion

The current research found no statistically significant difference between the two groups in terms of hernial features. This includes the length of the hernia, its laterality, the side on which surgery was performed, the kind of hernia, its reducibility, and the size of the hernial orifice.

Mean operational times varied from 45 to 70 minutes in the DT group to 67.2 to 88 minutes in the LT group.

The operating time for the DT group was much lower than that of the LT group.

According to our findings, Moghe et al. [11] included a total of 50 patients in their investigation, which is in line with our own findings.

There were 25 patients in each group (D and L) in the trial, and they were similar in terms of demographics.

Patients in Group 1 had a mean age of 27, whereas those in Group 2 were 28 on average.

Hernia repair has been performed on two patients in the DR group in the past.

Both patients had surgery, but one had an open hernioplasty on the left side and the other on the right.

Regarding hernia features, there was no discernible difference between the two groups.

Similarly, in the research conducted by Ahmed et al. [12], 65 patients underwent Desarda (D) repair and 65 patients underwent Lichtenstein repair among 130 patients with inguinal hernia who met our inclusion criteria and were admitted to the General Surgery department at Sohag and Assuit university hospitals (L).

Sixty-one out of the sixty-five patients in the Desarda group (D) and sixty-five out of sixty-five in the Lichtenstein repair group (L) were male.

patients' demographic data and hernias characteristics showed that there were no statistically significant differences between the groups with respect to age, sex, body mass index, or hernia characteristics.

Also, Poojary et al. [13] reported that data from 50 patients was evaluated.

Patients were randomly assigned to one of two groups, totaling 25 in each.

Neither the patient's age nor his or her gender nor the location of the hernia had a major role.

Desarda's hernioplasty procedures took an average of 30 minutes, whereas Lichtenstein's mesh hernioplasty procedures took an average of 45 minutes.

The Desarda repair may take less time in surgery since it does not include the use of mesh and because of the continuous suturing approach that is routinely used throughout the procedure.

Desarda's approach was less expensive than Lichtenstein's, which was an important consideration.

In addition, Arafa et al. [14] found no statistically significant differences in hernia features between the two groups.

D group operating times ranged from 45 to 71 minutes, whereas L group operative times went from 49 to 93 minutes, representing a very significant difference (P 0.001).

The pubic tubercle is often injured during mesh suturing, leading to widespread somatic discomfort.

The ilio-inguinal and genitofemoral nerves may be injured during surgery or included into the inflammatory process brought on by the prosthetic material, resulting in neuropathic discomfort.

The aforementioned disorders are not associated with Desarda repair since it is a pure tissue repair.

Nerve injury during surgery is still a possibility, although it is less likely since less tissue is being dissected [15].

Regarding Postoperative VAS for Local Pain, the present research found that the mean VAS for pain at 3 hours postoperatively was 1.2 0.7 in the DT group and 1.1 0.8 in the LT group.

After 24 hours, both groups' mean VASs had risen; in the DT group, it reached 1.9 0.7, while in the LT group, it reached 2.2 0.7.

48 hours post-treatment, the VAS for those receiving DT was 3.8 0.8 and for those receiving LT it was 3.5 1.1.

After one week, the mean VAS scores for those receiving DT were 1.3 1.2 and those receiving LT were 1.3 1.1.

In the DT group, the mean VAS was 0.5 0.5 after 2 weeks of follow-up, whereas it was 0.4 0.4 in the LT group.

Independent sample t test (P >.05) found no statistically significant difference between groups in VAS scores at any time point after surgery.

Pain scores were lower with Desarda repair (1.39 0.62) compared to those with Lichtenstein repair (2.18 0.78) in the research by Jain et al.[16].

Both groups reported an increase in pain beginning 48 hours after surgery, with the Desarda group reporting a mean score of 2.95 0.68 and the Lichtenstein group reporting a mean score of 5.65 0.89.

Pain decreased with time in both groups, while pain ratings were consistently greater in the Lichtenstein group.

The Desarda group had a mean pain score of 1.39 0.69 after one week, whereas the Lichtenstein group averaged 2.82 0.84.

Three months after surgery, both groups' mean pain ratings were at their lowest: 0.09 0.42 for those in the Desarda group, and 0.68 1.02 for those in the Lichtenstein group.

The mean difference in scores across all time periods was statistically significant, with a p value of less than 0.001.

Chronic inguinodynia was defined in their research as discomfort, foreign body feeling, or stiffness in the inguinal area lasting more than three months.

Chronic inguinodynia affected 4 patients (9.1%) in the Desarda group and 25 patients (62.5%) in the Lichtenstein group.

Less than 0.001 was the p value.

The Desarda group included 3 patients with stiffness and 1 with discomfort (VAS = 2).

Twenty-five patients in the Lichtenstein group reported inguinal stiffness; eleven individuals reported inguinal stiffness and pain; three patients reported just pain.

Our findings are consistent with those of Youssef et al. [17], Szopinski et al. [18], Manyilirah et al. [19], and Rodriguez et al. [20], who also observed no statistically significant difference in pain scores in the Desarda and Lichtenstein groups.

Statistically, there was no difference between the Desarda and placebo groups in terms of pain levels on days 7 and 30, however there was a trend toward higher scores in the Desarda group.

No patient in the Desarda group had discomfort for more than 15 days, whereas 4 patients in the Lichtenstein group experienced significant pain and 15 patients experienced mild pain at the conclusion of the study's one-month follow-up.

Pain was observed by 3 of the 25 patients who received Desarda repair (25%) and 5 of the 21 patients who underwent Lichtenstein repair (21.7%), according to a retrospective analysis by Zulu et al.[22].

The substantial dissection necessary to generate room for the mesh and the foreign body response to the mesh contribute to the higher pain levels seen after a Lichtenstein repair.

Desarda repair is shown to be tension free due to lower pain ratings.

Regarding RNF, the current research found that the DT group took 4.6 1.1 days and the LT group took 5.3 1.1 days to recover to baseline levels of activity (normal gait).

In the DT group, patients took 9.9 5.1 days to resume their regular routine at home, whereas in the LT group, it took 16.1 7.8 days.

The DT group had a longer mean time to return to work activity (51.3 23.1) than the LT group (45.6 24.6).

Independent sample t test: P .005 indicates a statistically significant difference between the DT and control groups in the time it takes to resume daily living and routine tasks at home.

Independent sample t test indicated no significant difference in time to return to work activities between groups (P =.285).

Consistent with the findings of Jain et al., [16], we found that the Desarda group had a considerably shorter time to return to regular activities.

Everyday things like taking a shower, going for a stroll, and other chores around the home were considered normal activities.

The time it took for patients to regain full function prior to surgery was considered the time it would take them to return to work.

There is agreement between our findings and those of Youssef et al. [17], Rodriguez et al. [20], and Desarda and Ghosh [21]. [21].

Furthermore, Sowmya and Udapudi [23] found that recovery time after Desarda herniorrhaphy was much shorter than that following open hernia repair.

On top of that, Ahmad et al. [24] showed that the average time to return to work following the Desarda treatment is less than that after the Lichtenstein surgery.

Abbas et al. [25] found that compared to Lichtenstein's approach, Desarda's procedure resulted in a quicker return to work (7.04 days) (11.30 days).

However, no statistically significant difference was found in the investigations conducted by Szopinski et al. [18] or Manyilirah et al. [19].

The Desarda repair has been shown in a research by Jain et al. [16] to reduce the time needed to recover to preoperative functional state.

The primary reasons for this include the relative absence of acute pain and discomfort in the Desarda group.

Yet not all investigations found the same conclusions.

These discrepancies may be explained by the fact that various studies use varied definitions of "normal activities," including "work."

Due to the rapid recovery time, inguinal hernia repair is often performed as an outpatient treatment.

When comparing the two groups, Moghe et al. [11] found that group 1 had a mean time to ADL of 1.901.02 days, whereas group 2 had a mean time of 1.530.84 days.

There was no statistically significant difference between the two groups (p>0.05).

In contrast, 93.5 percent of patients in the Desarda group in the research by Gulzar [26], were able to resume normal physical activity (such as walking and using the restroom independently) by the end of the first postoperative day, while only 6.5 percent did so by the end of the second day.

Whereas in the Lichtenstein group, 92.1% of patients resumed physical activity (such as walking and using the restroom independently) on the first postoperative day, and 7.9% on the second (p-value 0.74).

According to our findings, testicular edoema (7 days) and inguinal hematoma were the most prevalent postoperative complications in the DT group.

However, in the LT group, problems such wound seroma (30 days), testicular edoema (7 days), and inguinal hematoma were more prevalent.

When looking at the rate of complications after surgery, the Chi-square test showed no significant difference between the groups (P >.05).

While none of the patients in the DT group had wound seroma after 30 days, 20% of those in the LT group did (Chi-square test, P =.003).

The findings of Jain et al. [16], who found a greater overall complication rate in the Lichtenstein group, corroborated our own.

The two groups had similar rates of the most frequent consequence, scrotal edoema.

Other problems occurred at a greater incidence in the Lichtenstein group, although the difference was never large enough to be statistically significant.

Youssef et al. [17], Szopinski et al. [18], Manyilirah et al. [19], Rodriguez et al. [20], Desarda and Ghosh [21], and Zulu et al. [22] all found similar outcomes [22].

Since mesh repair requires extensive dissection, and since the prosthetic material always provokes a robust inflammatory response, the patient is more likely to have increased postoperative edoema and scrotal edoema.

As a result, the Lichtenstein repair is accompanied by a higher risk of morbidity than the Desarda repair.

In addition, Mohamedahmed et al. [27]did a meta-analysis consisting of 8 RCTs, with a total of 3177 patients, 1551 of whom were assigned to the Desarda group and 1,626 to the Lichtenstein group.

The Desarda repair group had the same rate of recurrence as the Lichtenstein repair group [P = 0.44].

Desarda patients had a decreased incidence of total postoperative complications [P = 0.003], seroma [P = 0.0004], and SSIs [P = 0.04].

Furthermore, Gedam et al., [28] found that when comparing and evaluating problems noticed post operatively, all the P Values are >0.05, which is statistically not significant, suggesting that the complication rates for Lichtenstein and Desarda are similar.

Postoperative complications such as fever, cord oedema, groyne pain, seroma, surgical site infection, persistent pain, neuralgia, and foreign body feelings were not significantly different between the two groups.

Furthermore, Ahmad et al. [24] found no statistically significant difference between the Desarda and Lichtenstein groups with regards to the proportion of postoperative problems.

Seroma occurred in 1 Desarda patient and 3 Lichtenstein patients, although the difference was not statistically significant (p=0.620).

It is possible that the influence of synthetic mesh on the tissues around it accounts for the increased prevalence of seroma after its use.

Two Lichtenstein patients and one Desarda patient had infections (p=1.0).

5. Conclusion

Desarda repair was found to be superior in terms of less operating time, less post-operative pain scores, and early return to preoperative functional status. Use of Desarda repair avoids mesh related complications like mesh infection, heaviness in the groin and foreign body sensation. Desarda repair is much more economical than Lichtenstein repair.

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