

Long-Term Outcome of Desarda Technique in Elective Inguinal Hernia Repair. A 10 Year Multicenter Experience

Amr G. Mohamed¹, Hisham E. Elareaf¹, Mohamed A. Shaban² and Ahmed M. Abostate¹.

¹ Department of General Surgery, Faculty of Medicine, Benha University, Egypt

² Department of General Surgery, Benha Teaching Hospital, Egypt

Corresponding author: Amr G. Mohamed, Mobile: 01226763986,

ORCID: 0000-0002-5706-7535, Email: Amr.g.m2010@gmail.com

ABSTRACT

Background: One of the most often performed operations and a pillar of a general surgery practice is inguinal hernia repair.

Objective: The study aimed to report our experience in tension-free repair of inguinal hernia using Desarda technique.

Patients and methods: 179 out of 216 patients with 1ry inguinal hernia repaired with Desarda and who completed at least five years of follow-up and underwent analysis were included. The current retrospective analysis was conducted between December 2013 and December 2023. Recurrence, chronic pain, abdominal wall stiffness was the main follow up corners.

Results: The mean age of the included patients was 44.76 ± 7.88 years. There was a statistically significant decrease in the testicular edema, hematoma, seroma, and surgical site infection after 1-month follow-up when compared to the incidence by the 1st week ($P < 0.001$). There was a statistically significant decrease in the incidence of loss of sensation, abdominal wall stiffness and FB sensation by time. The recurrence rate was 1.7% after 5 years follow.

Conclusion: Desarda technique is an easy, effective and reliable method in treatment of inguinal hernia repair with favorable long-term outcome.

Keywords: Tension free repair, Desarda technique, Inguinal hernia.

INTRODUCTION

With more than 20 million treatments done annually, inguinal hernia repair is one of the most common procedures done worldwide [1]. One of the most often performed operations and a pillar of a general surgery practice is inguinal hernia repair. If we exclude bilateral or recurring hernias, the expected number of cases performed per year is 800,000 [2,3].

With the exception of diaphragmatic hernias, the European Hernia Society (EHS) has published eight clinical guidelines since 2009. The best initiative was the Hernia Surge International Guidelines for Groin Hernia Management, which recommended that a mesh-based approach be used as the initial treatment option for all groin hernias [4,5].

Present findings indicate that all operating procedures have consistently high recurrence rates above 10%. Even with more seroma production, 6 Mesh lowers the chance of recurrence. Comparing mesh repairs vs non-mesh repairs, one recurrence was avoided for every 46 repairs [7,8].

For the Shouldice operation, the long-term follow-up by **Barbaro et al.** [9] revealed a 20-year recurrence rate of 9.7%. Comparing this to the TEP procedure's 25.7% recurrence rate, it was highly favorable [10]. Mesh does not appear to have a detrimental impact on the possibility of male infertility following surgery [11].

There was insufficient scientific data of sufficient quality to support any particular claims or recommendations for the Desarda repair. The equivalency of the Desarda and Lichtenstein procedures concerning recurrence is now reported by a number of studies with varying methodological quality

compared the Lichtenstein and Desarda procedures in elective primary inguinal hernia repair [12-14].

The results showed that the recurrence rates of the Desarda approach are comparable to those of Lichtenstein mesh repair. Nonetheless, bias and certain restrictions exist in the Desarda repair data that are currently accessible. Recurrence rates with a follow-up of two years or more are reported in just five randomized clinical trials (RCTs) [15-19]. The degree of evidence, length of follow-up, and caliber of these investigations vary. Additional high-quality research is required to validate these results.

Chronic post-operative inguinal pain (CPIP) is post-operative inguinal pain impacting daily activities and lasting longer than three months. Despite the avoidance of certain predisposing neuroanatomical and technological elements, CPIP is still a complicated problem with several genetic, psychological, social, and behavioral aspects. It's also critical to compare the preoperative pain status with the CPIP to confirm that the CPIP represents new postoperative pain (intensity, type, and location) [4]. The debate about the long-term outcome of Desarda technique has motivated the authors to conduct this study.

PATIENTS AND METHODS

Study design: 179 out of 216 patients who had an elective inguinal hernia repaired with Desarda and who completed at least five years of follow-up and underwent analysis between December 2013 and December 2023 were included in the current retrospective analysis. Both Benha University Hospital and Benha Teaching Hospital's general surgery departments received eligible patients. Patients with

tiny External oblique aponeurosis (EOA) were not eligible for Desarda repair.

The primary outcome of this study, the incidence of postoperative complications, and the 5-year follow-up for recurrence with an incidence of 20% loss in follow-up were taken into account while calculating the sample size. 179 samples were taken into consideration with an effect size of 0.7, a power of 80%, a P value of 0.05, and G-power 3.1 software (Universities, Dusseldorf, Germany).

Inclusion criterion: The 3 primary was the intraoperative assessment of the (EOA).

Exclusion criteria: Additionally, because of abnormalities in the EOA, patients with extremely wide exterior rings were also disqualified. Patients who failed to finish the follow-up period and those with an American Society of Anesthesiologists score more than three were also excluded.

After history taking and examination, the procedure was done under spinal anesthesia.

Procedure: All patients received IV antibiotics along with anesthetic induction as part of the specified protocol. An intentional inguinal incision involving the skin and subcutaneous layer was made while the patient was in the supine posture. The incision in the EOA was made beginning at the top border of the external ring and extending laterally. The spermatic cord sac was separated, exposing the inguinal canal. The internal ring was narrowed in addition to a proper herniotomy.

This Desarda repair was performed where the edge of the upper EOA flap was sutured in the reflected part of the inguinal ligament, forming the first suture line. A longitudinal incision was made 1 inch above the first suture line to create an EOA flap, which was then left in the inguinal canal floor and sutured in the conjoint ligament, forming the second suture line. The cord was placed over the flap and then the EOA was sutured above the cord. There was a subcutaneous drain closure.

Outcome and follow up:

The 1ry research objective was successful inguinal hernia repair with minimal postoperative complications.

The 2ry research objective was decrease over all cost for hernia surgery as well as avoiding complications of the prolene mesh.

Follow up was planned for at least 5 years for long-term outcome including recurrence and chronic pain or abdominal wall stiffness. The visual analogue scale (VAS), which ranges from 0 (no pain) to 100 (maximum, intolerable pain) was used to evaluate pain in order to determine early postoperative pain.

Resuming regular activities:

- Basic activity: The capacity to carry out simple tasks like getting dressed, moving, and taking a shower.
- Home activity: Routine household tasks (such as cooking and cleaning)
- Work activity: Finishing off all previously performed activities.

Ethical Approval: This study was ethically approved by the Institutional Review Board of the Faculty of Medicine, Benha University. Written informed consent was obtained from all participants. This study was executed according to the code of ethics of the World Medical Association (Declaration of Helsinki) for studies on humans.

Ethical Approval: This study was ethically approved by the Institutional Review Board of the Faculty of Medicine, Benha University. Written informed consents were obtained from all participants. This study was executed according to the code of ethics of the World Medical Association (Declaration of Helsinki) for studies on humans.

Statistical analysis

For the statistical study, IBM Corp., Armonk, New York, USA, provided SPSS, version 25 was used. When describing quantitative parameters with mean and SD, the student's t-test was employed. For qualitative indicators that were expressed as the frequency with percent, the χ^2 test was employed. P-values ≤ 0.05 were regarded as significant.

RESULTS

In the current study, 216 male patients were included and only 179 patients completed the follow-up and underwent analysis. The mean age of the included patients was 44.76 ± 7.88 years. Other sociodemographic data were reported in table (1).

Table (1): Sociodemographic data and patient characteristics

Variable		Value
Age	Mean \pm SD	44.76 \pm 7.88
ASA Score	Range	1-3
HTN	N (%)	8 (4.46%)
DM	N (%)	7 (3.9%)
IHD	N (%)	2 (1.1%)
Smoking	N (%)	14 (7.8%)
BMI>30kg/m2	Mean \pm SD	29.22 \pm 3.46
Employment		
Student	N (%)	14 (7.8 %)
Non physical	N (%)	68 (38%)
Light physical	N(%)	57 (31.85%)
Heavy physical	N (%)	28 (15.65%)
Retired	N (%)	12 (6.7%)

Table (2) reported the early postoperative complications where testicular edema was reported in 7.8% of cases after 7 days while seroma was reported in 5% after 1 week. There was a statistically significant decrease in the testicular edema, hematoma, seroma, and surgical site infection after 1-month follow-up when compared to the incidence by the 1st week $P < 0.001^*$.

Table (2): Early post-operative complications at 7 & 30 days.

Variable		7 days	30 days	P value
Testicular edema	N (%)	14 (7.8%)	9 (5%)	<0.001*
Inguinal hematoma	N (%)	7 (3.9%)	2 (1.1%)	<0.001*
Ecchymosis	N (%)	8 (4.46%)	1 (0.6%)	<0.001*
Seroma	N (%)	9 (5%)	0 (0%)	<0.001*
Surgical site infection	N (%)	7 (3.9%)	0 (0%)	<0.001*

Early post-operative pain was assessed and the present study using VAS score and the mean was 7.7 ± 1.2 . mild pain (VAS 1–29) was reported in 84% of cases while 16 % of cases reported chronic moderate pain (VAS 30–55). No strong pain (VAS > 55) was observed. Return to basic, home and work activities was achieved after 1.2 ± 0.22 , 5.6 ± 1.17 and 19.88 ± 7.23 days respectively (Table 3).

Table 3: VAS score and return to normal activities of the included patients.

Variables		Value
Return to Activities		
Return to basic activity	Mean± SD (days) Range (days)	1.2±0.22 1-5
Return to home activity	Mean± SD (days) Range (days)	5.6±1.17 17-33
Return to work activity	Mean± SD (days) Range (days)	19.88±7.23 6-11
VAS	Mean± SD	7.7 ± 1.2
Mild pain VAS (1-29)	N (%)	150 (84%)
Moderate VAS (30-55)	N (%)	29 (16%)
Strong VAS >55	N (%)	0 (0%)

There was a statistically significant decrease in the incidence of loss of sensation, abdominal wall stiffness and FB sensation by time. The recurrence rate was 1.7% after 5 years follow-up (Table 4).

Table 4. Long term follow-up at 1, 3 & 5 years.

	1 year	3 years	5 years	P value
Recurrence	0 (0%)	1 (0.6%)	3 (1.7%)	<0.001*
Loss or change in sensation	31 (17.4%)	9 (5%)	2 (1.1%)	<0.001*
Abdominal wall stiffness	22 (12.3%)	8 (4.46%)	4 (2.23%)	<0.001*
F.B sensation	7 (3.9%)	1 (0.6%)	1 (0.6%)	<0.001*

DISCUSSION

The Desarda method is a unique tissue-based approach for treating inguinal hernias. Despite the objections raised by certain authors, the application of the external oblique muscle aponeurosis in the form of an undetached strip, which fortifies the posterior wall of the inguinal canal, has been recognized as a novel concept in tissue-based hernia repair [20,21].

The procedure is novel, fresh, and distinct from previous approaches that used external oblique aponeurosis, first described in 1901 by **McArthur** [22].

We believe that the recently suggested repair approach complies with Lichtenstein's "no tension" guidelines. The aponeurotic strip is transferred tension-free from the inguinal canal's anterior to posterior wall. The concept of an undetachable, movable aponeurotic strip "physiologically" reinforcing the inguinal canal's posterior wall is novel and fascinating [23, 24].

It was proposed that a naturally displaced and movable aponeurotic strip is far more "physiological" than the scar tissue formed around a synthetic prosthesis for creating a mechanism against reherniation when viewing the Desarda technique as "dynamic enforcement" of the posterior wall of the inguinal canal. Additionally tissue-based is the Shouldice approach, which is still widely accepted and advised. It should be mentioned that only 20 to 30% of hernia patients have the hereditary and biochemical abnormalities [18].

The scientific community is still working to improve hernia surgery and reduce the rate of complications. Tissue-based methods are, in our opinion, still worthy of investigation in this area [4].

Between 15 and 28% of postoperative problems have been summarized in the literature that is currently available [25]. The frequency can potentially reach 50% with the application of aggressive postoperative surveillance [26]. Hematoma, seroma, surgical site infection, persistent discomfort, and recurrence were the most commonly reported side effects [27].

In the current study early postoperative complications were reported in 15.65% where edema and seroma were the most common complications, which is matching with what was reported in the literature and was less than what was reported in the

standard Lichtenstein technique where seroma was evident and this can be assumed to be the reaction of the body to the mesh used in the repair. This is consistent with other studies and the known influence of polypropylene on tissue [28,29]. Even among those who have followed the EHS criteria, the current range of hernia treatment outcomes is modest to outstanding. The typical Lichtenstein procedure has a mean recurrence rate of about 1% in hernia-specialized clinics, but it can go up to 4% in community hospitals. In certain articles, the rate has even been reported to reach 18% [18].

In the current study, the recurrence rate after 5 years was very low (1.7%) even less than what was reported in other tissue-based repair that may reach 20% [18]. This may be due to proper selection of the included patients with good EOA, proper technique and good hemostasis. Technical mistakes could be the cause of recurrence in Desarda method. An excessively long aponeurotic strip may be developed, leading to a reherniation and a big newly generated deep inguinal ring or because there was no obvious reherniation, but rather a weakening of the posterior wall as a whole [18].

There was no recurrence after 1 year follow-up, which is matching the reports of *Situma et al.* [30] who reported no recurrence among 269 patients who were included in their study and followed for 1 year although in the current study the results showed 1.7 % recurrence after 5 years but still comparable or even less than what was reported in either tissue-based or mesh-based technique after long period of follow-up.

Chronic pain has been defined as lasting > 3 months by the International Association for the Study of Pain [1]. In the current study no strong pain was reported and 84% of the cases reported mild pain and this can simply be the main cause of the early return of the included patients to basic, home and work activities. The pain in the current study was noticed very early and faded out by the 3rd month and only 2 (1.1%) patients reported long-term change in the sensation and numbness that can be assumed to be injury of the ilioinguinal nerve intraoperatively.

There were reports of rigid abdominal wall and foreign body sensation. The current study found that the rates of 0.6% and 2.3% respectively were too low compared to the range of reports for mesh repair that many authors had found, which was between 4.5 and 43.8% [31, 32].

Previous results of a 6-month follow-up analysis of the Desarda and Lichtenstein methods were published by *Mitura et al.* [19]. After six months, they saw no recurrence, and the pain levels in the Desarda and Lichtenstein groups were similar.

CONCLUSION

Desarda technique is an easy, effective and reliable method in treatment of inguinal hernia repair with favorable long-term outcome.

Declaration of conflicting interests: NIL.

Funding: NIL.

REFERENCES

1. **Stabilini C, van Veenendaal N, Aasvang E et al. (2023):** Update of the international HerniaSurge guidelines for groin hernia management. *BJS Open.*, 7(5): 1-38.
2. **Decker E, Currie A, Baig M (2019):** Prolene hernia system versus Lichtenstein repair for inguinal hernia: a meta-analysis. *Hernia*, 23 (3): 541-546.
3. **Muschaweck U, Koch A (2019):** Sportsmen's groin : Definition, differential diagnosis and treatment. *Radiologe.*, 59 (3): 224-233.
4. **Hernia Surge Group (2018):** International guidelines for groin hernia management. *Hernia*, 22: 1-165.
5. **Van Veenendaal N, Simons M, Hope W et al. (2020):** Consensus on international guidelines for management of groin hernias. *Surg Endosc.*, 34: 2359-2377.
6. **Murphy B, Ubl D, Zhang J et al. (2018):** Trends of inguinal hernia repairs performed for recurrence in the United States. *Surgery*, 163 (2): 343-350.
7. **Claus C, Oliveira F, Furtado M et al. (2019):** Guidelines of the Brazilian Hernia Society (BHS) for the management of inguino-crocal hernias in adults. *Rev Col Bras Cir.*, 46: 2226- 29.
8. **Lockhart K, Dunn D, Teo S et al. (2018):** Mesh versus non-mesh for inguinal and femoral hernia repair. *Cochrane Database Syst Rev.*, 9: CD011517.
9. **Barbaro A, Kanhere H, Bessell J et al. (2017):** Laparoscopic extraperitoneal repair versus open inguinal hernia repair: 20-year follow-up of a randomized controlled trial. *Hernia*, 21: 723-727.
10. **Oberg S, Andresen K, Klausen T et al. (2018):** Chronic pain after mesh versus nonmesh repair of inguinal hernias: a systematic review and a network meta-analysis of randomized controlled trials. *Surgery*, 163: 1151-1159.
11. **Clyde D, de Beaux A, Tulloh B et al. (2020):** Minimising recurrence after primary femoral hernia repair; is mesh mandatory? *Hernia*, 24: 137-142.
12. **Ge H, Liang C, Xu Y et al. (2018):** Desarda versus Lichtenstein technique for the treatment of primary inguinal hernia: a systematic review. *International Journal of Surgery*, 50: 22-27.
13. **Emile S, Elfeki H (2018):** Desarda's technique versus Lichtenstein technique for the treatment of primary inguinal hernia: a systematic review and meta-analysis of randomized controlled trials. *Hernia*, 22: 385-395.
14. **Mohamed A, Ahmad H, Abdelmabod A et al. (2020):** Non-mesh Desarda technique versus standard mesh-based Lichtenstein technique for inguinal hernia repair: a systematic review and meta-analysis. *World J Surg.*, 44: 3312-3321.
15. **Youssef T, El-Alfy K, Farid M et al. (2015):** Randomized clinical trial of Desarda versus Lichtenstein repair for treatment of primary inguinal hernia. *Int J Surg.*, 20: 28-34.
16. **Ahmed A, Ahmed W, Omar M et al. (2018):** Desarda versus Lichtenstein repair for inguinal hernia: a randomized, multi-center controlled trial with promising results. *Int Surg J.*, 5: 2723-2726.

17. **Vupputuri H, Kumar R, Subramani P *et al.* (2019):** A single-blind, randomized controlled study to compare Desarda technique with Lichtenstein technique by evaluating short- and long-term outcomes after 3 years of follow-up in primary inguinal hernias. *Int J Abdom Wall Hernia Surg.*, 2: 16–22
18. **Szopinski J, Dabrowiecki S, Pierscinski S *et al.* (2012):** Desarda versus Lichtenstein technique for primary inguinal hernia treatment: 3-year results of a randomized clinical trial. *World J Surg.*, 36: 984–992
19. **Mitura K, Rzewuska A, Skolimowska M *et al.* (2021):** Desarda technique as a valuable alternative for inguinal hernia patients refusing mesh implantation: long-term results fifteen years after a pure tissue repair in 198 patients. *Mini Invasive Surg.*, 5: 22–26
20. **Losanoff J, Millis J (2006):** Aponeurosis instead of prosthetic mesh for inguinal hernia repair: neither physiological nor new. *Hernia*, 10: 198–199.
21. **Abdel-Kader M, Ali W, Mohamed, H *et al.* (2022):** Study of Outcomes of Desarda Repair in Emergency Conditions of Inguinal Hernia. *The Egyptian Journal of Hospital Medicine*, 86(1): 139-146.
22. **McArthur L (1901):** Autoplastic suture in hernia and other diastases. *JAMA.*, 37:1162–1165.
23. **Ravitch M, Hitzrot J (1960):** 2nd The operations for inguinal hernia. I. Bassini, Halsted, Andrews, Ferguson. *Surgery*, 48: 439–466.
24. **Desarda M (2006):** Physiological repair of inguinal hernia: a new technique (study of 860 patients) *Hernia*, 10: 143–146.
25. **Bittner R, Sauerland S, Schmedt C (2005):** Comparison of endoscopic techniques vs Shouldice and other open nonmesh techniques for inguinal hernia repair: a meta-analysis of randomized controlled trials. *Surg Endosc.*, 19: 605–615.
26. **Eklund A, Rudberg C, Smedberg S *et al.* (2006):** Short-term results of a randomized clinical trial comparing Lichtenstein open repair with totally extraperitoneal laparoscopic inguinal hernia repair. *Br J Surg.*, 93: 1060–1068.
27. **Robinson T, Clarke J, Schoen J *et al.* (2005):** Major mesh-related complications following hernia repair: events reported to the Food and Drug Administration. *Surg Endosc.*, 19: 1556–1560.
28. **Grant A (2002):** Open mesh versus non-mesh repair of groin hernia: meta-analysis of randomised trials based on individual patient data. *Hernia*, 6: 130–136.
29. **Horstmann R, Hellwig M, Classen C *et al.* (2006):** Impact of polypropylene amount on functional outcome and quality of life after inguinal hernia repair by the TAPP procedure using pure, mixed, and titanium-coated meshes. *World J Surg.*, 30: 1742–1749.
30. **Situma S (2009):** Comparison of Desarda versus modified Bassini inguinal Hernia repair: a randomized controlled trial. *East Cent Afr J Surg.*, 14: 70–76.
31. **Paajanen H (2007):** A single-surgeon randomized trial comparing three composite meshes on chronic pain after Lichtenstein hernia repair in local anesthesia. *Hernia*, 11: 335–339.
32. **Staerkle R, Buchli C, Villiger P (2009):** Patient satisfaction, hernia recurrence rate, and chronic pain 10 years after endoscopic total extraperitoneal inguinal hernia repair. *Surg Laparosc Endosc Percutan Tech.*, 19: 405–409.