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"Desarda's Technique for the Management of Unilateral Inguinal Hernia: A Single Centre Study"

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Abstract:
Background*: Worldwide more than 20 million patients undergo inguinal hernia repair annually. The problem of our age is to find an operation that is simple, does not require implantation of a foreign body like mesh and does not produce major complications during or after surgery.*
Methods: *A prospective study was conducted on 50 cases of unilateral inguinal hernia repaired by Desarda technique in the Department of General Surgery, Gauhati Medical College and Hospital, Guwahati, from September,2020 to August,2021.*
Results: *All cases were elective; 34 cases had indirect hernia and 16 cases had direct hernia. All the patients were males, with a mean age of 43.32 ± 10.09 years. The mean operating time was 42.06 ± 4.43 minutes. There were no intra-operative complications. Post-operative pain according to VAS (Mean ± SD) on day 1 was 33.42 ± 9.88. The mean hospital stay was 2.06 ± 0.73 days. No patient had discomfort more than 14 days after this repair. Among post-operative complications there were not any severe complications. No chronic pain, sensation of foreign body and no recurrence was observed in the 1 year study period.*
Conclusion: *Desarda's method seems to be an attractive alternative to other methods of inguinal hernia repair widely adopted today. It is easy to perform and good in terms of post-operative pain, early return to normal activities and it has no foreign body sensation. Desarda repair has the potential to become the gold standard hernia repair in emergency settings and better option for those who refuse the mesh.*
Key words: *Desarda technique, Inguinal hernia, Recurrence*

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I. Introduction:

Inguinal hernia is a common disorder affecting approximately 5 to 10% of the adult population worldwide. Worldwide more than 20 million patients undergo inguinal hernia repair annually and it is one of the most frequently performed operations in general surgery. The estimated lifetime risk for inguinal hernia is 27% for men and 3% for women[1].

There are many types of inguinal hernia repair described in literature till date. In the European hernia society guidelines, mesh-based techniques and laparoscopic methods are recommended for the treatment of primary inguinal hernia[2].

Classical suture-based repairs described by Bassini, Shouldice, and McVay have the advantage over permanent mesh repairs in that they do not introduce significant permanent foreign body material but require expertise to do the dissection of the inguinal floor. The recurrence rate after the procedure done by expert surgeons or done at specialized centers is less but in the hands of an average or junior resident, it is high [3].

Lichtenstein mesh repair has been considered as a gold standard procedure for inguinal hernia repair in modern era but it has its own drawbacks such as mesh infection, mesh migration etc. and the groin being a mobile area, chances of mesh folding, wrinkling or curling is high. Chronic groin pain following mesh repair accounted for restriction in daily activities is seen in up to quarter of patients [4].

The benchmarks against which the success of any hernia surgery is evaluated are the recurrence rate of the operation, complications including chronic groin pain, and time taken to return to normal activities.

The improved surgical techniques and a better understanding of the anatomy and physiology of the inguinal canal have enabled many surgeons to look beyond prosthetic repair. One such technique is Desarda's method of repair of inguinal hernia which is based on the concept of providing a strong, mobile and physiologically dynamic posterior wall using an undetached strip of external oblique aponeurosis which strengthens the posterior wall of the inguinal canal [5].

Desarda's repair can routinely be done under local or regional anesthesia, is easy to do and learn, avoids the insertion of any foreign body, has minimal complications with no recurrence of hernia or chronic groin pain, and has been said to give results equivalent to those reported for mesh repair.

The objectives of this study are to study the outcomes of this surgery technique with regards to : 1) operating time, 2) postoperative pain 3)ambulation time 4)post-operative complications 5) duration of hospital stay 6)to look for any recurrence with regular follow up at one month, three months, six months and one year.

II. Methods:

A prospective study was conducted on 50 cases of unilateral inguinal hernia repaired by Dasarda technique in the Department of General Surgery, Gauhati Medical College and Hospital, Guwahati, from September,2020 to August,2021.

Patients over 60 years of age and under 18 years of age, recurrent inguinal hernias, complicated hernias, bilateral inguinal hernias, and those refusing to consent were excluded.

Method of sampling was non-random, convenience. After admission, short history was taken and a physical examination was conducted on each admitted patient with features of inguinal hernia. Patients were then explained about their diseases process and the possible line of management. All the necessary information regarding the study was explained to the patients or their valid guardian. Informed written consent was taken from the patients or their guardian willing to participate in the study.

Strict aseptic precautions were followed during the operation. Operation was performed by a consultant, and the surgeon factor was kept constant for these cases as to avoid bias in terms of technical feasibility of the procedure.

Meticulous techniques were practiced as far as possible. The operation procedure and related peri-operative factors were observed directly and recorded in the data collection sheet instantly. After completing the collection of data, it was compiled in a systematic manner.

Surgical technique:

Standard operative technique as described by the original surgeon was undertaken[5]. Skin and fascia are incised through a regular oblique inguinal incision to expose the external oblique aponeurosis. The external oblique is cut in line starting from the superficial ring up to the deep ring to expose the inguinal canal where cord structure is present along with hernia sac. Herniotomy was done in all cases except in small direct hernias where it was inverted. Now, a 1–2cm strip of external oblique aponeurosis is created by making an incision parallel to the previously cut margins of external oblique aponeurosis. The lower border of this strip of external oblique aponeurosis is sutured with the inguinal ligament from the pubic tubercle to the deep ring using 2/0 polypropylene interrupted sutures.

The upper free border of this strip is now sutured to the aponeurotic portion of the internal oblique muscle or conjoined muscle lying close to it with 2/0 polypropylene interrupted sutures throughout its length. Thus, this will result in the strip of the external oblique aponeurosis being placed behind the cord to form a new posterior wall of the inguinal canal .The spermatic cord is placed in the inguinal canal, and the lateral leaf of the external oblique is now sutured to the newly formed medial leaf of the external oblique in front of the cord, as usual, again using 2/0 polypropylene interrupted sutures . This is followed by closure of the superficial fascia and the skin as usual.

Antibiotics and analgesics were routinely prescribed to the patients post-operatively and all the patients were encouraged to resume normal activities as soon as possible.. Sutures were removed on day 7.

Following discharge, patients were reviewed at 7^{th} day, 15^{th} day ,at the end of 1^{st} month, 3^{rd} month, 6^{th} month and 1 year for complications and recurrence.

Outcome was measured as post-operative pain using visual analogue scale, requirement of analgesic injection, incidence of the wound infection, seroma, groin edema/hematoma, persistent pain, testicular atrophy, and recurrence.

III. Results:

All 50 patients were males with a mean age of 43.32 ± 10.09 years. Maximum number of patients were between the age of 35 to 44 years. The minimum age was 19 years and maximum age was 59 years.

All the patients were admitted, anaesthetic fitness obtained and operated electively. 16 (32%) patients had direct hernia, 34(68%) had indirect hernia and none of them had pantaloons hernia. 24(48%) patients had hernia on left side and 26(32%) had on right side.

The mean operating time taken to do surgery was 42.06 ± 4.43 minutes with minimum and maximum operative times being 38 minutes and 53 minutes respectively.

Analysis of pain was done on the first and third post operative day and according to linear visual analogue score(VAS), with 0-30mm signifying mild pain, 31-60mm moderate pain, 61-90mm severe pain and 91-100mm excruciating pain.

TABLE: Severity of postoperative pain in the study population

Pain	Postoperative day 1	Postoperative day 3	Post-operative day 15
Mild	19 patients	49 patients	0
Moderate	31 patients	1 patient	0
Severe	0	0	0
Excruciating	0	0	0

Mean post-operative day 1 pain = 33.42 ± 9.88 mm. Mean post-operative day 3 pain = 14.78 ± 8.47 mm.

The quantum of pain reduced significantly and patients complained of slight pain by day 3 except one patient with wound infection who had moderate pain. No patient had discomfort more than 14 days after this repair. There was not a single case which needed opioid analgesics.

Postoperatively, all the patients were allowed orally on the same day and encouraged to ambulate as soon as possible. Patients were freely mobile within 10-20 hours after surgery with a maximum of patients 18(36%) ambulating between 12 to 14 hours after surgery with a mean of 14.03 hours

Mean hospital stay was 2.06 ± 0.739 days with maximum of patients (90%) getting discharged within 3 days.

Following the surgery, patients were observed for post-operative complications.

TABLE: Various complications that occured in the study population:

Complication occurred	No. of patients
Seroma	2(4%)
Hematoma	2(4%)
Wound infection	2(4%)
Scotal edema	2(4%)
Orchitis	0
Testicular atrophy	0
Local hypoesthesia	0
Recurrence	0

There were no severe complications, chronic pain, or sensation of foreign body.

Appearance of a bulge in the groin on coughing was considered as a recurrence, but no patient had recurrence during the follow up period of one year.

RETURN TO NORMAL NON STRENUOUS ACTIVITY:

TABLE: Return to normal work in the study population

Return to normal non-strenuous work	No. of. patients
1-6 days	7(14%)
7-12days	23(46%)
13-17days	20(40%)

Patients returned to normal non strenuous work within 5-17 days (Mean = 11.08 ± 3.77days), with maximum of patients returning to normal work between 7 to 12 days after surgery.

IV. **Discussion**:

Inguinal hernia repair still remains a problem because of the following reasons:

a) High recurrence rates seen in the hands of the junior surgeons,

b) Difficult dissection of the inguinal floor in the Bassini/Shouldice repair, and

c) Infection and chronic groin pain following mesh repair.

d) After mesh repair the incidence of chronic groin sepsis is more common than reported and may require the complete removal of mesh to treat it [6].

OPERATING TIME:
In this present study of 50 patients, operating time (skin incision to skin closure) ranged from 38 to 53 minutes with a mean of 42.06 ± 4.43

STUDIES	OPERATING TIME(in minutes)
Youssef et al.(2015)[7]	59.4 ± 6.3
Gurgenidze et al.(2018)[8]	42.43 ± 12.55
Present study	**42.06 ± 4.43**

In a randomized clinical trial comparing Desarda and Lichtenstein repair for the treatment of inguinal hernia by **Youssef et al (2015)[7]**, a total of 168 patients were randomly allocated into two groups to undergo one of two repairs: Desarda (group I) or Lichtenstein (group II) (85 vs. 83, respectively). There was significantly longer operating time in group II (72.3.6 ± 12.2 min) than in group I (59.4 ± 6.3 min) (P < 0.001) and also earlier return to normal gait was in favor of Desarda repair (Return to normal gait was achieved earlier in group I patients (3.9 ± 0.9 days) than in group II patients (4.4 ± 1.1 days); statistically significant).

In 2012, **Manyilirah et al[9]** did a short term double blind randomized control trial comparing Desarda and Lichtenstein repair. A total of 101 participants (51 in the Lichtenstein arm and 50 in the Desarda arm) were enrolled into this single center double-blind randomized controlled trial. A significant difference was recorded in regard to operative time, with the Desarda repair markedly shorter in duration [15.9 ± 3.52 min for Lichtenstein repair and 10.02 ± 2.93 min for Desarda's repair, effect size (CI): 5.92 (4.62–7.20), P = 0.0001].But the operative time in this study was taken as the duration of actual repair technique, from the end of herniotomy (ligation of the sac) to the time of placement of the last stitch of repair (before embarking on closure of external oblique aponeurosis).The possibility of operator bias towards a particular method of repair could have contributed to this difference.
Arafa et al (2020)[10] also achieved similar results of lesser operative time in Desarda repair than Lichtenstein.
In a systematic review and network meta-analysis of randomized controlled trials comparing Shouldice and Desarda by **Bracale et al (2019)[11]** the anchored indirect treatment comparison showed that Desarda's technique requires a significantly shorter operative time (MD: −12.9 min; 95% CI: −20.6 to −5.2) and has a quicker recovery (MD: −6.6 days; 95% CI: −11.7 to −1.4).
However, **Rodriguez et al (2018)[12]** did not achieve similar results and Desarda repair was time consuming than Lichtenstein's repair (the operation time was 51 minutes in Desarda group and 40 minutes in the Lichtenstein group that is significant ($p<0.05$).
The shorter operating time in the Desarda group compared with the mesh group could be attributed to the need for more traction in fixing the mesh in some cases especially at the lateral extent of the repair, time taken to fashion the mesh and position it around the cord.
The results of the above studies and this present study are comparable with regard to operative time. Desarda's method of inguinal hernia repair operating time is comparable to that of the standard Lichtenstein repair and shorter than laparoscopic repair and other methods of inguinal hernia repair which are technically more challenging.

POST-OPERATIVE PAIN
In this study, post-operative pain as analyzed by VAS on Day 1 was only mild to moderate, ranging from 15mm to 60mm with a mean of 33.42 ± 9.88.

TABLE 11: Comparision of post-operative pain

STUDIES	POSTOPERATIVE PAIN(DAY1) in mm
Mitura et al.(2008)[13]	33
Gedam et al.(2017)[14]	24.33 ± 6.1
Gurgenidze et al.(2018)[8]	31.27 ± 0.86
Present study	**33.42 ± 9.88**

In a comparative study by **Gedam et al (2017)[14]** ,187 patients were randomly assigned to D or L group(92 Vs 95 respectively). Postoperative pain was significantly less in the first 7 post-operative days in Desarda group (P=0.09) compared to Lichtenstein group. Time taken to return to basic and home activities was significantly less in Desarda group (P =0.001)
The present study results are comparable to that of the Desarda groups in comparative studies by **Gedam et al (2017)[14], Mitura et al (2008)[13],Abbas et al (2015)[15]**, and **Youssef et al(2015)[7]**. The reason for this may be due

to many confounding factors like tissue handling, nerve traction and manipulation intraoperatively compared to other methods of hernia repair.

AMBULATION TIME, MEAN HOSPITAL STAY, RETURN TO NORMAL ACTIVITY :

In this present study, patients were allowed orally on the same day and were allowed to ambulate between 10 to 20 hrs after the operation with a mean of (14.03hrs). 45 patients(90%) were discharged less than 3 days (mean: 2.06 ± 0.739). 2 patients with hematoma formation,2 patients with wound infection and one patient with seroma formation got discharged after 3 days. One patient with seroma formation did dressing in his residence with antibiotic coverage and recovered on the first follow up. 2 patients had scrotal edema on their 1st follow up visit which subsided spontaneously on the second follow up visit. Patients returned to normal non strenuous work within 5 - 17 days (Mean 11.08 ± 3.77 days) with maximum of patients(46%) returning to normal activity between 7 to 12 days after surgery.

TABLE 12: Comparision of duration of hospital stay

STUDIES	DURATION OF HOSPITAL STAY(in days)
Rodriguez et al.(2018)[12]	1.20
Abbas et al.(2015)[15]	2.58
Gurgenidze et al.(2018)[8]	1.87± 0.78
Present Study	**2.06± 0.739**

Rodriguez et al(2018)[12] found that the duration of hospital stay and the period required to return to normal work after operation was in favour of the Desarda's group. Sixty-two cases in Lichtenstein group required more than 3 days in the hospital compared to only 5 patients from the Desarda's group; statistically significant.

Also since 6 cases needed re-exploration due to mesh infection, the morbidity was significantly more in the Lichtenstein's group(6%) compared to the Desarda's group(3.6%)**.**

In a study of 187 patients by **Gedam et al (2017)[14]** also found that the mean duration (in days) to return to the basic activities and home activities was less in Desarda repair ;statistically significant with P values < 0.05.

Abbas et al (2015) [15],Youssef et al (2015)[7],Mitura et al(2008)[13],Arafa et al(2020)[10] , Desarda et al(2006)[16] also achieved similar results and concluded that patients after Desarda repair returned to normal activities early than the Lichtenstein repair.

Early return to home activity in Desarda's technique may be attributed to less tissue handling, less dissections and less postoperative pain.

Table: Comparision of return to normal work

STUDIES	RETURN TO NORMAL WORK(in days)
Youssef et al.,2015	10-29(Mean: 17.44)
Arafa et al.,2020	11-29(Mean:19.74± 4.54)
Abd el wahab et al.,2020	6-14(Mean:8.62)
Present study	**5 -17(Mean: 11.08 ± 3.77)**

POSTOPERATIVE COMPLICATIONS AND RECURRENCE:

There was no recurrence in our 1 year follow up but long term follow up is needed for the assessment of this new tissue based hernia repair technique.2 patients(4%) had seroma formation, 2 patients(4%) had hematoma formation,2 patients(4%) had wound infection,2 patients(4%) had scrotal edema. Overall 20% of patients in this study experienced post-operative complication.

TABLE 14: Comparision of post-operative complications

STUDIES	POSTOPERATIVE COMPLICATION (Total complication % in their studies)
Youssef et al.(2015)[7]	22.5%
Gedam et al.(2017)[14]	17.40%
Present study	**20%**

In a study by **Szopinski et al (2012)[17]** a total of 208 male patients were randomly assigned to the D or L group (105 vs. 103, respectively). The primary outcomes measured were recurrence and chronic pain. During the follow-up, two recurrences were observed in each group (p = 1.000).

Chronic pain was experienced by 4.8 and 2.9% of patients from groups D and L, respectively (p = 0.464). Foreign body sensation and return to activity were not different between the groups. There was significantly less seroma production in the D group (p = 0.004).

Rodriguez et al (2018)[12] also achieved better results with regards to post-operative complications(3.4% morbidity in Desarda's group and 6% in Lichtenstein group).

Results of **Youssef et al (2015)**[7] showed that there was one recurrence in each study group during the 2-years follow up period (P =0.99). The recurrence in group I (Desarda's group) was at the newly reconstructed deep internal ring. In group II (Lichtenstein group) the recurrence was near the pubic tubercle. There were no early recurrences Groin pain after 6 months was reported by 4 (5.6%) and 3 (4.2%) patients from group I and II respectively (P = 0.68); pain was classified as moderate pain (VAS 3-5.5). There was no significant difference between the two groups regarding intra and post-operative complications.

Manyilirah et al (2012)[9] showed that Complication rates were similar in the two study arms and the effectiveness of the Desarda technique with respect to influencing the early clinical outcomes of hernia repair is similar to that of the Lichtenstein method.

Gedam et al (2017)[14] **and Arafa et al(2020)**[10] also showed that Complication rates were similar in Desarda and Lichtenstein repair.

Bracale et al (2019)[11] compared Shouldice and Desarda repair and showed that outcomes concerning intraoperative complications, early postoperative pain, post-operative complications, recurrence, were similar among the two techniques.

Hussain et al (2017)[18] also showed that the recurrence rate was significantly less in Desarda technique than darning technique in the management of emergency inguinal hernia.(55.5 % in darning group Vs 7.4% in Desarda group,(*p*-value<0.001) in his study period.

TABLE: Comparison of recurrence

STUDIES	RECURRENCE
Desarda MP.(2003)[26]	0.25%(15 years)
Sharma et al.(2020)[19]	0%(5 years)
Szopinski et al.(2012)[17]	1.9%(3 years)
Present study	**0%(1 year)**

However, recurrence seems to develop even after a long period of time, in particular, after non-mesh repair .It is known that recurrence continues to occur after the follow-up period of 1–5 years usually used in most hernia studies.[20] Hence, long term follow up studies are needed in future.

The use of synthetic material is still controversial in young patients. The effect of polypropylene placement or other synthetic mesh inside our body and side effects of sexual dysfunction is still unknown. As a result, many surgeons try to avoid mesh prostheses for hernia treatment in young patients. Also, the Desarda method, a tissue based technique, can be used in a contaminated surgical field, usually seen during operations for strangulated hernias.

Although based on multiple large systematic reviews, various hernia society guidelines generally advocate the use of mesh in a tension free technique for hernia repair,[21,22,23] and consider Lichtenstein's repair as the gold standard in inguinal hernia repair; it is still not the ideal solution due to the complications after mesh implantation, including stiffness, chronic pain, and foreign body sensation. So it is no doubt that the debate on the benefits of tissue-based repair or prosthetic repair of symptomatic inguinal hernias will continue for some time.

Next, apart from mesh repair, what is the "Ideal" tissue for repair? Most of the conventional tissue-based repairs aim to construct the posterior abdominal wall using patient's deep abdominal wall muscular tissue and fascia, and especially, the transversalis fascia gained much attention,[24] such as the Shouldice procedure. However, the Desarda's technique uses the external oblique aponeurosis (EOA),since the External Oblique Aponeurosis is not only strong, but more superficial and easy to manipulate, which makes the procedure simple. Furthermore, this new established layer, quite resemble the layer of the mesh placement in Lichtenstein procedure, which in part proved the reasonable layer for inguinal hernia repair. Third, most of the meshes for hernia repair are over-weight and much stronger than needed. [25] The use of patient's own tissue of the External Oblique Aponeurosis, although not as strong as a prosthetic mesh, but is obviously stronger than the transversalis fascia. Thus the External Oblique Aponeurosis may be a sound alternative tissue material in the majority of inguinal hernia cases, and provides a clue to the path to tissue repair.

V. Conclusion:

Desarda's technique of biological repair is a good alternative to Lichtenstein's repair considering the drawbacks of mesh. It is easy to perform and good in terms of less post-operative pain, early return to normal activities and has no foreign body sensation. It has the scope to become the procedure of choice in emergency settings such as obstructed or strangulated hernia where the use of mesh is contraindicated. It is a better option for those patients who disagree the use of mesh. However, further studies are needed in the future focusing on

the short and long-term results specifically in the group of currently accepted indications for tissue repair (i.e. contaminated cases, young adults and in cases of patients refusal to mesh implants) and also longer follow up period studies are needed to comment on the recurrence rate of Desarda's repair.

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