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Comparison of Lichtenstein mesh hernioplasty with Desarda's tissue based repair technique in the treatment of inguinal hernia: A prospective study

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Abstract

Background: The Desarda technique of inguinal hernia repair which was introduced in 2001, is still not accepted widely as a standard tissue based hernia repair technique. In our study we compared Desarda's pure tissue based technique with standard Lichtenstein repair in treatment of primary inguinal hernia.

Methods: 187 cases were allocated into 2 groups. Desarda-Group had 92 and Lichtenstein-Group had 95 patients. Primary outcome factor was early (<1 year) recurrence of inguinal hernia. Secondary outcome factors included operative time measured from skin incision to skin closure. Postoperative pain scores were assessed using Visual analogue scale. Time taken to return to basic and home activities was calculated. Cord oedema, groin discomfort, seroma, fever, surgical site infections, chronic pain, etc. were evaluated as postoperative complications.

Results: After a 15-month mean follow up period 1 recurrence is noted in each arm (P=1). Operative time was 73.89 ± 12.63 min in Lichtenstein and 72.60 ± 13.89 min in Desarda repair (P=0.508). 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). There was no statistical difference in rates of post-operative complications among the two arms of the study.

Conclusion: The results of inguinal hernia treatment with the Desarda technique are similar to the results after standard Lichtenstein operations. Desarda technique does not use a mesh. Patients after Desarda's operative procedure get ambulatory sooner as compared to the standard Lichtenstein mesh repair. Less Postoperative pain, complications similar to standardised technique. Desarda technique has the potential to enlarge the number of tissue based methods available to treat groin hernias.

Keywords: Lichtenstein mesh hernioplasty with Desarda's tissue, treatment of inguinal hernia

Introduction

The word "hernia" is derived from a Latin term meaning "a rupture."^[1] An inguinal hernia is a protrusion of the contents of the abdominal cavity or pre-peritoneal fat through a hernia defect in the inguinal area^[2].

The incidence and prevalence of inguinal hernia are not precisely known. The chance of a person having to undergo an inguinal hernia operation during his/her life is quite high, 27% in men and 3% in women^[3-5].

The European hernia society published guidelines in 2009 for hernia repair. They recommended Lichtenstein or laparoscopic methods for repair of primary inguinal hernia in adult males. The Shouldice repair technique is considered best among the non-mesh repair techniques with strength of recommendation level 1A. The Shouldice technique offers a recurrence rate ranging from 0.7 to 1.7% up to 15% depending on experience^[6, 7]. The Lichtenstein method is currently the most popular open mesh repair technique with recurrence rates of around 4% in long term follow up^[8, 9]. Lichtenstein method uses mesh implantation which has shortcomings like chronic groin pain, foreign body sensations, abdominal wall stiffness, surgical site infection etc. which interferes with daily patient activities^[10, 11]. Additionally problems like mesh migration, mesh rejection, sexual dysfunction leading to pain and impairment of sexual activity has also been reported after the mesh based hernia repair technique^[12-15].

The benchmarks against which a successful hernia surgery is evaluated are recurrence rate, rate of complications, simplicity to be performed by surgeons in training, low cost and time taken to return to normal activities^[16].

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Desarda, in 2001 has described a new method that seems to satisfy the above criteria. It does not require prosthetic mesh, complicated dissection or suturing, and no use of weakened muscles or transversalis fascia for repair. The technique is easy to learn. The author claims results, which are superior or equal to Shouldice and Lichtenstein repairs, with 1.8% complication rate and 0.2% recurrence [17, 18].

The aim of this clinical study is to compare the pure tissue based Desarda technique with standard Lichtenstein repair in terms of clinical outcomes, postoperative pain, complications and early recurrence in treatment of primary inguinal hernia in central Indian population.

Material and methods

The study to compare the two techniques of hernia repair was carried out at Department of Surgery at Ayaan Institute of Medical Sciences, Moinabad, and Telangana, India. The study group included patients with inguinal or inguinoscrotal hernia during the period of September 2019 to September 2021.

Study was approved by the local ethical committee. Informed consent was obtained from all the participating patients after explaining the purpose of the study. All patients with inguinal or inguino-scrotal hernia were eligible for the study.

The exclusion criteria were

- Patients below the age of 18 years,
 - Patients with complicated inguinal hernia *viz.*, obstructed, strangulated, and gangrenous hernia, recurrent inguinal hernia, patients found to have thin, weak or divided external oblique aponeurosis intra-operatively.
- Patients with a visible inguinal or inguino-scrotal swelling, presence of cough impulse, inability to get above the swelling, dull aching pain in inguinal region were diagnosed as inguinal hernia. All patients were subjected to preoperative evaluation including history taking, clinical examination and basic laboratory investigations. Elderly patients were subjected to further investigations as part of pre-anaesthetic work up and looked for any complications.
- Patients were divided into 2 groups by a team of surgeons to undergo one of the two repairs. Lichtenstein mesh based repair (L group) or Desarda tissue based repair (D group). Patient assignment to the type of surgery was done by randomization and on patient preference basis. All patients under Desarda technique were under a single surgical unit, while rest all units in the department performed Lichtenstein repair technique. Anaesthesia was used according to the anesthetist's opinion after detailed pre-anaesthetic evaluation. Oblique inguinal incision was used in all procedures. Dissection and assessment of the external oblique aponeurosis (EOA) was done. Operating time was calculated from skin incision to skin closure.

Desarda [D group]

The Desarda repair for inguinal hernia was done as per the original description [17]. The external oblique aponeurosis (EOA) was opened, hernia sac identified and either reduction inversion of the direct sac or herniotomy of the indirect sac was done. A splitting incision was taken in EOA, partially separating and creating a 2 cm strip whose medial leaf sutured to inguinal ligament in interrupted manner. The upper free border of EOA strip was sutured interruptedly to internal oblique or conjoint muscles with Prolene 2/0. The strip extended from symphysis pubis upto 1 to 2 cm beyond the internal ring. The resultant strip of EOA placed behind the cord formed a new posterior wall of inguinal canal. The spermatic cord placed in the inguinal canal

and the lateral leaf of EOA is sutured to the newly formed medial leaf of EOA in front of the cord using Prolene 2/0 interrupted sutures. The superficial fascia and skin were closed as usual.

Lichtenstein [L group]

The Lichtenstein tension free mesh repair was done as described by Lichtenstein. A polypropylene mesh was tailored to fit against the posterior wall of inguinal canal. The mesh was sutured to the pubic bone, the inguinal ligament and internal oblique with Prolene 2-0. A 2 cm slit was made in the mesh to accommodate the cord, the two tails of which sutured together to create a new deep ring. The spermatic cord placed in the inguinal canal, closed by suturing the two edges of EOA. The superficial fascia and skin were closed as usual.

Postoperative analgesic medication was same for both the groups. Routine administration of one dose of Diclofenac injection was given post-operatively to each patient. Tablet Diclofenac was given to all patients twice a day for 3 days.

Primary outcome factor was early (<1 year) recurrence of inguinal hernia. Secondary outcome factors included operative time measured from skin incision to skin closure. Postoperative pain scores were assessed on day 1, 3, 7, 30 and 90 using Visual analogue scale; 0 as least pain and 10 as maximum pain. Visual analogue scale score >5 after 3 months was the criteria to label as chronic pain. Time taken to return to basic and home activities was described as the patient's ability to perform basic elementary activities (i.e. getting dressed, walking) and home activities like (bathing, and performing daily household chores). Cord oedema, groin discomfort, seroma, fever, surgical site infections, chronic pain, etc. were evaluated as postoperative complications. Intense, intermittent pain (Neuralgia); an abnormal sensation tingling or pricking type (Paraesthesia/foreign body sensations) was noted in the operated area, in the groin or along the scrotum was noted to assess any nerve damage.

Patients were called up for follow up 1 month, 3 month, 6 month and 1 year after the operation to note the complications and recurrence of hernia. Patients who could not come for a follow-up visit were contacted telephonically and the questionnaires were filled. Total duration of follow up was 1 year.

Statistical analysis

Descriptive statistics presented in tabular format with Mean, standard deviation, percentage and others for descriptive statistical analysis. For analytical statistical calculations continuous variables were presented as Mean standard deviation. Continuous variables were compared using unpaired "T" tests and two tailed P Values were calculated. Categorical variables were expressed in actual numbers and percentages and were compared using Fisher exact test and the two tailed P value was calculated. The P value of <0.05 was considered as statistical significance. Statistical analysis was done using free trial version of Graph Pad Prism 6[®] for Windows version 6.07 (trial) during the 30 day demo interval.

Results

A total of 187 patients of inguinal hernia were operated during the study duration. 95 in Lichtenstein and 92 in Desarda arms. The baseline characteristics like demographic profile, comorbid conditions on comparison were similar in both the groups (Tables 1 and 2). Clinical characters and hernia features were compared with no statistical differences shown in Table 3. The intraoperative and early postoperative features are shown in

Table 4. There was a statistically significant difference in pain scores reported till postoperative day 7. Patients operated with Desarda technique had significantly less pain till POD 7 on comparison with Lichtenstein operated technique.

The mean duration (in days) to return to the basic activities and home activities on statistical calculation was statistically significant with P values < 0.05.

On looking at the Graph 1, it is clearly observed that the pain scores in Desarda group are significantly less in the first 7 days post-operative period. However as the duration advances the pain scores becomes almost equal and no difference is observed in pain among the two groups after one month of postoperative period.

On comparison & evaluation of complications observed post operatively all the P Values are >0.05 which is statistically not significant, implying that both Lichtenstein and Desarda have comparable complication rates. There was no significant difference with regard to postoperative fever, cord oedema, groin discomfort, seroma, surgical site infection, chronic pain, neuralgia and foreign body sensations (Table 5).

There was one recurrence each in Desarda and Lichtenstein arm during the one year follow up. In Lichtenstein group the recurrence was near the pubic tubercle and in the Desarda group it was near the deep ring.

Discussion

Surgical repair of the inguinal hernia is the most common general surgery procedure performed today [19]. The successful surgical repair of inguinal hernia depends on a tension free closure of hernia defect to attain the lowest possible recurrence rate [1]. For years together Bassini's repair and its modifications were standard treatment for inguinal hernia till Lichtenstein tension free repair came. After that there was limited scope for tissue-based repairs like Bassini's repair, Shouldice repair etc. In a large multi- centre-controlled trial, recurrence rates of 8.6%, and 11% were re-ported after Bassini and McVay repairs respectively [20].

Shouldice repair, is sophisticated technique, requiring long learning curve. It has recurrence rates of <1% at Shouldice hospital and up to 15% in general surgical practice [6, 7, 21, 22, 23]. This rate of recurrence in non-specialist centres shows that Shouldice repair is not a universal repair technique for hernia repair.

Use of prosthetic material for inducing fibrosis thereby strengthening the posterior wall of inguinal canal was principle behind Lichtenstein mesh repair technique. It achieves most of the requirements of an ideal hernia surgery, but the complications related to the mesh are described [10, 11]. Many newer prosthetic materials (Biomaterials) have come to light, but their use in treatment of inguinal hernia is still a question.

Thus the search for ideal operative technique for inguinal hernia with low costs, low complication and recurrence rates, operability by consultants, surgeons in training at smaller and district hospitals, ease of learning and enabling early return to day to day activities. The Desarda technique satisfies most of the criteria of an ideal technique.

Desarda uses external oblique aponeurosis for strengthening the posterior wall of inguinal canal. The author claims results, which are superior or equal to Shouldice and Lichtenstein repairs, with 1.8% complication rate and 0.2% recurrence. Only 3 randomised control trial have evaluated this technique.

The present study compared Desarda technique with standard Lichtenstein technique for clinical outcomes, postoperative pain, complications and early recurrence in treatment of primary

inguinal hernia.

In this study, one patient in Lichtenstein group and one in Desarda group had recurrence within one year of operative repair (P=1). In Lichtenstein group the recurrence was near the pubic tubercle and in the Desarda group it was near the deep ring. Desarda, in a clinical trial in small district hospital in India, comparing his technique to Lichtenstein repair reported no recurrence in his technique versus 1.9% recurrences in the mesh group [24]. Szopinski *et al.* [25] had 1.9% recurrence in Lichtenstein and 1.94% in Desarda group. Similar P values were obtained in studies by Youssef *et al.* [26], Z Abbas *et al.* [27], Rodriguez *et al.* [28], and Mitura *et al.* [29].

Postoperative pain was significantly less in the first 7 post-operative days in the Desarda group (P=0.09) compared to Lichtenstein group. This finding was not seen in any other study like Youssef *et al.* [26], Z Abbas *et al.* [27], and Mitura *et al.* [29]. The reason for this may be due to many confounding factors like tissue handling, nerve traction and manipulation intra-operatively.

Time taken to return to basic and home activities was statistically significant (P=0.001) and (P=0.013) respectively, suggesting patients operated with Desarda technique get ambulatory sooner and return to the basic and home activities before the patients operated with Lichtenstein repair. Early return to home activity in Desarda technique may be attributed to less tissue handling, less dissections and less postoperative pain. Youssef *et al.* [26], Z Abbas *et al.* [27], Mitura *et al.* [29] and Desarda *et al.* [24] reported similar results.

The duration of operation is a surgeon dependent variable and reflects the ease of operation. In the present study, operating time was calculated from skin incision to skin closure, unlike in other studies where only time needed to repair is considered.

The mean operative time was 73 ± 13.63 min for Lichtenstein and 72 ± 13.89 min for Desarda repair. (P = 0.5). It was statistically not significant. The similar operating time required is attributed to the fact that time required to fix the mesh is similar to the time required to cut and fix the external oblique aponeurosis in Desarda repair. Youssef *et al.* [26], Rodriguez *et al.* [28] reported significance differences in operative time unlike our results.

The present study had 1.05% incidence of chronic pain in Lichtenstein group and 1.08% in Desarda group, it is found to be of no statistical significance (P=1). The incidence of chronic pain in literature is quotes around 1.1-6.49% in Lichtenstein and 0.8-4.8% in Desarda group.

With respect to post-operative complications, there is no statistically significant difference between the two study arms. Szopinski *et al.* [25] reported high incidence of seroma in Lichtenstein group. Desarda *et al.* [24] reported three times complication rate in Mesh group. The most frequent complication in our study was cord oedema.

Some surgeons believe hernia is due to abnormal collagen metabolism and connective tissue defect. This set of surgeons are in opposition to Desarda technique. However Shouldice technique, being a pure tissue repair method is still accepted. We believe pure tissue based hernia repair method like Desarda must be considered among the mainstream treatment guidelines for inguinal hernia. The strip of EOA is an excellent alternative to mesh. The strip being physiological, natural, and universally available prosthesis for reinforcing posterior wall of inguinal canal. We think exact identification of patients who are appropriate for pure tissue based repairs is necessary. The most evident indications for use of the Desarda technique include use in young patients, strangulated inguinal hernias, and financial

constraints and when patient disagrees with the use of mesh. Use of originally unhealthy tissue for repair may lead to recurrence. Mean follow up period was around 15 months, which is a short period for evaluation of recurrence and hence the results are only showing short term outcome.

The present study is a longitudinal study where allocation of patients to the 2 groups was not done by randomization but by systematic allocation, however, there is definitely an allocation bias, as this is not randomized control trial. However, in order to overcome the deficiency of randomization, the 2 groups were compared on the basis of baseline features, not to get rid of bias but to state that the 2 groups, without randomization are also similar & the result obtained between the 2 groups have resemblance, which could be attributable to surgical intervention. Exclusion criteria had Patients < age of 18 years,

all complicated inguinal hernia. Obstructed, strangulated, and gangrenous hernia, recurrent inguinal hernia, patients found to have thin, weak or divided external oblique aponeurosis intra-operatively. Similar exclusions were also followed for Lichtenstein (L group) arm and the complicated patients were completely excluded.

For establishing efficacy of any surgical intervention and obtain class 1 evidence, RCT is the gold standard, but in present series, as we were trying newer technique, we specifically selected primary non complicated inguinal hernia patients and used longitudinal study to see the outcomes and short term efficacy of the newer procedure. Encouraged by the results of this present study, we plan to design a larger randomized control trial with a longer follow-up period. We accept that there are allocation and selection biases in this present study.

Table 1: Comparison of baseline characters of two groups.

Variables	Lichtenstein (n=95)	Desarda (n=92)	P-Value
Age (Mean±SD)	47.32 ± 14.06	49.75 ± 18.02	0.304
Gender	95M	91M/1F	NA
Comorbid conditions			
Hypertension	34(35.78%)	28(30.43%)	0.442
Diabetes	24(25.26%)	20(21.73%)	0.608
Smoking	29(30.52%)	31(33.69%)	0.754
Ghutka	30(31.57%)	27(29.34%)	0.753
Alcohol	30(31.57%)	34(36.95%)	0.446
Chronic cough	24(25.26%)	23(25%)	1
Asthma	2(2.10%)	6(6.52%)	0.164
Stricture/BHP	9(9.47%)	5(5.43%)	0.406

Table 2: Age distribution of patients.

Age in years	Lichtenstein number of patients (%)	Desarda number of patients (%)	P Value
18-30	15[15.78%]	19[20.65%]	0.083
>30-40	17[17.89%]	13[14.13%]	0.624
>40-50	18[18.89%]	11[11.95%]	0.447
>50-60	29[30.52%]	15[16.30%]	0.918
>60-70	15[15.78%]	25[27.17%]	0.176
>70	1[1.05%]	9[9.78%]	NA
Total	95	92	0.304

Mean age: 48.52 years.

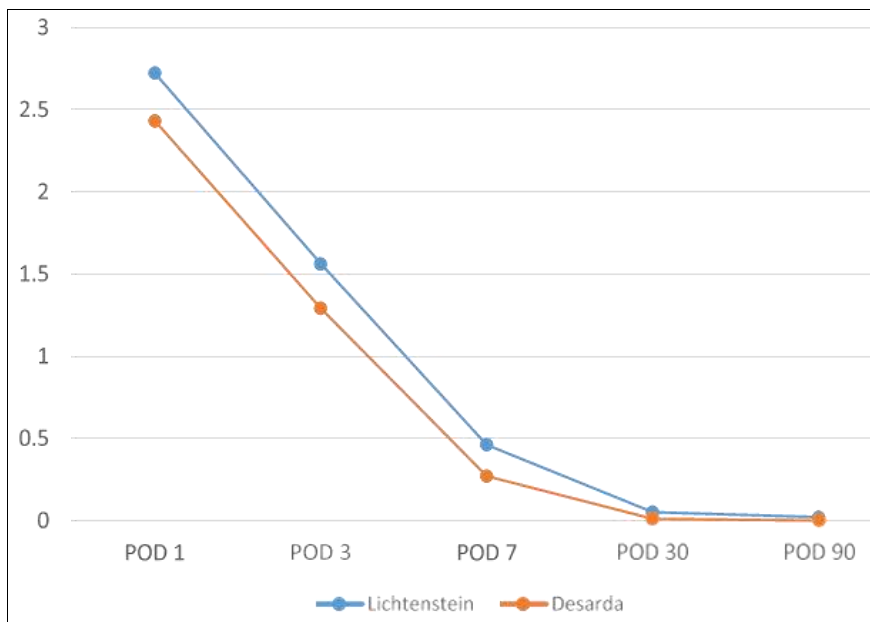
Standard deviation: 16.14

Table 3: Comparison of clinical characters.

Variables	Lichtenstein (n ¼ 95)	Desarda (n ¼ 92)	P Value
Duration of hernia (In months) (Mean±SD)	11.65 ± 16.65	14.20 ± 29.28	0.462
Side of hernia(Right/Left)	63/32	61/31	1
Type of hernia (Direct/ Indirect)	36/59	32/60	0.762

Table 4: Showing intraoperative and post operative variables.

Variables	Lichtenstein (n = 95)	Desarda (n = 92)	P Value
Operative time (In minutes)	73.89 ± 12.63	72.60 ± 13.89	0.508
Postoperative pain scores (Sheffield's pain scale)			
POD 1	2.72 ± 0.44	2.43 ± 0.61	0.0003
POD 3	1.56 ± 0.61	1.29 ± 0.65	0.0034
POD 7	0.46 ± 0.54	0.27 ± 0.44	0.009
POD 30	0.05 ± 0.26	0.01 ± 0.10	0.16
POD 90	0.02 ± 0.20	0.00 ± 0.00	0.32
Return to basic activity (Days)	3.30 ± 1.13	2.54 ± 0.85	0.001
Return to home activity (Days)	6.23 ± 2.02	5.56 ± 1.59	0.013
Follow up period (2-25 month)	14.70 ± 3.67	15.79 ± 4.94	0.088



Graph 1: Showing Postoperative Pain Scores.

Table 5: Showing comparison of complication rates between the 2 groups.

Variables	Lichtenstein (n = 95)	Desarda (n = 92)	P Value
Early complications (<30 days)			
Fever	7(7.36%)	6(6.52%)	1
Cord oedema	11(11.57%)	6(6.52%)	0.31
Groin discomfort	5(5.26%)	4(4.34%)	1
Seroma	2(2.10%)	3(3.26%)	0.679
Surgical site infection	1(1.05%)	1(1.08%)	1
Late complications (>30 days)			
Chronic pain	1(1.05%)	0	1
Neuralgia	0	0	1
Foreign body sensations	0	0	1
No complications	70(73.68%)	76(82.60%)	0.159
Recurrence	1(1.05%)	1(1.08%)	1

Conclusion

The results of inguinal hernia treatment with the Desarda technique are similar to the results after standard Lichtenstein operations over a 15-month mean follow up period. Desarda technique does not use a mesh, this makes Desarda repair cost effective, easy to learn. Patients after Desarda's operative procedure get ambulatory sooner as compared to the standard Lichtenstein mesh repair. Less Postoperative pain, complications similar to standardised technique. However Weak external oblique aponeurosis or EOA with separated fibers is the basic drawback of Desarda technique and here Lichtenstein technique scores over the Desarda. Large scale long term multicentric randomized control trials need to be conducted to evaluate this repair further. The technique has the potential to enlarge the number of tissue based methods available to treat groin hernias.

Ethical approval

The protocol for the study was approved by the institutional ethics committee.

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Conflict of interest

The authors declare that there are no conflicts of interest.

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