

# Inguinal Hernia repair by Darn versus Lichtenstein repair

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## ABSTRACT

**Background:** Tension free inguinal hernia repair like darning is commonly practiced in general surgery in our set up but mesh repair is getting popularity for the last few years.

**Aim:** Two techniques are compared with respect to effectiveness, duration of surgery, post-operative complications, duration of hospital stay, pain free early return to normal physical activity and work.

**Study Design:** It is a randomised prospective comparative study.

**Place and duration of study:** The study was conducted in surgical unit, Amna Inayat medical college Shaikhupura from May 2012 to April 2016.

**Methodology:** A total of eighty four patients were included in the study. They were randomly divided in two groups. Darn group (D) and Lichtenstein - mesh group L. Group D has forty (n= 40) patients and group (L) has forty four (n=44) patients. We assessed the post operatively for a follow up period of 20 months for effectiveness of the technique, post operative complications, duration of hospital stay and pain free early return to normal physical activity and work.

**Results:** A total of 84 patients were divided into two groups. Darn group (D) had 40 patients and Lichtenstein mesh group L had 44 patients. Two techniques were compared with respect to duration of surgery, post operative recovery, post operative complications like post operative pain which was 8(20%) in group D and 16(36.36%) in group L with p value 0.10, urinary retention 3(7.5%) in group (D) and 5(11.36%) with p value 0.47, inguinoscrotal swelling 3(7.5%) in group (D) and 6(13.63%) in group (L) with p – value 0.31, post operative wound infection no patient developed wound infection in group (D) while in group L 4(9.09%) P value 0.04. No any patient developed orchitis, osteitis pubis in any group. No patients developed recurrence of inguinal hernia in any group over a period of two years follow up. The mean hospital stay in group D was 2.37±1.38 days while it was 2.72±1.56 days in group L. Most of the patients in both groups returned to the normal activity on first post operative day, in group (D) 38(95%) and 34(77.27%) in group L.

**Conclusion:** There is no gross statistical difference between Darn repair and Lichtenstein repair. Darn repair is still better with respect to its simplicity, less inguinoscrotal swelling, less surgical site infection, cost effective and surgeons are used to perform it at all level of health care centers.

**Keywords:** Inguinal hernia, Darn repair, Lichtenstein repair

## INTRODUCTION

Inguinal hernia patients are the common visitors of surgical OPD since the time it was conceived<sup>1</sup>. Inguinal hernia repair is the commonest surgical operation which is performed at surgical floor all over the world<sup>2</sup>. Hernia is a protrusion of a viscus from the cavity in which it is contained. Several predisposing factors contribute to the development of hernia like lifting heavy weights, strenuous exercises, chronic cough, constipation and patients who are straining at micturition (e.g) prostate hypertrophy or hyperplasia all these increase the intra-abdominal pressure and is the cause of weakening of fascia transversalis. The other major cause of inguinal hernia is the congenital persistence of process vaginalis or peritoneo-vaginal canal<sup>3</sup>. International Statistical Classification of Diseases 10<sup>th</sup> Revision (ICD-10) mentioned several types of inguinal hernias<sup>4</sup>. In 2009 European Hernia Society has suggested a simplified system and classification for inguinal hernia. . Primary or recurrent (P or R). Lateral, Medial or Femoral (L, M or F). Defect size in finger breadth is assumed to be 1.5 cm<sup>5</sup>. Inguinal hernia is diagnosed during clinical examination. Usually these are painless swellings with cough impulse, reducible on lying down or by patient himself and reappearance of hernia on coughing or on standing. Deep inguinal ring occlusion test suggests that the hernia is indirect inguinal hernia or direct inguinal hernia<sup>6</sup>. Diagnostic difficulties

may arise in some case where there is an indistinct boundary of hernia protrusion in the groin. Ultrasound is a useful modality that helps the clinical examination with its diagnostic specificity 88 – 100 % and sensitivity 33 – 100%<sup>5</sup>. Computer tomography is not a good modality in the diagnosis of inguinal hernia but is useful in the diagnosis of sliding hernia<sup>7</sup>. Herniography is a safe diagnostic tool in cases of hidden hernias with its sensitivity of 100% and specificity of about 98-100%. This modality is almost not or very rarely used in domestic practice<sup>8</sup>. Since the early 19<sup>th</sup> century when the anatomists and surgeons were describing the inguinal canal anatomy and they were also working on the different surgical techniques of inguinal hernia repair. The basic principle of all these technique was the elimination of the defect in the posterior wall of the inguinal canal or reinforcement of the posterior wall of the inguinal canal with tightening of the deep inguinal ring<sup>9</sup>. The inguinal hernia repair can be done either externally the surgeons who performed these techniques in their respective era were Lucas Championere, Bassini, Lothiessen, Mcvay, Shouldice, Lichtenstein, Stoppa or internally via intraabdominal approach (laparotomy or laparoscopically)<sup>10</sup>. The hernia repair is revolutionized over the last many years but darn repair is still the most commonly and most prevalent simple repair in the domestic practice. The darn repair is the posterior wall repair of the inguinal canal by making a loose mesh in the form of figure of eight between the inguinal ligament and conjoint tendon with polypropylene suture no. 1 and the closure of the wound in layers<sup>11</sup>. Although Shouldice and Lichtenstein (mesh) repair are the procedure of choice for the last few decades but darn repair is still popular due to its simplicity its cost effectiveness in the low socioeconomic background and in the remote areas in the domestic practice.

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The aim and objective of this study is to compare the effectiveness of the procedures, the post operative complications, recurrence rate and early return to normal physical activity and work.

**MATERIAL AND METHODS**

This study was carried out in the department of surgery unit I Kishwar Fazal teaching hospital, Amna Inayat Medical College Shaikhupura from May 2012 to April 2016. The study protocol was approved by the Ethical Committee of Kishwar Fazal Teaching Hospital. As the study was random and patients were randomized by opening of sealed envelopes. The patients were informed about their treatment after the randomization. A total 84 patients were included in the study which were divided randomly in two groups. Group (D) Darn group and Group (L) was Lichtenstein group or mesh repair group. There were 40 patients in (D) group 44 patients in (L) group. All were male patients diagnosed as unilateral reducible inguinal hernia. All patients were admitted through surgical OPD and were subjected to detailed history of inguinoscrotal swelling and history of causative factors including chronic cough, constipation, symptoms of lower urinary tract were elaborate , clinical examination like cough impulse, upper limit of inguinoscrotal swelling, and deep ring occlusion test were performed to distinguish between indirect and direct inguinal hernia. Routine laboratory investigations like CBC, urine analysis, hepatitis profile were performed in all patients and X – ray chest and ECG were added who were above the age of 50 years. All patients were assessed by anesthetist pre-operatively and all patients were underwent surgery under spinal anesthesia. Congenital inguinal hernia, patients with recurrent inguinal hernia, sliding hernia, patients with coagulopathy and who were on aspirin and warfarin (anticoagulants) were excluded from the study. Patients who were diabetic also excluded from the study. Pre – operatively all patients were given injection amoxicillin and cavalonic acid 1.2 gm at the time of induction and three doses were given twelve hourly. The suprainguinal incision that was 2.5 cm above and parallel to the inguinal ligament from pubic tubercle to mid inguinal point was made on right or left side depending upon the side of hernia. In darn repair after making above mentioned incision external oblique aponeurosis incised in the line of incision, ilioinguinal nerve identified and saved in all cases. Cord identified lifted at the pubic tubercle, sac of hernia identified and separated from the cord. In indirect inguinal hernia herniotomy done and in the posterior wall fascia transversalis repaired with 3/0 prolene but in case of direct inguinal hernia after lifting the cord the hernia in the posterior wall reduced and fascia transversalis plicated with 3/0 prolene. Then a repair with polypropylene no 1 - 0 made in the form of figure of 8 between conjoint tendon and inguinal ligament. Then wound closed in layers. In Lichtenstein\_repair after dealing with the hernia sac the key hole polypropylene mesh placed over the posterior wall to strengthen the wall and anchored the mesh with the posterior wall conjoint tendon above and with the inguinal ligament below with 3 – 0 prolene and wound closed in layers. During closure of the wound all patients were injected Inj. Bupivacaine (long acting local anesthetic) 2 mg / Kg body weight in the wound. Post operatively all patients were given inj. Amoxicillin and cavalonic acid 1.2gm i/v 12 hourly three doses. For pain inj. Diclofenac sodium 75 mg i/m 12 hourly given for 1<sup>st</sup> 24 hours and then switched to same oral analgesic to both group.

Patients were evaluated for post operative complications like pain, urinary retention, swelling in the scrotum (hematoma or seroma), wound infection. Post operative pain was recorded by visual analog scale (VAS, 0 -10) in hospital at 2 hours

interval after operation. All patients were given same instructions regarding pain and were encouraged to return to work and normal daily activities. Most of the patients on the 1<sup>st</sup> post operative day from both groups or when we considered that they were fit to discharge and can go to their normal routine work with instructions. Sutured were removed on the seventh post operative day in both groups. All patients were followed up for a period of 20 months. Post operative follow up was fortnightly for one month then monthly for three months then three monthly for six months then six monthly for a year. Patients were also followed up on their contact numbers for any post operative complications particularly for recurrence, which was defined as any swelling or bulge or weakness in the operative area which was exacerbated by coughing or by a Valsalva maneuver and needed further surgical intervention or a truss. The study's data base was developed on Excel sheet on the basis of filled Performa. The categorical data of the study was presented in frequencies and percentages. The numerical data was presented as mean ± standard deviation. Student t- test and Chi-square, have been applied to compare the categorical variables between the two groups and for the analysis of the data software Excel 2016 was used. A p-value of less than 0.05 was considered to be statistically significant for the statistical test.

**RESULTS**

A total 84 patients with indirect and direct hernia were included in the study and they were randomly divided into (D) group having 40 patients and 44 patients were present in L group. Group (D) underwent darn repair and group (L) underwent Lichtenstein-mesh repair. The age of the patients ranged from 17 years to 70 years in both group with mean age in group (D) was 44±14.68 years (median age 42.5 years) and in group (L) 44.09±15.78 years ( median age 47 years).

Total no. of patients in the study:

Group D	Group L	Total
40(47.61%)	44(52.38%)	84(100%)

Age of patients in both groups:

No. of patients in groups	Mean age±SD years	Median age years
Group D (n=40)	44 ± 14.68	42.5 years
Group L (n=44)	44. ± 15.78	47

Mean age in group ( D ) = 44 ± 14.68

Mean age in group ( L ) = 44.09 ± 15.78

Types of hernia in both groups:

Type of Hernia	Group D	Group L	Total
Indirect	24( 60%)	24(54.54% )	48(57.14%)
Direct	16(45.45%)	20(45.45%)	36(42.85%)

Duration of surgery in minutes:

No. of patient in groups	Mean time in min. ± SD	Median time in min.
Group D(n=40 )	36.62 ± 6.98	35
Group L (n= 44)	45.81 ± 9.29	48

Mean duration of surgery in group ( D ) = 36.62 ± 6.98 min.

Mean duration of surgery in group ( L ) = 45.81 ± 9.29 min.

p – value 0.31,

p – value > 0.05

So duration of surgery between the two groups is not significant. Duration of surgery was same.

Post operative recovery time from spinal anesthesia in hours:

No. of patients in groups	Mean recovery time in hours ± SD	Median recovery time in hours

Group D	9.1 ± 0.35	9
Group L	9.20 ± 1.2	9

Mean recovery time in group ( D ) = 9.1 ± 0.35 hours  
 Mean recovery time in group ( L ) = 9.20 ± 1.2 hours  
 p – value 0.98, p – value > 0.05  
 Post operative recovery time in both groups was not significant it was almost same in both groups.

Postop complications: Postop. pain for first 24 hrs:

No. of patients in groups	Developed post op. pain
Group D ( 47.61 % )	8(20%)
Group L (52.38 % )	16(36.36%)
Total	24(28.57%)

p – value 0.102 p – value > 0.05

Urinary Retention on immediate post operative day: No. of pts in groups	Developed urinary retention
Group D (47.61%)	3(7.5%)
Group L (52.38%)	5(11.36%)
Total	8(9.52%)

p – value 0.47, p – value > 0.05

Inguinoscrotal swelling:

No. of pts in groups	Developed inguinoscrotal swelling
Group D (47.61%)	( n = 3 ) 7.5%
Group L (52.38 % )	( n = 6 ) 13.63%
Total	( n = 9 ) 10.71%

p – value 0.31, p – value > 0.05,

Wound Infection:

No. of patients in groups	Developed wound infection
Group D(47.61%)	0
Group L (52.38%_	4(9.09%)
Total	4(4.76%)

p – value 0.04, p – value > = 0.05  
 No any patient developed orchitis and osteitis pubis in both groups in our study.

Hospital stay in days:

Days	Group D	Group L	Total	p value
1 – 2	25(62.5%)	24(54.54%)	49(58.33%)	0.88 > 0.05
3 – 4	11( 27.5%)	13(29.54%)	24(28.57%)	0.68 > 0.05
5 – 6	4(10%)	7(15.90%)	11(13.09%)	0.36 > 0.05
Total	40(47.61%)	44(52.38%)	84(100%)	

Mean hospital stay in group D= 2.37 ± 1.38  
 Median stay in the hospital in group D=1.5 days  
 Mean hospital stay in group ( L ) = 2.72±1.56  
 Median stay in the hospital in group L = 1.25 days

Return to normal activity:

Day / Hrs	Group D	Group L	Total	p value
1 <sup>st</sup> day/24hrs	38(95%)	34(77.27%)	72(85.71%)	0.63 > 0.05
2 <sup>nd</sup> day/ 48 hours	2(5%)	4(9.09%)	6(7.14%)	0.41 > 0.05
3 <sup>rd</sup> day/ 72 hours	0	4(9.09%)	4(4.76%)	0.04 > = 0.05
4 <sup>th</sup> day/ 96 hours	0)	2(4.5%)	2(2.3%)	0.15 > 0.05
Total	40(47.61)	44(52.38%)	84(100%)	

Post operative follow up for recurrence:

Groups	No. of patients (n)	Recurrence rate
Group (D)	( n = 40 ) 4761%	( n = 0 ) 0%
Group (L)	( n = 44 ) 52.38%	( n = 0 ) 0%

Follow up – Time	Group D	Group L	Total
Fortnightly for 1 month	40(100%)	44(100%)	84(100%)
Monthly for 3 months	40(100%)	44(100%)	84(100%)
3 monthly for 6 moths	40(100%)	44(100%)	84(100%)

## DISCUSSION

Inguinal hernias are common surgical problems more in males than females and its incidence among the male population is about 3-5%<sup>12</sup>. Since the time of 19<sup>th</sup> century the repair of inguinal hernia is being modified by different surgeons. The objective of almost all surgeon was a tension free repair. The description of the Lichtenstein repair (mesh) repair opened a new era in the field of inguinal hernia repair. In this study the objective is to assess the results of Darn repair with Lichtenstein repair (open).

Inguinal hernia is a disease of people who are doing strenuous work particularly who are lifting heavy objects in their routine daily life. In this study mostly the patients were from labour class and the age of the patients was in the range of 17 – 70 years in both groups. The mean age of patients in Darn group was 44 + - 14.68 years and it was 44.09+ - 15.78 years in Lichtenstein group, almost similar age group was reported by Ahmad et al (i.e.,) 43+-6.22 years(13). Bringman S. et al. reported range of age (30 – 75) years with unilateral inguinal hernia in his study<sup>14</sup>. 78% of people in our study belong to rural areas labourer with low socioeconomic status and almost same 74% was reported by Khan et al in one local study(15). Both indirect and direct inguinal hernias were included in our study, 54.14% were indirect hernia and 42.85% constituted by direct hernias. Palanivelu C. reported 76% indirect and 24% direct in his study(16). Robb reported 63% indirect and 37% direct inguinal hernia<sup>17</sup> whereas 71.4% indirect inguinal hernia and 28.6% direct inguinal hernia reported by Naveen N and Srinath R<sup>18</sup>. In one study from Tikrit it was 83.3% indirect and 16.7% direct hernia(19). In studies mentioned above the ratio of types of hernia were almost same and almost all belonged to rural areas and most of them belonged to labour class.

Over all duration of surgery is about 40 to 45 minutes. In Darn repair in group (D) it is 36.62 ± 6.98 minutes, whereas in Lichtenstein repair group (L) the time is 45.5.81 ± 9.29 min. In both groups the operation time is statistically non significant with p – value 0.31 but Naveen N. reported that operation time is less in Lichtenstein mesh repair(18) while Harjai MM reported in his study it was insignificant (20). In both techniques the meticulous haemostasis is required to avoid post operative complications that 's why the operative time was more in mesh repair as compared to darn repair. Now the era is progress and development in the every field of medicine with meticulous technique excellent post operative care and judicious use of antibiotics considerably reduce the post operative complications. To quantify post operative pain we used a visual analog scale (VAS, 0-10)hours in the hospital at 2 hours interval for first 24 hours post operatively. In our study the post operative pain is less in both groups and there is no statistically significant difference in both groups according to duration of post operative pain. In first 24 hours only 24 patients (28.57%) reported pain with p – value 0.10 that is non-significant in both groups. Almost same results were reported by Bringman et al and Collaboration EH et al but only difference was laparoscopic repair which had very less pain and shorter rehabilitation than open repair<sup>14,21</sup>. Callesen CM. reported in his study that post operative pain is more common in yonger age group which is more pronounced at mobilization

or coughing than during rest. The moderate to severe pain is more pronounced on 1<sup>st</sup> post operative day which ceases over time. In his study he mentioned that under local anesthesia although pain was significant intraoperatively but post operatively patients were more satisfied as they were pain free and early discharged<sup>22</sup>. In different international studies it was reported that post operative pain was found to be less in the laparoscopic hernia repair as compared to open hernia repair across the board<sup>23</sup>. Lal P et al reported similar results<sup>24</sup>. Eklund et al. experienced in his study less post operative pain in laparoscopic hernia repair as compared to open Lichtenstein repair and patient consumed less analgesics<sup>25</sup>. In the immediate post operative period urinary retention is common particularly in elderly and it is usually due to post operative pain in this study 7.5% patient developed urinary retention in darn(D) group and 11.36% in Lichtenstein(L) group which is statistically non significant with p- value 0.47. In both groups these patient required indwelling catheterization which was removed early morning on 1<sup>st</sup> post operative day. Similar results was reported by Naveen N. and Srinath R<sup>18,20</sup>. Bringman S. reported 2.2% urinary retention as early post operative complication in Laparoscopic totally extraperitoneal hernioplasty but he did not find this complication in mesh – plug nor in Lichtenstein repair in his comparative study<sup>14</sup>. Pukar M and Lakhani D reported from his study that post operative urinary retention was 0.01% in Lichtenstein repair(26). In the international literature urinary retention after hrenioplasty could be in the range of 0.2% - 22.2%<sup>27</sup>. Similar results were reported by Koch CA et al in endoscopic hernia repair<sup>28</sup>. The incidence of post operative urinary retention was 8.2% in laparoscopic inguinal hernia repair reported by Patel JA et al and Sviasankaran MV et al in their respective studies they also emphasized that age greater than 50 years is a risk factor in the development of urinary retention(29,30). In our study the patient who developed urinary retention were more than 50 years of age and over all incidence of the problem was the same. The post operative inguino-scrotal (hematoma) in the present study was 7.5% in darn (D) group and 13.63% in Lichtenstein (L) group with over all incidence of 10.71% with p – value 0.31 which is not significant statistically. Zedan AM. reported 8.3% in mesh repair and 12.5% in darn repair (19). The incidence of post operative inguino scrotal hematoma 1.3% reported by Forte A, et al<sup>31</sup>. Chowbey PK et al reported that the incidence of inguino scrotal hematoma formation was in the range of 5 – 25% and they were especially seen in large indirect hernias<sup>32</sup>. The other international literature in the comparative study mentioned 3.3%, 6.7% and 7.8% incidence of post operative inguinal haematoma in TEP, Mesh-plug and Lichtenstein repair respectively<sup>14</sup>. In the one local comparative study Hassan A, et al reported 8.33% haematoma formation in Lichtenstein repair and 14.89% in darn repair with over all incidence 11.58%(33) which is quite close to the result of Memon et al<sup>34</sup> and comparable with our study. But in mesh plug hernioplasty Faish T. et al reported that 2% patient developed scrotal seroma which responded to conservative treatment<sup>35</sup>. In our study post operative wound infection was developed in 4 patients (n=4) 9.09% in Lichtenstein repair (L) group but no patient developed in darn repair (D) group, p – value 0.04. Hassan A in one local study reported post operative wound infection 2.08% in Lichtenstein repair and 8.5% in darn repair<sup>33</sup>. Surgical site infection rate 2.5% reported by Lifshutz H and Juler GL. in darn repair, 100 case study<sup>36</sup>. The incidence of post operative surgical site infection of 12% in darn and 8% with mesh repair reported by Qazi et al in one local study<sup>37</sup> while Swarup C. et al observed 12% in mesh repair and 6% darn repair<sup>38</sup>. So post operative surgical site infection usually develop due to inguinoscrotal hematoma

sometimes have to aspirate the collection in which chances of getting infection increases. In our study these hematoma and post operative wound infection resolved on conservative management. No patient in our study developed post operatively orchitis and testicular atrophy. It is a rare complications of inguinal hernia repair and results from injury to vessels that course along the inguinal canal, initially it is painful but becomes painless later on. During hernia surgery injury to the testicular vessels can result in ischemic orchitis and leads to testicular atrophy 0.2% - 1.1% of all inguinal hernia repair (39). In primary inguinal hernioplasty orchitis and testicular atrophy occurs in 0.5% while for recurrent hernias it increases to 5% (40). Incidence of testicular atrophy reported by Iles in open hernia repair(41) but Phillipies noted testicular pain swelling and orchitis in 0.9% to 1.5% of laparoscopic inguinal hernia repairs<sup>42</sup>. Osteitis pubis is a very rare condition. The first description about osteitis pubis in the English literature was by Beer<sup>43</sup> in 1924 and postulated that osteitis pubis was the result of intraoperative trauma to the symphysis and its muscular attachment either from surgical instruments or retractors. In Marshall-Marchetti-Krantz procedure where the sutures are placed directly into the periosteum or cartilage of the symphysis pubis like hernia repair the incidence is only 1% to 2.5% reported by Kammerer-Doak DN et al and Maimprize TC<sup>44,45</sup>. In our study of 84 patients we did not find any case of osteitis pubis in both groups. Very important and late complication is the recurrence of hernia. The recurrence of hernia has always been considered an important parameter to assess the effectiveness of any form of hernia repair either it is open surgery like Darn, Bassini, modified Bassini, Lichtenstein, Shouldice, mesh-plug or laparoscopic hernia repair. The effectiveness of the repair requires a follow up of the patient for a significant period to evaluate the recurrence. There are many studies which have determined the recurrence for different techniques. The recurrence is usually attributed to lack of fascial elements, poor operative technique and failure to identify the hernia sac (9,46). The maximum rate of recurrence is seen in first 6 months after repair thereafter it falls<sup>46</sup>. In our study the recurrence rate was 0% in both groups in a follow up period of 20 months. Csontos et al reported 16 (2.24%) recurrence out of 714 cases in his study of Lichtenstein mesh repair (47). In 1958 Moloney reported 0.8% recurrence rate in Darn repair (48). Delvin reported that Darning has 3.3 % recurrence rate while Lichtenstein has 3.5%. There is no difference in the recurrence of hernia repair regarding the technique of repair (49). Same results were reported by Abrahamson in 1995(50). In one local study Farooq et al. reported 0.6% recurrence rate in darn repair<sup>51</sup>. Millis IW et al and Swarup C. et al reported no recurrence in mesh and Darn repair in their studies at different time<sup>38,52</sup>. Review of routine hernia repair practice have shown recurrence rates of primary inguinal hernia repair vary from <1% to 17%<sup>53</sup>. This is the era of laparoscopic surgery as day care surgery and also inguinal hernia surgery is being done under local anesthesia. The reason is to keep the post-operative complication rate as low as possible and early return of the patient to normal daily physical activity and work. Most of the patients in both groups discharged on the second post operative day in group (D) 25(62.5%) and I group (L) (n = 24) 54.54% p – value 0.88. On 3 – 4<sup>th</sup> post operative day and 5 – 6<sup>th</sup> post operative day almost same percentage of patients (i.e) 27.5% group (D) and 28.57% group (L), p – value 0.68 and 10% in group (D), 15.90 % in group (L), p – value 0.36 respectively. The mean hospital stay of the patient in Darn (D) group was 2.37±1.38 days and it was 2.72 ± 1.56 days in Lichtenstein (L) group. Median stay in the hospital in group (D) is 1.5 days while it is 1.25 days in (L) group. Aldoescu S, et al concluded in his study that length

of hospital stay depends upon the post operative complications, he explained, it is different with different age group and coated 1.8 days in his model<sup>54</sup>. Qadri et al in his comparative study coated significant shorter hospital stay in laparoscopic group 1.53 days and 4.33 days in open hernia repair group<sup>55</sup>. In one local study mean duration of hospital stay was 1.05 days in Darn repair and 1.57 days in Lichtenstein repair and duration of was almost same in both groups<sup>9</sup>. It is well accepted that people after uncomplicated inguinal hernia repair usually return to normal routine work within 4 to 6 weeks. Most of the tissues usually gain strength in the immediate post operative period and it is considered that polypropylene the non absorbable suture plays a part (56) but it is the control of pain which encourages the patient for early mobilization and return to normal activity. Most of the patient in both groups in our study started their daily routine work like sitting in the bed, walking up to wash room, taking bath and changing clothes on the 1<sup>st</sup> post operative day. Neumayer L et al. reported that the time to the resumption of daily activity was 5 days in open hernia repair while it was 4 days in laparoscopic repair<sup>67</sup>. In 1993 one survey conducted in United Kingdom that surgeons recommended taking an average of 4.4 weeks off work after surgery general practitioners recommended 6.2 weeks and patient actually took an average of 7.0 weeks off<sup>58</sup>. Robertson and Bachoo P. emphasized that those patients who had physically strenuous jobs are significantly slower to resume work after hernia surgery<sup>58,59</sup>. Ninety seven uncomplicated hernia repairs returned to to full work after 21 days reported by Taylor EW and Dewar EP<sup>60</sup>. Majority of patients whether underwent open inguinal surgery or laparoscopic surgery are usually return to normal activities at one week. Patient who is doing desk job return to work earlier than those who have heavy or strenuous work (23). The recovery period and return to normal work after inguinal hernia repair was analyzed with respect to clinical variables (i-e) age, pain, type of hernia, type of repair and occupation. In this study it was found that light physical activity like walking without assistance, changing clothes, going to wash rooms were resumed in 38 patients 38(95%) patient in Darn (D) group while 34 patients n=34(77.27%) in Lichtenstein (L) group on 1<sup>st</sup> post operative day (after 24 hours) with p – value 0.63 this difference was not statistically significant, 2 patients n=2 (5%) in next day in Darn group and 4 patients (9.09%) in Lichtenstein group p – value 0.41. Rest of the patient in Lichtenstein group return to normal activity on third and fourth post operative day with p – values 0.04 and 0.15 respectively which are statistically non significant. Activity like climbing stairs, driving were resumed in almost all patients during 4<sup>th</sup> to 5<sup>th</sup> week post operatively, 34 patients n=34 (85%) on 14<sup>th</sup> post operative day in Darn group and 38(86.36%) in Lichtenstein group, 2 patients n=2 (5%) in 3<sup>rd</sup> week in Darn group 4 patients ( 9.09%) in Lichtenstein (L) group. And 2 patients (4.5%) on 4<sup>th</sup> week in Lichtenstein group. Tremendous subjectivity are incorporated in reporting the time it takes a person to return to work or usual activities. However recovery time is an important issue in terms of the degree of suspension of patient's activity and the cost to the society calculated by days missed from productive work. In our study almost all patients in group (D) returned to normal work in the third to fourth post operative week in both groups with some restrictions to all patients of excessive climbing of stairs, lifting heavy objects etc. for at least three months.

Although there is no gross statistical differences between Darn repair and Lichtenstein mesh repair but expenditure on Darn repair is less as compare to mesh repair. Now in the modern era of innovation although the laparoscopic mesh repair is the best option but in the rural areas of the country

and the people who are laborer and belong to lower middle class for them it is difficult to remain away from the work it is seen that in our set up Darn repair is simple, cost effective, easy and people are used to perform it at all level of health care centers countrywide.

## CONCLUSION

Although there is no gross statistical difference between the Darn repair and Lichtenstein repair, our results are showing that Darn repair is still better with respect to its simplicity, short duration of surgery, less post operative pain, less inguinoscrotal swelling and surgical site infection, cost effective and early return of the patient to normal physical activity and work.

## REFERENCES

1. Millat B. Inguinal hernia repair. A randomized multicentric study comparing laparoscopic and open surgical repair. *J Chir* 2007; 144:94-5.
2. Rutkow IM. Surgical operations in the United States. Then (1983) and now (1994). *Arch Surg* 1997; 132:983-990.
3. Kurzer M, Belsham PA, Kark AE. The Lichtenstein repair for groin hernias. *Surg Clin Manzar S. Inguinal hernias, Incidence, complications and management. J Coll Physicians & Surg Pak* 1992;2:7-9.
4. Tomin M.S. Open inguinal hernia repair in adult patients. *Journal of V. N. Karazin KhNU. No 1108. 2014.*
5. Simons MP. Aufenacker T. Bay-Nielsen M. European Hernia Society guidelines on the treatment of inguinal hernia in adult. 2009; Volume 13(4). 343-403.
6. Norman Browse clinical methods book 4<sup>th</sup> edition.
7. Pandanaboyana S, Mittapalli D, Rao A. et al. Meta-analysis of self-gripping mesh versus sutured mesh in open inguinal hernia repair. *Surgeons – 12(2);2014:87-93.*
8. Vasyuk SM, Fedorchenko VM, Prudnikov OV. Tension free hernioplasty of inguinal hernias in elderly patients Kharkiv surgical school. 6(44);2010:53-55.
9. Khan JA, Imaduddin S, Razzak R, et al. Darning versus mesh repair for inguinal hernia: When do patients return to normal physical activity? *Pak J Surg* 2015;31(3):173-78.
10. Perviz KA. Groin hernia repair : open techniques. *World J Surg* 2005;29:1046-51
11. Operative surgery. Baily & love incidence
12. Ahmad M. Inguinal hernia: Clinical presentation and Post operative Complications of patients when treated with Desarda Technique. *Ann. Pak. Inst. Med. Sci* 2017:3-5.
13. Bringman S, Ramel S, Heikkinen TM, et al. Tension-Free Inguinal Hernia Repair: TEP Versus Mesh-Plug Versus Lichtenstein. A prospective randomized controlled trial. *Annals of Surgery*: 2003; vol. 237, No. 1, 142-147.
14. Khan JA, Imaduddin S, Razzak R, et al. Darning versus mesh repair for inguinal hernia: When do patients return to normal physical activity? *Pak J Surg* 2015; 31(3): 173-178.
15. Palanivelu C. Result of hand sutured laparoscopic hernioplasty: An effective method of repair. *Indian Journal of Surgery*. 2000;62(5):339 – 41.
16. Rutledge Robb H. Cooper's ligament repair: A25 years' experience with a single technique for all groin hernias in adults. *British Journal of Surg*. 1998; 103(1):1-10.
17. Naveen N. and Srinath R. A comparative study between Modified Bassini's repair and Lichtenstein mesh repair of inguinal hernias in rural population. *J. Clin. Diagn. Res*. 2014 Feb; 8(2): 88-91.
18. Zedan A.M. Inguinal hernioplasty by darning versus prosthetic mesh. *Tikrit Medical Journal* 2009; 15(1):158-162.
19. Harjai MM, Nagpal BM, et al. A prospective randomized controlled study of Lichtenstein's Tension Free versus Modified Bassini repair in the management of groin hernias. *MJAFI*. 2007;40-43.

20. Collaboration EH. Laparoscopic compared with open methods of groin hernia repair: systematic review of randomized controlled trials. *Br J Surg* 2000; 87:860-867.
21. Callesen T. Inguinal hernia repair: anaesthesia, pain, Convalescence *Dan Med Bull* 2003 Aug; 50:203-18.
22. Jain SK, Gupta A, Kumar S, Kaza RCM. Laparoscopic vs open inguinal hernia repair: A systematic review of literature. *Asian Jurnal of Medical Science*: 2014;5(3):10-14.
23. Lal P, Kajla RK, Saha CR, et al. Randomized controlled study of laparoscopic total extraperitoneal vs open Lichtenstein inguinal hernia repair. *Surg Endosc* 2003;17:850-6.
24. Euklund A, Rudberg C, Smedberg S, et al. Short – term results of a randomized clinical trial comparing Lichtenstein open repair with totally extraperitoneal laparoscopic inguinal hernia repair. *Br J Surg* 2006; 93:1060-8.
25. Pukar M, Lakhani D. Combination of Lichteinstein repair with herniirraphy in open inguinal hernia repair – A prospective observational single centre study. *J Clin Diagn Res*. 2014 oct; 8(10): NC03-NC08.
26. Finley RK Jr, Miller SF, Jones LM. Elimination of urinary retention following inguinal herniirraphy. *Ann J Surg*. 1991;57: 486-88.
27. Koach CA, Grinberg GG, Farley DR. Incidence and risk factors for urinary retention after endoscopic hernia repair. *Ann J Surg*. 2006;191:381-85.
28. Patel JA, Andrew S, Kaufman, Howard RS. Risk factors for urinary retention after laparoscopic inguinal hernia repair. *Surg Endosc*. 2015;29(11): 3140-3145.
29. Sviasankaran MV, Pham T, Divino CM. *Ann J Surg*. 2014 Feb;207(2):288-92.
30. Forte A, D'Urso A, Gallivosco LS, Lostorto G, Bosco MR, Vietri F, Beltrami V, Complications of inguinal hernia repair. *G Chir*, 2002Mar; 23(3):88-92.
31. Chowbey PK, Pithawala M, Baiijal M. Complications in groin hernia surgery and the way out. *J Minim Access Surg*. 2006 Sep; 2(3):174-177.
32. Hassan A, Aameer N, Mahmud MA. Inguinal hernia repair: A comparison of Lichtenstein and Darn techninique: *P A F J*. 2007; 57(1): PebMed.
33. Memon AS, Memon JMA, Ali SA. Management of inguinal hernia. Experience of 334 cases at Hyderabad JCPSP 1993;3:50-53.
34. Faish T. Early results of inguinal hernia repair by mesh plug technique – first 200 cases. *Annals of the Royal College of Surgeons*. 2000;82:396-400.
35. Lifshutz H, Juler GL. The inguinal Darn. *Arch Surg* 1986;121:717-91.
36. Qazi JA, Gulfam MA, Nawid FK. Darning vs prosthetic mesh repair in cases of inguinal hernia. *Pak J Surg*. 2005;21:72-5.
37. Swarup C, Amitana M, Maitreyee B. Tension Free inguinal hernia repaircomparing darn with mesh: A prospective randomized controlled clinical trial. *Indian J Surg*. 2007;69:52
38. Dellabianca C, Bonardi M. and Alessi S. Testicular ischemia after inguinal hernia repair. *J Ultrasound*. 2011 Dec; 14(14):205-207.
39. Moore JB, Hasenboehler EA. Orchiectomy as a result of ischemic orchitis after laparoscopic inguinal hernia repair: case report of a rare complication. *Patient Saf Surg*.2007; 1:3
40. Iles JD. Specialisation in Elective Herniirraphy. *Lancet* 1965;1: 751-55.
41. Phillips EH, Arregui M, Carrol BJ, et al. Incidence of complications following laparoscopic hernioplasty. *Surgical endoscopy*. 1995;9: 16-21.
42. Beer, E. Periostitis of the symphysis and descending rami of the pubis following suprapubic operations. *Int J Med Surg*; 1924;37:224-5.
43. Kammerer-Doak DN, Comella JL, Magrina JF. et al. Osteitis pubis after Mashall-Marchetti-Krantz urethropexy: a pubic osteomyelitis. *Am J Obstet Gynecol*. 1998;179:586-90.
44. Mainprize TC, Drutz HP. The Mashall-Marchetti-Krantz-procedure: a critical review. *Obstet Gynecol Surv*1988;43:724-9.
45. Devlin HB. Inguinal hernia operations in adults. In:Dudley H, Pories W, Carter D (Eds). *Rob and Smith Opwratve surgery Alimentary Tract and Abdominal Wall*. 4<sup>th</sup> ed vol 1. *Lodon Butterworths*, 1984: 455-6.
46. Csontos Z, Kassai M, Lukacs L, et al. The results of Lichtenstein operations for groin hernias – prospective multicentre study. *Magy Seb*. 2005; 58(4):219-24.
47. Moloney GE. Result of nylon Darn repairs of hernia. *Lancet*. 1958;1:273-8.
48. Delvin HB. [ Management of abdominal hernias] 1<sup>st</sup> ed, *London: Butterworths* 1988:10-27.
49. Abrahamson J. Factors and mechanisms leading to recurrence. *Probl Gen Surg*. 1995;12:151-8.
50. Farooq O, Batool Z, Rehman B. Prolene darn: Safe and effective method for primary inguinal hernia. *J Coll Physicians Surg Pak*. 2005;15:358-61.
51. Millis IW, Mcdermot IM, Ratliff DA. Prospective randomized controlled trial to compare skin staples and polypropylene for securing the mesh in inguinal hernia repair. *Br J Surg*. 1998;85:790-2.
52. Bisgaard T, Bay-Nielsen M, Kehler H, et al. Re-recurrence after operation for recurrent inguinal hernia. A nation wide 8-year follow up study on the role of type of repair. *Ann Surg*. 2008;247:707-711.
53. Aldoescu S, Patrescu T, and Brezean I. Predictors of length of hospital stay after inguinal hernia surgery. *J Med Life*. 2015 Jul-Sep; 8(3):350-55.
54. Qadri SJF, Khan M, Wani NS, et al. Laparoscopic and open incisional hernia repair using polypropylene mesh – A comparative single centre study. *International Journal of Surgery*. 2010; 8(6): 479-483.
55. Polat C, Kahraman A, Yilmaz S, Koken T. et al. A comparison of the oxidative stress response and antioxidant capacity of open and laparoscopic hernia repairs. *J Laparoendo scopy Adv Surg Tech A* 2003; 13: 167- 73.
56. Neumayer L, Hurder AG, Jonasson O, Fitzibbons R. et al. Open mesh versus Laparoscopic mesh repair of inguinal hernia. *The New England Journal of Medicine*. April, 2004; 350(8):1819-27.
57. Robertson GSM, Haynes IG, Burton PR. How long do patients convalesce after inguinal herniirraphy? Current principles and practice. *Ann R Coll Surg Engl* 1993;75:30-33.
58. Bachoo P, Duncan JL. Prolonged convalescence following inguinal hernia repair. An unnecessary trend. *Health Bull (Edimb)*1995;53: 209-12.
59. Taylor EW, Dewar EP. Early return to work after repair of a unilateral inguinal hernia *Br J Surg* 1983; 70:599-600.