INTRODUCTION

The history of hernia is the history of surgery (Falix Patino). The trial for optimal operation is still going on regarding cost effectiveness, low recurrence rate and acceptable postoperative pain and no or less wound infection.\(^1\) Inguinal hernia repair is the most frequently performed operation in general surgery.\(^2\) The repair has over the years been revolutionized and still the optimum method has not yet been determined in terms of cost effectiveness, low recurrence rate and acceptable postoperative pain and no or less wound infection.\(^3,4\) Post operative pain is a significant problem after open inguinal hernia repair\(^5\) caused by stimulation of free nerve endings that transmit impulses from periphery to CNS via nerve fibers (widely distributed in the skin, deeper tissues such as arterial wall, periosteum, peritoneum and viscera). They are either large or myelinated (A-O fibers) or small and unmyelinated (C fibers).\(^6\) A nerve may be damaged as a result of perineural fibrosis, entrapment by staplers, suture, or prosthetic material, or direct injury by stretching, contusion, diathermy or partial or complete division of nerve\(^7\) and by chemical (hydrogen, potassium, bradykinin, serotonin, histamine, acetylcholine, proteolytic enzyme and prostaglandins) stimuli indirectly.\(^8\) Post operative wound infection represents a major complication for all types of hernia surgeries.\(^9\) In groin hernias certain factors have been recognized and beg to be outlined for example females have 2.1 times higher infection rate than males, older patients over 70 years have 3.2 fold higher incidence rate. Presence of a drain and length of that presence increased the infection by a factor of nine. The prophylactic use of antibiotic has been a common practice in more so out of fear than belief.\(^10\) Duration of surgery – a significant factor, operations that lasts 30 minutes or less carries infection rate of 2.7% while those with 90 minutes having 9.9% infection rate.\(^11,12\) Until recent past the standard procedure has been open musculoaponeurotic repair using polypropylene sutures under possible tension to close the defect but with the revolutionary advent of biomaterials fro hernia repair in 1950 tension free repair using prosthetic mesh is becoming increasingly common and accepted worldwide because of its relative low recurrence rate and complications.\(^13\) Nevertheless, meshes are now used routinely in hernia surgery,
long term epidemiological data don’t indicate a pronounced reduction in recurrence rate and does not guarantee a successful outcome in all patients.14

After several decades of improvement Lichtenstein presented open mesh repair technique in 1986 that involves the same initial approach as open anterior repair of hernia. A polypropylene mesh is trimmed to fit the floor of inguinal canal; its apex is first sutured to the pubic tubercle and the lower border to the free edge of inguinal ligament. An opening is made into its lower edge to accommodate the spermatic cord; the mesh is then anchored to the conjoint tendon by interrupted suture.1,8

Although darning is operator dependent but in account of cost effectiveness especially in developing countries still it is safer, cheaper, and cost effective and has low recurrence rate than other conventional method.13 Darning is done after reducing the hernia contents and ligation of hernia sac by applying non absorbable suture prolene in a figure of eight /8/ between conjoined tendon and inguinal ligament in two continuous layers.9 Early measures of postoperative outcome that is pain, wound infection and early return to work is seen equivalent in both darning and mesh repair.10 However with regard to hernia recurrence, mesh repair is considered superior.1,9

In this study visual analog scale for post operative pain and Southampton wound scoring system to assess the wound infection rate between darning and Lichtenstein hernia repair therefore to determine a technique which is causing less complication that is pain and wound infection so that the patients have the benefit of the technique.

The objectives of my study are to: Compare the intensity of post operative pain by visual analogue scale between Darning and Lichtenstein repair of inguinal hernia and Ascertain the frequency of post operative wound infection by Southampton wound grading score for a period of four weeks (If not needed the above green writing can be deleted)

METHODOLOGY

This prospective, comparative randomized study was carried out in Zia uddin University Hospitals Karachi in the period of 8 months from December 16th, 2006 to August 16th, 2007. A total of 60 patients in the age range of 15-70 years with simple inguinal hernia were randomized in two groups i.e. Group A (Lichtenstein) and Group B (Darning repair). All inguinal hernias (Direct and Indirect), Male gender, Age above 15 years and below 70 years were included while recurrent/ Obstructed / Strangulated / Irreducible Inguinal Hernia were excluded from the study.

All patients with inguinal hernia from the surgical out patient department were diagnosed clinically and selected according to inclusion criteria. They were randomly assigned by lottery method to either group A (Lichtenstein hernia repair) or group B (Darning repair). Thorough clinical examination and laboratory profile (complete blood count, urea & creatinine to assess renal function, chest XR, ECG, blood sugar, PT&APTT for anesthesia) were carried out to assess preoperative fitness for general or spinal anesthesia. Written informed consent was obtained after discussing the purpose, risk and benefit of the procedure.

On pre-operative day the patient was explained about the markings of severity of pain on visual analog scale. After the procedure of repair, NSAIDS were given per rectally on operating table, and then postoperative pain was assessed using visual analogue scale (VAS) at 4 hourly intervals for 24 hours. Patient was asked to mark the level of his pain on a 100mm, non hatched VAS scale marked at one end as “no pain” and at the other end as “worst pain imaginable”. Before analysis of the data, pain severity categories are defined. Patient with VAS pain scores of 30mm or less is defined as having mild pain. That with scores above 70mm is considered to have severe pain and those from 31mm to 70mm moderate pain. Surgical wounds were also assessed by using Southampton wound grading score (SWGS) at 48 hours (before discharge) and 7th day (in the outpatient department). Any seroma or infection at wound site if noticed within 7 days of surgery was also noted. Follow up visits recorded at 14th, 21st and 28th day to assess the wound if needed.

And all patient’s related information was noted in pre set approved proforma from relative hospital’s ethical review committee.

Statistical package for social sciences (SPSS-10) used to analyze data. Frequency and percentage computed for categorical variables like co morbidities, pain intensity and wound infection for group A (Lichtenstein) and group B (Darning repair). Mean and standard deviation computed for quantitative variables like age and pain score. Independent sample t-test or Mann-Whitney test used to compare mean pain score for group A & group B. Chi-square test applied to check proportion difference between groups for wound infection. p<0.05 considered for level of significance.

RESULTS

Out of sixty 56(93.3%) patients reported with pain from 4 hours to 12 hours post operatively 20(33%) patients reported within 4 hours, 27(45%) up to 8 hours and 9(15%) up to 12 hours. While 4(6.7%) patients without pain was observed. The intensity of pain assessed by VAS; and given a numerical value for statistical analysis of mild in 7(11.6%) patients, moderate in 45(75%), severe in 4(6.7%) and no pain in 4(6.7%). The mean pain score at 4 hours in group A was 60±11.5 & in group B it was 50±8.9. At 8 hours it was 58.1±14.7 in group A and 52.1±10.5 in group B. After 12 hours it was 63.3±11.5 in group A & 60±14.1 in group B. The reporting time of pain after two procedures were found statistically non significant (Chi-square 0.348, P=0.84). (Table-I).

The intensity of pain when compared between the two groups was found statistically non significant (Chi square=2.84, P=0.42). It was more severe in 3 patients (10%) in group A as compared to 1 patients (3.3 %) in group B. Moderate pain in 20 patients (66.6%) in group A as compared to 25 patients (83.3%) in group B. Mild pain seen in 5 patients(16.6%) in group A and 2(6.6%) in group B. While no pain is seen in 2(6.6%) patients in each group. (Table - II).

Ten out of 60 patients (16.6%) had developed wound infection. Among them 05 (8.3%) each was found between two groups.
The maximum number of patients were 6(10%) who developed wound infection at day 3.
The Southampton wound grading system applied to assess the wound infection among infected patients were followed up for a week or if needed more. Four out of 10 patients found in IC classification 2 were found in each group; 2 patients in IIA (group A-2 & group B-0) and 1 patient in each I, II, V (I=group A-1 & group B-0), (II=group A-0 and group B-1) & (V=groupA-0 & group B-1)(Table - III).
The Southampton wound grading system did not depend on the procedure performed when tested by Chi Square test of dependency (Chi-square=2.89, P=0.82).

**TABLE I: COMPARISON OF POSTOPERATIVE PAIN INTENSITY B/W TWO GROUPS**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>4 hours (n=11)</th>
<th>8 hours (n=13)</th>
<th>12 hrs (n=4)</th>
<th>No Pain</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lichtenstein</td>
<td>60±11.5</td>
<td>58.1±14.7</td>
<td>63.3±11.5</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Repair</td>
<td>(n=9)</td>
<td>(n=14)</td>
<td>(n=5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Darning</strong></td>
<td><strong>50.0±8.9</strong></td>
<td><strong>52.1±10.5</strong></td>
<td><strong>60.0±14.1</strong></td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td><strong>Repair</strong></td>
<td><strong>(n=9)</strong></td>
<td><strong>(n=14)</strong></td>
<td><strong>(n=5)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Chi Square=0.348, P=0.84)

**TABLE II: COMPARISON OF POSTOPERATIVE PAIN INTENSITY B/W GROUP A & B**

<table>
<thead>
<tr>
<th>Pain Intensity</th>
<th>Lichtenstein n= (%)</th>
<th>Darning n= (%)</th>
<th>Total</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild Pain</td>
<td>5 (16.7%)</td>
<td>2 (6.6%)</td>
<td>7</td>
<td>11.6</td>
</tr>
<tr>
<td>Moderate Pain</td>
<td>20 (66.6%)</td>
<td>25 (83.3%)</td>
<td>45</td>
<td>75</td>
</tr>
<tr>
<td>Severe Pain</td>
<td>3 (10%)</td>
<td>1 (3.3%)</td>
<td>4</td>
<td>6.7</td>
</tr>
<tr>
<td>No Pain</td>
<td>2 (6.7%)</td>
<td>2 (6.6%)</td>
<td>4</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30 (100%)</strong></td>
<td><strong>30 (30%)</strong></td>
<td><strong>60</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Chi Square = 2.84, P= 0.42 (ns)

**TABLE III: COMPARISON OF POSTOPERATIVE WOUND INFECTION B/W TWO GROUPS**

<table>
<thead>
<tr>
<th>Southampton Wound Grading system</th>
<th>Lichtenstein Repair</th>
<th>Darning Repair</th>
<th>Total n= (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>25</td>
<td>25</td>
<td>50(83.3)</td>
</tr>
<tr>
<td>IC</td>
<td>2</td>
<td>2</td>
<td>4(6.7)</td>
</tr>
<tr>
<td>IIA</td>
<td>2</td>
<td>0</td>
<td>2(3.3)</td>
</tr>
<tr>
<td>I</td>
<td>0</td>
<td>1</td>
<td>1(1.7)</td>
</tr>
<tr>
<td>II</td>
<td>1</td>
<td>0</td>
<td>1(1.7)</td>
</tr>
<tr>
<td>IIIA</td>
<td>0</td>
<td>1</td>
<td>1(1.7)</td>
</tr>
<tr>
<td>V</td>
<td>0</td>
<td>1</td>
<td>1(1.7)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>30</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>

Chi-square=2.89, P=0.82

**DISCUSSION**

Results of this study to date indicate that polypropylene mesh has no added advantage over polypropylene darn with respect to early postoperative pain & wound infection. Thus the study supporting the hypothesis that there is no significant difference in postoperative pain intensity between darn and mesh hernia repairs.
The world literature as well as country wide studies also support that the well constructed darn is as safe as mesh repair in terms of early postoperative complications.
Koukourou had recorded no differences in early postoperative pain; however he noted pain in 24, 48 & 72 hour contrary to our study in which pain was analyzed after 4,8,12 and 24hour. Manzoor Ali and Omer Farooq in their separate trials on darn found it safe with regard to postoperative pain and considered as a competing procedure with mesh repair. WW Vrijland also found no difference between the two groups with regard to postoperative pain and complications. There were no major differences in the postoperative wound infection recorded between the two groups we studied. Thus refuting the hypothesis that darn causes less postoperative wound infection than mesh.
Similarly Swarup noticed no major differences in the early postoperative complications and observed 12% superficial surgical site infection in mesh group in comparison with 6% in
the darn group. Qazi et al in 2005 recorded a slightly higher postoperative wound infection with an incidence of 12% with darn and 8% with mesh repair. However they noticed 6% scrotal hematoma in darn repair & 2% in their mesh group in contrast to our study where no scrotal hematoma seen.

Koukourou had recorded no differences in early or late complications as well. He reported infection 4% in mesh repair and 2% in darn, seroma 2% in mesh and 4% in darn and wound oozing from 2% in mesh and 0% in darn. As mesh is more expensive & if gets infected (albeit rare), may require its removal the result of this study question its wide spread application.

CONCLUSIONS

It is concluded that there is no difference in post operative pain & wound infection between well constructed darn and mesh hernia repair however study limitations are that it is of short duration with some shortage of sample size.

A long–term study of around 10-15 years is still desirable to judge the both techniques in terms of recurrences.

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REFERENCES