MATERIAL & METHODS

My study was a cross section prospective study started from August 2007 and completed in August 2012. The patients were subjected for Lichtenstein hernioplasty and than evaluated for postoperative pain and recurrence. The patients having bilateral hernias, each side considered as a separate surgery for purpose of evaluation. The patients who were willing for scheduled follow up of 7\textsuperscript{th}, 30\textsuperscript{th}, 90\textsuperscript{th} and 180\textsuperscript{th} day were enrolled in the study. The patients who completed 90\textsuperscript{th} day follow up were considered for analysis of this study. The patients which did not turn up for follow up on 180\textsuperscript{th} day than ITT (Intension To Treat) done and his 90\textsuperscript{th} day follow up was considered for 180\textsuperscript{th} day.

The study was carried out as below:

a) Selection of patients: In this study inclusion of the cases done with following criteria.

1. Male patients above 18 years of age.
2. Uncomplicated inguinal hernias and fit for surgery.
3. Had planned non emergency surgery and operated upon by unit consultant.
4. The patients willing for Liechtenstein onlay hernioplasty
5. The patients willing for scheduled follow up of 7\textsuperscript{th}, 30\textsuperscript{th}, 90\textsuperscript{th} and 180\textsuperscript{th} day.

The patient’s exclusion criteria were, having severe uncontrolled systemic diseases, emergency hernia surgery, pre peritoneal hernia surgery, laparoscopic hernia surgery and recurrent hernia surgery.

b) Pre operative preparation: The patients were investigated for planned surgery as outdoor or indoor patients. Patients who were fit to undergo surgery were admitted to the hospital. The patients were explained for surgery and probable complications. Patients were asked to give written consent for surgery and follow ups.

c) Pre operative orders:

1. Nil by mouth from 10:00 pm the night prior to surgery.
2. Written informed consent for anaesthesia and surgery.
3 Inj. T.T. 0.5 cc intramuscular before shaving.

4 Shaving from the umbilicus to knees including private parts in the morning of surgery followed by a soap bath.

5 Preanesthetic medication as per the advice of the anesthesiologist.

6 Prophylactic antibiotic Inj. Ceftriaxone (1 gm) just before anesthesia.

7 Safe surgery checklist marking.

d) Anaesthesia: Surgery was carried out under anesthesia as per surgeon and patients agreement.

(1) General anaesthesia

(2) Spinal anaesthesia: 2ml of 5% lignocaine with or without adrenaline was given by lumbar puncture.

(3) Local anaesthesia: The drug used was 0.5% lignocaine with 1:200000 adrenaline with 0.5% bupivacaine. The mixture was prepared using 10 ml of 2% lignocaine with adrenaline, 10 ml of 2% bupivacaine and 20 ml of normal saline making 40 ml of mixture. The ilioinguinal and iliohypogastric nerves are blocked 2-3 cm medial to anterior superior iliac spine on spinoumbilical line, in deep intermuscular plane using 10-15 ml anesthetic drug mixture, other 5 ml at the level of pubic tubercle and 10 ml as subcutaneous infiltration at the skin incision site, peritoneum being infiltrated at the time it is exposed.

e) Operative Method: The basic operative method was same as onlay Lichtenstein method or with some variations depending on the preference of the surgeon. The incision was kept about 2.5 cm above and parallel to the inguinal ligament in the medial 3/5 of the inguinal ligament extending to beyond the deep ring (Figure 18). The subcutaneous tissue dissected with proper haemostasis of subcutaneous vessels and the external oblique aponeurosis exposed (Figure 19). It was incised along the line of incision with due care to avoid injury to ilioinguinal nerve. The inguinal canal opened up and the spermatic cord dissected from the surrounding tissues. The ilioinguinal nerve separated and its branches were tried to be protected (Figure 20), the nerve was isolated in the retracted lower fold of the external oblique aponeurosis. Cremasteric muscles on the
Figure 18: Lichtenstein repair - Incision in inguinal region

Figure 19: Lichtenstein repair – External oblique muscle with Superficial ring
Figure 20: Lichtenstein repair – Isolated ilioinguinal and iliohypogastric nerves

Figure 21: Lichtenstein repair – Dissected indirect inguinal sac from spermatic cord.
Figure 22: Lichtenstein repair – Opened indirect sac and transfixation of sac

Figure 23: Lichtenstein repair – Fixed lower edge of mesh to inguinal ligament
Figure 24: Lichtenstein repair – Completed meshplasty with reposition of cord and nerve

Figure 25: Lichtenstein repair – Local anesthesia
spermatic cord is opened up for any indirect sac it was dissected (Figure 21) and twisted to empty the contents and transfixed (Figure 22). While dissection genital branch of genitofemoral nerve was identified and tried to preserve it or its branching. The sac was cut and residual sac allowed retracting deep to the deep ring. In case of direct hernia the sac was allowed to fall down by itself. Sac were opened only when there was suspected content adhesion with sac, sliding component or very large sac (Figure 22). The defect in the posterior wall looked for size and weakness. If there was large defect or weak support, posterior wall base prepared for placing the mesh. Prolene mesh cut to appropriate size then placed over the prepared bed. The mesh was sutured to the pubic tubercle medially and to the inguinal ligament inferiorly (Figure 23). Superiorly mesh fixed to internal oblique muscle one or two stitches with due care to avoid any injury to iliohypogastric nerve. The mesh slit laterally to create a new deep ring and accommodate the cord. After reposting cord and ilioinguinal nerve the two tails of mesh were sutured to each other beyond the cord to a new deep ring (Figure 24). The two leaves of the external oblique aponeurosis are sutured to each other and the new superficial ring is created. The skin is then closed with 2-0 or 3-0 nylon sutures by taking vertical mattress sutures.

e) Post op. period: If the patient was operated under spinal anaesthesia the bed is given foot end elevation for about four hours. The patient was kept nil by mouth for about four hours than after he is allowed to take liquids and gradually to full diet by next day. Intravenous drip is continued till patient start adequate orally.

- Intravenous antibiotics and intravenous/intramuscular analgesics for one the day of surgery.
- Early ambulation is encouraged.

If the patient was operated under local anaesthesia then he was allowed to take orally about one hour after the surgery and encouraged for early ambulation. Scrotal support is given to the patients in whom the sac was very large and in whom dissection of the sac from the cord was difficult.

- The patient is generally discharged the next day and was advised follow up in the outpatient department.
- The patient is given oral antibiotics and analgesics for 5 days and further oral analgesics were given according to the need.
Dressing was done on the 3rd and 7th postoperative days.

Stitches were generally removed on the 7th post operative day.

The patient was then followed up in OPD at 30, 90 and 180 days intervals as regular follow up and as and when they wish in between.

The patient’s complaints, complications, return to work and recurrence data were collected. The patient data were entered in the performa prepared.

Guidelines for recording the data in master chart.

1) Size:  
   A < 4 cm  
   B 4-8 cm  
   C > 8 cm

2) Type:  
   Lateral / indirect L  
   Medial / direct M  
   Combined (L+M) C

3) Dimension of defect:  
   I < 1.5 cm  
   II 1.5 – 3 cm  
   III > 3 cm

4) Stage of sac extension:  
   1 Sac in the canal  
   2 Sac beyond External ring – Not in scrotum  
   3 Sac in scrotum

5) Suture material  
   P1 Prolene 1/0  
   P2 Prolene 2/0  
   V1 Vicryl 1/0  
   V2 Vicryl 2/0

6) Operative Time  
   a <30 min.  
   b 30-45 min.  
   c 45-60 min.  
   d > 60 min.

7) Pain Score: Visual Analog Score describe by patients from range 0 to 10 than redefined as follows  
   P0 VAS Score 0 – No pain  
   P1 VAS Score 1-3 - Mild  
   P2 VAS Score 4-6 - Moderate  
   P3 VAS Score 7-10 - Severe

Add “+” if taking analgesics
Follow up questionnaire:

We have used very simple questionnaire for our patients follow up which was prepared by Bay-Neilson et al for their nationwide survey.[13]

Questions going to asked at the time of follow up for pain and recurrence

1. Have you had any pain at operative site? Yes/ No
2. Have you followed up or examined for pain? Yes/ No
3. Have you required treatment with analgesics for pain? Yes/ No
4. How will you rate pain from 1 to 10? 1 to 10
5. Have pain limited your work or leisure activity? Yes/ No
6. Have you noticed any recurrence (swelling) at operated site? Yes/ No