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General Surgery

A COMPARATIVE STUDY BETWEEN LICHTENSTEIN REPAIR AND MODIFIED ANTERIOR ABDOMINAL PRE PERITONEAL METHOD

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ABSTRACT **Introduction:** Repair of inguinal hernia remained an equivocal task A definite or ideal solution for the problem is yet to be evolved despite of presence of various options. Non tension repair is agreed universally. This is possible by using synthetic mesh as bridge for defect. Lichtenstein repair become standard out of several other methods relatively recent technique preperitoneal mesh placement can be done open or laparoscopically. Modified open anterior abdominal preperitoneal approach in inguinal hernia repair might have benefit of mesh in preferred space without the cost and disadvantages of an laparoscopic procedure. **Aim and Objectives:** The objectives of the study was to compare the following parameters between the two methods of hernia repair, namely Open Lichtenstein Repair and Open modified Anterior Abdominal Pre-Peritoneal method of Hernia Repair in matched patients. **Material and Method:** A comparative study done over 90 patients 45 in each group (Open Lichtenstein and Open modified APP). Patients having inguinal hernia >18 years age given valid informed consent were included. Patients with comorbidites like CKD, impaired liver function hampering normal healing were excluded. A follow up of 1 year was done. **Results:** Result were interpreted on following parameters operation time, time to discharge, immediate and chronic post operative pain, SSI (superficial wound infection and mesh infection). Mean time of surgery was 45.67±6.357 minutes in Open Lichtenstein and 53.80±6.927 minutes in modified APP mean time to discharge was 5.07±1.421 days in Open Lichtenstein and 4.09±1.104 days in modified APP. Immediate postoperative pain on 24 hours in visual analogue score was 3.96±1.445 in Open Lichtenstein and 2.18±0.576 in modified APP. **Conclusion:** For surgeons preferring open approach modified APP mesh repair is a feasible alternative to standard Lichtenstein repair. Both methods showed comparable result in immediate and chronic post operative pain and SSI operative time being significantly lower in Lichtenstein repair and time to discharge significantly lower in modified APP repair.

KEYWORDS : Pain, Visual analogue scale, Hernia, Inguinal.

INTRODUCTION

Repair of an inguinal hernia is one of the most common surgeries performed by the surgeons worldwide. There have been plenty of evolutions in surgical techniques of hernia repair. The current standard technique is tension free repair using a prosthetic mesh proposed by Lichtenstein[1]. The use of laparoscopy in performing tension-free hernia repair was proposed to have benefits of reduced post-operative pain, early discharge from the hospital and early return to normal activities[2]. But a few studies found that laparoscopy in hernia repair was associated with major vascular injury, bowel obstruction, nerve injuries and bladder injury[3].

However Lichtenstein repair suffering from disadvantage that is does not repair fruchaud's orifice as is done in laparoscopic repair. There are methods of open repair which can however replicate the repair as done in laparoscopy like Ughary preperitoneal mesh repair, Kugel repair, Nyhus repair and open modified anterior abdominal preperitoneal method.

AIM AND OBJECTIVES

The objectives of the study was to compare the following parameters between the two methods of hernia repair, namely Open Lichtenstein Repair and Open modified Anterior Abdominal Pre-Peritoneal method of Hernia Repair in matched patients.

- Epidemiology of patients:
  - Age
  - Sex
  - Type and Class of Hernia
    - Bubonocele
    - Funicular
    - Vaginal
- Operative techniques
- Operative time
- Intra-operative complications
- Post-operative complications
- Post-operative pain based on pain scale.
- Post-operative recovery/ hospital stay.
- Time to return to work
- Recurrence
- Chronic post-operative inguinal pain

MATERIAL AND METHODS

All eligible cases undergoing Lichtenstein repair and modified anterior abdominal pre-peritoneal method hernia repair in the Department of Surgery, Maharani Laxmi Bai Medical College, Jhansi during the study period of January 2019 to August 2020 were included. All patients admitted at Maharani Laxmi Bai Medical College, Jhansi who met the inclusion and exclusion criteria was randomly sampled and taken up for the study.

After getting informed consent for either of the procedures, the patients were investigated and randomly assigned to either of the 2 groups after matching for age, sex and size of hernia (bubonocoele, funicular/scrotal).

The study was done on 90 patients. Out of which 45 patients were included in group A (Open Lichtenstein Repair) and 45 patients were included in Group B (Open Modified Anterior Abdominal Pre-Peritoneal).

Pre operative evaluation included ECG, pulmonary function tests and ultrasound of abdomen and pelvis. All patients were operated under spinal anaesthesia.

Inclusion criteria:

- Patients diagnosed as having inguinal hernia aged 18 years and above giving valid written informed consent.
- Patients with recurrent inguinal hernias, irreducible scrotal hernia, femoral hernia or incarcerated hernia.

Exclusion criteria:

- Co-morbidity where regional anaesthesia was given.
- < 18 years where hernioplasty was not done.
- Patients who opted for herniorrhaphy rather than hernioplasty.

Operative parameters to be noted:-

- Operative techniques.
- Operative time.
- Intraoperative complication

Post operative parameters to be noted:-

- **Short Term:**

- Post-operative pain based on pain scale.
- Post-operative recovery/ hospital stay.
- Time to return to work

- **Long Term**
- Recurrence
- Chronic post-operative inguinal pain

PROCEDURE:

Group A (Open Lichtenstein Repair):

Inguinal canal opened. Sac dissected out from rest of the canal contents. Herniotomy done. A mesh of appropriate size sutured to posterior wall of canal encircling spermatic cord with classical five stitch anchoring. Wound closed in layers without drain. Aseptic dressing done. All patients were prescribed antibiotics and an initial dose of NSAID injection. Later analgesics given only if there was complaint of pain. Ambulation encouraged from next morning onward. Wound inspected for any sign of infection.

Group B (Open Modified APP):

We made a 3- to 4-cm oblique incision centered over the deep inguinal ring, starting half way across the line between the superior iliac spine and the pubic tubercle Gallaudet's fascia and the external oblique aponeurosis were opened classically without any extended dissection. First, the cord was located and checked for indirect and direct hernia. The ilioinguinal nerve was identified and gently placed internally behind the retractor. In cases of indirect hernia, the sac was separated from the cord by a bloodless dissection using peanut gauze up to the internal ring. In cases of direct hernia, associated indirect hernia was checked for.

In cases of indirect hernia, the internal ring was dilated and offered easy access to the preperitoneal space where the epigastric vessels were found medially. These vessels were retracted medially and index nger was introduced into the preperitoneal space. For a direct hernia, the preperitoneal space was dissected through the dilated fascia transversalis. Blunt dissection was done with the index nger above the pubic tubercle and the peritoneum was pushed up and medially. For good positioning of the mesh, the dissection was performed until Cooper's ligament and the pubis bone could be palpated. At this time, an eventual undiagnosed femoral hernia could be identi ed and treated using the same procedure. Dissection of the sac and cord was performed up to the point where the spermatic cord and spermatic vessels separate, so that the cord could be easily parietalized. We used a mono lament knitted polypropylene mesh 6x4 inches, which was folded in its length at the junction of two third and one third length and then at the junction of two third and one third breadth.

A small quadrant of the mesh was cut from the common end and the mesh was laid open resulting in a key hole defect with the circular end being towards the centre of the mesh. The cord was then wrapped around, with the circular portion of the defect encircling it. Prolene suture was used to approximate the free end of the defect around the cord, with the larger section of the mesh being directed medially and inferiorly. The ends of the mesh were held with long curved artery forceps in a crises cross manner and inserted into the preperiotoneal space via the deep ring covering the entire groin area including indirect, direct, and femoral orices. Once the mesh was in place, its position was checked by inserting the index nger into the preperitoneal space between the inguinal ligament and mesh with boundaries of mesh covering Coopers ligament caudally, iliac vessels laeterally, and the rectus abdominis medially. If the deep ring was dilated then Lytle's repair was done. After closure of the external oblique and Gallaudet's fascia with a running 1-0 vicryl suture, the skin incision was closed with Ethilon 2-0.

Post operative pain:

Accurate pain assessment is a prerequisite for successful pain management as well as for study. The American Pain Society emphasizes the importance of obtaining the patients self report of pain as the gold standard of pain assessment. There are various pain scores to measure post operative pain.

Visual analogue scale (VAS)

Operationally a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end, as illustrated in Fid. The patients marks of the line the point that they feel represents their perception of their current state. The VAS score is determined by measuring in millimeters from the left hand end of the line to the point that the patients marks.

No Pain 1 _____ Very severe pain

Statistical analysis:

Descriptive statistical analysis has been carried out to present the data in the present study. Results on continuous measurements are presented with Mean and standard deviation and results on categorical measurements are presented in number and percentages.

Significance is assessed at 5% level of significance. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups.

The statistical software SPSS version 17.0 was used for the analysis of the data and Microsoft word and Excel have been used to generate graphs and tables.

RESULT

TABLE 1: AGE WISE DISTRIBUTION

Age (in years)	Group A (Open Lichtenstein Repair)		Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	
	No of Patients (n=45)	Percentage	No of Patients (n=45)	Percentage
18-30 Years	08	17.78%	07	15.56%
31-50 Years	13	28.89%	17	37.78%
>51 Years	24	53.33%	21	46.67%
Total	45	100%	45	100%

TABLE 2: MEAN AGE WISE DISTRIBUTION

Mean Age (in years)	Group A (Open Lichtenstein Repair)	Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	p value
Mean+SD	51.44±17.789	48.78±16.545	0.4646 (NS)

TABLE 3: SEX WISE DISTRIBUTION

Sex	Group A (Open Lichtenstein Repair)		Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	
	No of Patients (n=45)	Percentage	No of Patients (n=45)	Percentage
Male	45	100%	44	97.78%
Female	0	0%	01	2.22%
Total	45	100%	45	100%

TABLE 4: PREOPERATIVE DIAGNOSIS

Preoperative diagnosis	Group A (Open Lichtenstein Repair)		Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	
	No of Patients (n=45)	Percentage	No of Patients (n=45)	Percentage
Bubonocele	09	20.00%	13	28.89%
Funicular	17	37.78%	20	44.44%
Scrotal (Complete)	19	42.22%	16	35.56%

TABLE 5: PRESENTING COMPLAINTS

Presenting complaint	Group A (Open Lichtenstein Repair)		Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	
	No of Patients (n=45)	Percentage	No of Patients (n=45)	Percentage
Pain	12	26.67%	08	17.78%
Swelling/fullness in the inguinal region	45	100%	45	100%
Aching sensation	07	15.56%	09	20.00%
Nousea	01	2.22%	00	0.00%
Vomiting	00	0.00%	00	0.00%

TABLE 6: MEAN TIME OF SURGERY

Mean time of Surgery	Group A (Open Lichtenstein Repair)	Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	p value
Mean+SD	45.67±6.537	53.80±6.927	0.0001 (S)

TABLE 7: PER OPERATIVE PARAMETERS

Per operative parameters	Group A (Open Lichtenstein Repair)	Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	p value
Mean time of surgery	45.67±6.537	53.80±6.927	0.0001(S)
Mean time to discharge	5.07±1.421	4.09±1.104	0.0004(S)
Preoperative bleeding	00	03	-

TABLE 8: POSTOPERATIVE COMPLICATION

Postoperative Complication		Group A (Open Lichtenstein Repair)		Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	
		No of Patients (n=45)	Percentage	No of Patients (n=45)	Percentage
Pain	Immediate	45	100%	45	100%
	Chronic (6 month)	06	13.33%	03	6.67%
Surgical site infection	Superficial	03	6.67%	03	6.67%
	Mesh	0	0.00%	0	0.0%

TABLE 9: MEAN VISUAL ANALOGUE SCORE (VAS)

Mean visual analogue score (VAS)			Group A (Open Lichtenstein Repair)	Group B (Open Modified Anterior Abdominal Pre-Peritoneal)	p value
Pain	Immediate	12 hours	5.73±1.388	4.44±1.035	0.0001 (S)
		24 hours	3.96±1.445	2.18±0.576	0.0001 (S)
		36 hours	2.02±0.149	2.13±0.505	0.1646 (NS)
		48 hours	1.62±0.834	1.67±0.739	0.7641 (NS)
	Chronic (6 month)		0.31±0.848	0.18±0.576	0.3972 (NS)

DISCUSSION

Age at presentation:

The incidence of age at presentation of inguinal hernia was maximum between 30-60 yrs of life in a study by Bhola singh[5]. In the above study the maximum incidence of age >51 years. Results is comparable with present study. In our study mean age of presentation was 51.44±17.789 years in case of group A (Lichtenstein Repair) and 48.78±16.545 years in Group B (Modified APP). p value being 0.4646 i.e. non significant.

Sex Distribution:

Studies by Lichtenstein 94% were male patients and 6% female patients occurring at any age, males were more commonly affected than females. In this study 100% were male in group A and Group B 97.78% male and 2.22% female. The percentage of females within this study is less compared to other studies. This may due to the decreased awareness in women about hernia. Social, economic and education level of female patient contributing to the less no of female presenting to hospital with inguinal hernia in early stage in our study. This may be also due to difference in the embryology and anatomical content of the inguinal canal.

Preoperative diagnosis:

In our study in group A 20% patient presented with bubonocele, 37.78% with funicular hernia and 42.22% presented with complete hernia. In group B 28.89% presented with bubonocele, 44.44% with finicalcular hernia and 35.56% with complete hernia.

Mode of presentation:

In both group A and B all patient presented with swelling in the inguinal region. 26.67% of them in group A presented with pain and 17.78% presented with pain group B, 15.56% presented with aching sensation in group A and 20% aching sensation in group B. only 1 (2.22%) patient in our study presented with nausea (in group A). The study shows around 20-25% patient neglected hernia till they developed pain or aching sensation thus leading to increase rate of complication and morbidity.

Tension free hernia repair using a prosthetic mesh is the primary surgical method for treating groin hernias. There are various methods for tension free herniorraphy, with mesh placement in different locations. Apart from placing the mesh in the premuscular position sublay to the external oblique, it can also be placed in the periperitoneal space. The mesh is sandwiched between the peritoneum and fascia transversalis and secured over the myopectineal orifice with the help of intra-abdominal pressure.

The preperitoneal mesh reinforces the whole myopectineal orifice including the anatomical structures like the internal inguinal ring, the Hesselbach'S triangle and annulus femoralis , where the groin hernia sac originates. Therefore, theoretically, preperitoneal repair can treat the three most common types of groin hernias i.e. indirect, direct and femoral hernia.

It also prevents postoperative occurrence of any of the types of hernia, especially femoral hernia, which can't be achieved by premuscular & inlay repair procedure like Lichtenstein repair.

The preperitoneal space can be accessed through various approaches, including laparoscopic and open procedure. The laparoscopic procedure of TAPP & TEP, are widely practiced for preperitoneal repair.

The open preperitoneal repair (tension free) which was introduced earlier i.e. Stoppa-Wantz technique is now less frequently used.

Other procedures are Kugel posterior preperitoneal herniorraphy, modified Kugel (which is anteriorly approached), Ugahary gridiron incision anterior preperitoneal approach & modified anterior preperitoneal repair (in our study).

The modified Kugel approach and Ugahary approach to the preperitoneal space is by incising the fascia transversalis. But in our method of modified APP we approach the space via the deep inguinal ring by lifting the inferior epigastric artery and as a result the fascia transversalis .So there is no need to incise the fascia transversalis and thus we can avoid another potential site of herniation.Our approach can be considered as a unilateral modification of Stoppa's technique but is much better as compared to it in terms of the length of the incision taken and the morbidity involved.

"….. Application of single layer modified Kugel mesh for inguinal hernia repair ….." Study of Pao-Hwa Chen et al (2017)[5] showed that mean total operative time (skin to skin) was 73 minutes, average hospital stay was 2 days.

"…….. Anterior approach preperitoneal hernia repair using the kugel patch…." By Xue-LU Zhou et al (2016)[6] showed mean operating time was 50 minutes, in 91.2% cases local anaesthesia was applied. The patient were discharge from 4-8 days.

"….. .. Kugel patch method for repair of adult inguinal hernia….." by Yuji Kurihara et al (2008)[7] showed mean operation time was 45.6±11.3 minute and average hospitalization time was 6.2±5 days.

"…… Kugel hernia repair: open mini invasive technique……" by V Ceriani et al (2005)[8] showed surgical incision extension was 3.5cm on average. Mean operation time was 33 minutes. In 96% patients spinal anaesthesia was applied. Patients resumed work after and average of 9 days from operation.

"……. Stab anterior preperitoneal hernioplasty in groin hernias …." by R Sinha (2007)[9] showed mean incision size was 2.8cm, operative time was 15.7 minutes, discharge time was 2.5 days return to work was in 12.6 days.

Mean time of surgery:

In our study the mean time of surgery in group A was 45.67±6.537 minutes and in group B 53.80±6.927 minutes. p value being 0.0001 i.e. significant.

Study by Simon Nienhuijs et al (2007)[10] showed in the Lichtenstein group the surgery took significantly longer (54 minutes versus 41

minutes) than kugel preperitoneal repair group.

Study by Junsheng Li et al (2012)[11] showed no statistical difference in operative time between open lichtenstein and open preperitoneal repair.

Study by Osman Dogru et al (2006)[12] showed no statistical difference in operative time between open lichtenstein and Kugel repair.

Result of our study does not follow this as mean time of surgery is significantly less in open Lichtenstein repair than open modified APP repair.

Peroperative bleeding:
In our study 3 cases were noted in group B where intra operative bleed was significant (>30ml). it was due to injury to the inferior epigastric artery, While lifting it to create the preperitoneal space.

Mean time to discharge:
In our study mean time discharge in group A was 5.07±1.421 days and in group B was 4.09±1.104 days. p value 0.0004 i.e significant. In group B the mean time to discharge was significantly less than group A. it can be attributed due to less immediate postoperative pain and less need of IV analgesia.

In study by Pawana Sharma et al (2019)[13] showed participants with open preperitoneal mesh repair returned to work and normal activities significantly earlier than those who underwent lichtenstein repair (mean difference -1.49 days.

Study by Jean Francois Maillart et al (2011)[14] of trans inguinal preperitoneal groin hernia repair using a preperitoneal mesh performed with a permanent memory ring showed 59% patient opted ambulatory surgery, 38% preferred one night surgery and 4% required 2 night day.

In our study mean time to discharge was significantly less in open modified APP 4.09±1.104 days than open Lichtenstein repair 5.07±1.421 days and it favors study by Pawana Sharma et al (2019)[13].

"….. Application of single layer modified Kugel mesh for inguinal hernia repair ….."Study of Pao-Hwa Chen et al (2017)[23] showed that most of the post operative complications included soreness (14%), pain for >3 months (1.4%) and scrotal haematoma. 1 patient had recurrence after 1 year of surgery.

"…….. Anterior approach preperitoneal hernia repair using the kugel patch…." By Xue-LU Zhou et al (2016)[6] showed 8.9% patients were affected by postoperative complications.

"….. .. Kugel patch method for repair of adult inguinal hernia….." by Yuji Kurihara et al (2008)[7] showed 5 complication of seroma.

"…… Kugel hernia repair: open mini invasive technique……" by V Ceriani et al (2005)[8] showed 3% patients were affected by postoperative complication. Postoperative pain was well controlled. No chronic pain was registered at follow up.

"……. Preperitoneal gridiron hernia repair for inguinal hernia……." by L M Veenendaal et al (2004)[15] showed retrospective analysis of 366 patients who underwent Ugahary hernia repair. 10.1% of patients had minor complications.

"……. Stab anterior preperitoneal hernioplasty in groin hernias …." by R Sinha (2007)[9] showed seroma in 8 patients, chronic pain at 6 month in 8 patients and superficial wound infection in 1 patient.

Immediate postoperative pain:
In our study all the patients both in group A and B presented with some degree of immediate postoperative pain. The results were interpreted on the VAS (visual analogue scale). In 12hours the mean VAS score was 5.73±1.388 in group A and 4.44±1.035 group B, p value being 0.0001 i.e significant. In 24 hours mean VAS score was 3.96±1.445 in group A and 2.18±0.576 in group B, p value 0.0001 i.e. significant. In 36 hours mean VAS score was 2.02±0.149 in group A and 1.67±0.739 in group B, p value 0.1646 i.e. non significant. In 48 hours mean VAS score was 1.62±0.834 in group A and 1.67±0.739 in group B, p value i.e. 0.7641 i.e. non significant. In group B the mean VAS score in 12hours and 24 hours being significantly less than group A allowed early mobilization and discharge of the patients.

In study be GS Randhawa et al (2016)[16], showed 10% presented with immediate postoperative pain in preperitoneal repair and 60% in Lichtenstein repair.

In study by Simon Nienhuijs et al (2007)[10] showed mean vas pain score was lower in the kugel preperitoneal repair group that in the lichtenstein group for every day of first 2 post operative weeks.

In study by Junsheng Li et al (2012)[11] and Pawana Sharma et al (2015)[13] showed no statistical difference in the incidence of acute post operative pain between Lichtenstein repair and open preperitoneal repair group.

Our study favours study by Junsheng Li et al (2012)[11] and Pawana Sharma et al (2019)[13] but goes against study by G.S. Randhawa et al (2016)[16] as all patients in our study both in group A and B presented with some degree of immediate post operative pain. Our study favors study by Simon Nienhuijs et al (2007)[10] as mean VAS score in our study is significantly less in modified APP repair than Lichtenstein repair in 1sr 12 hours and 24 hours.

Chronic postoperative pain:
In our study 6 (13.33%) patient in group A presented with chronic pain and in group B 3 (6.67%) patients presented with chronic pain after 6 month. The mean VAS score 0.31±0.848 in group A and 0.18±0.576 in group B, p value being 0.3972 i,e, non significant.

In study by G.S. Randhawa et al (2016)[16] showed 2% patients presented with chronic groin in preperitoneal group and 80% in Lichtenstein group presented with chronic pain.

In study by Simon Nienhuijs et al (2007)[10] showed in the Kugel preperitoneal repair group mean VAS pain score at 3 months was less (0.3 versus 0.9, p value 0.0002) than Lichtenstein group as was the proportion of patients reporting pain (21% versus 40%, p vaule 0.007).

In study by Junsheng Li et al (2012)[11] and Pawana Sharma et al (2019)[13] showed no significant difference in incidence of chronic pain between Lichtenstein and open prepertitoneal repair.

Our study favors the result of Junsheng Li et al (2012)[11] and Pawana Sharma et al (2019)[13] but goes against the results of G.S. Randhawa et al (2016)[22] and Simon Nienhuijs et al (2007)[10].

Superficial surgical site infection:
In our study both group A and group B 3 (6.67%) patients in each presented with superficial surgical site infection.

Study by Junsheng Li et al (2012)[11] showed no significant statistical difference in terms of incidence of wound infection between Lichtenstein and open preperitoneal repair.

Our study outcomes favours results of Junsheng Li et al (2012)[11]

Preperitoneal repair has been associated with low recurrence rates as found in the following studies "…….Early experience of performing a modified Kugel hernia repair with local anesthesia….." by Junsheng Li et al (2012)[11] showed mild discomfort in the inguinal area after 6 months. There was no incidence of recurrence.

"……..Long-term follow-up of anterior approach preperitoneal hernia repair using the Kugel patch……" by Xue-lu zhou et al (2016)[6] showed there were 3 recurrences in the period (.5%).

"……. Preperitoneal gridiron hernia repair for inguinal hernia……." by L M Veenendaal et al (2004)[13] showed retrospective analysis of 366 patients who underwent Ugahary hernia repair. Overall recurrence rate was 6.5% in 2 years of follow up.

"…… Experience with direct kugel patch method for repair of adult inguinal hernia..…" by Yuji Kurihara et al (2008)[7] showed only 1 recurrence.

"……. Stab anterior preperitoneal hernioplasty in groin hernias …." by R Sinha (2007)[9] showed overall recurrence rate 1.66% .

Mesh infection:
In our study no patient presented with mesh infection in follow up.

Recurrence:
In our study no patient presented with recurrence in follow up of 1 year.

Follow up:
In our study in group A 5 patients presented with chronic pain, 2 patient presented with superficial SSI and 1 patient presented with both chronic pain and superficial SSI in follow up. In group B 2 patients presented with chronic pain and 2 patient presented with superficial SSI and 1 patient presented with both chronic pain and superficial SSI.

CONCLUSION

- In our study inguinal hernia was more common in patient with age >51 years.
- Majority of the patient were male.
- Majority of patient presented with funicular and complete hernia.
- All patients were operated under spinal anaesthesia.
- All of the patient presented with swelling in the inguinoscrotal region.
- Mean time of surgery was significantly less in open Lichtenstein repair.
- Immediate postoperative pain was significantly less in open modified APP.
- Mean time to discharge was significantly less in open modified APP.
- None of the patient presented with recurrence and mesh infection in follow up.
- 3 cases of significant intra operative bleed noted in modified APP repair due to inferior epigastric artery injury.
- The modified APP approach allows a minimal invasive tension free and suture less procedure with protection for the nerves.
- Modified APP technique repairs the myopectineal orifice of Fruchaud.
- Study demonstrates that modified APP repair is a safe and feasible alternative to the standard open Lichtenstein repair. However the procedure is difficult to reproduce in non expert hands.

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