INTRODUCTION:

100 years ago, Bassini described the first herniorrhaphy. They believed immobilization and bed rest enhanced wound healing. But it turned out to be the culprit for genesis of fatal pulmonary embolism. Hence early ambulation was suggested.

This study is done to prove the fact that Trans Inguinal Preperitoneal (TIPP) Hernia Repair (using prolene mesh) resulted in greater patient comfort with reduced post operative pain and also decreases the number of complications and recurrence rate and that it can be recommended for all primary unilateral Inguinal Hernias.

More than 7 lakh inguinal hernia repairs were performed each year in US in 1980. More than 70,000 patients developed recurrent hernia due to excessive tension repair.

Abstract

Context: The transinguinal pre peritoneal mesh repair is an amazing simplistic technique which gives an approach to inguinal, femoral and obturator hernias and bears the same anatomical relationship in TEP and TAPP approaches which gives a better understanding of the TEP and TAPP procedures.

Aims: The objective of the study is to compare the outcomes of Lichenstein and Transinguinal preperitoneal mesh repair for inguinal hernia.

Settings and Design: About 25 cases of transinguinal pre peritoneal mesh repair was done in the period 2014 to 2015 at Govt. medical college hospital and compared with 25 cases of Lichenstein repair.

Methods and Material: Cases were selected at random irrespective of the type of inguinal hernia, the age of the patient and the size of the defect. The material used for repair is monofilament polypropylene clear non absorbable synthetic knitted surgical mesh.

Statistical analysis used: The comparisons were done in terms of postoperative pain, length of operation, early and late complications, recurrence rates and time required to return to work. Operation length was 49.16 + 8.74 min in the Lichenstein group and 82.36 + 8.34 min in the TIPP group. Visual analog scales at day 1 were 2.44 + 1.44 for Lichenstein group and 0.8 + 1.08 for TIPP group, whereas visual analog scale values at day 7 were for 0.96 + 1.42 Lichenstein group and 0.32 + 0.55 for TIPP group.

Results: In our experience, the repair of groin hernias with Preperitoneal mesh (Prolene mesh through an inguinal incision) has resulted in greater patient comfort with reduced post operative pain and also decreased number of complications. There was no recurrence observed in my study during the follow up period of 3 months. The duration of stay in the hospital was reduced and the patients had a rapid return to work.

Conclusions: It is an easy technique with short learning curve. The contact of mesh with the cord structures and nerve is minimal which reduces the postoperative cord oedema, pain (Inguinodynia), orchitis and sensory loss.

Key-words: TIPP, preperitoneal mesh repair, Lichensteins repair

Key Messages: open transinguinal preperitoneal hernia repair and lichenstein’s hernia repair
which was then replaced with Lichtenstein’s tension free mesh repair. But due to chronic post operative pain, sensory loss, cord oedema, Trans Inguinal Pre Peritoneal repair was tried which proved to be useful.

SUBJECTS AND METHODS:

About 25 cases of transinguinal pre peritoneal mesh repair was done in the period 2014 to 2015 at Kilpauk medical college hospital and compared with 25 cases of Lichenstein repair. Cases were selected at random irrespective of the type of inguinal hernia, the age of the patient and the size of the defect. The material used for repair is monofilament polypropylene clear non absorbable synthetic knitted surgical mesh available in our hospital as SURUMESH manufactured by SURU INTERNATIONAL PVT LTD. These cases were followed up in the immediate and post operative periods. Post operative pain, scrotal collection, seroma, cord oedema and wound infection were looked for. They were asked to come for regular follow-up visit after discharge. During each follow-up visit, the patients were assessed for pain, surgical site infection and recurrence.

TRANSINGUINAL PRE PERITONEAL MESH REPAIR:

Under spinal anesthesia, aseptic precaution, parts painted and draped, classical inguinal incision made between the anterior superior iliac spine and the pubic tubercle. Then external oblique fascia is divided, cord structure and sac identified, ilio inguinal nerve is isolated from the posterior inguinal wall. In a case of indirect hernia, sac is separated from the cord well beyond the deep ring, content reduced and then sac is transfixed and excised. In case of congenital hernia, firm adhesion with the tunica vaginalis, sac may be transected in the middle part, leaving open the distal sac. In case of direct hernia, is reduced into the peritoneal cavity, transversalis fascia is opened from the deep ring to the pubic tubercle, safe-guarding the epigastric vessels. Preperitoneal space is defined, dissection is extended laterally beyond the deep ring, inferiorly to the Cooper’s ligament and medially to the outer border of the rectus sheath. A synthetic polypropylene mesh, rectangular in shape, 15x7cm in size, is prepared to cover Bogros’s space and the Fruchaud’s Myopectineal orifice. A slit is made at the lateral end of the mesh, to create a new deep ring and allow free passage of the cord. The mesh is anchored inferiorly to the ilio Pectineal ligament medially to the rectus sheath. The two tails of the newly created deep ring are crossed behind the cord and laterally sutured to the internal oblique muscle. External oblique fascia is sutured. Skin is closed. Compressive dressing to be done at the end of the procedure. Post operatively analgesic and antibiotics given. Each patient discharged at 7th post operative days.
RESULTS:

Among the 50 patients taken for the study, 25 patients were subjected to lichenstein’s hernia repair and 25 for the TIPP procedure. The mean age of the patients subjected to lichenstein repair was 53.84 ± 12.44 yrs and for TIPP it was 48.8 ± 14.17 yrs.

Operation length was 49.16 ± 8.74 min in the Lichenstein group and 82.36 ± 8.34 min in the TIPP group. The duration of operation was more in the TIPP group and this was statistically significant. (p < .05)

The per operative complications encountered were injury to peritoneum, vessels and nerves. Injury to peritoneum was encountered in (n=0) none of the patients in Lichenstein group whereas injury to peritoneum was encountered 3 (n=3) patients of TIPP group. Injury to nerves was encountered in (n=0) none of the patients in TIPP group whereas injury to nerves was encountered in 6 patients (n=6) in Lichenstein group.

None of the patients developed urinary retention in the early post operative period. The various early post operative complications encountered among the patients subjected to Lichenstein repair were seroma (n=8), surgical site infection (n=2), scrotal collection (n=0) and cord edema (n=8). Among the patients who underwent TIPP procedure the early post operative complications seen was surgical site infection (n=1) with only one patient experiencing it.

During the first follow up of patients at one month it was noticed that 24% of patients who underwent lichenstein repair had complications. SSI (n=2), cord edema (n=2), recurrence (n=0), loss of sensation (n=5). On the other hand none of the patients who underwent TIPP had complications.

At second follow up (3rd month) it was noticed that no patient who underwent TIPP had complication like chronic pain, cord oedema, sensory loss and recurrence in my observation. On the other hand one patient who underwent LR had chronic pain and 2 patient who underwent LR had sensory loss.

TABLE-1: The comparison of the patient demographics, early and late complications, and cost effectivity among two groups.

<table>
<thead>
<tr>
<th></th>
<th>Lich enstein (n=25) Mean+ SD</th>
<th>TIPP (n=25) Mean+ SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>53.84 ± 12.44</td>
<td>48.8 ± 14.17</td>
</tr>
<tr>
<td>Time</td>
<td>49.16 ± 8.74</td>
<td>82.36 ± 8.34</td>
</tr>
<tr>
<td>Hospitalization time</td>
<td>3.12 ± 0.76</td>
<td>3.03 ± 0.78</td>
</tr>
<tr>
<td>Early complication YES</td>
<td>11 (44.00)</td>
<td>1 (4.00)</td>
</tr>
<tr>
<td>Early complication NO</td>
<td>14 (56.00)</td>
<td>24 (96.00)</td>
</tr>
<tr>
<td>Late complication YES</td>
<td>7 (28.00)</td>
<td>0 (0.00)</td>
</tr>
<tr>
<td>Late complication NO</td>
<td>18 (72.00)</td>
<td>25 (100.00)</td>
</tr>
<tr>
<td>Gender</td>
<td>MALE 24 (96.00)</td>
<td>24 (96.00)</td>
</tr>
<tr>
<td></td>
<td>FEMALE 1 (4.00)</td>
<td>1 (4.00)</td>
</tr>
</tbody>
</table>

TABLE 2: The comparison of the VAS score among the two groups.

<table>
<thead>
<tr>
<th>DAY</th>
<th>VAS</th>
<th>Lichenstein Mean+ SD</th>
<th>TIPP Mean+ SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 1</td>
<td>2.44 ± 1.44</td>
<td>0.8 ± 1.08</td>
<td></td>
</tr>
<tr>
<td>DAY 7</td>
<td>0.96 ± 1.42</td>
<td>0.32 ± 0.55</td>
<td></td>
</tr>
<tr>
<td>3rd month</td>
<td>0.12 ± 0.63</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

FIGURE 4: mesh in preperitoneal space

FIGURE 5: Postoperative period
Visual analog scales at day 1 were 2.44 + 1.44 for Lichtenstein group and 0.8 + 1.08 for TIPP group, whereas visual analog scale values at day 7 were 0.96 + 1.42 for Lichtenstein group and 0.32 + 0.55 for TIPP group. Visual analog scale results at 3rd month were 0.12 + 0.63 in the Lichtenstein group and 0.00 in the TIPP group.

**DISCUSSION:**

Of the 25 transinguinal pre peritoneal mesh repair was done, 12 were indirect hernia versus 13 were direct hernia. most of them were European hernia society classification PM1. maximum number of patients belonged to 45-55 year age group. From the observation, it is clear that post operative pain is very much less with transinguinal pre peritoneal mesh repair using prolene mesh with most of the patients having minimal or no pain after 2 days. The majority of patients required only oral analgesic. Most of them required sedation only on the day of their surgery. One patient developed wound infection at the end of 1st week, no patient developed wound infection, cord oedema, recurrence at the end of 1st month and one patient who developed chronic pain at the end of 1 month in this group of patients. unrestricted activity was encouraged in these patients after discharge.

Out of 25 patients for transinguinal pre peritoneal mesh repair, 23 patients came for regular follow-up the average follow up period was 3 month. During each follow-up visit, patients were assessed for pain, any restriction of physical activity, surgical site infection, mesh rejection and recurrences. 25 patients underwent lichtensteins repair experienced more pain in the early post operative period. the intensity of pain was more in the early post operative period, the intensity of pain was even more increased during coughing and during ambulation. Although these patients experienced minimal pain at rest after 5 days the intensity was increased during coughing and ambulation. These patients needed larger doses of analgesics and sedatives and most of them had restricted physical activities up to 1 month post operatively. 5 patients developed wound infection. 8 patients developed cord oedema, at the end of 1st week 9 patients developed pain over surgical site. Although no recurrence was noted in this group, 1 patient developed pain at 3rd month.

In the study conducted by JF Maillar, P. Vantournhoudt, G. Piret – Gerard, E. Mauel, Pelissier et al [1] using a Preperitoneal mesh performed with a permanent memory ring for groin hernia TIPP found to be a good alternative to LR (2006-2008), no infection of mesh, no clinical recurrence. There was an ultrasound recurrence in < 2% (n=3) of the asymptomatic patients and chronic pain in 4.8% of the patients. Benefits of the anterior approach (easy technique, short learning curve, low cost) and the Preperitoneal placement of the mesh (less recurrence, less pain). This procedure is a good alternative to LR. Frederik Berrevoet UGent, Lander Maes UGent, Koen Reynjens UGent, Xavier Rogiers UGent, Roberto Trouser UGent and Bernard de hemptinne UGent [2010] [2], did study to compare TIPP versus lichtensteins in relation to acute and chronic pain, post operative complication and recurrence rate. Duration of study was 18 months. They observed mean operative time for TIPP is less than Lichtenstein, 33 versus 44 min respectively (p=0.04). less post operative pain observed in the TIPP than Lichtenstein group. Recurrence were observed less in TIPP than LICHENSTEIN group respectively 2.8% versus 5.1%. Pelissier and colleagues (2007) [3] described that recurrence rate is 2% and rate of chronic pain is 5-7% in TIPP groups. More recently Berrevoet and his team [4] described a recurrence rate of 1-3% and visual analogue pain scale of 0.2 1 yr after TIPP. Reason for lower rate of post operative pain were found to be minimal dissection around the ilioinguinal and iliohypogastric nerve and also due to no fibrosis of the mesh in contact with the inguinal nerve. Koning GG, Schipper HJP, Oostvogel HJM, Verhofstefd MHJ, Gerritsen PG, Larrhoven KCJHM, Vriens PWHI [5] double blind RCT comparing Lichtensteins and TIPP (2009-10). Studied in 496 patients: 225 TIPP and 271 LICHENSTEINS. This study revealed no significantly better result for the TIPP as compared to lichtensteins. Moldoon RL, Marchant k, J OHNSON dd, yoder GG, Read RC, Hauer-Jensen M, RCT study of lichtenstien and TIPP Trial (2004) [6], described recurrence in the lichtensten is 4.3% and in less than 1% recurrence in THE PREPERITONEAL Read Rives. Both anterior repairs are associate with low post operative morbidity and recurrence rates. (p=0.21). Giel G. Koning: Patrick W.H.E Vriens 2011 [7], St Elizabeth hospital, did study on Anterior PPR of extremely large hernias. In extremely large hernias, the lateral side of the mesh can be insufficient to fully embrace the hernia sac. They describe the use of 2 preperitoneal placed meshes (Butterfly technique) to repair extremely large hernias. 2 inverted meshes to cover the deep ring both medial and lateral. Recurrence did not occur after repair. Chronic pain was not reported. In a study by Muldoon RL, Marchant K, Johnson DD, Yoder GG, Read RL, Haver- [8] Jens M PPR (n=121); LR(n=126) Read Rive’s repair was 9 min longer than LR. No wound infection.

Rajeshwar Singh, MD, Lalit Chauhan, MD, and Naya Singh, MD.
Akhavan Moghaddan, Shaban Mehrvarz, Hassan ali Mohabbi [9] did comparison of Read Rive's and LR for treatment of unilateral inguinal hernia. Early postoperative complications, duration of surgery and hospital stay, return to normal activity, recurrence was found to be equal in both the groups. G.G.Koning, C.S.Andeweg, F.Keus, M.W.A. Van Tilburg, C.J.H.M. Van Larrhova, W.L. Akkersdijk [10] popularized the Preperitoneal mesh position due to promising result of less chronic pain. However, considering the proportions of severe adverse events, learning curve, added cost, Performed trans rectus sheath preperitoneal repair in 50 patients. They observed no technical problems in surgery, no recurrence and chronic pain after a mean follow up of 2 years.

**CONCLUSION:**

In our experience, the repair of groin hernias with Preperitoneal mesh (Prolene mesh through an inguinal incision) has resulted in greater patient comfort with reduced post operative pain and also decreased number of complications. Although there was no recurrence observed in my study, the follow up period was only minimal (average 3 month). The duration of stay in the hospital was reduced and the patients had a rapid return to work. Hence the transinguinal pre peritoneal mesh repair is an amazing simplistic technique which gives an approach to inguinal, femoral and obturator hernias and bears the same anatomical relationship in TEP and TAPP approaches which gives a better understanding of the TEP and TAPP procedures. It is an easy technique with short learning curve. The risk of vessel injury is less in the hands of an expert. The contact of mesh with the cord structures and nerve is minimal which reduces the postoperative cord oedema, pain (Inguinodynia), orchitis and sensory loss.

**REFERENCES:**

1. JF Maillar, P.Vantournhoudt, G. Pirer – Gerard, E.Maul, Pelissier et al
2. Frederik berrevoet UGent, leanderMaesUGent, KoenReyntjensUGent, XavierRogiers UGent, Roberto trou-ser UGent and Bernard de hemptinneUGent [2010], koning GG ,Schipper HJP, Oostvogel HJM, Verhofstad MH, Gerrits enPG, Larrhoven KCJHM, Vriens PWHI


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