Laparoscopic transabdominal preperitoneal versus lichtenstein tension free repair for inguinal hernia

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Abstract

Introduction: Chronic groin pain is a common complaint after repair of inguinal hernia. This pain most frequently is due to iatrogenic damage or entrapment of the nerves, in and around the inguinal canal, the most important of which is the ilioinguinal nerve.

Objective: To compare the two tension-free methods of hernia repair: trans-abdominal pre-peritoneal laparoscopic mesh repair and the open Lichtenstein mesh technique in terms of operative time, length of hospital stay and chronic post-operative pain.

Study Design: Randomized controlled trial

Setting and Duration: Surgical “C” Unit, Khyber Teaching Hospital, Peshawar, Pakistan, May 2009 to December 2009.

Materials and Methods: A total of 176 male patients, aged between 16-60 years, were divided into two groups, A and B, with patients being subjected to Transabdominal Pre-Peritoneal (TAPP) and Lichtenstein repairs, respectively. The two groups were compared for operative time, length of hospital stay, and chronic groin pain. Percentages were calculated for categorical data while numerical data were represented as mean ± SD. Chi square test and t test were used to compare categorical and numerical variables, respectively. Probability ≤ 0.05 (P ≤ 0.05) was considered significant.

Results: At one month interval, in group A mild, moderate and severe pain was observed in 23 (26.1%), 6 (6.8%) and 2 (2.3%) patients compared to 32 (36.4%), 18 (20.5%) and 8 (8.1%) patients, respectively, in group B. Mean operative duration was significantly longer in group A compared to group B (P < 0.001). Mean hospital stay was significantly longer in group B compared to group A (P < 0.001).

Conclusion: Tran-abdominal pre-peritoneal laparoscopic inguinal hernia repair is effective in decreasing the incidence of chronic groin pain and post-operative hospital stay in comparison with Lichtenstein tension free mesh hernioplasty.

Keywords: Inguinal hernia, Lichtenstein repair, Laparoscopy, chronic pain.

Introduction:

Inguinal hernias are common and surgical repair of inguinal hernias remains one of the most common operations in general surgery and in USA alone, about 700,000 cases are performed each year\(^1\). Since the original description of hernia repair by Bassini in 1889, hernia surgery underwent numerous refinements with the sole idea to reduce recurrence\(^2\).

Evidence comparing laparoscopic and open hernia repairs has varied with time and with changes in techniques used\(^3\). Despite all these advances, the best method for inguinal hernia repair has not yet been established\(^4\). The introduction of different varieties of prosthetic mesh has increased the interest in inguinal hernia surgery\(^5\).

Some authors have also compared Lichtenstein with Laparoscopic repair and better outcomes
especially in terms of pain, resumption of normal physical activity and shorter sick time were seen in laparoscopic repairs, however the recurrence rates were the same and the laparoscopic repair required surgical skill expertise. In addition significantly shorter duration of post operative analgesia was required in the laparoscopic arm compared to the open Lichtenstein approach for inguinal hernia repair. There are, however, others who failed to reproduce these results and cost-effectiveness was questioned.

With all the above in mind a thorough study needed to be undertaken comparing an open tension-free mesh technique (Lichtenstein) with a Trans-abdominal pre-peritoneal laparoscopic (TAPP) mesh repair to better define the true place of laparoscopic technique in hernia surgery.

Materials and methods:
This study was conducted at surgical C unit, Khyber Teaching Hospital, which is a 1200 bedded tertiary care facility affiliated with Khyber Medical University, Peshawar. The objective of the study was to compare the two tension-free methods of hernia repair: trans-abdominal pre-peritoneal laparoscopic repair (TAPP) and open Lichtenstein repair (LR) in terms of operative time, length of hospital stay and chronic post-operative pain. The study was approved by the Institutional Medical and Ethics Committee.

In this study a total of 176 patients presenting to the outpatient department (OPD) with clinical diagnosis of inguinal hernia were recruited using 95% confidence interval, 20% and 16% prevalence of LR and TAPP, respectively and 8% margin of error. The hypothesis of the study was that TAPP was superior to LR in terms of operative time, length of hospital stay and chronic post-operative pain. The study was approved by the Institutional Medical and Ethics Committee.

The inclusion criteria was patients with primary inguinal hernia (unilateral/bilateral), 16 to 60 years old, American Society of Anaesthesiologists class I (ASA I) and those willing to participate in the study after written informed consent. Patients with irreducible or obstructed hernia, previous lower abdominal surgery, and radiotherapy were excluded from the study. All these were excluded for they would act as confounders and produce bias in the study results.

All the included patients were admitted in ward through Outpatient Department a day before surgery. After admission detailed history, physical examination and investigations for surgical fitness were carried out. The patients were explained the risks and benefits of the two procedures and written informed consent was obtained.

The repairs in both the groups were performed by consultant surgeons with a case load of at least 100 repairs in both the open and laparoscopic techniques. General anesthesia was used for carrying out the procedures in both the groups in addition to spinal anaesthesia in group B. The patients were given, in both groups, a prophylactic dose of third generation cephalosporin at induction as part of the protocol while two doses of the same were repeated postoperatively at 8 hours and 16 hours.

Laparoscopic repair (TAPP) was performed through a 3 port technique with carbon dioxide used for creation of pneumoperitoneum through a 10mm infraumbilical port upto a pressure of 12 mmHg. The other two ports were placed in the lower abdomen according to individual surgeon’s choice. The prolene mesh was placed tranperitoneally in the preparitoneal space.

The open lichentstein repair was performed through a skin crease incision in the right inguinal region with length depending on patient’s habitus. After dissection of the sac and herniotomy, posterior wall of the canal was reinforced with placement of prolene mesh size 6 x 11cm anchored with prolene 3/0 suture. Skin incision in both the procedures was closed with subcuticular prolene 2/0 suture.
The patients were kept Nil by Mouth until they were fully recovered from anesthesia and had their bowel sounds returned when clear fluids were started. Soft diet followed by regular diet was introduced when the patients tolerated the liquid diet. Patients were discharged once they were able to take regular diet, afibrile and had good pain control. A standardized questionnaire was used to record the data.

All the operative details were recorded. The operative times was recorded in minutes for both the procedures and was counted from the incision to the placement of the last suture. Hospital stay was defined as the number of nights spent in hospital postoperatively. Postoperative pain was measured qualitatively (subjectively) using Visual Analogue Scale and was graded into no pain, no discomfort during daily life activities (VSA = 0), mild pain, occasional discomfort but not affecting the quality of life (VSA = 1 - 3), moderate pain, pain hampering patient’s quality of life including inability to take part in sports (VSA = 4 - 7), and severe pain, the presence of constant or intermittent pain debilitating the patient or interfering with activities of daily living (VSA = 8 - 10). Confounding variables were controlled through strictly following the exclusion criteria.

The patients were followed up in OPD at one and six month’s intervals postoperatively. During each follow up visit the patients were asked whether they had any pain at rest in the treated groin and this variable was subjectively quantified using a 10-point visual analogue Scale.

**Results:**
A total of 176 patients were selected for study and were divided into two groups, group A patients underwent TAPP and group B patients were subjected LR. Mean age of patients in group A was 38.64 ± 9.04 years compared to 38.32 ± 13.40 years in group B (P = 0.854). There were 85 (96.5%) males and 3 (3.4%) females in group A compared to 84 (95.4%) males and 4 (4.5%) female patients with inguinal hernia in group B with a male to female ratio of 28:1 in group A compared to 21:1 in group B, respectively, as shown in Table 1.

All patients in group A were operated under general anesthesia while in Lichtenstein repair group, general and spinal anesthesia was used in 32 (36.3%) and 56 (63.7%) patients respectively.

On follow up of the patients at One month interval, pain occurrence was gauged as mild, moderate and severe based on VSA score. In group A 57 (64.8%) patients did not experience any pain compared to 30 (34.1%) patients in group B. The ratio of severe pain in group A to B was 1:4, with severe pain occurring in 2 (2.3%) patients in group A compared to 8 (9.1%) patients in group B.

Follow up of patients at Six months interval revealed absence of pain in 79 (90%) patients in group A in contrast to 58 (66%) patients in group B. The frequency of mild, moderate, and severe pain in group A was 8 (9%), 0 (0%), 1 (1%). The corresponding figures in group B were 21 (23.8%), 6 (6.8%), 3 (3.5%), respectively, as shown in Table 2.

Mean hospital stay was 1.45 ± 0.72 days in group A compared to 2.61 ± 0.71 days in group B, which proved to be significant on statistical analysis (P < 0.001). The mean operative duration was 60.13 ± 14.76 minutes in laparoscopic group as compared to 41.01 ± 9.71 minutes in the Lichtenstein hernia repair group proving to be significant on statistical analysis (P < 0.001).
Discussion:
Inguinal hernia repair is one of the most common surgical procedures with an annual rate of 2800 per million populations in Europe and the USA. Many studies have been carried out on the incidence of post operative pain after Laparoscopic and Lichtenstein mesh repair. Pain occurring after surgery is due the tension at the suture lines and the tight suturing of fibroconnective tissue causing stimulation of the myelinated (type A) fibers and unmyelinated (type C) fibers.

Our study concluded the superiority of laparoscopic repair over the open mesh repair in terms of post operative pain occurring after one month and six months intervals follow up. Most of the patients (64.8%) operated Laparoscopically experienced no pain as compared to 30 (34.1%) patients operated by Lichtenstein repair. So there was a net 30% reduction of pain in Laparoscopic procedure. Ratio of mild and moderate pain was considerably lower. Moderate pain was present in 6 (6.8%) patients operated laparoscopically as compared to 18 (20.8%) patients operated through Lichtenstein repair. Severe pain after one month was present in 2 (2.3 %) patients with laparoscopic repair.

Sudhir, Nixon, and Macintyre, compared the post operative pain in both types of repairs. Their study results, in corroboration to our findings, reveal that pain occurrence was significantly less in Laparoscopic versus the Lichtenstein repair.

The incidence of pain after inguinal hernia repair is about 10%. Predictive risk factors for chronic postoperative pain are: preoperative pain, repeat surgery, psychological vulnerability, and workers compensation, a surgical approach with risk of nerve damage, moderate or severe intensity of acute postoperative pain, radiation therapy, neurotoxic chemotherapy, depression, neuroticism, and anxiety.

Another finding from our study was that the rate of occurrence of long term severe pain was insignificant among the two procedures. This signifies and verifies the fact that early post operative results of minimal access surgeries are encouraging in terms of hospital stay, pain of mild, moderate and severe degree and early return to job and daily life activities. However, as mentioned earlier, both procedures being tension free open repair gives almost similar results in terms of long term post operative pain. The pain incidence on long term follow up diminishes to insignificant levels.

Weight of most of the patients (60.2%) in our study was ranging between 61-70 kg which is within the range of the normal weight for height ratios and for particular age limits. Obesity is thought to be an adverse factor for morbidity of such patients but Sandrine Kamoun et al conclude that the overall post surgical morbidity rate and were similar in obese and non-obese patients.

Duration of operation in our study was significantly longer in the Laparoscopic group compared to the open group. Various studies report a reduced hospital stay and prolonged operating time for laparoscopic hernia repair. Colack
and colleagues compared extra-peritoneal laparoscopic and open mesh repair. They report mean operating time of (Mean 49.67 ± 14.11 minutes) for laparoscopic versus (Mean 56.64 ± 12.32 minutes, P = 0.001), open mesh repair. Neumayer L et al, however, found no significant difference in the mean operating time between the two modalities of treatments (P = 0.1). Our result is reconfirmed by randomized control trials as by other studies which reveal a significantly longer mean operating time in laparoscopic hernia repair. In accordance to with our study others have reproduced similar results so far operative duration was considered.

Mean hospital stay in our study was significantly longer in the open Lichtenstein repair group compared to the Laparoscopic group. Tanphibat et al and Erhan Y et al, however found no significant difference in duration of hospital stay between laparoscopic (Mean 2.6 ± 1.2 days) and open repair (Mean 3 ± 1.5 days, P = 0.1). In other few studies similar findings to our results were observed revealing a significantly shorter hospital stay in the Laparoscopic preperitoneal arm of hernia repair surgery (P < 0.001).

In general, laparoscopic technique is much superior to the Lichtenstein repair in terms of short term post-operative pain, return to activities of daily life, cosmesis and patient satisfaction. However, operation time is prolonged, higher incidence of recurrence and higher cost of this minimally invasive technique. The results are expected to improve in future with the increased use and development of expertise in this technique.

Conclusion:
Transabdominal preperitoneal laparoscopic inguinal hernia repair in comparison with Lichtenstein tension free mesh repair of inguinal hernia leads to less frequency of reporting of chronic inguinal region pain after surgery and less post-operative hospital stay. It is a preferred method but requires general anesthesia. However keeping in view the increased recurrence rate in trans-abdominal laparoscopic repair, the role of this procedure should be thoroughly evaluated in future studies.

References:
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