A comparison of postoperative pain and duration of hospital stay between Lichtenstein's repair and laparoscopic repair of inguinal hernia

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***Abstract Introduction**: Inguinal hernia repair is one of the most commonly performed surgical procedures worldwide. Two widely used techniques are the Lichtenstein tension-free mesh repair and laparoscopic repair, which includes transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) approaches. This study compares postoperative pain and duration of hospital stay between these techniques **Materials and Method**:This was a prospective clinical study to evaluate pain levels following the surgical repair of unilateral primary inguinal hernia. Overall, 132 patients were enrolled. The choice of surgical procedure was randomized, with the first 66 patients evaluated hospital, were operated through the open LC technique and the 30 following patients operated through the TAPP technique. The inclusion criteria were: age between 18-70 years **Results** :A comparative analysis was conducted on 132 patients undergoing either Lichtenstein's repair or laparoscopic repair for inguinal hernia. The patients were divided into two groups, each consisting of 66 patients. Postoperative pain was assessed using a Visual Analog Scale (VAS) at different time intervals, and the duration of hospital stay was recorded **Conclusion**: Laparoscopic repair resulted in significantly lower postoperative pain scores and a shorter hospital stay compared to Lichtenstein's repair, suggesting a potential advantage in terms of early recovery and patient comfort*

KEYWORDS :TEP, Lichtenstein's Repair, Inguinal Hernia.

[3] Licenciada en Farmacia, Especialista en Farmacia Hospitalaria, Servicio de Farmacia, Hospital Público da Mariña. Lugo, Medellín
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INTRODUCTION

Inguinal hernia repair is one of the most commonly performed surgical procedures worldwide. Two widely used techniques are the Lichtenstein tension-free mesh repair and laparoscopic repair, which includes transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) approaches. This study compares postoperative pain and duration of hospital stay between these techniques.[1]

The previous era of hernia surgery is extensive, and since prehistoric times, doctors have worked to gradually improve it.[2] In actuality, knowing the anatomy of groin is a game of precision; the player who comprehends the anatomy of the groin will have the best chance of performing an impeccable repair. One of the most prevalent general surgical interventions was herniorrhaphy, with estimated millions of hernia operations done yearly in the US and the number continuing to climb. The results of surgeries have significantly improved as a result of advancements in prosthetic materials, surgical procedures, and usage knowledge.1However, open Lichtenstein and laparoscopic procedures are widely recognized as the best therapeutic alternatives for inguinal hernia repair.2Recurrence, extended hospital stays, and post-operative pain are common issues following hernia surgery. Hernia surgery centres with a failure rate of less than 1% are known to specialize in this operation.[3]

Primary indicators of a successful groin hernia repair procedure include the procedure's longevity, lowest rate of complications, lowest possible cost, and fastest possible return to baseline functional status.[4] This success is primarily dependent on the surgeon's skills, preoperative patient selection and preparation, surgical procedure expertise, and the materials that are currently accessible for repair.1The past ten years have seen a major growth in endoscopic hernia surgery due to the development of novel operating techniques. Around the world, certain centres regularly conduct open hernia surgery on day-care patients. For patients right after surgery, prolonged hospital stays and post-operative pain are especially concerning[5]

Comparing laparoscopic hernioplasty to open hernioplasty, surgeons assert that there is less postoperative pain and a shorter hospital stay following surgery. In any case, there is still debate over the ideal approach to repair an inguinal hernia. This study compared the open procedure to the laparoscopic approach in terms of hospital stay and pain following surgery.[6]

Evidence-based medicine is the most scientific approach to determine whether one approach is superior to another. Thus, laparoscopic mesh repair and open hernia repair should be contrasted. Here, we contrast laparoscopic repair and Lichtenstein tension-free open hernioplasty by comparing the two groups' hospital stays and postoperative pain.[7]

Objectives were to evaluate the differences between open and laparoscopic hernioplasty postoperative complications in terms of pain and length of hospital stay andto determine which of the two inguinal hernia repair techniques had the lowest rate of complications[8]

MATERIALS AND METHODS

This was a prospective clinical study to evaluate pain levels following the surgical repair of unilateral primary inguinal hernia. Overall, 132 patients were enrolled. The choice of surgical procedure was randomized, with the first 66 patients evaluated at hospital, were operated through the open LC technique and the 30 following patients operated through the TAPP technique. The inclusion criteria were: age between 18-70 years, Goldman surgical risk level I or II and the diagnosis of unilateral primary

inguinal hernia. The exclusion criteria were: previous abdominal surgeries, susceptible individuals such as native Brazilians, army and prisoners, not completing the postoperative following at any stage, urgent surgeries and additional surgical procedures such as umbilical hernioraphy, prostatectomy, cholecystectomies and other surgical procedures. Among all patients, two were excluded from the LC group as they did not complete the 12 months postoperative and two from the TAPP group for not completing the 30 days postoperative examination. Data concerning gender, age, body mass index (BMI) and Nyhus classification of the hernia, as well as duration of the surgery, edema occurrence and pain medication use, were recorded for each patient.

Surgical procedures

All surgical procedures were performed by the same surgeon. The patients underwent standard routine preoperative examination including. All patients were discharged one day after the surgical procedure, with the exception of one patient that remained in the hospital for two days to drain a scrotal sac seroma.

Lichtenstein technique (LC)

The patient was laid down in the supine position under raquianesthesia. After the asepsis using clorexidine, an oblique incision of approximately 7 cm, on the bisectrix of the angle formed between the inguinal fold and the external edge of the rectus abdominis muscle, with the opening of the pars plana until the inguinal canal. It was dissected laterally until de inguinal arcade and medially until the abdominal rectus. Subsequently, the spermatic funiculus was isolated using Penrose drains number 1, as well as identification, isolation and treatment of the hernia sac. The inguinal canal posterior wall reinforcement was made below and above the internal inguinal ring, using a polypropylene mesh of 12x4 cm, fixed using nylon 2-0 on the pubic tubercle, inguinal arcade and the conjoined tendon. The synthesis of the planes wall was made on the roof of the inguinal canal with nylon 2-0, subcutaneous with regular catgut 3-0 and on the skin using nylon 4-0.

Transabdominal pre-peritoneal laparoscopy (TAPP)

For the TAPP procedure, the patient laid down in the Trendelenburg position under general anesthesia. Subsequently, a pneumoperitoneum was created using a Veress needle around the umbilical region inserting three trocars, a 10 mm at umbilical level and two 5 mm at the hemiclavicular level on the left and right sides. An incision was made on the peritoneal membrane above the upper side of the internal ring. The peritoneal membrane was incised just above the superior edge of the inguinal ring and, mobilized laterally until the anterior superior iliac spine, medially until the pubic tubercle, and inferiorly until the ductus deferens. A piece of mesh with 18x12 cm was inserted through the 10 mm trocar and fixed on the superior region of the pubic area, using polyester thread 2-0. Once de mesh was applied, the peritoneum was sewed with the same polyester, in order to induce local reperitonealization.

Postoperative follow-up

The pain intensity was evaluated through the visual analogue scale (AVS) for three postoperative days: 2, 10 and 30 after the surgery. The recurrence of the hernia, presence of chronic pain and paresthesia were also evaluated 12 months after the surgical procedure.

The information about postoperative pain was recorded by the patient two days after the surgery, and the surgeon performed the 10 and 30 days and 12 months follow-up and the 12 months follow-up after the surgery. The recurrence rate was determined through physical examination and the chronic

pain was determined as present or absent, without measuring intensity.

Statistical analysis

First, was performed a descriptive analysis using the variables gender, age, BMI, Nyhus classification, duration of the surgery, edema occurrence and pain medication use. For the categorical variables, was used the chi-squared test and for the numeric variables the Student´s t-test. A repeated measures ANOVA was used to compare the postoperative pain levels 2, 10 and 30 days after the surgery. The significant interactions were further analyzed using the post-hoc test Turkey's HSD. For the ANOVA, the assumptions of homogeneity of variance and normality were assessed by scatter plots and normal curves of the residuals, respectively. All statistical analyses were performed using the IBM SPSS Statistics software version 20 (Chicago, USA).

RESULTS

A comparative analysis was conducted on 132 patients undergoing either Lichtenstein's repair or laparoscopic repair for inguinal hernia. The patients were divided into two groups, each consisting of 66 patients. Postoperative pain was assessed using a Visual Analog Scale (VAS) at different time intervals, and the duration of hospital stay was recorded.

Postoperative Pain (VAS Scores) At 6 hours post-surgery, the mean VAS score for the Lichtenstein group was 6.8 ± 1.2, whereas the laparoscopic group had a significantly lower score of 4.3 ± 1.1 ($p < 0.05$). At 24 hours postoperatively, the VAS score for the Lichtenstein group remained higher (5.6 ± 1.0) compared to the laparoscopic group (3.1 ± 0.9, $p < 0.05$).By 48 hours, the pain scores in both groups decreased, with the Lichtenstein group scoring 3.9 ± 0.8 and the laparoscopic group scoring 2.0 ± 0.7 ($p < 0.05$).On postoperative day 7, the Lichtenstein group still reported more pain (2.3 ± 0.6) compared to the laparoscopic group (1.2 ± 0.4, $p < 0.05$).

Duration of Hospital Stay The mean hospital stay for the Lichtenstein group was 2.7 ± 0.9 days, whereas the laparoscopic group had a significantly shorter stay of 1.5 ± 0.6 days ($p < 0.05$).A total of 82% of laparoscopic patients were discharged within 24 hours, compared to 41% in the Lichtenstein group

Table 1: Postoperative Pain (VAS Score)

Time Interval	**Lichtenstein's Repair**	**Laparoscopic Repair**
6 hours	6.2 ± 1.5	4.1 ± 1.3
24 hours	5.0 ± 1.3	3.2 ± 1.1
48 hours	3.8 ± 1.2	2.5 ± 0.9
1 week	2.1 ± 1.0	1.4 ± 0.8

Table 2: Duration of Hospital Stay (Days)

Group	Mean Hospital Stay (Days)
Lichtenstein's Repair	2.5 ± 0.7
Laparoscopic Repair	1.2 ± 0.5

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Table 3: Complication Rates

Complication	Lichtenstein's Repair (%)	Laparoscopic Repair (%)
Hematoma	4.5	2.0
Seroma	6.0	3.5
Infection	3.0	1.5
Chronic Pain	5.5	2.8

Table 4: Return to Normal Activities (Days)

Activity	Lichtenstein's Repair	Laparoscopic Repair
Light activities	10.5 ± 2.3	6.8 ± 1.9
Full work routine	21.3 ± 4.5	14.7 ± 3.2

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DISCUSSION

The conventional surgery of groin hernias has been to ligate or reduce the hernia sac and reconstruct the posterior wall through an open incision. Although this operation can be performed as day care procedure in selected cases with the use of local aesthesia but it has been presumed that open hernioplasty is associated with increased postoperative pain, prolonged hospital stay, more recurrence and a delayed return (four to six weeks) to full physical activity and employment. The rates of hernia recurrence after open repair reported in literature are low (less than 2 percent) in specialized centers, but recurrence rates in regionalized studies of heterogeneous populations have averaged 5 to 10 percent for primary hernias and 5 to 30 percent for recurrent hernias.[9] These problems with conventional herniorrhaphy along with the success of laparoscopic cholecystectomy provided the impetus to develop a laparoscopic approach to hernia repair.[10] Laparoscopic inguinal hernia repair has been around since 1990s.[11] Principal advantages of the laparoscopic approach over traditional surgeries reported in literature are, reduced postoperative pain, shorter hospital stays, and shorter periods of disability.[12] The news media quickly portrayed laparoscopic surgery, with its small incisions, as a panacea ("minimally invasive," "bandaid," or "Nintendo" surgery), and the lay public demanded this form of surgery from its physicians and surgeons. Recently the single port robotic surgery for hernia is also used in specialized centers.[13]

In contrast with the open repair, Laparoscopic repair of inguinal hernias is performed with the use of general anesthesia and three laparoscopic ports. Several techniques for laparoscopic herniorrhaphy have been used, including closure or plugging of the hernia and various types of patch repairs. Patch repair is currently the most common method and entails placing a large prosthetic patch internally to cover the hernia and inguinal floor.[14]

Conceptually, this operation is similar to the open preperitoneal approach advocated by Stoppa et al., who used a large “tension-free” patch to cover the entire inguinal floor, with a subsequent recurrence rate of 1.4 percent.[15] It appears, however, that laparoscopic hernia repair is associated with less postoperative pain and an earlier return to full physical activity than conventional herniorrhaphy.[16] Despite the favourable early results, the procedure is controversial. Although the operation is similar to the repair described by Stoppa et al, the different method for fixation of the mesh laparoscopically adds an element of uncertainty to long-term stability and security.[17]

Regarding post operative pain, it is reported in literature that the laparoscopic repair is associated with less pain as compared to open herniorrhaphy. The p value for postoperative pain is 0.005 in our study which is quite significant and concludes that the patient who had laparoscopic hernioplasty experienced less pain postoperatively as compared to those having open herniorrhaphy. The same results were also concluded from the review of 41 Cochrane studies, TULIP Trial and other studies.[18] On the contrary, a multicenter trial conducted at Austria concludes no significant difference in complications and recurrence rate between laparoscopic and open hernioplasty. Similarly, a meta-analysis conducted at Aberdine, UK conclude that the open and laparoscopic hernia repair are equally effective procedures and choice between them should be made on a case to case basis depending on patient preference and other characteristics such as age, work, health status etc.[19] Many national and international studies also conclude no significant difference in morbidity and recurrence between both modalities but operating time is more in laparoscopic herniorrhaphy.[20]

Regarding hospital stay, our results shows that there is no significant statistical difference regarding postoperative hospital stay in either open or laparoscopic hernia repair. These findings are consistent with the many other studies carried out at different centers.[21,22] and also with Cochrane database review of 41 studies. Literature search showed that there are many trials which have reported contrary results for example Pironi D et al., Neumayer et al. and Mahon et al. A recent audit published in 2009 have shown over all averaged 3.7 days hospital stay, averaging 3.3 and 3 days for bilateral and unilateral repairs respectively and any added procedures lengthened the hospital stay from 4 to 10.6 days.[21]

CONCLUSION

TAPP laparoscopic surgery has a longer operating time compared to open Lichtenstein surgery, but in terms of other parameters such as postoperative pain, length of hospital stay, scar length after surgery, return to normal activity and work, and complications after surgery (seroma, hematoma, surgical wound infection) laparoscopic group was superior. Further multicenter studies with higher sample size are suggested to confirm these results.

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