TEP versus Lichtenstein, which one to choose? A retrospective cohort study

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INTRODUCTION

Inguinal hernia repair is one of the most common surgical procedures performed by general surgeons. The technique used for inguinal hernias has changed since the beginning of hernia repair, with the first hernia terminology defined in 1552 B.C. in Erb's papyrus¹. Many techniques have since been described for inguinal hernia repair, and many modifications have been applied to these techniques. After the invention of biocompatible synthetic meshes, new techniques such as Lichtenstein, offering tension-free hernioplasty with low rates of recurrence and high postoperative quality of life, became the
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ized techniques, and results were compared for the parameters that are currently debated.

METHODS

Patients who underwent hernia repair by two surgeons at the Gulhane Training and Research Hospital between January 2013 and April 2018 were included in the study. Both surgeons applied polypropylene-based meshes and fixed them with laparoscopic fixators as tacks, instead of intracorporal saturation. Data of the patients were collected retrospectively from hospital records, and postoperative long-term follow-up data were collected by telephone questionnaire. Our study is a retrospective cohort study that included follow-up results of 96 TEP and 90 Lichtenstein procedures, for a total of 186 patients who underwent hernioplasty. The mean follow-up duration was 21.93 months. Demographic data such as age and sex and data related to the type of the hernia, postoperative VAS score, conversion to the conventional technique, early postoperative complications, hospitalization duration, and type of surgery were obtained from hospital records. Long term follow-up parameters, including chronic pain, paresthesia, and relapse, were collected by telephone questionnaire and by radiological test results if needed. All data obtained were noted on patient sheets and were organized in Microsoft Excel 2010 (Redmond, Washington, U.S.). The independent variable in this study was the type of surgery (TEP or Lichtenstein), and the dependent variables were postoperative hospitalization duration, VAS score, chronical pain, paresthesia, relapse, and early postoperative complications. Data analysis was done using SPSS v.20 (New York, U.S.). Chi-square, Fisher’s exact, and Mann-Whitney U tests were used for statistical evaluation.

RESULTS

Our study compared only newly diagnosed inguinal hernias repaired with the TEP or Lichtenstein technique. No recurrent hernias were evaluated in our study. The 186 patients in the study had inguinal hernioplasty for direct, indirect, or combined inguinal hernia. None of the patients had femoral hernias. A total of 96 (51.6%) patients were operated with the TEP technique and 90 (48.4%) with the Lichtenstein conventional technique. None of the TEP operations were converted to Lichtenstein, so there was no con-
version to open hernioplasty. The mean follow-up duration was 21.93 (3-66) months. Ten (10.4%) patients from the TEP group and 9 (10.0%) from the Lichtenstein group, totaling 19 (10.2%) patients, underwent surgery for bilateral inguinal hernia. These patients were considered to have one hernia, and relapses or complications that occurred on one side or both sides were considered a relapse or complication.

The gender of the patients was analyzed; 171 (91.9%) were male, and 15 (8.1%) female. We found no statistically significant difference between the two groups in terms of gender (X²= .881, p=0.348).

The mean age of the patients was 48.7 (18.0-83.7) years. The mean age was 46.7 (18.0-80.3) years for the TEP group and 50.8 (19.9-83.7) for the Lichtenstein group. There was no statistical difference between the groups (p=0.1). Mean length of hospital stay was 2.0 days (1-7): 1.6 (1-5) days for the TEP group and 2.4 (1-7) for the Lichtenstein group. The difference between the two groups was statistically significant (p=0.0001). Patients were evaluated on the postoperative day 1 for the VAS score. The mean VAS score was 1.9 (1-5) for the TEP group and 2.3 (1-5) for the Lichtenstein group. The difference between the two groups was statistically significant (p=0.003) (Table 1).

Patients were evaluated for chronic pain, paresthesia, and relapse; 24 (12.9%) patients reported postoperative chronic pain of different severities, 9 (9.3%) from the TEP group and 15 (16.6%) from the Lichtenstein group. There was no statistically significant difference between groups (X²= 2.198, p=0.138). The two groups were evaluated for postoperative long-term paresthesia. A total of 19 (10.2%) patients had paresthesia, 6 (6.3%) from the TEP group, and 13 (14.4%) from the Lichtenstein group. There was no significant difference between the two groups (X²=3.40, p=0.065).

Total relapses were seen in 8 (4.30%) patients, 3 (3.13%) from the TEP group, and 5 (5.56%) from the Lichtenstein group. Relapses were confirmed with ultrasound, and there was no significant difference between the groups (Fisher exact test, p=0.48). Relapses were re-operated according to patient’s request by the same surgeon with the open technique.

Postoperative early complications (hematoma, seroma, and wound infection) were evaluated (Table 2). There were no significant differences between the two groups according to total postoperative complications (X²=0.334, p=0.563).

DISCUSSION

Inguinal hernia is one of the most common ailments treated by general surgeons. For this reason, determining the best hernioplasty technique affects many people. Recent consensus for inguinal hernioplasty is on a tension-free approach due to its low recurrence rates and better postoperative quality of life. Liechtenstein has been the gold standard for conventional tension-free hernioplasties for more than three decades. Because a minimally invasive surgical approach is the currently preferred approach for many operations, TEP is debated as the new gold standard for hernioplasty if expertise is available. As a result, comparing the conventional Liechtenstein technique with minimally invasive TEP is a vital topic.

A total of 186 patients, 96 with TEP and 90 with Liechtenstein, were compared for age and sex, and no statistically significant difference was found (p=0.1, p=0.34 respectively). The two groups were also similar in terms of the rate of bilateral hernioplasties (10%). As a result of these similarities, the two groups were suitable for comparison of the remaining parameters.

The two groups were compared for hospitalization duration, which was statistically significantly shorter in the TEP group than in the Lichtenstein group (p=0.0001). Short hospitalization duration may be an indicator of lower complication rates and enhanced recovery. Even though TEP is accepted as a higher-cost operation than Liechtenstein, enhanced recovery after TEP may decrease its cost. Further cost analysis should be done to reach a conclusion.

According to our results, postoperative early VAS scores were lower in the TEP group (p=0.003) (Table 1), as in the study by O’Reilly et al. This is also the probable reason for the statistically significant lower length of hospital stay in the TEP group. However,
the main debate in comparing open hernioplasty to laparoscopic hernioplasty is not early postoperative pain but chronic postoperative pain, which is one of the major complications of inguinal hernioplasty. Our study found lower chronic postoperative pain in the TEP group (9.3%) than in the Lichtenstein group (16.6%), as in many studies, but there was no statistically significant difference between the groups.

Manangi et al.¹ studied the reasons for postoperative pain after inguinal hernioplasty and found that preoperative pain is statistically strongly significant for the development of postoperative pain, which probably is related to the patient’s pain threshold level. The relationship of preserving or scarifying the regional sensory nerves at the operation site is a matter of debate for postoperative chronic pain. Some studies conclude that preserving or scarifying nerves increases chronic postoperative pain; for this reason, prophylactic neuroectomy and pragmatic neuroectomy are being debated, without any high-quality evidence⁴-⁷. This is a debate for neuropathic pain.

The incorporation of nerves with staples, sutures, or mesh is another major cause of neuropathic postoperative chronic pain. Ilioinguinal, iliohypogastric, genitofemoral, and lateral femoral cutaneous nerves are commonly involved. Somatic pain can also be the reason for postoperative pain. Reaction to the prosthetic mesh material, osteitis pubis, and tendon-muscle injuries during surgery may be the reason why somatic pain is more common than neuropathic pain⁴.

TEP has an advantage over Lichtenstein because it interferes less with the chronic pain etiologies discussed above. Because TEP is a posterior hernioplasty, the surgeon is unlikely to dissect regional sensory nerves. As a note, surgeons must be careful of the pain triangle during TEP. Also, staplers and sutures applied for mesh fixation in TEP can barely incorporate the nerves. Furthermore, because no primary repair to the hernia defect is applied through muscles and tendons, the incidence of somatic pain also decreases. All these factors also decrease the rate of early postoperative pain. However, we could not find a statistically significant difference between postoperative chronic pain with open and laparoscopic inguinal hernioplasty.

Laparoscopic posterior hernioplasty has the advantage of less muscle and tendon injury during dissection and lower incorporation of regional sensory nerves, which may result in less postoperative paresthesia. As our clinic routine, we give importance to preserving the local sensory nerves during Lichtenstein hernioplasty. We have a lower rate of postoperative paresthesia with TEP (6.3%) than with Lichtenstein (14.4%), but there was no statistically significant difference between the two groups (p=0.065). Douek et al.²¹ studied paresthesia in open vs. laparoscopic inguinal hernioplasty and found that 12 of 242 patients had paresthesia five years after hernioplasty, which decreases the quality of life of the patients. All patients with paresthesia underwent open hernioplasty, and they concluded that the laparoscopic approach is strongly related to lower rates of postoperative paresthesia. Our study confirms the findings of Douek et al., but unfortunately, we could not prove this statistically. Postoperative recurrence rates of both groups were in acceptable ranges, and there was no statistically significant difference between them (p=0.48) (Table 2). One of the largest systemic reviews on the topic by McCormack et al.²², with 7161 patients from 41 studies in 2003, found no statistically significant difference for postoperative hernia recurrence between open and laparoscopic hernioplasty approaches (p=0.16), as in this study. The laparoscopic approach had the same or lower recurrence rates compared with the Lichtenstein technique, which endorses the laparoscopic technique for becoming the gold standard.

### Table 2. Postoperative Complications per Hernioplasty Technique.

| Type of complication                  | TEP n (%) | Lichtenstein n (%) | Total n (%) | p-value |
|--------------------------------------|-----------|--------------------|-------------|---------|
| Chronical pain                       | 9 (%9.3)  | 15 (%16.6)        | 24 (%12.9)  | 0.138   |
| Long term paresthesia                | 6 (%6.25) | 13 (%14.44)       | 19 (%10.2)  | 0.065   |
| Relapse hernia                       | 3 (%3.13) | 5 (%5.56)         | 8 (%4.3)    | 0.48    |
| Postoperative early complications (Hematoma, seroma, wound infection) | 11 (%11.4) | 8 (%8.8)          | 19 (%10.2)  | 0.563   |

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RESUMO

OBJETIVOS: As técnicas de hernioplastia inguinal foram melhoradas desde a primeira hernioplastia. Técnicas livres de tensão que aplicam materiais de malha sintética, como na abordagem de Lichtenstein, são o padrão ouro. A hernioplastia laparoscÓpica é a alternativa mais forte ao Lichtenstein. A superioridade da hernioplastia laparoscÓpica sobre o Lichtenstein é um dos principais temas debatidos. Neste estudo, procuramos encontrar uma conclusão para esse debate comparando nossas experiências totalmente extraperitoneais (TEP) com as experiências de Lichtenstein.

MÉTODOS: Pacientes submetidos à hernioplastia inguinal no Gulhane Training and Research Hospital de 2013 a 2018 foram incluídos neste estudo de coorte retrospectivo. A amostra incluiu 96 pacientes TEP e 90 pacientes Lichtenstein para um total de 186 pacientes. As variáveis avaliadas foram tempo de internação, escore da escala analógica visual precoce no pós-operatório, dor crônica, parestesia, recidiva e complicações pós-operatórias precoces. Os dados foram coletados dos prontuários e do questionário por telefone, se necessário. A análise dos dados foi realizada pelo SPSS v20, utilizando os testes qui-quadrado, exato de Fisher e U de Mann-Whitney.

RESULTADOS: As razões homem/mulher foram semelhantes entre os grupos TEP e Lichtenstein. Não houve diferença na média de idade entre os grupos (p=0,1). A permanência hospitalar foi menor (p=0,1) e a escala visual analÓgica precoce foi menor no grupo TEP (p=0,003). Dor crônica, parestesia, recorrência e complicações pós-operatórias imediatas (hematoma, seroma, infecção da ferida) foram semelhantes.

CONCLUSÕES: O TEP é superior ao Lichtenstein, com menor tempo de internação e menores taxas de dor pós-operatória precoce. Nessuma diferença entre as duas técnicas foi encontrada para dor crônica. Acreditamos que a abordagem de hernioplastia laparoscÓpica pode ser a melhor técnica alternativa para correção de hérnia inguinal.

PALAVRAS-CHAVE: Herniorrafia. Laparoscopia. Hérnia inguinal/cirurgia.

RESUMEN

OBJETIVOS: Las técnicas de hernioplastia inguinal mejoradas desde la primera hernioplastia. Técnicas libres de tensión que aplican materiales de malha sintética, como en la abordaje de Lichtenstein, son el estándar oro. La hernioplastia laparoscópica es la alternativa más fuerte a Lichtenstein. La superioridad de la hernioplastia laparoscópica sobre Lichtenstein es uno de los principales temas debatidos. En este estudio, buscamos encontrar una conclusión para este debate comparando nuestras experiencias totalmente extraperitoneales (TEP) con las experiencias de Lichtenstein.

MÉTODOS: Los pacientes sometidos a hernioplastia inguinal en el Hospital Gulhane Training and Research de 2013 a 2018 fueron incluidos en este estudio de cohort retrospectivo. La muestra incluyó 96 pacientes TEP y 90 pacientes Lichtenstein para un total de 186 pacientes. Las variables evaluadas fueron tiempo de internación, escala visual analógica precoz en el postoperatorio, dolor crónico, parestesia, recurrencia y complicaciones pós-operativas precoces. Los datos se recogieron de los expedientes y el cuestionario telefónico, si fuese necesario. La análisis de los datos fue realizada con el SPSS v20, utilizando los test de chi cuadrado, exacto de Fisher y U de Mann-Whitney.

RESULTADOS: La razón hombre/mujer fue similar entre los grupos TEP y Lichtenstein. No hubo diferencia en la media de edad entre los grupos (p=0,1). La permanencia hospitalaria fue menor (p=0,1) y la escala visual analógica precoz fue menor en el grupo TEP (p=0,003). Dolor crónico, parestesia, recurrencia y complicaciones póst-operatorias inmediatas (hematema, seroma, infección de la herida) fueron similares.

CONCLUSIONES: El TEP es superior a Lichtenstein, con menor tiempo de internación y menores tasas de dolor póst-operatorio precoz. No hubo diferencia entre las dos técnicas para dolor crónico. Creemos que la abordaje de hernioplastia laparoscópica puede ser una técnica alternativa para corrección de hernia inguinal.

PALABRAS-CHAVE: Herniorrafía. Laparoscopia. Hernia inguinal/cirugía.

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