

Comparative postoperative outcomes between open and minimally invasive approaches in patients undergoing inguinal hernia surgery at a teaching hospital.

Resultado comparativo del postoperatorios entre abordaje abierto y mínimamente invasivo en pacientes operados de Hernia Inguinal en un Hospital Escuela.

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ABSTRACT

Introduction: Inguinal hernia, a global health challenge, significantly affects the population. This comparative study between the Lichtenstein and TAPP laparoscopy techniques at the Sonora State General Hospital sought to analyze postoperative results. **Objective:** Compare postsurgical results between patients intervened by Lichtenstein technique hernioplasty and TAPP handling. **Materials and Methods:** Observational and transversal, 78 patients (49 Lichtenstein, 29 TAPP). Data recollected from January 2020 to December 2022. Statistical analysis with U-Mann Whitney and Fisher-Freeman-Halton tests. **Results:** No significant difference in surgical time. Increased pain in Lichtenstein ($p=0.0344$). Average in-patient stay of 1.7 days. 3.8% recurrence, more in Lichtenstein (4.1% vs. 3.4%). No significant difference between complications, although its distribution was associated with the used technique ($p=0.025$). **Conclusion:** Both techniques are effective, although the choice could affect the complication profile and specific postoperative pain. These results offer relevant information for decision-taking regarding inguinal hernia repair, highlighting the importance of considering the hernia type when choosing a surgical technique.

Key words: Inguinal Hernia, Lichtenstein technique, TAPP laparoscopic.

RESUMEN

Introducción: La hernia inguinal, un desafío global de salud, afecta significativamente a la población. Este estudio comparativo entre las técnicas de Lichtenstein y laparoscópica TAPP en el Hospital General del Estado de Sonora buscó analizar resultados postoperatorios. **Objetivo:** Comparar los resultados post quirúrgicos entre pacientes intervenidos de hernioplastia técnica Lichtenstein con abordaje TAPP. **Material y Métodos:** Observacional y transversal, 78 pacientes (49 Lichtenstein, 29 TAPP). Datos recolectados de enero de 2020 a diciembre de 2022. Análisis estadístico con pruebas U-Mann Whitney y Fisher-Freeman-Halton. **Resultados:** Sin diferencia significativa en tiempo quirúrgico. Mayor dolor en Lichtenstein ($p=0,0344$). Estancia hospitalaria promedio de 1,7 días. Recurrencia del 3,8%, más en Lichtenstein (4,1% vs. 3,4%). Complicaciones no difirieron significativamente, pero su distribución sí se asoció con la técnica utilizada ($p=0,025$). **Conclusión:** Ambas técnicas son efectivas, pero la

elección podría afectar el perfil de complicaciones y el dolor postoperatorio específico. Estos resultados ofrecen información relevante para la toma de decisiones en la reparación de hernias inguinales, destacando la importancia de considerar el tipo de hernia al seleccionar la técnica quirúrgica.

Palabras clave: Técnica de Lichtenstein, Laparoscópica TAPP, Hernia Inguinal.

INTRODUCTION

The inguinal hernia, a public health problem which constitutes a global challenge and affects the population significantly both in Mexico and the rest of the world. ⁽¹⁾ This abdominal wall problem not only impacts public health significantly, affecting 10-15% of the general population, it also carries major social and work performance repercussions, affecting up to 25% of the economically active population. ⁽²⁾

With close to 75% of abdominal wall hernias being located on the groin, and indirect inguinal hernia being the most common subtype in both sexes, more than 20 million inguinal hernia (IH) repairs are annually performed at a global level. Although most hernias are asymptomatic, its surgical treatment, mostly successful, may present recurrences (10-15%) which require reoperation and generate chronic inconvenience for over three months (10-12%).

IH incidence is more predominant in men, with a 3-4:1 ratio regarding women, being more frequent during the patients' productive stage, particularly between 30 and 59 years old, ages in which 40% and 55% of all hernias present themselves. Incarceration, with a frequency between 7% and 30%, represents the main complication, of which approximately 10% evolves towards strangement. ⁽³⁾

After the introduction of surgical repair without tension using a prosthetic mesh, recurrence rates were informed to

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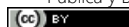
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be less than 5%, significantly improving the patients comfort in comparison to tradition repairs which produce tension⁽⁴⁾. Despite conventional open repair techniques, minimum-access laparoscopic surgery has become the preference for some. The ideal surgical technique is that which is easily reproducible with scarce recurrence rates and minimal morbidity, that allows a postoperative with few complications and duration, and doesn't require high economic costs.⁽⁵⁾

Although laparoscopic repair has proven to be superior regarding postoperative convalescence, anterior open procedure without tension is still the most used method.⁽⁶⁾ However, the debate regarding handling way persists, estimating that only 8% of hernioplasties in Latin America are performed through laparoscopic handling.⁽⁷⁾

At Sonora State General Hospital, between 50 to 100 hernioplasties are performed yearly, engaging elective as well urgent cases, using mostly conventional Lichtenstein and laparoscopic TAPP (transabdominal preperitoneal) techniques. In view of this, the main question of this study arises: What are the postoperative results of inguinal plasty through Lichtenstein vs. TAPP techniques? In order to identify the different inguinal hernioplasty's results between Lichtenstein (TL) and Transabdominal preperitoneal through laparoscopic (TAPP) technique.

MATERIALS AND METHODS

The performed study is observational, transversal on 78 patients with inguinal hernia surgery history through TL and TAPP, performed by general surgery residents under attached general surgeons' supervision. The contemplated defects for the study were only unilateral hernias, thus including, patients with direct and indirect hernias with a recurrence rate within the first ninety days. The study was performed at the Sonora State General Hospital during the January 2020 to December 2022 period.

During data recollection data bases from the Information Technology department were used: name, age, performed surgery and number of files, digital clinical file: postsurgical note, nurse form, analogical pain visual scale, external consultation notes.

Patients operated for inguinal hernia through other techniques, not done on the inguinal region, or where surgery starts through laparoscopic way and becomes open technique were excluded.

The data base was extracted from January 2020 to December 2022 in an Excel® form sheet considering the study's variables: surgical time, postsurgical pain, postsurgical complication, in-patient stay, surgical handling type (TL or TAPP).

Upon receiving authorization for the investigation's protocol and authorization for access to the Hospital Information System's data base, central tendency measures, T-student test, and Fisher-Freeman-Halton test were employed. Data was recollect-ed, analyzed, and used through the JMP statistical software.

RESULTS

In this study a total of 78 surgeries during the 2020 to 2022 period were analyzed. The distribution according to employed surgical technique were of 49 patients through open plasty with TL, and 29 through TAPP technique with minimally invasive handling. 26 were excluded due to lack of follow-up or incomplete documents.

The hernia type found were indirect defects in 60 occasions, mixed in 10 occasions, direct in 7, and only one in femoral. Re-

garding surgical time, the average for both groups was 120 minutes, the average for TL was 135 min (± 63.4 min) and 140min for TAPP (± 50.3 min). With the goal of discarding independence between surgical technique and time Mann-Whitney's U was used and a statistical significance of $p=0.711$ was obtained, we infer that no association between surgical time and technique exists.

EVA's scale was analyzed for 67 patients' pain reporting mild postsurgical pain, 11 moderate pain (*see Table 1*) the most patients with moderate pain was TL. Fisher-Freeman's test was performed, this finding proves statistically significant with $p=0.0344$. Relationship between postoperative pain and hernia type was analyzed, obtained results indicate that both variables are independent amongst each other with $p=0.103$ obtained through the Fisher-Freeman-Halton (*see Table 2*).

Average in-patient was of 1.7 days (± 0.55), proving an efficacy in patient recovery.

Seven of the patients experienced complications, distributed among 4 cases with TL and 3 with TAPP: the exact Fisher test didn't reveal significant statistics ($p=0.7721$), suggesting independence between the performed technique and complications' incidence. (*see Table 3*)

Table 1. Postsurgical pain regarding surgical technique. n=78

Pain	Surgical Technique		Total
	Lichtenstein	TAPP	
Mild	39	28	67 (85.9%)
Moderate	10	1	11 (14.1%)
Total	49	29	78

Table 2. Postsurgical pain regarding hernia type. n=78

Pain	Hernia Type				Total
	Direct	Indirect	Femoral	Mixed	
Mild	6	52	1	8	67 (85.9%)
Moderate	1	8	0	2	11 (14.1%)
Total	7	60	1	10	78

Table 3. Complication type regarding surgical technique. n=78

Pain	Surgical Technique		Total
	Lichtenstein	TAPP	
No complications	45	26	71 (91%)
Complication total	4	3	7 (9%)
Hematoma	0	1	1
Recurrence	2	1	3
Orchitis	0	1	1
Hydrocele	1	0	1
Deferent section	1	0	1
Total	49	29	78

Recurrence was the most frequent complication observed, especially in patients submitted to open surgery (TL). This study yielded a recurrence rate of 3.8%, distributed in 4.1% for TL and 3.4% for TAPP.

Other documented complications with this technique were hydrocele and deferent section. On the other hand, with TAPP technique, the registered complications include hematoma and orchitis, each presenting itself once. The distribution's analysis of these complications through the Fisher-Freeman-Halton test

revealed significant statistics ($p=0.025$), suggesting that the complication type is influenced by the employed surgical technique.

Complications related with different types of hernia were distributed, with a larger number of patients suffering indirect defects (see Table 4), although this difference didn't reach statistical significance according to the Fisher-Freeman-Halton ($p=0.189$).

After evaluating the complications' distribution according to the hernia type, as it was observed that recurrence, the most frequent complication, predominantly presented itself in patients with indirect defects. Furthermore, other complications such as deferent section, hematoma and orchitis were also registered in this type of hernia (see Table 4).

Table 4. Complication presence regarding hernia type. $n=78$

Complication	Hernia Type				Total
	Direct	Indirect	Femoral	Mixed	
No complication	7	54	1	9	71 (91%)
With complication	0	6	0	1	7 (9%)
Total	7	60	1	10	78

As for the hernia type, the most common one was the indirect one in 76.9% of procedures, with 62.85% for Lichtenstein technique and 37% for TAPP technique. These findings match the observed tendency by Medina and cols⁽⁹⁾, affirming the distribution consistence of hernia types between studies.

This study offers detailed information regarding diverse variables related with inguinal hernia surgery, highlighting the independence between surgical technique and time, the significant association between open technique and moderate pain, and the lack of significant association between postoperative pain and the hernia type. The lack of significant statistics in the comparisons suggests that Lichtenstein and TAPP techniques may be equally effective and safe for inguinal hernia repairment.

DISCUSSION

The study included 78 files with a predominance of male patients (65 men and 13 women). The most used techniques were the open plasty with TL in 49 patients and TAPP technique with minimum invasion in 29. This finding is coherent with the literature which shows an increased inguinal hernia incidence in men.

The average surgical time didn't show significant differences among TL and TAPP, indicating that, despite variations, both are efficiently viable in terms of duration. Although results contrast with Bernal Gómez and cols' study in 2014,⁽¹⁰⁾ this may be due to the patients' different cohorts and the study's specific conditions.

The average hospital stay was 1.7 days which matches with an effective recovery process. Although the complications' proportions were apparently increased for the TAPP technique, the exact Fisher test didn't reveal statistical significance.

As for postoperative pain, it was observed that TL had a greater patient proportion with moderate pain, being statistically significant. These findings are consistent with Sultan and cols' study in 2022,⁽¹¹⁾ which recorded lesser postoperative pain during TAPP fixing in comparison to TL. However, significant association between postoperative pain and hernia type was not found.

Regarding recurrence, Yang B and cols in 2018,⁽⁸⁾ reported a rate of 6.5% for TL and 1.7% for TAPP, compared to our study which yielded a global recurrence rate of 3.8%, divided into groups of 4.1% and 3.8% respectively.

Complications vary between the hernia type, being more frequent in indirect defects, although with no statistical significance. These findings match Medina and cols' study in 2021.⁽⁹⁾ However, the complications' distribution type were significantly dependent on the employed surgical technique, indicating that the technique of choice can influence the complication profile.

After evaluating the complications according to the hernia type, a significant dependency was found. Recurrence was the most frequent complication, especially in indirect defects. This finding is relevant for surgical planning and suggests the need to consider the hernia type when choosing a technique.

One of the biases of the present study is that clinical characteristics of the patients were not studied which could defer in TL and TAPP groups.

CONCLUSIONS

This study shows the difference between TL and TAPP inguinal hernia repair. Although both techniques yield similar results in terms of surgical time and general complications, the chosen technique can influence the specific complications and postoperative pain intensity. It's necessary to provide a treatment that offers results with the least number of complications, and that reduces the reintervention risk⁽¹²⁾, despite that at a global level the minimally invasive techniques' superiority has been proven and the need of a better learning curve can condition these results considering that they were obtained in a teaching hospital, we deem that these results exhort this type of unit an early immersion for residents to minimally invasive surgery.

Conflict of interest

Authors declare no conflict of interests.

Ethical considerations

The data was treated with confidentiality, equality and justice, respecting Helsinki's principles.

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Author's contribution

All authors contributed equally to the article's production.

REFERENCES

1. Brunnicardi FC, Schwartz M. Principios de Cirugía. 10a ed. Nueva York, NY, Estados Unidos de América: McGraw-Hill Professional Publishing; 2015.
2. Mayagoitia González JC, Cisneros Muñoz HA. Consensos y guías de práctica clínica para hernias de pared abdominal. Asociación Mexicana de Hernias; 2015.
3. Eyvaz Kemal, Gokceimam Mehmet. Emergency presentation of abdominal wall hernias: Factors affecting resections and surgical-site complications in complex acute scenarios. *Cir. cir.* . 2022; 90(4): 447-453.
4. Memon GA, Shah SKA, Habib-Ur-Rehman. An experience with mesh versus darn repair in inguinal hernias. *Pak J Med Sci.* 2017 ;33(3):699-702. doi: 10.12669/pjms.333.13257
5. Bellido Luque A. Hernia Inguinal: Cirugía abierta vs. Cirugía Laparoscópica. *Cir Andal.* 2018; 29(2), 104-105.
6. Arias CL, Kleinfinger MS. Reperación Hernia inguinal laparoscópica con uso de materiales autoexpandibles. *Rev Mex Cir Endoscop.* 2011; 12(2): 54-57.
7. Chávez Peón Pérez F, Rodríguez Arias JI, Barrientos Fortes T. Metaanálisis comparativo de hernioplastia inguinal TAPP vs Lichtenstein. *Acta méd. Grupo Ángeles.* 2020 ; 18(4): 373-381.
8. Yang B, Zhou S, Li Y, Tan J, Chen S, Han F. A Comparison of Outcomes between Lichtenstein and Laparoscopic Transabdominal Preperitoneal Hernioplasty for Recurrent Inguinal Hernia. *The American Surgeon*TM. 2018;84(11):1774-1780. doi:10.1177/000313481808401134
9. Medina P, Fernández Alberti J, Iriarte F, Porto E, Pirchi D. Hernias inguinoescrotales: diferencias entre plásticas laparoscópicas y convencionales con seguimiento a largo plazo. *Rev Hispanoam Hernia.* 2021;9(1):4-9
10. Bernal Gómez R, Sagüi de la Fuente L, Olivares Ontiveros O. Plastia inguinal tipo Lichtenstein versus reparación inguinal laparoscópica TAPP. Ensayo clínico abierto. *Cir. gen.* 2014; 36(1): 9-14.
11. Sultan AA, Abo Elazm HA, Omran H. Lichtenstein versus transabdominal preperitoneal (TAPP) inguinal hernia repair for unilateral non recurrent hernia: A multicenter short term randomized comparative study of clinical outcomes. *Ann Med Surg (Lond).* 2022 Mar 18;76:103428. doi: 10.1016/j.amsu.2022.103428.
12. Avilez-Arias JM, Castillo-Ortega G. ESWEP score, aplicación global: un estudio retrospectivo. *Cir. parag.* 2023; 47(2): 13-19.