

Review Article

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Chronic Pain after Laparoscopic Transabdominal Preperitoneal Inguinal Hernia Repair

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ABSTRACT

Introduction: Chronic pain, defined as pain persisting for more than 3 months after inguinal hernia surgery, poses a significant challenge in postoperative management. This study compares outcomes, including chronic inguinal pain, pain levels before and after surgery, and hernia recurrence rates, among patients undergoing mesh fixation using tacker, histoacryl glue, or no mesh fixation in the context of Transabdominal Preperitoneal (TAPP) hernioplasty.

Methods: A prospective, double-blinded, two-site study was conducted on patients undergoing TAPP hernioplasty. The study included 59 male patients aged 26 to 76 years who underwent 85 hernioplasties using the TAPP technique. Postoperative pain intensity was assessed using the Carolinas Comfort Scale (CCS). **Results:** Patients were followed up at 3, 12, and 24 months postoperatively. Chronic pain was present in 10.6% of patients at 3 months, 4.8% at 12 months, and 2.4% at 24 months post-surgery.

Conclusion: Our findings suggest that the type of mesh fixation does not significantly impact the risk of chronic postoperative pain. Additionally, we observed no significant difference in pain scores pre- and postoperatively. Further studies may be warranted to explore optimal mesh fixation techniques in TAPP hernioplasty.

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Chronic groin pain, persisting for more than 3 months after inguinal hernia surgery, poses a significant challenge in postoperative management. Symptoms may include pain, burning sensation, and discomfort in the surgical area, along with complications such as pain during sexual intercourse or in the testicles. Treatments typically involve pain medications, nerve blocks, nerve ablation, or peripheral nerve field stimulation. Surgical intervention, either through open incision or laparoscopically, may be considered after thorough consultation and examination by a surgeon. Depending on the nature of the groin pain, some patients may benefit from neurectomy.

This study aims to compare postoperative chronic pain among different methods of mesh fixation in TAPP hernioplasty, as well as assess the association between pain before and after surgery and hernia recurrence rates.

Patients and Methods

The study was conducted as a prospective, double-blinded, two-site study involving patients undergoing transabdominal preperitoneal (TAPP) hernioplasty. The research took place at the Department of abdominal surgery in general hospital Celje and General Hospital Slovenj Gradec between January 2015 and May 2016.

Participants

A total of 59 male patients, aged between 26 to 76 years, underwent 85 hernioplasties using the TAPP technique. Patients' details were anonymized and assigned a study number to maintain confidentiality. Written consent was obtained from all participants. The aim of the study was to compare outcomes regarding postoperative chronic inguinal pain and hernia recurrence rates among three different methods for mesh fixation in TAPP hernioplasty.

Follow-up

Participants were followed up at 3, 12, and 24 months postoperatively. Chronic postoperative pain was assessed using the Carolinas Comfort Scale (CCS). Pain intensity was evaluated on a scale from 0 to 5 across various activities, including lying down, bending, sitting, daily activities, coughing or deep breathing, walking or standing, climbing stairs, and exercising. Surgeons who performed the operations did not conduct any follow-up after surgery. Instead, a researcher of the study was responsible for follow-up assessments.

Ethical Considerations

Written consent was obtained from all participants prior to their inclusion in the study. The research adhered to ethical guidelines for medical research involving human subjects. This study design ensured a rigorous and systematic investigation of the effectiveness of different mesh fixation methods in TAPP hernioplasty, while

prioritizing patient confidentiality and ethical considerations.

Pain Analysis

We assessed pain with Carolinas comfort scale which includes the following variables average sensitivity of mesh and average pain between the type of fixation:

- Lying down
- Bending over
- Sitting up
- Daily living activities
- Coughing or deep breathing
- Walking
- Walking up the stairs
- Exercising

Statistical Analysis

Variables were compared using Chi-square test, Fisher's t-exact test, Pearson correlation, Student's t test, ANOVA with Games-Howellov posthoc. The analysis was performed with SPSS version 22 (IBM corporation, USA). P-value of <0.05 was considered statistically significant

Results

The median age of the patients in our study was 52.4 years, with an age range of 26 to 76 years. Our analysis revealed no significant difference in the average sensitivity of mesh and average pain between different types of fixation methods across various activities, including lying, sitting, bending, everyday activities, coughing or deep breathing, walking, standing, climbing stairs, or exercising.

We compared the degree of pain pre and postoperatively at 3, 12 and 24 months. Chronic pain was present in 10.6% of patients 3 months after surgery. (Figure 1). Twelve months after surgery was present in 4.8% and 24 months after surgery in 2.4% of the patients (Figure 2).

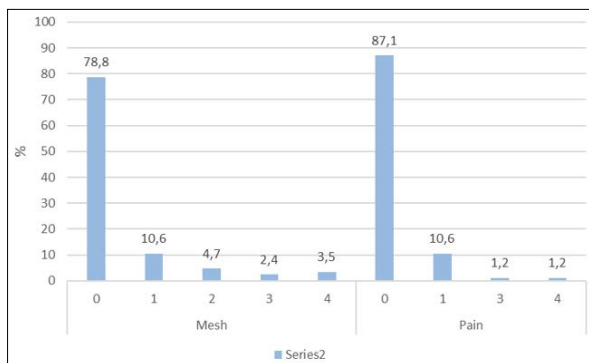


Figure 1: Pain after 3 Months

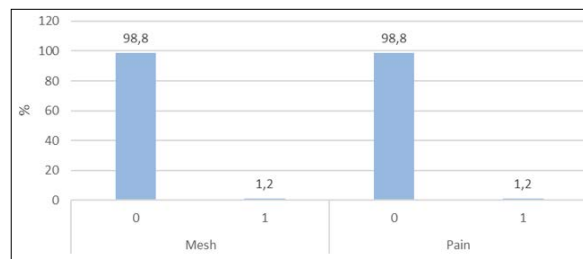


Figure 2: Pain after 24 Months

However, a statistically significant difference was observed in mesh sensitivity during everyday activities ($p = 0.021$). Post hoc analysis indicated that there was higher mesh sensitivity when using tacker mesh fixation compared to fixation with glue ($p = 0.022$).

These findings suggest that while overall pain levels may not differ significantly between fixation methods, there may be variations in mesh sensitivity during specific activities, particularly during everyday activities. Further research is warranted to explore the underlying mechanisms and implications of these differences.

Comparison of Pre-To Postoperative Pain

We compared the degree of pain pre and postoperatively at 3, 12 and 24 months. Our results showed that preoperative pain is correlated linearly to postoperative pain at 12 months and 24 months, however there is weak correlation (Table 1,2,3). We also assessed the correlation of postoperative pain to laterality of hernia occurrence- right to left. (Table 4,5). There was no statistical significant difference in average pain scores depending on laterality-left or right (Figure 3,4,5)

Table 1: Pain before Operation

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
B pred op	85	0	5	1.71	1.549

Mean value of pain before operation is $1,71 \pm 1,55$

Table 2: Pain before Operation

Bolečina before operation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	31	36,5	36,5	36,5
	1	6	7,1	7,1	43,5
	2	21	24,7	24,7	68,2
	3	13	15,3	15,3	83,5
	4	12	14,1	14,1	97,6
	5	2	2,4	2,4	100,0
	Total	85	100,0	100,0	

Table 3: Correlation Matrix of Pain Sensation

Correlation					
		Pain before operaton	Pain after 3 months	Pain after 12 months	Pain after 24 mounths
Pain before operation	Pearson Correlation	1	.191	.234*	.227*
	Sig. (2-tailed)		.080	.034	.041
	N	85	85	83	82
Pain after 3 months	Pearson Correlation	.191	1	.204	.168
	Sig. (2-tailed)	.080		.064	.131
	N	85	85	83	82
Paind after 12 months	Pearson Correlation	.234*	.204	1	.676**
	Sig. (2-tailed)	.034	.064		.000
	N	83	83	83	82
	Pearson Correlation	.227*	.168	.676**	1
	Sig. (2-tailed)	.041	.131	.000	
	N	82	82	82	82

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).

Table 4: Average Pain before operation to Laterality of Hernia Occurrence- Right to Rleft

Group Statistics					
	pozicija	N	Mean	Std. Deviation	Std. Error Mean
Bolečina pred operacijo	HID	48	1.69	1.600	.231
	HIS	37	1.73	1.503	.247

Table 5: Age Matrixcorrelation

Correlations									
		age	B pred op	Pain 3m	Sensitiv 3m	Pain 12m	Sensitiv 12m	Pain 24m	Sensitiv 24m
age	Pearson Correlation	1	-.049	.197	.177	-.100	-.060	-.125	-.130
	Sig. (2-tailed)		.658	.070	.105	.369	.590	.263	.246
	N	85	85	85	85	83	83	82	82

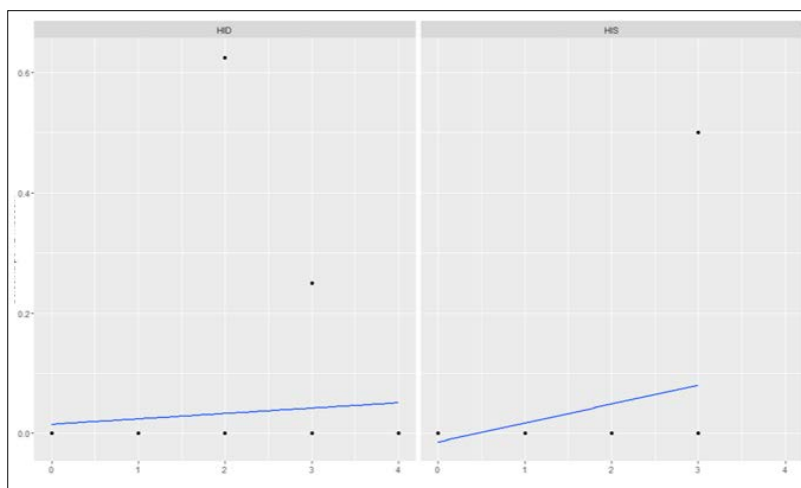


Figure 3: Linear Correlation Pain (before and 12 months after Operation) Right-Left Hernia

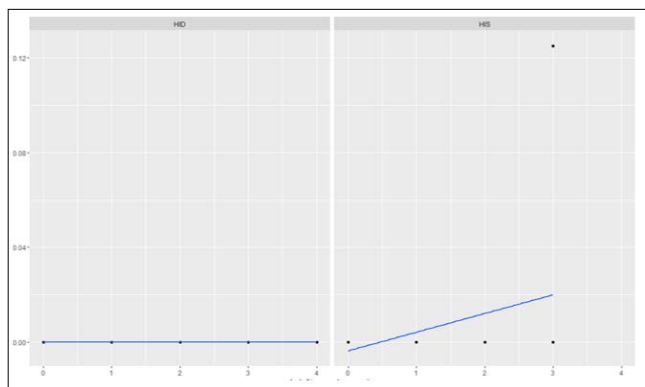


Figure 4: Linear Pain Correlation (before and 24 months after op.) According to the Position of the Hernia

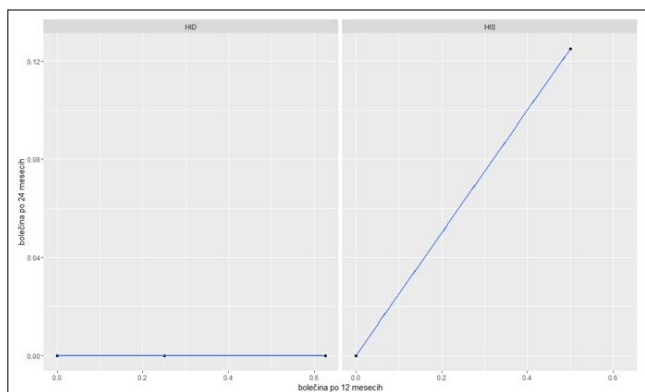


Figure 5: Linear Pain Correlation (12 months in 24 months after op.) According to the Position of the Hernia

Discussion

Our study aimed to investigate the impact of different mesh fixation techniques on postoperative outcomes in laparoscopic inguinal hernia repair. Contrary to our initial hypothesis, our results did not demonstrate higher postoperative pain in the group where the mesh was tacker fixed. Additionally, we found that glue mesh fixation did not increase the risk of hernia recurrence and appeared to reduce the likelihood of developing chronic groin pain.

Our findings diverge from those of Sajid et al, who reported low rates of chronic pain with glue fixation in retrospective studies [1]. However, it's important to note that our study utilized the TAPP technique, while Sajid et al. focused on the TEP approach. Moreover, our study suggests that the type of mesh used may play a role in chronic pain outcomes, with lightweight-macroporous mesh associated with less chronic pain. This contrasts with the findings of Sajid et al., who reported no significant difference between lightweight and heavyweight mesh.

Furthermore, our study found no significant difference in pain scores pre- and postoperatively between patients with left and right-sided hernia occurrence. This aligns with previous studies reporting a decrease in chronic groin pain prevalence over time, with rates as low as 4.69% for laparoscopic repairs at 1-2 years post-op. Our study reported a lower recurrence rate of 2.4% at 2 years post-op for TAPP repairs [2].

Regarding the comparison between TAPP and TEP techniques, our study suggests that TAPP may be associated with a higher incidence of early postoperative pain, longer operative time, and cord edema, whereas TEP may be linked to a higher incidence

of seroma formation. However, further investigation is needed to fully understand the differences between these techniques and their impact on postoperative outcomes.

In conclusion, our study provides valuable insights into the role of mesh fixation techniques and surgical approaches in laparoscopic inguinal hernia repair. While glue mesh fixation appears to be a promising alternative to tacker fixation, further research is warranted to optimize surgical techniques and minimize postoperative complications [3-13].

Conclusion

Our study suggests that the type of mesh fixation does not significantly affect the risk of chronic postoperative pain or hernia recurrence. However, the site of mesh fixation may play a role in postoperative pain outcomes. Further investigation is warranted to determine the most effective mesh fixation technique in TAPP hernioplasty.

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