

Assessment of inguinodynia between Lichtenstein's tension free mesh hernioplasty and laparoscopic mesh hernioplasty

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Introduction

Inguinodynia is one of the very commonly seen complications post hernioplasty. Recurrent inguinal hernia, has now been replaced by inguinodynia as the primary complication post herniorrhaphy, a common yet an under-reported problem [1,2,3].

Inguinodynia is defined as chronic groin pain for more than 3 months post inguinal hernioplasty [3],[4]. Another school of thought says, inguinodynia has no universally accepted definition, etiology, classification or surgical treatment except triple neurectomy [5].

Anatomic variation and cross innervation of the inguinal nerves in the retroperitoneum and inguinal canal make selective neurectomy unreliable [6]. Hence, there is a need to prevent this common and under-reported complication [6]. Some reports say that laparoscopy is better than open approach, though controversial [3]. This gives an idea of the extensive grey area in prevention and management of inguinodynia. This study compared open and laparoscopic approach based on incidence and severity of inguinodynia.

Inguinodynia is independent of the method of repair. Swedish hernia registry reports post herniorrhaphy chronic pain ranging from 6%-8% and even 10%, affecting activities of daily living in 2%-4% [5, 3].

Materials and methods

A prospective, observational, comparative parallel group study was carried out in patients who underwent mesh hernioplasty – open or laparoscopic. One group comprised of patients who underwent Lichtenstein's tension free mesh hernioplasty and the other group comprised of patients who underwent laparoscopic mesh hernioplasty (TEP and TAPP). Information of the type of repair was collected from the elective OT register of Nilratan Sircar Medical College and

Hospital. Each group had 35 patients (sample size calculation as follows). Patients were alternately assigned to open hernia repair (Lichtenstein's tension free inguinal mesh hernioplasty) group and laparoscopic group (TEP or TAPP).

The patients were operated by experienced surgeons. In this study, experienced surgeons were regarded as those who had operated 25 or more cases of inguinal hernia laparoscopically and 25 or more cases by open methods individually without any supervision. The operating surgeons in both the groups were same and included the 6 unit chiefs of the 6 units under the Department of General Surgery, Nilratan Sircar Medical College and Hospital.

The patients were followed up, 3 months and 6 months after surgery.

The severity and disability of inguinodynia were assessed by Visual Analog Scale (VAS) Score and Oswestry Disability Index (ODI), respectively [7].

Those who presented with pain post-hernioplasty lasting for more than 3 months, prevalence of inguinodynia post repair was determined. Thus, based on the prevalence and severity, we concluded, regarding which procedure caused less inguinodynia, such that, improvisation on the same, may completely eliminate inguinodynia.

Design of study

This was a prospective comparative study, where patients with inguinal hernia were admitted in the elective ward of the Department of General Surgery and the details were collected for filling the proforma from the operation records.

Study population: In-patients operated for inguinal hernia

Period of study: February 2021-January 2022

Follow-up period: 3 and 6 months after surgery

Sampling method: Purposive

Sampling size:

Calculation of sample size –

Sample size (s) = $\frac{3.96 \times P \times Q}{L^2}$

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*Where P = prevalence of inguinodynia in Lichtenstein's tension free mesh

hernioplasty $Q = 100 - P$

L = absolute allowable error : 10%

Sample size (S) = $3.96 \times 0.095 \times 0.905$

0.1×0.1

$P = 0.095$ [8], $Q = 0.905$

= 34 (approx.)

*Minimum sample size of Lichtenstein's tension free mesh hernioplasty = 34 Hence, 35 patients in each group was the sample size for a 1:1 comparison.

Case: Each patient served as a case who was checked upon 3 months and 6 months after surgery to enquire all about inguinodynia.

Inclusion criteria-

Uncomplicated inguinal hernia.

Age: >16 years

Exclusion criteria-

Recurrent inguinal hernia

Obstructed or strangulated hernia

Age: <16 years

Patients with previous history of inguinal pain or pelvic pain

Study variables: Dependent variables: Prevalence and severity of inguinodynia

Independent variables: Age, Sex, Type, size of inguinal hernia

Data collection: In spreadsheet, from the information collected in proforma.

Study tools: Study proforma (Appendix 1).

Visual Analog Scale Score (Appendix 2) [9]. Oswestry Disability Index (Appendix 3) [9],[7].

Analysis: Spreadsheet analysed and presented as tables and graphs.

Results

Inguinodynia was compared between laparoscopic and Lichtenstein's tension-free mesh hernioplasty. In the present study, we found that the mean (SD) age of the patients among group 1 (laparoscopic inguinal mesh hernioplasty) was 56.11 (8.53) years and among group 2 (Lichtenstein's tension free mesh hernioplasty) was 55.83 (8.7) years. Among both the groups, majority of the subjects were in the group of 46-55 years (not statistically significant). COPD was the commonest precipitating factor of inguinal hernia (commonest co-morbidity) followed by constipation in both.

Smokers in group 1 and non-smokers in group 2 were majority. No statistically significant association was found based on history of previous abdominal surgeries. Majority of the patients were pre-obese in both groups.

In this study, inguinodynia was a common occurrence in both open (Lichtenstein's) and laparoscopic (TEP and TAPP) mesh hernioplasty for inguinal hernia. The present study found that Group 2 patients (open hernia repair: Lichtenstein's) had higher VAS score of 2 and 3 at 3 months and at 6 months than group 1 (laparoscopic hernia repair: TEP and TAPP), which was statistically significant. Group 2 patients had higher incidence of moderate disability according to Oswestry Disability Index than group 1 at 3 months and 6 months (statistically significant). The mean VAS score and ODI score decreased significantly among group 1 patients than group 2 from 3 months to 6 months period. Result has been described with tables and graphs (Tables 1, 2, 3, 4, 5, Graphs 1, 2, 3, 4)

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Discussion

Chronic Groin Pain, also known as inguinodynia is a complication of inguinal hernia mesh repair. It has a significant impact on an individual with respect to quality of life [10,11]. Inguinodynia prevails despite evolving techniques.

The present study aimed at comparing the traditional open Lichtenstein's tension free mesh hernioplasty with laparoscopic inguinal mesh hernioplasty in our tertiary care center, as the world is moving towards minimal access surgeries. The findings of the study and other studies are as follows.

In the present study, we found that the mean (SD) age of the patients among group 1 (laparoscopic inguinal mesh hernioplasty) was 56.11 (8.53) years and among group 2 (Lichtenstein's tension free mesh hernioplasty) was 55.83 (8.7) years.

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De Jonge PV et al (2008) found that most studies used visual analogue scale (VAS) for pain measurement and Medical Outcomes Study Short-Form 36 (SF-36) for the measurement of HRQL (Health-Related Quality of Life). HRQL domains were most often being affected by pain. Estimates of chronic pain and discomfort had no established psychometric properties [11]. Our study assessed inguinodynia using the VAS score as in this study and there was another score that was used in this study, that is, Oswestry Disability Index (ODI). So, this study proved the difference in occurrence of inguinodynia using two different scales, that is, VAS and ODI instead of only one, further increasing the reliability.

Courtney CA et al (2002) found that chronic pain (severe or very severe) was reported at the third month post hernia repair affecting patients' daily activities and quality of life [12]. This study assessed chronic groin pain at 3 months and at 6 months post hernia repair. Some patients had decrease in the extent of inguinodynia in the sixth month after surgery. So, in the mentioned study which assessed inguinodynia only at the third month post surgery, a more prolonged follow-up as in our study, showed a decrease in inguinodynia. Hence, prolonged follow-up is needed for the assessment of inguinodynia.

Bay-Nielsen M et al (2001) used two sets of self-administered questionnaires. The first, for establishing incidence of chronic groin pain. The second for characterizing the pain and how the pain affected the individual reporting pain. Patients more than age 18 years and registered in the Danish Hernia Database who were operated between February 1, 1998, and March 31, 1998 were included. Inguinodynia was reported by 28.7%, and in 11.0%, it was interfering with activity. Older patients had a lower incidence of pain. There were no differences in the incidence of pain with type of hernia, surgical repair, type of anaesthesia. The second questionnaire was returned by 83%. Of these, 4% reported constant pain. The intensity of pain at rest was moderate or severe in 3%; with physical activity, pain was moderate or severe in 8%. Impairment of specific daily activities was reported by 16.6%. One year after inguinal hernia repair, pain is common (28.7%), functional impairment in more 50% [13]. Our study was based on

comparing inguinodynia between laparoscopic and inguinal hernia repair. It showed that inguinodynia was more common in the open inguinal hernia repair group. Intensity of pain was assessed based on VAS and ODI but not the characteristic of the pain in our study.

Alwahab A et al (2018) found that open approach injures ilioinguinal, iliohypogastric, genital branch of the genitofemoral nerves. And laparoscopic approach injures lateral femoral cutaneous nerve. This can be prevented with careful handling of tissue and over-manipulation of nerves. In laparoscopic approach, staple placement below the ilio-pubic tract decreases risk of nerve entrapment [14]. In our study, no measures of preventing inguinodynia were studied. Our study showed what type of inguinal hernia mesh repair had more chances of inguinodynia.

Memon et al, in 2013 conducted a meta-analysis of the randomized evidence to determine the relative merits of laparoscopic (LIHR) and open (OIHR) inguinal hernia repair and concluded that LIHR was associated with earlier recovery and significantly fewer postoperative complications [15]. In our study also, one of the common complications of inguinal hernia repair, that is inguinodynia was studied and it was found in this study also that inguinodynia was lesser in laparoscopic than open hernia repair.

Köckerling et al, in 2016 showed that there was no significant difference between laparoscopic and Lichtenstein techniques. Post-operative complications were lesser in TEP than Lichtenstein's [16]. Same was the result of our present study, which focused on inguinodynia. Inguinodynia was lesser in TEP than Lichtenstein's tension free inguinal mesh hernioplasty. Our study also included TAPP in the laparoscopic method of inguinal hernia repair.

Scheuermann et al, in 2017 conducted a meta-analysis of randomized controlled trial on TAPP versus Lichtenstein operation for primary inguinal hernia. Outcome showed no significant differences. TAPP had less chronic inguinal pain [17]. Same was the result of our present study, which focused on inguinodynia. Inguinodynia was lesser in TAPP than Lichtenstein's tension free inguinal mesh hernioplasty.

In our study, inguinodynia was lesser after laparoscopic repair than with Lichtenstein's repair.

References

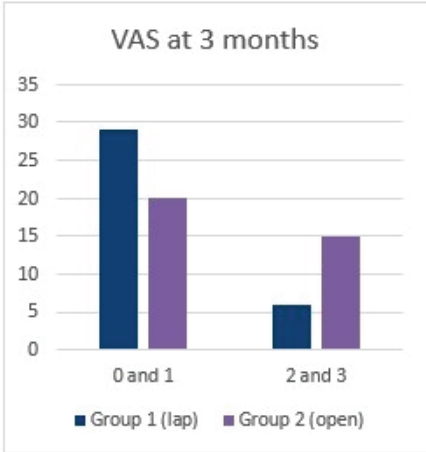
1. Bansal VK, Misra MC, Babu D et al. A prospective, randomized comparison of long-term outcomes: chronic groin pain and quality of life following totally extraperitoneal

- (TEP) and transabdominal preperitoneal (TAPP) laparoscopic inguinal hernia repair. *SurgEndosc.* 2013 Jul;27(7).p2373-82.
2. Hakeem A, Shanmugam V. Inguinodynia following Lichtenstein tension-free hernia repair: a review. *World J Gastroenterol.* 2011 Apr 14;17(14).p1791-6.
 3. Malangoni MA, Rosen MJ. Hernias. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL. *Sabiston Textbook of Surgery The Biological Basis of Modern Surgical Practice.* 20th ed. Philadelphia: Elsevier; 2017. p1092-1119.
 4. Tulloh B, Nixon SJ. Abdominal wall, hernia and umbilicus. In: Williams NS, O'Connell PR, McCaskie AW (Eds). *Bailey and Love's Short Practice of Surgery.* 27th ed. Great Britain: CRC Press Taylor & Francis Group; 2018. p1043-67.
 5. Amid PK, Chen DC. Post herniorrhaphy Inguinodynia: Causes, Prevention, and Surgical Treatment: Triple Neurectomy. In: Donnellan K, Huffman B, Oberle K (Eds). *Fischer's Master of Surgery.* 7th ed. Philadelphia: 2019. p6603-18
 6. Das C, Jamil T, Stanek S, et al. Inguinal hernias. In: Brunicki CF, Anderson DK, Billiar TR, Dunn DL, Hunter JG, Kao LS, Matthews JB, Pollock RE (Eds). *Schwartz's Principles of Surgery.* 11th ed. United States of America: Mac-Graw Hill Education; 2019. p1626-51
 7. Mehra A, Baker D, Disney S, Pynsent PB. Oswestry Disability Index scoring made easy. *Ann R Coll Surg Engl.* 2008 Sep;90(6).p497-9.
 8. Bueno J, Serralta A, Planells M et al. Inguinodynia after two inguinal herniorrhaphy methods. *Surg Laparosc Endosc Percutan Tech.* 2004 Aug;14(4).p210-4.
 9. Vetter Tr. The Health-Care Policy of Pain Management. In: Benzon HT, Rathmell JP, Wu CL, Turk DC, Argoff CE, Hurley RW (Eds). *Practical Management of Pain.* 5th ed. Philadelphia: Elsevier; 2014. p47-55.
 10. Fischer JE. Hernia repair: Why do we continue to perform mesh repair in the face of the human toll of inguinodynia? *The American Journal of Surgery.* Oct 2013;206(4):619-623.
 11. P van Hanswijck de Jonge P, Lloyd A, Horsfall L, Tan R, O'Dwyer PJ. The measurement of chronic pain and health related quality of life following inguinal hernia repair: a review of the literature. *Hernia* 2008; 12: 561-9.
 12. Courtney CA, Duffy K, Serpell MG, et al. Outcome of patients with severe chronic pain following repair of groin hernia. *Br J Surg.* 2002; 89:1310-4.
 13. Bay-Nielsen M, Perkins FM, Kehlet H. Pain and functional impairment 1 year after inguinal herniorrhaphy: a nationwide questionnaire study. *Ann Surg.* 2001;233-7.
 14. Al Wahab A, AlAwadhi A, Nugud AAA, et al. Worst Case Scenario! Related to Hernial Disease. In: *Hernia Surgery and Recent Developments* 2018 Apr 12. IntechOpen.
 15. Memon MA. Meta-analysis of randomized clinical trials comparing open and laparoscopic inguinal hernia repair. *Br J Surg.* 2003; 90: p 1479-92.
 16. Köckerling F. Surg Endosc TEP versus Lichtenstein: Which technique is better for the repair of primary unilateral inguinal hernias in men? 2016; 30: 3304.
 17. Scheuermann U, Niebisch S, Lyros O, et al. Transabdominal Preperitoneal (TAPP) versus Lichtenstein operation for primary inguinal hernia repair - A systematic review and meta-analysis of randomized controlled trials. *BMC Surg.* 2017;17(1):55.

Table 1, Graph 1 show that group 2 had higher VAS of 2, 3 at 3 months than group 1, statistically significant (p value-0.018).

VAS at 3 months	Group1(lap.) (n=35) n (%)	Group 2 (open) (n=35) n (%)	χ ² value, df, p value
0, 1	29 (82.8)	20 (57.1)	5.5102,1, 0.018
2, 3	06 (17.2)	15 (42.9)	
Total	35 (100)	35 (100)	

Table 1: Distribution according to VAS at 3 months

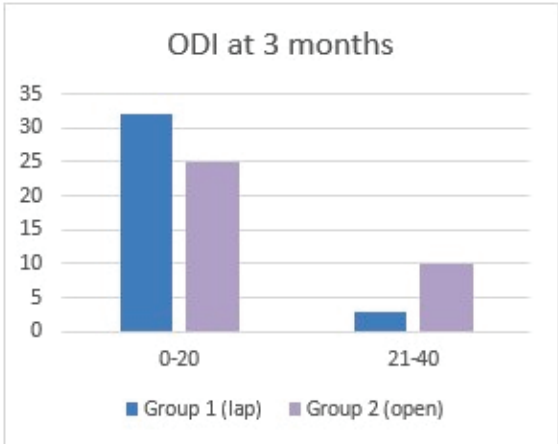


Graph 1: Distribution according to VAS at 3 months

Table 2, Graph 2 show that group 2 had higher incidence of moderate disability (ODI) than group 1 at 3 months, statistically significant (p value – 0.03).

ODI at 3 months	Group 1 (lap.) (n=35) n (%)	Group2 (open) (n=35) n (%)	χ ² value, df, p value
Minimal disability (0-20%)	32 (91.4)	25 (71.4)	4.6289, 1, 0.03
Moderate disability (21-40%)	03 (8.6)	10 (28.6)	
Total	35 (100)	35 (100)	

Table 2: Distribution according to ODI at 3 months



Graph 2: Distribution according to ODI at 3months

Table 3, Graph 3 show that group 2 had higher VAS of 2, 3 at 6 months than group 1, statistically significant (p value-0.011).

VAS at 6 months	Group 1(lap.) (n=35) n (%)	Group 2 (open) (n=35) n (%)	χ^2 value, df, p value
0, 1	33 (94.3)	25 (71.4)	6.4368, 1, 0.011
2, 3	02 (5.7)	10 (28.6)	
Total	35 (100)	35 (100)	

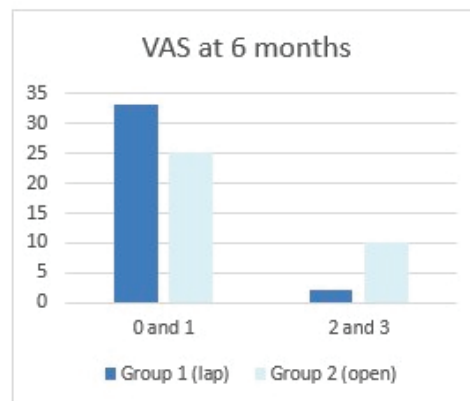


Table 3: Distribution according to VAS at 6 months

Graph 3: Distribution according to score at 6 months

Table 4 and Figure 4 show that group 2 had higher incidence of moderate disability (ODI) than group 1 at 6 months, statistically significant (p value – 0.006).

ODI at 6 months	Group1 (lap.) (n=35) n (%)	Group2 (open) (n=35) n (%)	χ^2 value, df, p value
Minimal disability (0-20%)	34 (97.1)	26 (74.3)	7.4667, 1, 0.006
Moderate disability (21-40%)	01 (2.9)	09 (25.7)	
Total	35 (100)	35 (100)	

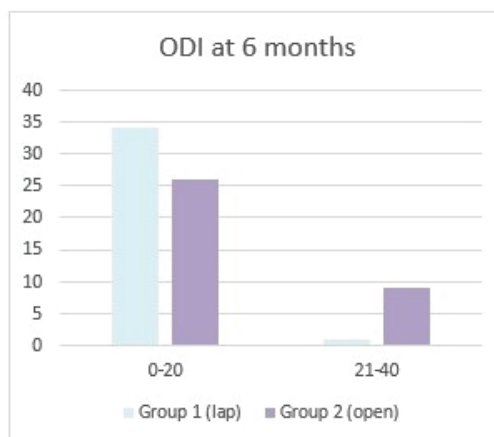


Table 4: Distribution according to ODI at 6 months

Graph 4: Distribution according to ODI at 6 months

Table 5 shows that the mean VAS and ODI scores decreased significantly among group 1 than group 2 from 3 months to 6 months period.

Table 5: Distribution and association of VAS score and ODI score at 3 months and 6 months of study subjects

	Group 1 (lap.) (n=35) Mean (SD)		Group 2 (open) (n=35) Mean (SD)		p value (Wilcoxon signed ranks test)
	3 months	6 months	3 months	6 months	
VAS	1.11 (0.58)	0.60 (0.60)	1.51 (0.95)	0.86 (1.14)	<0.001
ODI	14.29 (9.40)	2.71 (6.22)	14.09 (12.37)	9.86 (11.34)	<0.001