Original Article **Open Access**

Comparative Study between Prophylactic Ilioinguinal Neurectomy and Nerve Preservation in Lichtenstein Tension-Free Meshplasty for Inguinal Hernia Repair

Muhammad Talha Khan, Noor-Ul-Ain Mujahid, Hamza Mustafa, Balakh Sher Zaman, Ali Akbar, Ameer Afzal

Abstract:

Objective: To compare prophylactic ilioinguinal neurectomy with nerve preservation in lichtenstein tension-free meshplasty for inguinal hernia repair

Study Design and Setting: The present comparative study was carried out at the surgical department in Mayo Hospital Lahore for a period of 6 months after approval of synopsis.

Methodology: Non-probability consecutive sampling technique was used. The sample size was 60 and was determined by using the WHO calculated. Patients were divided randomly into 2 groups by using lottery method. In group A, patients underwent surgery and prophylactic ilioinguinal neurectomy was performed. In group B, patients had done surgery via conventional method with nerve preservation. Operative time and intra-operative blood loss were noted. Patients were followed-up in OPD for 1, 3 and 6 months and evaluated for outcomes. Data was entered and analyzed in SPSS -26.

Results: The mean age of the study participants in PINE group was 42.2 ±4.39 and INPE was 41.8±7.45 years. 10% of the participants in Ilioinguinal Nerve Preservation had pain at rest between the three and six months following surgery but no individuals experienced pain in the PINE. The incidence of pain from any kind of hernia in either group did not differ significantly.

Conclusion: The current study concluded that one serious and incapacitating side effect after inguinal hernia repair was chronic groin pain. The frequency and severity of pain were greater in ilioinguinal nerve preservation group than prophylactic ilioinguinal neurectomy group.

Key words: Inguinal hernias, neurectomy, ilioinguinal nerve preservation

How to cite this Article:
Khan MT, Mujahid NUA, Mustafa H, Zaman BS, Akbar A, Afzal A. Comparative Study between Prophylactic Ilioinguinal Neurectomy and Nerve Preservation in Lichtenstein Tension-Free Meshplasty for Inguinal Hernia Repair. J Bahria Uni Med Dental Coll. 2026;16(1):164-169 DOI: https://doi.org/10.51985/JBUMDC2025813

Muhammad Talha Khan *(Corresponding Author)*
Post Graduate Resident, Department of General Surgery
Mayo Hospital Lahore
Email: m.talhakhan001@hotmail.com

Noor-ul-Ain Mujahid
Assistant Professor, Department of General Surgery
Mayo Hospital Lahore
Email: noorulainmujahid@gmail.com

Hamza Mustafa
Post Graduate Resident, Department of General Surgery
Mayo Hospital Lahore
Email: Hmza81@gmail.com

Balakh Sher Zaman
Assistant Professor, Department of General Surgery
Mayo Hospital Lahore
Email: Dr.balakh@kemu.edu.pk

Ali Akbar
Associate Professor, Department of General Surgery
Mayo Hospital Lahore
Email: dr.aliakbar81@gmail.com

Ameer Afzal
Professor, Department of General Surgery
Mayo Hospital Lahore
Email: naustysurgeon@gmail.com

Received: 18-10-2025
1st Revision: 25-11-2025
Accepted: 07-01-2026
2nd Revision: 17-12-2025

INTRODUCTION

A hernia is the abnormal protrusion of a viscus or part of a viscus through a defect or weakened area in the wall of the cavity that normally contains it. The most prevalent kind is an external abdominal hernia, with the inguinal, femoral, and umbilical types making about 75% of occurrences. The main consequence following open inguinal hernia repair has recently shifted from recurrence to persistent groin discomfort due to increased focus on patient outcomes. Inguinal hernias, which have an incidence rate of 18% to 24%, have become one of the most common disorders in the world. Amazingly, inguinal hernias have been discovered to occur more frequently in men than in women. [1, 2] The extensive literature on the topic has documented a variety of hernia repair approaches over time. Mesh Lichtenstein, a more recent approach, is currently the gold standard. In the Lichtenstein tension-free repair, which is a standard open surgical procedure for inguinal hernias, a polypropylene mesh is placed to strengthen the weakened abdominal wall. Because the mesh spans the hernia defect and eliminates the need to pull and stitch tissue together, this technique is known as "tension-free" and lowers discomfort and the risk of recurrence. The procedure entails separating the hernia

sac, covering the defect with the mesh, and fastening it to the internal oblique muscle and inguinal ligament. [3, 4] A significant problem that develops following open inguinal hernia surgery is post-operative groin discomfort, which has been documented to occur between 18% and 63% of the time. It is possible for this uncomfortable condition to seriously hinder and interfere with one's normal daily activities.[5]Five Additional factors that have been suggested as possible predictors of chronic post-operative pain and hypo/hyperaesthesis include damage to the inguinal nerves, entrapment of the ilioinguinal nerve during suturing, the occurrence of fibrosis in the mesh placement area and surrounding area, mesh implantation, partial division, and neuroma formation.[6] One strategy to lower the chance of experiencing chronic postoperative pain has been suggested: elective ilioinguinal nerve division. Initially, it was suggested that safeguarding ilioinguinal nerve could decrease the possibility of chronic discomfort after surgery.[7]According to a study, the elective ilioinguinal nerve division group experienced mean post-operative discomfort of 0.6±0.7, whereas the nerve preservation group experienced 1.5±0.7. [8] In another research, the elective ilioinguinal nerve division group experienced mean post-operative pain of 0.5±2, whereas the nerve preservation group experienced mean post-operative pain of 2.6±2.[9] In another research, the elective ilioinnguinal nerve division group experienced mean post-operative pain of 0.98±0.25, whereas the nerve preservation group experienced mean post-operative discomfort of 1.72±0.61.The risk of discomfort is lower with preventive ilioinguinal neurectomy than with traditional nerve preservation techniques, according to the literature. However, nerve preservation is used routinely, and this is the main reason for pain after surgery .[10]

METHODOLOGY

This was comparative study, carried out at the surgical department in Mayo Hospital Lahore during a period of 6 months after approval of synopsis. The approval of the study was taken from the ethical committee of the research (ref No:657/RC/KEMU, Date: 28/08/2024) Non-probability consecutive sampling technique was used. The sample size was determined by using the WHO calculator by taking 95% confidence level, 80% power of study and mean pain score (effectiveness) i.e. 0.7±0.7 with ilioinguinal neurectomy and 1.5±0.7 with nerve preservation.[8] The total sample size determined was 60. Male patients of age 18-50 years diagnosed with inguinal hernia undergoing Lichtenstein's tension-free meshplasty inguinal hernia repair were enrolled in this study. Individuals with irreducible or strangulated hernia and those with infections at the surgery site (on clinical examination) were excluded. After taking approval from hospital's ethical committee, 60 patients fulfilling the selection criteria were enrolled in the study from surgical wards. Informed consent were taken. Basic information of each patient (name, age, BMI, marital status, number of children, duration of hernia, size of hernia, lateral side, type of hernia (direct or indirect), diabetes (BSR> 200 mg/dl), hypertension (BP=140/90 mmHg), anemia (hb<11 g/dl), occupation, life style, ASA status were noted. Patients were divided randomly into 2 groups by using lottery method. In group A, patients underwent surgery and prophylactic ilioinguinal neurectomy was performed. In group B, patients had done surgery via conventional method with nerve preservation. Operative time and intraoperative blood loss were noted. All procedures were performed by single surgical team under spinal anesthesia with assistance of researcher. After 48 hours, each patient was moved to a post-surgical unit and discharged. For one, three, and six months, patients were monitored in the outpatient department. Patients were evaluated in the following ways: at rest, following a typical everyday activity, during walking, following a ten-stair climb, and following a strenuous exercise (such doing exercises, jogging, mild weightlifting, etc.). Pan score was recorded. If score was 0, then effectiveness was noted (as per operational definition)."All the data were collected in proforma in a specialized designed profoma. SPSS-26 was used for data entry and analysis. Quantitative factors, such as age, hernia size, and duration, are shown as mean and ±SD. Frequencies and percentages were used to display qualitative characteristics such as lateral side and the kind of hernia (direct or indirect). The chi-square test was employed to assess differences in efficacy between the two groups, and a P value of less than 0.05 was considered significant statistically. Age, BMI, hernia duration, hernia size, marital status, number of children, lateral side, hernia type (direct or indirect), diabetes, hypertension, anemia, employment, lifestyle, ASA status, operating time, and intraoperative blood loss were all taken into consideration when stratifying the data. After stratification, the chi-square test was applied within each stratum to evaluate the efficacy between the two groups. A P value of less than 0.05 was considered as significant statistically."

RESULTS

A total of 60 male patients (aged 18-50 years) receiving hernioplasty for an inguinal hernia were enrolled. Participants of the study were divided equally in to group A and group B with same number of individuals. Group A underwent a prophylactic ilioinguinal neurectomy (PINE) and group B underwent ilioinguinal nerve preservation(INPE) during hernia repair. The mean age of the study participants PINE group was 42.2 ±4.39 and INPE was 41.8±7.45 years. In terms of the kind of anesthesia, the side of the hernia, and baseline pain assessments during different activities, both groups were comparable. Most participants in both groups were aged 29–38 years (43.3% vs. 46.6%). The age distribution was not significant (p value =0.82) as presented in table 1. 40% of patients in PINE group had a hematoma, compared to 53.3 in INPE Group. Urinary retention was

Table 1. Demographic features of the study participants

Features		PINE(Group A)	INPE (Group B)	Value of P
Age (years) Mean ±SD		42.2 ±4.39	41.8±7.45	0.42
Age (Years)	18 or below	2(6.6%)	4(13.3%)	0.83
	19-28	5(16.6%)	6(20%)	
	29-38	13(43.3%)	14(46.6%)	
	39-48	7(23.3%)	6(20%)	
	49-50	3(10%)	2(6.6%)	
Pain While Cycling/ Heavy Activities: No Pain: Mild Pain		20:10	22:8	0.68
Pain While Straining: No pain: Mild Pain		18:10	22:8	0.72
Pain at Rest: No pain: Mild Pain		17:13	24:	0.63
Hernia Side: Right: Left		17:13	19:11	0.26
Type of Anesthesia: Spinal: General		16:14	18:12	0.062

Table 2. Early complications in both groups

Complications	PINE (Group A)	INPE (Group B)	Value of P
Wound infection	2(6.6%)	5(16.6%)	0.38
Urinary retention	4(13.3%)	2(6.6%)	0.52
Haematoma	12(40%)	16(53.3%)	0.72

Table 3.types of Inguinal Hernia

Inguinal Hernia	PINE(Group A)	INPE (Group B)
Right indirect	14(46.6%)	16(53.3%)
Left direct	8(26.6%)	6(20%)
Right direct	6(20%)	4(13.3%)
Left Indirect	2(6.6%)	2(6.6%)
Total	30	30

Table 4 Pain in both groups during various activities

Pain	PINE	INPE	P value (Fischer's Exact Test)
One month	2(6.6%)	4(13.3%)	1
Three months	zero	3(10%)	0.2
Six month	Zero	3(10%)	0.2
Pain in both groups during moderate activities			
Pain	PINE	INPE	P value
One month	5(16.6%)	8(26.6%)	0.50
Three months	1(3.3%)	3(10%)	0.2
Six month	Zero	2(6.6%)	0.02
Pain in both groups during vigorous activities			
Pain	PINE	INPE	P value
One month	15(50%)	20(66.6%)	0.50
Three months	4(13.3%)	13(43.3%)	0.005
Six month	2(6.6%)	8(26.6%)	0.05
Postoperative Hyperesthesia in two study groups			
Postoperative Hyperesthesia	PINE	INPE	P value
One	8(26.6%)	12(40%)	0.3
Three months	3(10%)	5(16.6%)	0.5
Six months	1(3.3%)	3(10%)	0.5

noted in 6.6% of PINE group participants and 13.3% of INPE group individuals. The difference between the two groups was not statistically significant as shown in table 2. In the PINE group, the frequency of right indirect hernia was 46.6%, whereas in the INPE group, it was 53.3%. Left indirect hernias were the least common, accounting for 6.6% of cases in both groups as presented in table 3.

10% of the participants in Ilioinguinal Nerve Preservation had pain at rest between the three and six months following surgery but no individuals experienced pain in the PINE. Majority of the participants 13(43.3%) in INPE group had seen to have pain after three months during vigorous activities as compared to PINE group (13.3%).this difference was statistically significant (p value 0.005). Ten percent of participants in INPE group and 3.3% of participants the PINE group experienced hyperaesthesia six months after surgery as presented in table 4. The incidence of pain from any kind of hernia in either group did not differ significantly.(table 5). The restriction of physical activities had a significant impact on group A patients (6.6%) and group B patients (10%).Likewise, 10% of the individuals in group B and 6.6% of patients in group A reported limited social activities as shown in table 6.

DISCUSSION

Globally, inguinal hernias are among the most prevalent conditions affecting men [11]. Pain that lasts longer than three months is referred to as inguinal postoperative chronic pain (PCP), often called inguinodynia or groin pain .[12] It is one

Table 5. Post-operative pain related to hernia type (vas score)

Hernia type	Pain	PINE One month	INPE	PINE 3rd month	INPE	PINE 6th month	INPE
Direct	Yes	2	1	2	2	0	2
	No	10	7	2	8	10	7
Indirect incomplete	Yes	6	7	2	5	3	5
	No	4	6	8	8	7	8
Indirect complete	Yes	7	8	3	4	2	3
	No	1	1	3	3	8	5
Total		30	30	30	30	30	30

Table.6 Quality of life- Physical Functioning in both groups

Activities	PINE n= 30	INPE n= 30	P value (Fischer's Exact Test)
No	27(90%)	25(83.3%)	0.01
Mild	1(3.3%)	1(3.3%)	0.4
Severe	2(6.6%)	4(13.3%)	0.6
Table.11 Quality of life- social health in both groups			
Activities	PINE	INPE	
No	26(86.6%)	24(80%)	0.3
Mild	2(6.6%)	3(10)	0.5
Severe	2(6.6%)	3(10%)	0.5

of the most frequent side effects following inguinal hernia surgery [13]. Regardless of the surgical methods employed, the incidence rate of PCP varies from 0% to 63% [13]. This wide variation is caused by disparate definitions of inguinal postoperative pain, study endpoints, and pain assessment methodology. Oral analgesics, local anesthesia, physical therapy, or additional procedures may be necessary to treat inguinal postoperative chronic pain, which can be caused by inflammation, fibrotic responses, neuroma development, or entrapment or stretching of nerves.[13] The extensive literature on the topic has documented a variety of hernia repair approaches over time. Mesh Lichtenstein, a more recent approach, is currently the gold standard. In the Lichtenstein tension-free repair, which is a standard open surgical procedure for inguinal hernias, a polypropylene mesh is placed to strengthen the weakened abdominal wall. Because the mesh spans the hernia defect and eliminates the need to pull and stitch tissue together, this technique is known as "tension-free" and lowers discomfort and the risk of recurrence. The procedure entails separating the hernia sac, covering the defect with the mesh, and fastening it to the internal oblique muscle and inguinal ligament.[3-4] The mesh was fixed inferiorly with polypropylene sutures to the pubic tubercle, lacunar ligament, and inguinal ligament outside the internal ring. The upper edge is attached to the internal oblique muscle or aponeurosis using a few interrupted sutures. After cutting the mesh along its side and bringing the two tails around to encircle the cord at the inside ring, a single polypropylene suture is employed to secure the mesh to the inguinal ligament. As a result, another internal ring and shutter mechanism is created.[5] Chronic inguinal neuralgia is defined by the International Association for the Study of Pain as "pain that lasts three months or longer." It has been demonstrated that 1.8% of patients experience post-operative discomfort for more than five years, and up to 7.5% of patients may experience greater pain than they had before to the procedure.[22] Treatment is frequently tough and demanding. One of the most frequent surgeries performed in any hospital is an inguinal hernia. One of the most prevalent issues these people have is chronic inguinal pain. Inguinal hernia repairs are not the only surgical procedure that uses the idea of regular neurectomy. The intercosto brachial and larger auricular nerves are sacrificed during routine neurectomy, which is frequently carried out during axillary & neck dissections. Routine excision of the ilioinguinal nerve has been proposed to prevent the long-term complication of post-herniorrhaphy neuralgia, potentially reducing the occurrence of persistent postoperative groin pain. In our study, a total of 60 male patients (aged 18-50 years) receiving hernioplasty for an inguinal hernia were enrolled. Participants in the study were divided equally in to group A and group B with same number of individuals. During hernia repair, Prophylactic ilioinguinal neurectomy was done for Group A participants while group B participants underwent ilioinguinal nerve preservation. The mean age of the study participants PINE group was 42.2 ±4.39 and INPE was 41.8±7.45 years. A similar study was conducted by Sharma in India in which same differences in age were

reported.[14] Our study results were also comparable to Christou et al.[1] In terms of the kind of anesthesia, the side of the hernia, and baseline pain assessments during different activities, both groups were comparable**.** Majority of the study participants were in the age group 29-38 years in both groups (43.3% versus 46.6%) . The age distribution was not significant (p value =0.82). These findings are similar with the study conducted by Uppada [15]. 40% of patients in PINE group had a hematoma, compared to 53.3 in INPE Group. In the present study urinary retention was noted in 6.6% of PINE group participants and 13.3% of INPE group individuals. The difference between the two groups was not statistically significant. Our study findings are similar to the previous research.[16] In our study most of the participants 43.3% in INPE group had seen to have pain after three months as compared to PINE group (13.3%).this difference was statistically significant (p value 0.005). Ten percent of participants in INPE group and 3.3% of participants the PINE group experienced hyperaesthesia six months after surgery. Similar to our study double blinded, randomized trial was conducted on 120 patients who were having open anterior mesh surgery for an inguinal hernia. Out of the 120 individuals, 60 were given nerve preservation and 60 were given neurectomy. Pain was observed in 21% of the nerve-preserved group and 7% of the neurectomy group."The findings showed that following elective intestinal hernia repair, the neurectomy reduced post-operative pain which support our results.[17] Another retrospective study was carried out on 90 individuals who had done Lichtenstein inguinal hernia repair. The study found that the frequency of neuralgia was significantly lower in the neurectomy group compared to the nerve preservation group (3% vs. 26%, $P < 0.001$). The neurectomy group did not have a significantly greater prevalence of paresthesia after 1 year.[18] According to these results, neurectomy does not always result in a statistically important long-term increase in paresthesia when compared to nerve preservation, even if it is linked to a decreased prevalence of chronic pain (neuralgia).The findings of the current study were consistent with those of the previously mentioned studies. Numerous studies and meta-analyses indicate that the ilioinguinal nerve neurectomy (division) group frequently has less severe and frequent postoperative pain than the nerve preservation group. The outcome runs counter to the user's argument. Regarding preoperative pain, it has been noted that the two groups measured similarly. Pain during regular activities was experienced by 6.6% of patients in study group A at one month, and by six months, it had disappeared. In contrast, 13.3% of patients in group B experienced pain at one month, and 10% of patients continued to experience it after six months. The findings aligned with a prior investigation.[19]In this study at three and six months of follow-up, there were notable differences between the two groups in the occurrence of pain following vigorous activity. These results aligned with those of other similar research.[19]There was no discernible variation in hyperaesthesia between the two groups in the present study. These findings were consistent with previous study.[20] Significant difference was not observed between the two study groups based on' health-associated quality of life. The results of the earlier study served to support this.[21] After comparing the findings of the current study with the previous studies it was explored that chroic groin pain is a major problem after the treatment of hernia. The nerve preservation study group had noticeably increased pain frequency and severity. This suggests that preventive neurectomy may be a suitable way to avoid persistent groin pain after Lichtenstein inguinal hernia surgery, and it may be a perfect addition to the routine hernia repair treatments.

CONCLUSION

The current study concluded that one serious and incapacitating side effect after inguinal hernia repair was chronic groin pain. The frequency and severity of pain were greater in ilioinguinal nerve preservation group than prophylactic ilioinguinal neurectomy group. Therefore, prophylactic neurectomy may be a suitable alternative to traditional hernia repair treatments and a suitable means of preventing persistent groin pain after Lichtenstein inguinal hernia surgery.

Conflicts of Interest: Nil

Source of Funding: Nil

Acknowledgement: Nil

Authors Contribution:
Muhammad Talha Khan: Primary researcher, conception, acquisition, analyzing the data and writing manuscript
Noor-Ul-Ain Mujahid: Drafting, editing and reviewing the manuscript
Hamza Mustafa: Interpretation of data
Balakh Sher Zaman: Review and expert guidance
Ali Akbar: Critically reviewed for intellectual content
Ameer Afzal: Oversight, guidance and mentorship

REFERENCES

1. Christou N, Ris F, Naumann D, Robert-Yap J, Mathonnet M, Gillion J-F, et al. Risk factors for surgical site infection after groin hernia repair: does the mesh or technique matter? Hernia. 2022:1-10.
2. Xu Z, Qu H, Kanani G, Guo Z, Ren Y, Chen X. The outcomes of routine ilioinguinal neurectomy in the treatment of chronic pain during herniorrhaphy: A meta-analysis of randomized-controlled trials. Asian journal of Surgery. 2021;44(2):431-9. doi: 10.1016/j.asjsur.2020.10.022.
3. Perrone EE, Deprest JA. Fetal endoscopic tracheal occlusion for congenital diaphragmatic hernia: a narrative review of the history, current practice, and future directions. Translational pediatrics. 2021;10(5):1448. doi: 10.21037/tp-20-130.
4. Köckerling F, Simons MP. Current concepts of inguinal hernia repair. Visceral medicine. 2018;34(2):145-50. doi: 10.1159/000487278

5. Bande D, Moltó L, Pereira JA, Montes A. Chronic pain after groin hernia repair: pain characteristics and impact on quality of life. BMC surgery. 2020;20:1-11. doi: 10.1186/s12893-020-00805-9.
6. Charalambous M, Charalambous C. Incidence of chronic groin pain following open mesh inguinal hernia repair, and effect of elective division of the ilioinguinal nerve: meta-analysis of randomized controlled trials. Hernia. 2018;22:401-9. doi: 10.1007/s10029-018-1753-9
7. Moseholm VB, Baker JJ, Rosenberg J. Nerve identification during open inguinal hernia repair: a systematic review and meta-analyses. Langenbeck's Archives of Surgery. 2023;408(1):417. doi: 10.1007/s00423-023-03154-2.
8. Malekpour F, Mirhashemi SH, Hajinasrolah E, Salehi N, Khoshkar A, Kolahi AA. Ilioinguinal nerve excision in open mesh repair of inguinal hernia—results of a randomized clinical trial: simple solution for a difficult problem? The American Journal of Surgery. 2008;195(6):735-40. doi: 10.1016/j.amjsurg.2007.09.037
9. Muneeb MD, Baig MAN. Elective division of ilioinguinal nerve in inguinal hernioplasty: remedy for the morbid postoperative inguinal pain. J Coll Physicians Surg Pak. 2017;27(11):682-5.
10. Jatoi AH, Younus SM, Ghayassuddin M, Mirani AJ, Ghayas N, Qazi A, et al. Postoperative pain: comparison after preservation and elective division of ilioinguinal nerve in inguinal hernioplasty. Professional Med J. 2014;21(03):559-65.
11. The HerniaSurge Group (2018) International guidelines for groin hernia management. Hernia 22:1–165 doi: 10.1007/s10029-017-1668-x. Epub 2018 Jan 12.
12. Bjurstrom MF, Nicol AL, Amid PK, Chen DC (2014) Pain control following inguinal herniorrhaphy: current perspectives. J Pain Res 7:277–290 doi: 10.2147/JPR.S47005.
13. Fra¨nneby U, Sandblom G, Nordin P, Nyre´n O, Gunnarsson U(2006) Risk factors for long-term pain after hernia surgery. Ann Surg 244:212–219 doi: 10.1097/01.sla. 0000218081. 53940.01.
14. Sharma, J., 2011. Comparison of prophylactic ilioinguinal Neurectomy and ilioinguinal nerve Preservation in open inguinal hernia repair (Master's thesis, Rajiv Gandhi University of Health Sciences (India)).
15. Uppada, G. L. P., Mallayya, B., & Rao, P. S. (2020). Comparison of prophylactic ilioinguinal neurectomy and ilioinguinal nerve preservation in open inguinal hernia repair: a prospective study. J Med Sci Clin Res, 8(7), 237-248. DOI: https://dx.doi.org/10.18535/jmscr/v8i7.42
16. Neogi, Probal, Santosh Kumar Singh, Soumitra Manwatkar, Sunil Kumar Singh, Abhishek Saxena, and Anish Kola. "A prospective study comparing preservation of ilioinguinal nerve with neurectomy in open mesh repair of inguinal hernia." Int Surg J 6 (2018): 114-118. DOI:10.18203/2349-2902. isj20185121
17. Javid PJ, Books DC, Hernias ZMJ, Ashley SW. Maingot's abdominal operations. 11th ed. New York: McGraw-Hill; 2007:103-39
18. Ferzli GS, Edwards ED, Khoury GE. Chronic pain after inguinal herniorrhaphy. J Am Coll Surg. 2007 Aug; 205(2): 333-41. doi: 10.1016/j.jamcollsurg.2007.02.081.
19. Dennis R, O'Riordan D. Risk factors for chronic pain after inguinal hernia repair. Ann R Coll Surg Engl. 2007; 89(3):218-20. doi: 10.1308/003588407X178991.
20. Dennis R, O'Riordan D. Risk factors for chronic pain after inguinal hernia repair. Ann R Coll Surg Engl. 2007; 89(3):218-20. doi: 10.1308/003588407X178991
21. RavichandranBD,. Kalambe G et al , Pilot Randomized controlled study of Preservation or Division of Ilioinguinal Nerve in open Mesh Repair of Hernia, Br J Surg 2007 ;87 :1166 -67.9. doi: 10.1046/j.1365-2168.2000.01529.x.
22. Patil DB. Comparative Study of Skin Staples and Polypropylene Sutures for Securing the Mesh in Lichtensteins Tension Free Inguinal Hernia Repair": A Prospective Randomized Controlled Clinical Trial (Doctoral dissertation) DOI: https://dx.doi.org/10.18535/jmscr/v5i5.31.