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Original Research Article

Lichtenstein Tension Free Mesh Hernioplasty under Local Anaesthesia versus Spinal Anaesthesia

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Conflict of interest: Nil

Abstract:

Background and Aim: The surgical repair of an inguinal hernia is one of the most common general surgery procedures. The present study was undertaken to compare intraoperative and postoperative outcomes of Lichtenstein tension-free mesh hernioplasty under local anaesthesia compared to spinal anaesthesia.

Materials and Methods: In this longitudinal study, 100 patients aged between 20-80 years, posted for elective mesh hernioplasty were enrolled & divided into two groups. Group- L (n=50) hernioplasty was done under local anaesthesia, & Group-S(n=50) hernioplasty was done under spinal anaesthesia. Patients were assessed for intraoperative comfort or pain felt during surgery, duration of surgery, postoperative pain score, postoperative analgesic doses required, duration of hospital stay and patient satisfaction.

Results: Intraoperative pain was comparable in both groups (p=0.695). There was statistically significant difference observed in duration of surgery (p=0.001), postoperative pain at 6hrs (p=0.001), 24hrs(p=0.009) and 48hrs(p=0.047). The mean duration of hospital stay was 2.12 ± 0.172 days in Group-L and 3.9 ± 1.1days in Group-S (p=0.001). The total incidence of postoperative complications seen in Group L and Group S was 6% and 32%, respectively, which was statistically significant (p-0.001). However, in Group-L, 84% of cases responded 'satisfactory', and in Group-S, 80% responded 'satisfactory' at 6 weeks follow-up, which was statistically insignificant.

Conclusion: Lichtenstein tension free mesh hernioplasty under local anaesthesia can be a safer alternative to spinal anaesthesia with the advantages of less postoperative pain and postoperative complications in uncomplicated inguinal hernia.

Keywords: Lichtenstein Mesh Hernioplasty, Local Anaesthesia, Spinal Anaesthesia.

Introduction

About 75% of all hernia occurs in the inguinal region. One of the most common general surgical procedures today is the surgical repair of inguinal hernias [1]. Among the available options, the most common and widely performed procedure is Lichtenstein tension-free mesh hernioplasty which can be performed under various modes of anaesthesia, i.e. general (GA), regional (intrathecal or epidural), paravertebral block and local anaesthesia [2]. Now a days spinal anaesthesia (SA) or GA is the most common type of anaesthesia used to repair an inguinal hernia. General and SA cause haemodynamic changes and their effects during the postoperative period. Local anaesthesia(LA) has many advantages like stress-free surgery & postoperative period, early postoperative mobilization with fewer postoperative complications, shorter hospital stay or as a day care surgery and is economically cheaper than other forms of anaesthesia, as supported by much research [2,3,4]. In India in higher centres although inguinal hernia surgeries done under local anaesthesia as day care surgery , the detailed information on patient characteristics, selection criteria, safety profile, and cost-effectiveness is limited. In a developing country

like India, with a huge patient load, limited resources and expert manpower, and a lack of an anaesthesia team, hernia surgeries done are under local infiltration can be a good option mainly in peripheral institutions. This study aimed to investigate the safety and efficacy of local anaesthesia compared to spinal anaesthesia for Lichtenstein tension-free mesh hernioplasty.

Materials and Methods

This longitudinal study was conducted at MKCG MCH, Berhampur, Odisha, India, from December 2022 to November 2023. We included 50 patients in each group. A hundred patients aged between 20-60 years were selected for study.

Group-L: Patients undergoing Lichtenstein tension-free mesh hernioplasty under local anaesthesia. (n = 50)

Group-S: Patients undergoing Lichtenstein tension-free mesh hernioplasty under spinal anaesthesia. (n = 50)

Pre-anesthesia assessment was done one day prior to surgery, and the sensitivity to local anaesthetic lignocaine was done by the intradermal skin test. Routine investigations, i.e. CBC, FBS/RBS, LFT, Serum electrolytes, BT, CT, chest X-Ray, Urine RE/ME were done. Digital rectal examination and ultrasonography were done in patients aged more than 50 years for evaluation of the prostate. Preoperatively, 1 hour before surgery Inj cefoperazone-sulbactam 1.5 gm IV was given to all patients.

Anaesthetic Procedure: In Group-L, the anaesthetic mixture used for local anaesthetic repair consists of 15 ml of 2% lignocaine with 1: 200,000 adrenaline diluted in 45 ml of distilled water to make a total of 60 ml solution. Point Block technique [5] of anaesthesia infiltration was used, summarized as follows:

"The mid inguinal point area was infiltrated with 10 ml of prepared solution. The pubic tubercle area was infiltrated with 10 ml. At the point below, the inguinal ligament lateral to the femoral artery was infiltrated with 10 ml (blocks genital branch of the genitofemoral nerve).

At the point, 2 cm above and medial to the anterior superior iliac spine was infiltrated with 10 ml (blocks iliohypogastric nerve). The line of skin incision was infiltrated with 10ml. During dissection of the hernia sac, 10 ml was injected into the neck of the hernia sac." [Figure-1].

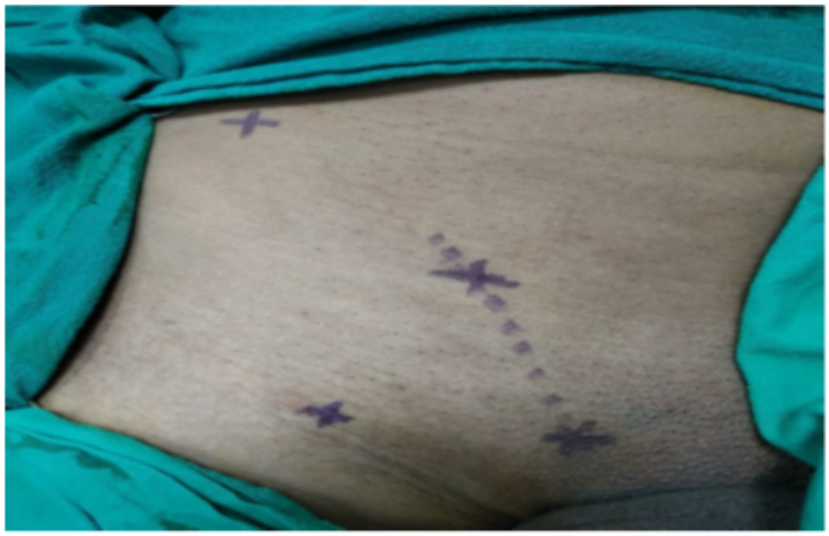

Figure 1: Position of point block

In Group S, SA was given by an anaesthesiologist using 3ml of 0.5% bupivacaine heavy and the patient was monitored by him. In case of inadequate or no effect of local or spinal anaesthesia, the patient was converted into general anaesthesia and was excluded from the study.

Lichtenstein tension-free mesh hernioplasty [6] was done in both groups with Polypropylene Prosthetic mesh, with dimensions of 12x6 cm. All the operative procedures followed standard procedures. Postoperatively patient was shifted to the ward, and on patient demand injection Diclofenac 75 mg was given intravenously in 100ml normal saline as rescue analgesia. Patients were allowed oral fluids after 2 hrs of surgery in the local anaesthesia group and after 6 hrs in the SA group. The patients were discharged when they were hemodynamically stable and clinically normal. They were followed up on the 7th and 15th days and then at 6 weeks after discharge, as an outpatient and were assessed for any wound sepsis, persistent pain at the incisional site and any other complications.

The parameters recorded were pain during surgery, intraoperative complications, duration of surgery, and postoperative pain at 6hr, 24hr and 48hr, number of analgesics doses required postoperatively, postoperative complications like seroma, urinary retention, wound hematoma, headache, testicular pain or swelling, duration of mobilization, duration of hospital stay in days and satisfactory response at 6 weeks follow up. The postoperative pain intensity was assessed using the Visual Analogue Score (VAS), "where 0=no pain and 10=worst pain imaginable" [7]. Duration of surgery was defined as the time interval between the first incision and closure of all the wounds. Days of hospital stay were defined as the number of days between operation and the actual day of hospital discharge. In Microsoft excel 2016, data were entered. Quantitative data were presented as means with standard deviation (SD) and analyzed using an independent t-test. Qualitative data were presented as frequency and percentages and analyzed using the chi-square test and Fisher's Exact Test.

Table 1: Demographic Parameters and Duration of Surgery

Variables	Group-L	Group-S	p-value
Age(years)	46.32±15.86	46.94±15.12	0.868
Sex			
Male	50	50	–
Female	0	0	
ASA			
Grade-1	38	33	0.373
Grade-2	12	17	
Type of inguinal hernia			
Direct(right side, left side)	7(3,4)	6(3,3)	0.766
Indirect(right side, left side)	43(32,11)	44(29,15)	
Duration of surgery(mins)	50.26±11.8	68.74±14.604	0.001

p-value <0.05 is significant

A p-value <0.05 was considered statistically significant. SPSS version 23 was used for statistical analysis.

Result

The age group of patients (n = 100) observed ranged from 20-76 years. The mean age for Group L was 46.32 ±15.86 years, and for Group S was 46.94 ±15.12 years. The incidence of indirect inguinal hernia was high (86% and 88%) as compared to direct hernia (14% and 12%) in both groups [Table-1]. Intraoperative complications and intraoperative pain were comparable in both groups.

The mean duration of surgery in Group-L was 50.26 ± 11.8mins and in Group-S was 68.74 ± 4.048mins (p<0.05). A statistically significant difference was found in postoperative pain between the two groups at 6 hr, 24 hr and 48 hrs with a p-value of 0.001, 0.009 and 0.047, respectively. The requirement of the number of analgesic doses in the first 24 hr postoperative period and till discharge was less in Group L than in Group S, which was statistically significant (p=0.001). Postoperative complications in Group-L were 6% and in Group-S was 32% (p=0.001). The duration for mobilization was significantly less in Group-L. (p-0.000). The mean duration of hospital stay in Group-L was 2.12±0.712 days compared to 3.9±1.11 days in Group-S(p=0.001). Patient satisfactory response at 6 weeks was similar in both groups (p=0.603) [Table-2].

Discussions

The present study included 100 patients who underwent Lichenstein's open mesh repair. The mean age (46.32 ± 15.86 vs 46.94 ± 15.12) was comparable between the two groups; all study participants were male. This finding was similar to the study by Prasad KYV et al. [8], which was 50.61yrs. In other studies by O' Dwyer PJ et al. [9] and Sanjay P et al. [10], the mean age was higher (55 years and 62 years, respectively). The overall inguinal hernia was common in elderly age groups. The incidence of indirect inguinal hernia (86% in Group L and 88% in Group S) and the right-sided hernia (70% in Group L and 64% in Group S) was more in both the study groups. The findings were similar to other studies by Sanjay Pet al [10], Alam M et al. [11] by Shivakumar KP et al. [12], which have a higher incidence of indirect type and right-sided hernias.

In this study, the mean duration of surgery was less in Group L (50.20 ± 11.8mins) compared to Group S (68.74 ± 14.604 mins), which was statistically significant. Our result was similar to the results of studies by Yound DV [2], Prasad KYV et al. [8], Sanjay Pet al [10], Song D et al. [13], van Veen RN et al. [14], Jain A et al. [15], where operative time was found to be shorter in the local anaesthesia group. This was maybe due to the use of lignocaine

with adrenaline, providing a bloodless field during surgery. However, the study by Goel A et al. [16] and Olsha O et al. [17] reported longer operative time under local anaesthesia.

Studies by Goyal Pet al [18], Ranani MS et al. [19], Prakash D et al. [20], and Bhedi A et al. [21] showed no difference in operative time between local and spinal anaesthesia. The duration of operations varies depending on the surgical technique used, the anatomy of the patients, type of hernia, associated patient co-morbidities and also the degree of experience of surgeons.

In Group-L, 76% of patients reported no pain, whereas 18% experienced mild pain and 6% experienced moderate pain. In Group S, 92% of patients reported no intraoperative pain, and 8% experienced mild pain significantly. Thus, there was no significant difference between the groups. However, it was clinically significant as more patients experienced mild and moderate pain in Group L than in Group S. Although the local anaesthesia blocked pain sensation, discomfort and pain were probably caused by touch or pressure on the surrounding non- anaesthetized areas or traction on the peritoneum or by pulling off the spermatic cord or by the handling of the hernia sac during difficult dissection due to adhesions of the sac [22], which was easily manageable by reassurance and additional injection of local anaesthetic solution. None of the patients in either group experienced severe pain and was converted to general anaesthesia.

Our results are comparable to Besra S et al. [4], Goyal Pet al [18] and Prakash D et al. [20], who have reported in their study number of patients complaining of mild pain is greater in the local anaesthetic group, and that complaining of moderate to severe pain is almost equal in both the groups.

At 6 hr postoperative period in Group-L, the majority of the patient had a pain score of VAS- 0 (in 52%), and the maximum pain score was VAS-3 (in 6%). In Group-S, the majority of them had a score of VAS-3 and VAS-2(in 36%, 32% of patients), respectively, and the maximum score was VAS-5 (in 14%), and none of them had a VAS-0 score [Fig-1]. Similarly, more number of higher VAS pain scores was obtained in Group-L than in Group-S during the postoperative period of 24hr and 48hr, which were statistically significant [Fig-2 and Fig-3]. Hence in our study, postoperative pain at 6, 24 and 48 hr was significantly less in Group L as compared to Group- S.

This result was similar to results in other studies like Besra S et al. [4], Prasad KYV et al. [8], Goyal Pet al [18], Nordin P et al. [23], Umerzai FK et al. [24]. Shafique N et al. [25]. In 24hrs postoperative period, in Group-L, the majority of the patients (84%) required one dose, whereas only 10% and 6% of patients required two and three doses. In Group -S, the majority of the patients (70%) required two doses, 9% required three, whereas only 6% required one dose. Until discharge, in Group L, most patients (70%) required only two doses, and the maximum requirement was four doses in 6% of patients.

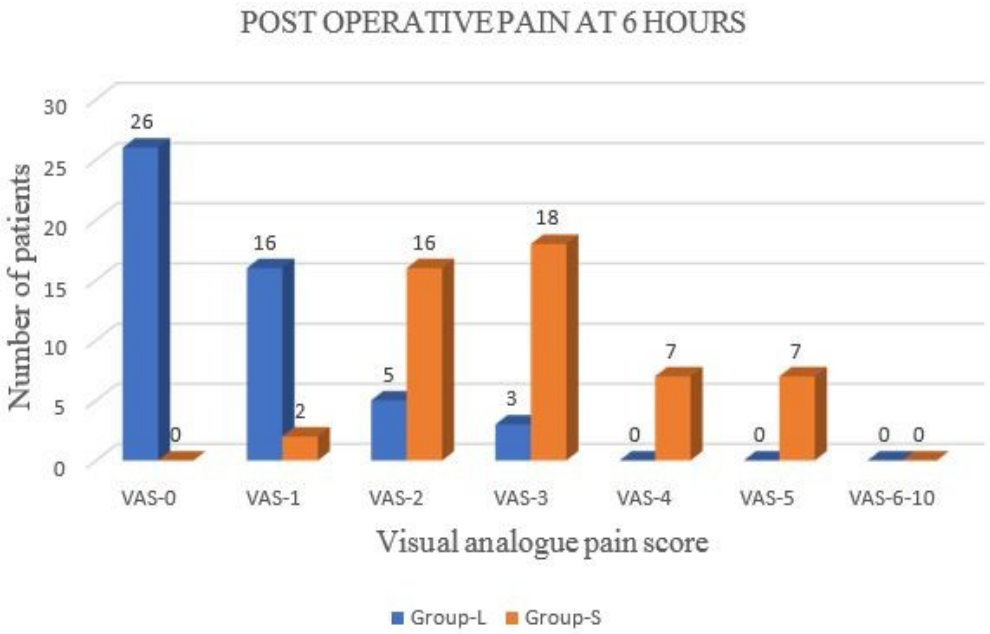

Figure 2: Pain score at 6hrs postoperative period

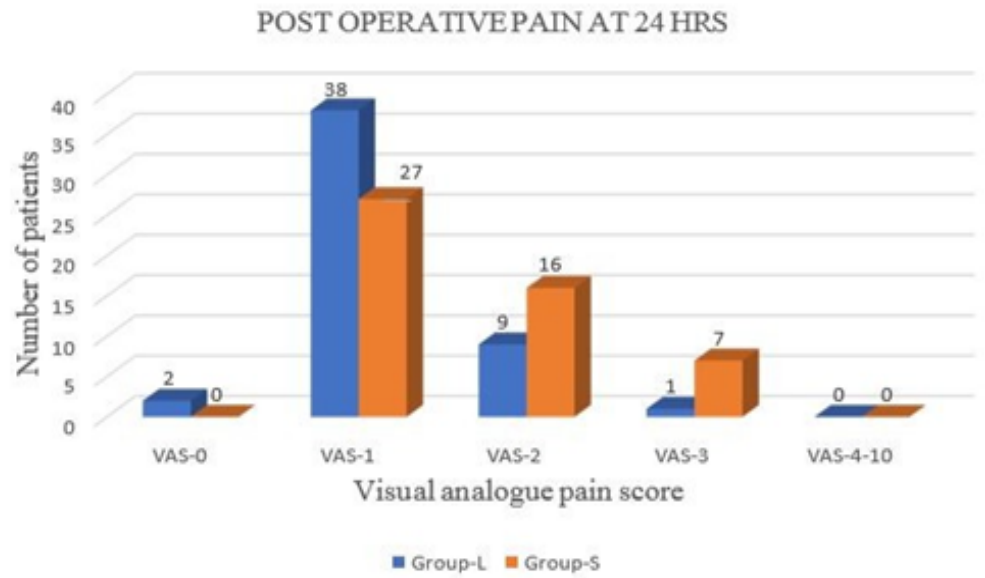

Figure 3: Pain score at 24hrs postoperative period

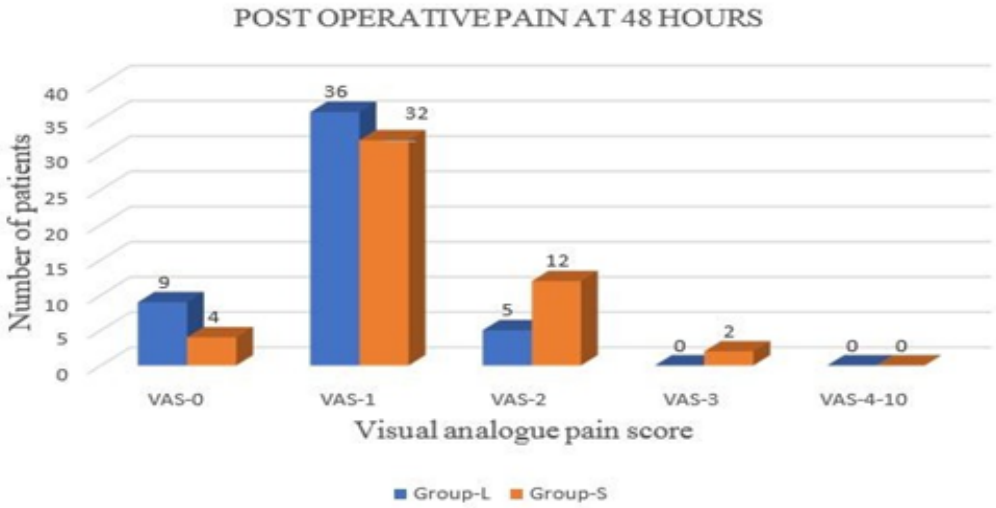

Figure 4: Pain score at 48hrs postoperative period

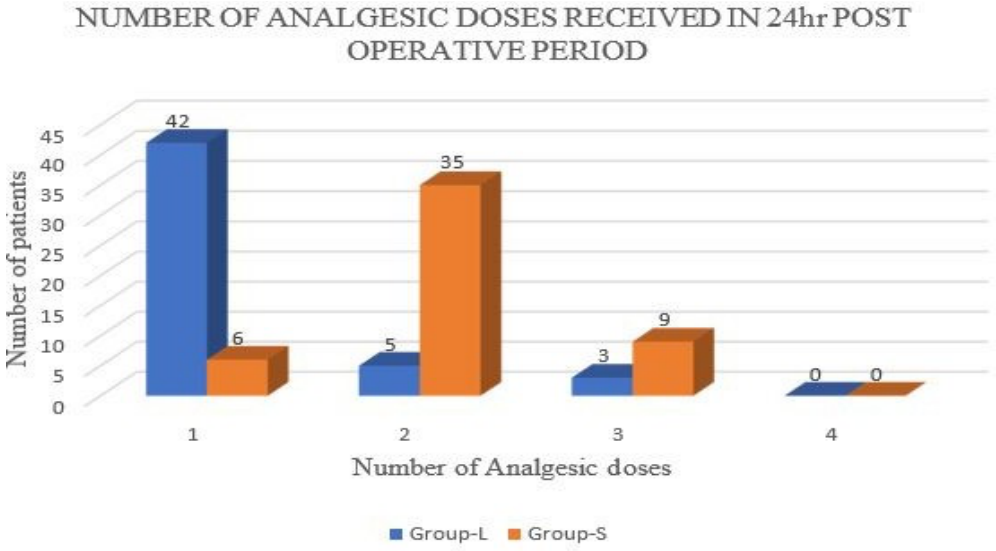

Figure 5: Number of analgesic doses received in 1st 24hrs in postoperative period

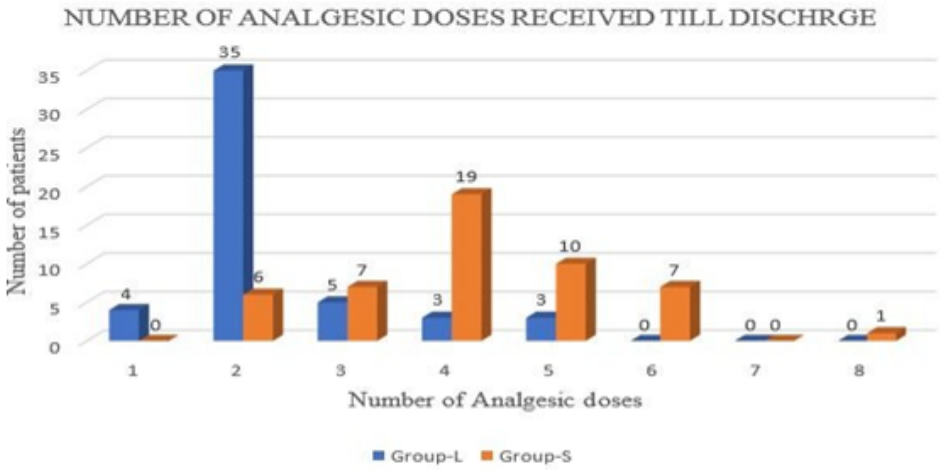

Figure 6: Number of analgesic doses received till discharge

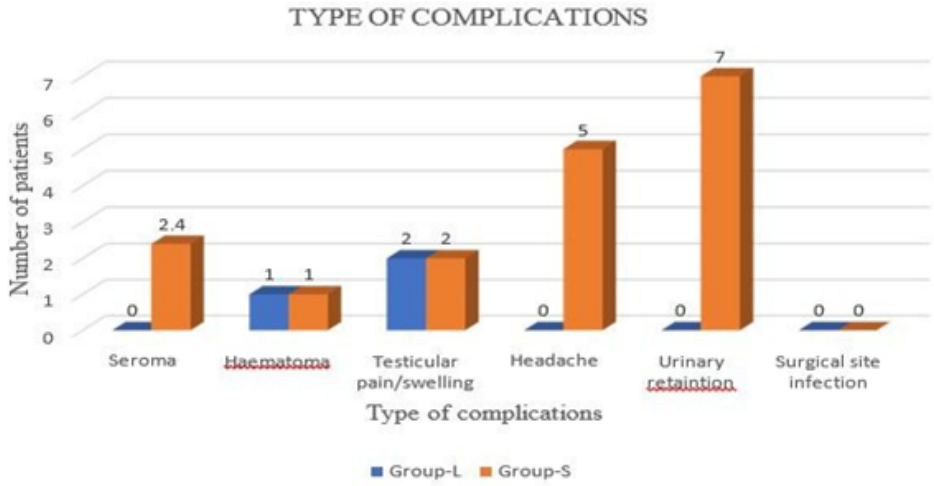

Figure 7: Type of complication and its incidences

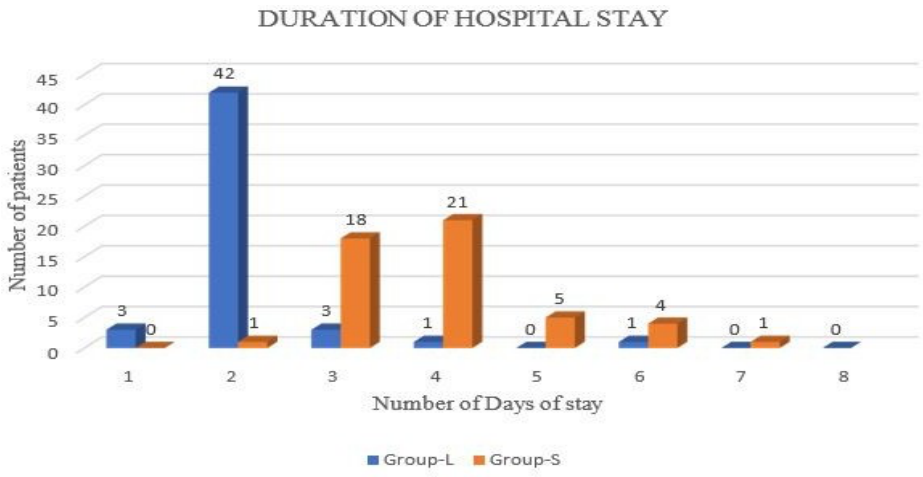

Figure 8: Duration of Hospital stay

In Group-S, 38%, 20% of the patients required four or five doses, and the maximum requirement was eight doses in 2% of patients. Therefore, the requirement for analgesic doses was less in Group-L compared to Group S, which was statistically significant [Fig-5 and Fig-6]. Postoperative pain relief was better in local anaesthesia because pre-incisional field block with local anaesthesia reduces the build-up of nociceptor molecules and lasts longer in the postoperative period [25]. The total postoperative complications seen in Group L and Group S were 6% and 32%, respectively. The complications seen in Group L were wound haematoma 2% and testicular pain 4%. Headache

(10%) and urinary retention (14%) were exclusively seen in Group-S. Moreover, others were seroma 2%, testicular pain 4%—[Fig-7]. Urinary retention and headache were observed by Most patients (66%) in Group-L were mobilized immediately within 3hrs of the postoperative period, whereas in Group-S, 70% of patients mobilized within 6-12hrs, and 28% mobilized within 12-24hrs. As a result, the mean duration of hospital stay was less in Group L (2.12 ± 0.712 days) in comparison to Group S (3.9 ± 1.1days) (p=0.001) [Table-2]. Most of the patients (84%) in Group- L were discharged on 2nd day, and in Group-S, most of the patients were discharged on 3rd (36%) and 4th day (42%) [Fig-8].

In Group-S, urinary retention and more postoperative pain lead to delayed mobilisation and discharge time. So the number of days of stay in hospital was significantly less in patients who received local anaesthesia. Our result was in accordance with results obtained by Besra S et al. [4], Sanjay p et al. [10], Saxena et al. [26] and Gianetta E et al. [27]. Satisfactory response at 6 weeks postoperative period in Group-L was 84% and in Group-S was 80% (p=0.603), hence statistically not significant. In the study by Sanjay p et al. [10], satisfaction was reported in 94% of cases.

Cost-effectiveness could not be studied for the choice of anaesthesia as, in our setup, the government is providing free of cost of all requirements for the procedure. Studies by O' Dwyer PJ et al. [9], Song D et al. [13], and Kark AE et al. [28] found that "economic benefits are enhanced by low morbidity, minimal need for catheter and lesser duration of the recovery room and postoperative ward stay under local anaesthesia".

Conclusions

Lichtenstein tension-free mesh hernioplasty under local anaesthesia is a safer alternative to spinal anaesthesia with intraoperative comfort and satisfactory response at 6 weeks follow-up comparable to spinal anaesthesia. The advantages of hernioplasty under local anaesthesia over spinal anaesthesia are less duration of surgery, less postoperative pain, early mobilisation, less postoperative analgesic dose requirement, early discharge, and no incidence of spinal headache or urinary retention. Moreover, they can be done in centres with no anaesthetic expertise. Hence Lichtenstein tension-free mesh hernioplasty under local anaesthesia can be considered a choice in uncomplicated inguinal hernia.

References

1. Liu N, Greenberg JA, Brooks DC. Inguinal hernia. In: Zinner MJ, Ashley SW, Hines OJ, editors. Maingoat's abdominal operations.13th edition. New Delhi: McGraw –Hill education; 2018; 506- 550.
2. Young DV. Comparison of local, spinal and general anaesthesia for inguinal hernia repair. Am J Surg. 1987; 153:560-3.
3. Callesen T, Bech K, Kehlet H. One-thousand consecutive inguinal hernia repairs under unmonitored local anesthesia. Anesthesia & Analgesia. 2001 Dec 1; 93(6):1373-6.
4. Besra S, Mohanta PK, Mallik C, Hussian NH, Biswas S, Pal S, et al. A comparative study of Lichtenstein hernioplasty performed under spinal anaesthesia versus local anaesthesia in treatment of unilateral inguinal hernia. Int Surg J. 2019; 6:3773-80.
5. Bhat SM. SRB's Manual of General Surgery: Hernia. 4th ed. New Delhi: Jaypee Brothers Medical Publishers; 2013. Chapter 18, Hernia; 797-837.
6. Lichtenstein IL, Shulman AG, Amid PK, Montllor MM. The tension-free hernioplasty. The American Journal of Surgery. 1989 Feb 1; 157(2):188-93.
7. European Society of Regional Anesthesia and Pain Therapy, Post-operative Pain Management-Good Clinical Practice, www. anesthesia-az.com.
8. Prasad KYV, Ganguly A, Vyas BAN, Rai SBK, Bhat SM. Inguinal hernia repair under regional anaesthesia versus local anaesthesia: a comparative study. Sri Lanka Journal of Surgery. 2021; 39(3):14–7.
9. O' Dwyer PJ, Serpell MG, Millar K, et al. Local or general anaesthesia for open tension-free hernioplasty: A randomized trial. Ann Surg. 237:574-79.
10. Sanjay P, Woodward A. Inguinal Hernia Repair: Local or General Anaesthesia? Ann R Coll Surg Engl. 2007; 89: 497-503.
11. Alam M, Qureshi MA, Rasool MI. Outcome of inguinal hernia repair under local anesthesia. Pak J Med Sci 2014 July; 8(3):542-5.
12. Shivakumar KP, Sharma MJ, Ajjappa A. Field block for inguinal hernia repair–a clinical study. Journal of Evolution of Medical and Dental Sciences. 2013 Feb 4; 2(5):452-62.
13. Song D, Greilich NB, White PF, et al. Recovery profiles and costs of anaesthesia for outpatient unilateral inguinal herniorrhaphy. Anaesth Analg. 2000; 91:876-81.
14. Van Veen RN, Mahabier C, Dawson I, et al. (2008) Spinal or local anaesthesia in Lichtenstein hernia repair: A randomized controlled trial. Ann Surg. 247:428-33.
15. Jain A, Jain R, Choudhrie A. Local Anaesthesia versus Spinal Anaesthesia in Inguinal Hernia Surgery-An Evidence-Based Approach. IJARS. 2019; 8: SO01-SO04

16. Goel A, Bansal A, Singh A. Comparison of local versus spinal anesthesia in long standing open inguinal hernia repair. Int Surg J. 2017; 4:3701-3704.
17. Olsha O, Feldman A, Odenheimer DB, Frankel D. Local anesthesia for inguinal hernia repair in adolescents. Hernia. 2007 Dec; 11(6):497-500.
18. Goyal P, Sharma SK, Jaswal KS, et al. (2014) Comparison of inguinal hernia repair under local anesthesia versus spinal anesthesia. IOSR-JDMS. 2014; 13:54-59.
19. Ranani MS, Moghaddam NG, Firouzian A, et al. (2015) A Comparison between Local and Spinal Anesthesia in Inguinal hernia Repair. Int J Clin Anesthesiol. 2015; 3:1041.
20. Prakash D, Heskin L, Doherty S, et al. Local anaesthesia versus spinal anaesthesia inguinal hernia repair: A systematic review and meta-analysis. Surgeon. 2017; 15:47-57.
21. Bhedi A, Damor S, Sarkar A. Inguinal Hernia Repair: Comparison of Local Anaesthesia and Spinal Anaesthesia. JMSCR. 2016; 4:14540-14547.
22. Jolon AM Meyer-bech D, Rosa AD, MarcosAG, Inguinal hernia repair under local anaesthesia, evalution of intraoperative discomfort. Br J Surg. 1995; 82:100-2.
23. Nordin P, Zetterstrom H, Gunnarsson U. Local, regional or general anaesthesia in groin hernia repair: Multicentre randomized trial. Lancet. 2003; 362:853.
24. Umerzai FK, Kalim M, Hussain M. efficacy of local versus spinal anaesthesia for mesh inguinal hernioplasty in terms of postoperative pain. jpmi: Journal of Postgraduate Medical Institute. 2016 Oct 1; 30(4).
25. Shafique N, Rashid HU, Raja MI, Saeed M. Comparison of efficacy of spinal anaesthesia and subfascial local anaesthetic inguinal field block for open inguinal hernia repair- A single institutional experiences. J Ayub Med Coll Abbottabad. 2015; 27(1):197-200.
26. Saxena P, Saxena S. A prospective comparative study of Lichtenstein's mesh hernioplasty performed under local and spinal anesthesia. Int Surg J. 2016; 3:1477-85.
27. Gianetta E, De Cian F, Cuneo S, Friedman D, Vitale B, Marinari G, Baschieri G, Camerini G. Hernia repair in elderly patients. British journal of surgery. 1997 Jul; 84(7):983-5.
28. Kark AE, KuzerMN- Three thousand one hundred seventy five primary inguinal hernia repair advantages of ambulatory open mesh repair using local anasthsia Am. J. coll. Surg. 1998; 186: 1541-7.