

Outcome Assessment of Lichtenstein Hernioplasty under Spinal Anaesthesia V/S Local Anaesthesia

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Abstract

Aim: Comparison of Lichtenstein hernioplasty under spinal anaesthesia v/s local anaesthesia with respect to clinical outcome of hernioplasty based on preoperative, intra operative and postoperative factors (pain, complication, duration of stay in hospital) and also to evaluate proper technique for painless procedure in between spinal anaesthesia and local anaesthesia.

Methods: The present study was conducted by Department of General Surgery at Department of General Surgery, Jawaharlal Nehru medical College and hospital, Bhagalpur, Bihar, India. The study was conducted during the period for six months which included all patients undergoing hernioplasty operation for unilateral inguinal hernia repair during the study period.

Results: The mean (\pm standard deviation) age of the participants put under local anaesthesia, i.e. the A group was 40.5 (\pm 8.6). While those in the B group i.e. those who were given spinal anaesthesia had a mean (\pm standard deviation) age of 42.8 (\pm 8.7). Unclear anatomy was observed in 11 patients of the A group and 8 patients of the A group. Increased muscle tone was observed in 7 patients in A group and 5 patients of the B group. However, cauterization difficulty was different in proportion in A group and B group, which was statistically significant on Fisher's Exact Test ($p < 0.001$).

Conclusion: The study concludes that local anaesthesia certainly has some advantages over spinal anaesthesia - postoperative pain and postoperative complications like urinary retention, headache, and hypotension were more evident in spinal anaesthesia.

Keywords: Inguinal hernia, Lichtenstein repair, Hernioplasty, Spinal anaesthesia, Local anaesthesia

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Introduction

A hernia is the bulging of part of the contents of the abdominal cavity through a weakness in the abdominal wall. [1] 75% of abdominal wall hernias occur in the

groin, and it has been documented that while the lifetime risk of inguinal hernia is 27% in males, it is 3% in females, indicating thereby a gender predisposition

of inguinal hernias. [2,3] Incidence of inguinal hernia has a bimodal age distribution in males, with peaks before the first year and after 40 years of age. [4]

A globally aging population means that the demand for surgical services for hernia is ever increasing. The technical aspect of hernia surgery has evolved over time. Numerous techniques have been described to date for the repair of inguinal hernia-both open and laparoscopic. Open method of inguinal hernia repair remains popular worldwide. It can be performed under all types of anaesthesia- general, spinal, epidural and local. Open repair under local anaesthesia has been reported to be both safe and economic. However, its use is not wide spread despite benefits observed by several centers of excellence worldwide. [5]

Traditionally, patients undergoing inguinal hernia surgery were administered regional anaesthesia which was considered as gold standard as it is simple, cost effective with requirement of basic skills, and safe. But at the same time was associated with complications of intra operative of hypotension and post-operative complications of nausea, vomiting, headache, backache, urinary retention. [6] Another limitation of regional anaesthesia is contra-indications like spinal deformity, dermatological conditions, clotting disorders and anti-coagulant therapy etc.

Like in any surgical procedure performed under spinal anaesthesia when hernioplasty is carried out there are complications of spinal anaesthesia itself in many instances. Common complications which follows the administration of spinal anaesthesia in immediate and post-operative periods are hypotension, nausea, vomiting, post dural puncture headache, urinary retention and so on. [7-10] But the incidence of all the above mentioned complications is quite low in case of local anaesthesia.

Many specialised hernia centres like should ice or Lichtenstein hernia institutes have adopted the use of local anaesthesia hernia repair surgeries. Metanalysis comparing the outcome of SA vs. LA for hernia surgery which included 10 RCT concluded that LA was better than SA in pain control, urinary retention, and decreased rate of anaesthetic failure. [11] Similarly, another metanalysis comparing LA to other anaesthesia concluded LA to be better tolerated in terms of urinary retention and operative time. [12]

This study aims to compare hernioplasty done under spinal anaesthesia and local anaesthesia and to find out better anaesthesia choice for the procedure. Comparison of Lichtenstein hernioplasty under spinal anaesthesia v/s local anaesthesia with respect to clinical outcome of hernioplasty based on preoperative, intra operative and postoperative factors (pain, complication, duration of stay in hospital) and also to evaluate proper technique for painless procedure in between spinal anaesthesia and local anaesthesia.

Methods

The present study was conducted by Department of General Surgery at Department of General Surgery, Jawaharlal Nehru medical College and hospital, Bhagalpur, Bihar, India. The study was conducted during the period for six months which included all patients undergoing hernioplasty operation for unilateral inguinal hernia repair during the study period.

A total of 100 patients were studied, 50 in one group named A Group and 50 in other group named B. Calculation is based on fact that 60% of the surgeries are done under spinal anaesthesia and 40% in local anaesthesia in Jawaharlal Nehru medical College and hospital, Bhagalpur, Bihar, India on routine basis.

Sample design

Patients were selected into 2 groups i.e. A and B group. Selection was done by envelope method, i.e. patients coming under inclusion criteria were told to choose one envelope in which previously written letter, either A or B. B group - operated by standard Lichtenstein hernioplasty under spinal anesthesia. A group - operated by standard Lichtenstein hernioplasty under local anesthesia

All patients with reducible, uncomplicated unilateral inguinal hernias in the age between 18 to 60 years were included in the study. Patients with bilateral and recurrent inguinal hernias were excluded from the study.

Data recorded during preoperative, intra operative & postoperative period were arranged in a master table and various statistical methods were applied for the data analysis to arrive at specific conclusions.

Anesthetic procedure

Spinal anesthesia

Anaesthesia was administered as standard procedure in subarachnoid space at L3-L4 space with 5% Bupivacaine (H). Anaesthetic failure patients were converted to GA and were excluded from the study.

Local anesthesia

Mixture local solution is prepared for infiltration. It included 20 ml of 1% Lidocaine with Epinephrine, 30 ml of 0.25% Bupivacaine without epinephrine and 10 ml of Sodium bicarbonate solution and then diluted with 40 ml of normal saline. [13,14]

Statistical analysis

The data collected was entered in MS Excel 2016. The data was analyzed by IBM SPSS version 22.0 (licensed). Proportions were calculated. Chi-square test was used to compare the proportions. Two-tailed significance test with p value of 0.05 or less was considered to be statistically significant.

Results

Table 1: Central tendencies and dispersion measures of age of the participants in the two study groups

Age (in years)	Study Groups		P value
	Local anaesthesia	Spinal anaesthesia	
Mean (\pm SD)	40.5 (\pm 8.6)	42.8 (\pm 8.7)	0.950
Median (inter-quartile range)	42.0 (12.0)	43.0 (11.0)	0.520
Minimum	23	20	-
Maximum	56	57	-

Table 1 shows the age distribution of the study participants. The mean (\pm standard deviation) age of the participants put under local anesthesia, i.e., the A group was 40.5 (\pm 8.6). While those in the B group i.e., those who were given spinal anesthesia had a mean (\pm standard deviation) age of 42.8 (\pm 8.7).

Table 2: Distribution of the participants according to different intra-operative difficulties encountered among the study groups

Different intra-operative difficulties	Study Groups		P value
	Local anaesthesia	Spinal anaestesian	
Unclear anatomy	10	8	0.430
Cauterization difficulty	12	0	<0.001
Increased muscle tone	7	5	0.840

Table 2 is a multiple response table, which summarizes the proportions of different intra-operative difficulties encountered. Unclear anatomy was observed in 10 patients of the A group and 8 patients of the B group. Increased muscle tone was

observed in 7 patients in A group and 5 patients of the B group. However, cauterization difficulty was different in proportion in A group and B group, which was statistically significant on Fisher's Exact Test ($p < 0.001$).

Table 3: Distribution of the participants according to intra-operative pain perceived among the study groups

Intra-operative pain	Study Groups		P value
	Local anaesthesia (n %)	Spinal anaesthesia (n %)	
No pain	35 (70%)	36 (72%)	0.350
Mild pain	8 (16%)	8 (16%)	
Moderate pain	4 (8%)	3 (6%)	
Severe pain	3 (6%)	3 (6%)	
Total	50	50	

Table 3 discusses the distribution of participants in different study groups as per perception of intra-operative pain. It was observed that in both the group A and B, majority of the participants (70% and 72% respectively) had no perception of pain intra-operatively. Around 16% of those who underwent local anaesthesia had mild perception of pain, while a similar

mild intra-operative pain was reported by 16% of those given spinal anaesthesia. Moderate and severe pain was reported by one participant each for A group and for B group it was two and one participant respectively. The observed difference in trend was not statistically significant ($p = 0.350$).

Table 4: Central tendencies and dispersion measures of duration of hospital stay after surgery (hrs) for the participants in the two study groups

Duration of hospital stay after surgery (hrs)	Study Groups		P value
	Local anaesthesia (n %)	Spinal anaesthesia (n %)	
Mean (\pm standard deviation)	24.6 (\pm 12.8)	57.3 (\pm 16.4)	0.007
Median (inter-quartile range)	25.0 (8.0)	48.0 (24.0)	0.001
Minimum	12	24	-
Maximum	72	96	-

Table 4 summarizes the mean, median and maximum and minimum values of duration of hospital stay after surgery. The mean (\pm SD) post-operative duration of hospital stay for those put under local anaesthesia, i.e. the A group was 24.6 (\pm 12.8) hours. While those in the B group i.e. those given spinal anaesthesia had a mean (\pm SD) post-operative duration of hospital stay of 57.3 (\pm 16.4) hours. The range in the A group was 12-72 hrs while in B group it was 24 - 96 hrs. The median duration of stay in L and S groups were

respectively 25.0 and 48.0 hrs. The differences were statistically significant amongst the study groups with respect to both mean and median.

Discussion

Inguinal hernia in the earlier phase is a neglected morbidity. As the disease progresses, it can lead to grave complications in the form of obstructed and strangulated hernia. [15] Early intervention can stop this progression and the complications can be avoided. 16 Uncomplicated hernia can be operated

under local anaesthesia as a standard procedure as well as under spinal anaesthesia. Intraoperative difficulties faced by the surgeon are of paramount importance in this study. It consists of cauterization difficulty, unclear anatomy and increased muscle tone.

Painless operative procedure is always desired and appreciated by both patient and surgeon. In this study, in both spinal and local anaesthesia group major proportion of patient did not complain of pain intra-operatively. The number of patients complaining of mild pain is greater in local anaesthetic group and that complaining of moderate to severe pain is almost equal in both the groups ($p=0.342$). This data correlates with findings of Goyal. [17] They have concluded that local anaesthesia is better in terms of intra operative pain management but this result is contradicting the findings of Singh. [18]

Postoperative pain is the most important variable and the soul of this study. Patient and surgeon satisfaction with acceptability depends upon postoperative pain. Postoperative pain control was better in local anaesthesia because pre-incisional field block with local anaesthesia reduces the build-up of nociceptor molecules and that also lasts for longer duration in the postoperative period. [19]

Mean duration of hospital stay after operation was 24.6 ± 12.8 hours in comparison to 57.3 ± 16.4 hours in case of spinal group, $p=0.006$. Early mobilization was possible with less or nil pain in case of local anaesthesia group, hence were discharged earlier than the spinal group. This result is similar with study by Saxena. [20]

The post op pain is compared using visual analogue scale. Readings were taken on 2nd hour, 6th hour, 12th hour, 24th hour and 48th hour post operatively. Taking 2 hour postoperative period into consideration, both in local and spinal group, majority of the patients did not

complain of pain. However, of those who did complain of pain, more of them were from the local anaesthesia group. The difference observed in the two groups were not statistically significant, $p=0.072$. At 6th postoperative hour, results were different. Patients operated under local anaesthesia were in VAS 0-2 and some patients complained little more pain and that was controlled by analgesics. However in spinal group patients complained of comparatively more pain. Majority were in VAS 2-4 categories. The comparison was statistically significant, $p=0.004$. As the time progressed to 12th postoperative hour, local group had less postoperative pain as compared to spinal anaesthesia. 95.2% patient has VAS score of 0 to 4 in local anaesthesia. In spinal anaesthesia, 78.6% patients have VAS score of 2 to 6. The comparison is statistically significant, $p=0.042$. On 24th hour again one reading was taken. In both group patients were limited to VAS score 0 to 6. 52.4% patients of local anaesthesia had no pain whereas 23.8% of patients did not complain any pain. $P=0.041$, which is statistically significant.

On 48th hour of postoperative pain, both group had similar results, $p=0.132$. These findings regarding postoperative pain very well correlates with various studies done by Mengal et al, Jethva et al, Goyal et al. [17,21,22,23] All of them have observed that postoperative pain is less with local anaesthesia but result not correlates with observation of Singh who had found postoperative pain is similar in both groups. [18]

Conclusion

The study concludes that local anesthesia certainly has some advantages over spinal anesthesia - postoperative pain and postoperative complications like urinary retention, headache, and hypotension were more evident in spinal anesthesia. Using local anaesthesia can usher surgeons towards day care or short stay surgery since it leads to fewer complications and

quicker recovery time, which in turn results in early discharge. Shorter hospital stay causes reduced financial burden on the patients as well as hospitals. It can be considered for all patients including those not suitable for regional or general anaesthesia. Additionally, strength of the posterior wall of abdomen can be determined intra-operatively or a missed hernia can be identified. Thus, local anaesthesia is a safe, efficient and cost-effective option for inguinal hernia repair compared to spinal anaesthesia in terms of patient benefits and satisfaction.

References

1. Williams NS, O'Connell PR, McCaskie A, editors. Bailey & Love's short practice of surgery. CRC press; 2018 Apr 27.
2. Beadles CA, Meagher AD, Charles AG. Trends in emergent hernia repair in the United States. *JAMA surgery*. 2015 Mar 1;150(3):194-200.
3. Mehta A, Hutfless S, Blair AB, Dwarakanath A, Wyman CI, Adrales G, Nguyen HT. Emergency department utilization and predictors of mortality for inpatient inguinal hernia repairs. *journal of surgical research*. 2017 May 15; 212:270-7.
4. Brunnicardi CF. Schwartz's Principles of Surgery, 10th Ed, McGraw Hill, 2015: 1495.
5. Abdu RA. Ambulatory herniorrhaphy under local anesthesia in a community hospital. *The American Journal of Surgery*. 1983 Mar 1;145(3):353-6.
6. Urbach KF, Lee WR, Sheely LL, Lang FL, Sharp RP. Spinal or general anesthesia for inguinal hernia repair? a comparison of certain complications in a controlled series. *JAMA*. 1964;190(1):25-9.
7. Kaban OG, Yazicioglu D, Akkaya T, Sayin MM, Seker D, Gumus H. Spinal anaesthesia with hyperbaric prilocaine in day-case perianal surgery: Randomized controlled trial. *Scientific World J*. 2014;60(8):372.
8. Fischer Josef E et al. Fischer's Mastery of Surgery, 7th Ed, Wolters Kluwer, 2018: 2220.
9. Pirbudak L, Özcan HI, Tümtürk P. Postdural puncture headache: Incidence and predisposing factors in a university hospital. *Ağrı*. 2019;31(1):1-8.
10. Mahan KT, Wang J. Spinal morphine anaesthesia and urinary retention. *J Am Podiatric Med Association*. 1993;83(11):607-14.
11. Prakash D, Heskin L, Doherty S, Galvin R. Local anaesthesia versus spinal anaesthesia in inguinal hernia repair: A systematic review and meta-analysis. *The Surgeon*. 2017 Feb 1;15(1):47-57.
12. Argo M, Favela J, Phung T, Huerta S. Local VS. Other forms of anesthesia for open inguinal hernia repair: A meta-analysis of randomized controlled trials. *Am J Surg*. 2019;218(5):1008-15.
13. Fazli M, Hashemi SA. A Comparison between Local and Spinal Anaesthesia in Inguinalhernia Repair. *Int J Clin Anesthesiol*. 2015;3(1):1041.
14. Umerzai FK, Kalim M, Hussain M. Efficacy of local versus spinal anaesthesia for mesh inguinal hernioplasty in terms of postoperative pain. *J Postgrad Med Inst*. 2016;30(4):318-22
15. Ohene-Yeboah M, Abantanga FA. Inguinal hernia disease in Africa: A common but neglected surgical condition. *West Afr J Med*. 2011;30(2):77-83.
16. Malik AM, Khan A, Talpur KA, Laghari AA. Factors influencing morbidity and mortality in elderly population undergoing inguinal hernia surgery. *J Pak Med Assoc*. 2010;60(1):45-7.
17. Goyal P et al. Comparison of Inguinal Hernia Repair under local anaesthesia versus spinal anaesthesia. *IOSR J Dent Med Sci*. 2014;13(1):54-9.

18. Goel A, Bansal A, Singh A. Comparison of local versus spinal anesthesia in long standing open inguinal hernia repair. *Int Surg J.* 2017;4(11):3701-4.
19. Shafique N, Rashid HU, Raja MI, Saeed M. Comparison of efficacy of spinal anaesthesia and sub-fascial local anaesthetic inguinal field block for open inguinal hernia repair-a single institutional experience. *Journal of Ayub Medical College Abbottabad.* 2015 Mar 1;27(1):197-200.
20. Saxena P, Saxena S. A prospective comparative study of Lichtenstein's mesh hernioplasty performed under local and spinal anesthesia. *International Surgery Journal.* 2016 Dec 9;3(3):1477-85.
21. Zafer Mengal H. Comparison of outcome of local versus spinal anaesthesia in mesh inguinal hernioplasty with respect to pain and hospital stay. *PJMHS.* 2016;10(3):3.
22. Jethva J, Gadhavi J, Patel P, Parmar H. Comparison of hernioplasty under local anaesthesia v/s spinal anaesthesia. *Int Arch Integrated Med.* 2015;2(5):48 – 55.
23. IJ O., J O. J., & U O. B. Evaluation of the Effectiveness of Intra-operative Low Dose Ketamine Infusion on Post-operative Pain Management Following Major Abdominal Gynaecological Surgeries. *Journal of Medical Research and Health Sciences,* 2022; 5(10): 2269–2277.