

## Original Article

## Comparison of Mesh Inguinal Hernioplasty Under Local versus Spinal Anesthesia

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### Abstract

**Objective:** Postoperative pain and costs are regarded as equally important issues as technique and recurrence rates in inguinal hernia repair. Postoperative pain may vary according to the method by which an anesthesia is applied.

To compare mesh inguinal hernioplasty under local versus spinal anesthesia with reference to postoperative pain and hospital stay of patient.

**Methods:** A randomized control trial study was conducted at North Surgical Unit, Mayo Hospital Lahore Pakistan. Duration of the study was six months in which a total of 82 patients (41 in each group) were observed by using 79% proportion of pain in local and 99% proportion of pain in spinal. 7.95% confidence level and 90% power of test under WHO software for sample size determination. Furthermore non probability purposive sampling technique was used for sample collection.

**Results:** The mean age in Group A (local anaesthesia) was 30 years with SD +6.47 and in Group B (spinal anaesthesia) was 31 years with SD + 6.98 in this study. All the patients in both the groups were males. Post operatively the pain score values as well as duration of hospital stay of patients were found to be lower in Local anesthesia group as compared to Spinal Anesthesia group.

**Conclusion:** Local anesthesia not only reduces post-operative pain but also facilitates patient's mobilization and discharge along with decreasing the early complications that occur post operatively. Thus, Local Anesthesia is comparatively secure and advantageous method to be applied in inguinal hernia repair for day care surgery.

**Key Words:** local vs. spinal anaesthesia, mesh inguinal hernioplasty, pain, hospital stay

### How to cite this:

Sandhu MF, Fazal MI, Hassan M, Jawad M, Arooj Z, Munir W. Comparison of Mesh Inguinal Hernioplasty Under Local versus Spinal Anesthesia. J Pak Soc Intern Med. 2021;2(3): 226-230

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### Introduction

A condition in which a viscous or part of it is displaced and protrudes through the wall of cavity in which it is contained (often involve the intestine at a weak point in the abdominal wall) is known as hernia.<sup>1</sup> Elective inguinal herniorrhaphy is commonly performed surgery globally.<sup>2</sup> The fundamental principle of hernia repair is tension free repair. The major evolution in hernial repair is the thought of tension free repair with prosthetic material and also the more recently laparoscopic repairs for hernia. Lichtenstein hernioplasty is simple, effective, and easy to learn for surgical residents and also it has low recurrence rate.<sup>3,4</sup> Postoperative pain is minimum

due to less tension on tissues.<sup>5</sup> Lichtenstein hernioplasty can be performed under general, local, as well as regional anesthesia. Spinal anesthesia has advantage of complete work up of the patient. On the other hand it has disadvantages like cost of spinal anesthesia is more as compare to local anesthesia, cardiovascular and urinary complications after operation, monitoring, and longer hospital stay.<sup>6</sup> Local anesthesia is cost effective, secure, rapid in onset, has minimum post-operative complications, and beneficial in decreasing the list load of elective surgeries. Another major benefit of local anesthesia is postoperative pain relief as it has quick but long lasting effect.<sup>6</sup>

Patient is fully awake under local anesthesia and can walk just after surgery that minimize the duration of hospital stay after operation. Early ambulation reduces the postoperative convalescence period and many of the patients can resume their work early. Local anesthesia especially in elderly and moribund patients can be preferred as it averts the patients from systemic effects related with general and spinal anesthesia.<sup>7</sup>

Selection of anesthesia for patients undergoing inguinal mesh hernioplasty varies from institution to institution. Usage of local anesthesia for inguinal mesh hernioplasty varies from 7% to 79%, depending on different hospital practice. In developed countries generally spinal anesthesia is employed in 10-20% of cases while in specialist hernia centers local anesthesia is used for all hernia surgeries to achieve 100% day case rates. Spinal anesthesia for inguinal mesh hernioplasty has been employed from 57% to 96% of cases.<sup>8</sup> Similarly Gayeseker and Hakan Kulocoglu found in their study that in the year between 2005- 2010 mesh hernioplasty under local anesthesia surged from 2.1% to 61.2% (7.7fold), while spinal anesthesia increased from 4.2% to 20.6% (4.9 fold), studies demonstrate significant variability in time and settings therefore further studies are required to get to conclusive statistics.<sup>9</sup>

The aim of this study is to compare local and spinal anesthesia for mesh inguinal hernioplasty with regard to post-operative pain and hospital stay. We designed to do this study in order to get to possible and real statistics of both spinal anesthesia and local anesthesia for inguinal mesh hernioplasty. The surgeon himself can give local anesthesia while spinal anesthesia can only be given by the anesthetist. The aim is to compare the any differences in postoperative pain and duration of hospital stay. It can help to decrease the financial burden, duration of admission of patients and work load of the medical team.

## Methods

**Study Design:** Quasi experimental study design used  
**setting:** North Surgical Unit, Mayo Hospital Lahore Pakistan  
**Study Duration:** Six months

**Sample Size:** There is sample size of 82 patients (41 in each group) using 79% proportion of pain in local and 99% proportion of pain in spinal. 95% confidence level and 90% power of test.

**Technique of Sampling:** Non probability purposive sampling

**Sample Selection:**

**Criteria Of Inclusion:**

- Gender :Male
- Age : 18 -80years

- Inguinal hernia with following characteristics:
  - Reducible
  - Unilateral

**Exclusion Criteria:**

- Obstructed hernia
- Recurrent hernia
- Strangulated hernia
- Patients with contraindication to spinal anesthesia

**Data Collection Procedure:**

A total of 82 patients diagnosed with inguinal hernia that were fulfilling inclusion criteria were registered through in patient department of Surgery, North surgical unit, Mayo Hospital, Lahore. Patients were explained about the nature of research and an informed consent obtained in all cases. The demographic information and variables like name, age, sex, and address collected through Performa. Patients fulfilling inclusion criteria were randomly allocated in 2 groups. Randomization was done by using random table. All 41 patients in Group A received local anesthesia & all 41 patients in group B received spinal anesthesia. Result in the form of post- operative pain through the pain scale was assessed at 2,4 and 8 hours after surgery and of hospitalstay in terms of hours starting from the time of incision given to the time of discharge was calculated. All this information collected through a designed questionnaire form.

Subjective pain scoring on a 1-10 pain rating scale at post-operative day 2, 4 and 8 hours after surgery done in both groups. Hospital stay was calculated in terms of hours starting from time of incision given to time of discharge from hospital. Criteria to discharge that patient remained pain free and no other complaint or any anesthesia complication. Confounding factors addressed through inclusion and exclusion criteria. The data collected was entered in SPSS Version 20 and then analyzed accordingly. Table and graphs were used to express the variables. Standard deviation and mean was used to measure numerical variables like age of patient. Percentage and frequency was used to measure qualitative variables like gender of patient and operation. To test the significance of quantitative data like age, pain score and hospital stay hours student T test was used. P-value of 0.05 was considered level of significance.

## Results

The mean age in group-A patients was  $30 \pm 6.47$  years and that in group B was  $31 \pm 6.98$  years. Status of pain among two groups was analyzed at an interval of 2, 4 and 8 hours postoperatively. In Group A (local anaesthesia) at 2 hours 30(73.2%) patients didn't had pain while 12(26.8%) patients had pain score < 3 and no

patients had pain score > 3. On the other hand in Group B (spinal anaesthesia) at 2 hours 16(39%) patients didn't had pain while 24(58.5%) patients had pain score <3 and 1(2.4%) patients had pain score >3. In Group A (local anaesthesia) after 4 hours 30(73.2%) patients didn't had pain while 11(26.8%) patients had pain score <3. Where as in Group B (spinal anaesthesia) after 4 hours 13(31.7%) patients didn't had pain while 22 (53.7%) patients had pain score<3 and 6(14.6%) patients had pain score>3. In Group A(local anaesthesia) after 8 hours 15(36.6%) patients didn't had pain while 22(53.7%) patients had pain score < 3 and 4 (9.8%) patients had pain score>3. Whereas in Group B (spinal anaesthesia) after 8 hours 13(31.7%) patients didn't had pain while 23(56.1%) patients had pain score < 3 and 5(12.4%) patients had pain score >3. (As shown in Table No 2). Patient having pain score more than 3 were given injection dicloran 75mgIM for pain relief. Thus results conclude that in comparison to spinal anesthesia the local anesthesia has relatively good post-operative pain control. In terms of hospital stay duration in Group A (local anaesthesia) after 8 hours of surgery 38(87.8%) were fit to discharged after assessment while in Group B (spinal Anesthesia) 27(65.9%) were discharged and after 12 hours 1(2.4%) patient remained admitted in group A while 10(24.4%) in group B. After 24 hours all the patients from Group A were discharged but 2(4.9%) patients from group B remained admitted due to some post-operative complications.

**Table 1:** Comparison of pain status in both groups at different intervals

Pain	Groups	Pain Score			P-Value
		No Pain	<3	≥3	
after 2 hours	Local	30(73.2%)	11(26.8%)	0(.0%)	0.001
	Spinal	16(39.0%)	24(58.5%)	1(2.4%)	
after 4 hours	Local	30(73.2%)	11(26.8%)	0(.0%)	0.013
	Spinal	13(31.7%)	22(53.7%)	6(14.6%)	
after 8 hours	Local	15(36.6%)	22(53.7%)	4(9.8%)	0.605
	Spinal	13(31.7%)	23(56.1%)	5(12.2%)	

**Table 2:** Comparison of hospital stay / discharge in both groups

Duration		Anesthesia		P-Value
		Local	Spinal	
After 8 Hour	Admitted	5(12.2%)	14 (34.1%)	0.003
	Discharged	38(87.8%)	27 (65.9%)	
After 12 Hour	Admitted	1 (2.4%)	10 (24.4%)	0.001
	Discharged	40 (97.6.0%)	31 (75.6%)	
After 24 Hour	Admitted	0 (0.0%)	2 (4.9%)	0.494
	Discharged	41 (100.0%)	39 (95.1%)	
After 48 Hour	Admitted	0 (0.0%)	1 (2.4%)	1
	Discharged	41 (100.0%)	40 (97.6%)	

**Discussion**

Lichtenstein hernioplasty is becoming popular these days because of less rate of recurrence and it can be performed under local, general and spinal anaesthesia. The incidence of postoperative morbidity, pain, hospital stay and expenses is related to the type of anesthesia being employed. The study is designed in order to compare the two types of anesthesia with regard to control of pain and duration of Hospital stay after surgery. Local anesthesia is easy to perform and requires simple training. Studies prove that the best secure approach to geriatric patient is to perform hernioplasty using local anesthesia. (149-51) All over UK, the day-case rate for inguinal hernia repair in the year 2003 was around 20%. One of the main reason for achieving about 100% day case rates by specialists in hernia centers is use of local anesthesia for hernioplasty.<sup>11</sup>

In this study mesh hernioplasty was done under local and spinal anesthesia for which the patients were randomly divided into two groups. Pain was assessed at an interval of 2, 4 and 8 hours after surgery and duration of admission after surgery was also checked for first 48 hours. The mean age of patients in Group A (local anesthesia) was 30±6.47 years while in Group B (spinal anesthesia) the mean age of patients was 31±6.98. All the patients in both the groups were male. Local anesthesia (L/A) did not decrease the time of operation. However, it was associated with minimum stay in recovery room after surgery and was demanding significantly less post-operative monitoring. The reason that why a shift to local anesthesia is not in line with guidelines of Royal college of surgeons is perhaps because surgeons are more comfortable with the techniques of general anesthesia and spinal anesthesia as compare to local anesthesia. This also explains why quite less number of surgeons offer their patients L/A for hernioplasty.<sup>12</sup>

In Group A 9.8% patients had complaint of pain while in Group B 14.6% patients had complaint of pain after 2 hours of surgery. Patient ratio remained same in group A while ratio increased to 22.0% in group B after 4 hours of surgery and lastly after 8 hours of surgery the ratio of patient complaining pain was 17.1% more in group B as compared to group A. Whereas in another results done by Bahroozm et.al,<sup>13</sup> shows that the effectiveness for pain in patients underwent in surgery in local anaesthesia was 70% and that of in spinal anaesthesia was 65%.

The benefits of local anesthesia before surgery of hernia had been probed by Tuerskoy et.al,<sup>14</sup> They found that both the constant and incident pain to be less severe for almost up to forty-eight hours post-operatively as compared to those who received no local anesthesia. Kehlet also found decrease in post-operative pain and

analgesia usage in local anesthesia.<sup>15</sup> All these findings are consistent with our study showing decrease in analgesic usage. Decrease in post-operative vomiting and nausea leads to shorter hospital stay of patient. The prospective study gives short-term results of 208 inguinal herniorrhaphy performed under local anesthesia. Local anesthesia could not be achieved in 1 (0.5%) patient because he was panic-stricken. No serious complications occurred. The mean hospital stay after hernia surgery reported as 2.8 days (1-10). Twenty seven (13%) patients were discharged on 1st postoperative day, 93(46%) in a period of time less than or equal to 2 days, 147(73%) in a period less than or equal to 3 days and 184(91%) in a period less than or equal to 4 days.<sup>16</sup>

In a study review by Sanjay a total of 52% cases of local anesthesia had hospital stay of < 1 day while about 58% cases of spinal anesthesia and general anesthesia had hospital stay of > 1 day. The study conducted, the patients in group A 80% had hospital stay of < 12 hours while in group B 75 % of patients had hospital stay duration of > 12 hours.<sup>17</sup>

In a study conducted at Liaquat University Hospital, Jamshoro from January 2008 to October 2009 the mean age of patients was 38.5 ± 10.12 years, among those patients 81 (75%) had indirect inguinal hernia; while 27(25%) had direct inguinal hernia. Among those patients 31 (28.70%) developed wound pain, and in that 17 (54.83%) were in the early phase and 14 (45.16%) were in the late phase of pain. Out of these two patients (1.85) in early post-operative phase had complain of vomiting and only one (0.92%) patient had complain of urinary retention, while on other hand 3(2.7%) patients in late phase had complain of wound infection. In this study duration of hospital stay was between 6–52 hours with mean of 27.27 ± 9.91 hours. Local anesthesia has certain advantages like short hospital stay after surgery, decrease risk of cardiopulmonary complications, and early return to normal routine life.<sup>18</sup>

Urinary retention after repair under local anesthesia is less common as compared to spinal anesthesia, In my study 4.8 % patients had postoperative urinary retention. This figure is slightly higher than 2% reported by Chaudri Avetal<sup>19</sup> but almost comparable to 4% by Rehman AU et al.<sup>20</sup>

The number of elderly patients with inguinal hernia repair is increasing with increasing life expectancy. The group of older people is more likely to have concurrent diseases and therefore are more prone to complications related to general or spinal anesthesia, especially complication related to cardiovascular system as well as urinary retention and spinal headache. All these not only increase hospital stay of patient but also build up the cost of treatment.<sup>14</sup>

This study provides proof that local anesthesia is practicable in most cases of inguinal hernia repair and is superior to spinal anesthesia. Besides being cost effective, local anesthesia provides highly acceptable intra-operative analgesia, and minimum post-operative pain<sup>21,22</sup> early mobilization and recovery. It also minimizes work load on anesthetist and other operation theater staff. The unwillingness of surgeons to offer local anesthesia can be reduced by increasing awareness and demonstrating the techniques of local anesthesia administration in workshops.

### Conclusion

Patients undergoing mesh repair of inguinal hernia under local anesthesia experienced less pain as shown by the Wong Backer pain scale. The difference was however statistically insignificant. But it facilitates patient's mobilization and early discharge. Thus, the study shows that local anesthesia is a secure and beneficial method for day care surgery of inguinal hernia repair.

### Conflict of Interest

None

### Funding Source

None

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