

Lichtenstein Inguinal Hernia Tension Free Mesh Repair Under Total Intravenous Versus Regional Anaesthesia

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Abstract

Introduction: Surgery for Inguinal hernia can be performed under a variety of anaesthesia techniques such as general anaesthesia, spinal anaesthesia and epidural anaesthesia. Patient safety and the provision of optimal operating conditions for the surgeon are the main criteria for the selection of anaesthesia technique [1]. **Aims & objectives:** To compare the results of Lichtenstein inguinal hernia tension free mesh repair operated under Propofol, Total Intravenous Anaesthesia (TIVA) + Local Infiltration with those operated under Regional Anaesthesia (Spinal/ Epidural) in terms of various parameters. **Methodology:** Prospective comparative study of 52 patients for hernia repair by Lichtenstein's technique under regional anaesthesia (group I) versus total intravenous anaesthesia+local anaesthesia (group II). **Results:** Hernia predominantly occurred in age group of 41- 51 years, inguinal swelling as chief complaint with similar variation in pulse rate, respiratory rate before surgery and systolic blood pressure during and after surgery in both the groups, while respiratory rates after surgery was statistically significant. Light headedness, urinary retention was seen in group I patients while group II patients were able to walk early with shorter duration of hospitalization compared to group I patients. **Conclusion:** Patients operated under total intravenous anaesthesia had several advantages over those operated under regional anaesthesia like - less postoperative pain, requiring less analgesics, no

urinary retention, early ambulation, reduced incidence of nausea and spinal headache, with a shorter duration of hospitalization.

Keywords: Lichtenstein Tension-Free Mesh Inguinal Hernia Repair; Total Intravenous Anaesthesia (TIVA); Regional Anaesthesia.

Introduction

Inguinal hernia repair is one of the world's most common surgical procedures with over one million surgeries accomplished per year in Europe and the United States, mainly as an out-patient regime [2].

Although laparoscopic hernia repairs offer short term benefits of reduced postoperative pain, complications and early return to normal activities when compared to an open repair [3] the high cost associated with laparoscopic repairs, a long learning curve, unavailability of instruments in remote areas and recurrence rate that is equal to [4] or more [5] than open repairs have been a set back especially in developing countries like India.

Lichtenstein tension-free mesh inguinal hernia repair being simple, safe, comfortable, effective method, with extremely low early and late morbidity and remarkably low recurrence rate and therefore is often preferred to undertake hernia repair [6].

Although the classic Lichtenstein repair recommends mesh repair under local anaesthesia as a day care procedure [7,8] it is still not practiced routinely in our setup. Patient's anxiety, surgeon's apprehensions, lack of good backup medical facilities in case of emergencies once the patient is discharged, ease of surgery with regional anaesthesia are some of the reasons cited as preference for performing hernia surgeries under regional or general anaesthesia over local anaesthesia.

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Addition of TIVA to surgery done under local infiltration, using a short acting drug like Propofol not only allays the anxiety of the patient but also increases the comfort of the operating surgeon. Therefore this study was conducted with the aim to compare Lichtenstein inguinal hernia tension free mesh repair operated under Propofol, total Intravenous anaesthesia + local Infiltration with those operated under regional anaesthesia (Spinal/ Epidural). The features assessed included the following parameters like postoperative pain, nausea, vomiting, headache, urinary retention, ambulation, duration of hospitalization, early pulmonary complications, Intraoperative variations in vital parameters like pulse, blood pressure and respiratory rate.

Methodology

A prospective comparative study conducted at St. Philomena Hospital, Bangalore. Patients between 18-65 years, who presented with uncomplicated inguinal hernias (direct, indirect) from March 2007 to June 2009, under ASA Grade I or Grade II were divided into two groups by using the method of picking chits. Group I was operated under regional anaesthesia and group II under TIVA with local infiltration. Informed written consent was taken from all patients. While patients below 18 years and above 65 years, presenting with femoral, recurrent, bilateral or incarcerated hernia and under ASA Grade III were excluded from the study.

Preoperative evaluation (Hemoglobin, Total WBC count, Differential count, Erythrocyte sedimentation rate, Urine routine, chest X-ray, Electrocardiogram, Serum creatinine, blood sugars) was done for all patients. Pre-anaesthetic evaluation was done for all patients.

Patients in Group I received - Spinal or Epidural anaesthesia and 5 ml of local anaesthesia (1:1 mixture of 0.25% Bupivacaine + lignocaine adrenaline) infiltrated along the incision at the end of surgery.

Patients in Group II received - 100 mcg of Fentanyl + 1-1.5 mg/Kg Propofol IV for induction, 75-100 mcg/Kg/min Propofol for maintenance from a syringe pump and 30-40 ml of 1:1 mixture of 0.25% Bupivacaine + 2% lignocaine for layered local infiltration as described.

All patients were given IV fluids $\frac{1}{2}$ DNS at 100 ml/hr during and for 2 hrs after the surgery. Vital parameters including Pulse rate (PR), Blood pressure (BP), Respiratory rate (RR) were monitored after induction of anaesthesia, 30 minutes during the surgery and at the end of surgery were documented to analyze for any intraoperative hemodynamic instability, especially hypotension and respiratory depression (apnea), known to occur with regional and Propofol anaesthesia respectively.

All patients were monitored at 30 min, 1 hr, 2 hr, 4 hr, 6 hr, 8 hr, 12 hr and 24 hr interval postoperatively

for postoperative pain measured by Visual analogue scale (VAS) in mm, nausea, vomiting, headache/light headedness, urinary retention, i.e. time taken to void urine after the surgery, ambulation, pain at site of regional anaesthesia (Spinal/Epidural) and pulmonary complications like tachypnoea, respiratory distress.

VAS scores of less than 30 were considered as mild pain, 30-49 as moderate pain and those above 54 as severe pain.

Statistical Analysis

Descriptive statistical analysis was carried out. Results on continuous measurements were presented on Mean \pm SD (Min-Max) and results on categorical measurements were presented in Number (%). Significance was assessed at 5% level of significance. Intergroup analysis was done by Student 't' test to find the significance of study parameters on continuous scale and Chi-square/2X2, 2X3 Fisher Exact test has been used to find the significance of study parameters on categorical scales between two groups. Confidence interval of 90% was considered to find the significant features and confidence interval with more than 50% is associated with statistical significance.

Significant figures :+Suggestive significance

(p value: 0.05<p<0.10)

*Significant (p value: 0.01<p \leq 0.05)

**Strongly significant (p value: p \leq 0.01)

The Statistical software namely SPSS 15.0, Stata 8.0, MedCalc 9.0.1 and Systat 11.0 were used for the analysis of the data

Results

A Comparative study consisting of 52 patients randomized into two groups with 26 patients in Group I receiving regional anaesthesia (Spinal/Epidural anaesthesia) and 26 patients in Group II receiving (Propofol TIVA + Local anaesthesia) have been included in the present study. Table 1 demonstrates age distribution of patients in both groups, hernia predominantly occurred in the age group of 41-50 years. 24 (92.3%) in group I and 26 (100%) in group II affected were males. It was seen that patient presented predominantly with chief complaint as swelling in 42.3% in group I and 50% in group II followed by complaints of both swelling and pain in 34.6% & 42.3% in group I and group II respectively (Table 3).

Variation in pulse rate before, after anaesthesia and during surgery between the study groups were identical. After surgery, it was 82.92 \pm 4.81 per min in Group I vs. 80.38 \pm 5.43 per min in Group II - statistically significant (Table 4). Variation in systolic blood pressures intra-operatively between the study groups were similar i.e., 119.00 \pm 8.58 mm Hg during surgery and

123.96±8.31 mmHg after surgery - statistically significant. Diastolic blood pressure variation intraoperatively between the study groups was not statistically significant (Table 5). Variation in respiratory rates, intra-operatively, between the study groups were statistically similar, except 'after surgery' where it was 19.85±1.49 vs 19.00±1.41, statistically

significant (Table 6). Though vomiting was not complained by any patient, in either group, however 8 patients in group I and 6 in group II complained of nausea, possibly due to opioid analgesic - Tramadol.

Statistically significant number of patients complained of headache in Group I, especially in the 1-2 and 2-4 hr postoperative interval (Table 7).

Table 1: Age distribution of patients studied - Descriptive statistics

Age in years	Group I		Group II		Pooled	
	No.	%	No.	%	No.	%
20-30	4	15.4	9	34.6	13	25.0
31-40	6	23.1	4	15.4	10	19.2
41-50	11	42.3	9	34.6	20	38.5
>50	5	19.2	4	15.4	9	17.3
Total	26	100.0	26	100.0	52	100.0

Table 2: Comparison of age and weight of patients studied

	Group I	Group II	p value
Age in years	42.08±10.53	39.08±12.17	0.346
Weight in kg	67.12±11.86	67.15±8.52	0.989

Table 3: Chief complaints of patients studied

Chief complaints	Group I		Group II		Pooled	
	No.	%	No.	%	No.	%
Pain	6	23.1	2	7.7	8	15.3
Swelling	11	42.3	13	50.0	24	46.2
Pain+ Swelling	9	34.6	11	42.3	20	38.5
Total	26	100.0	26	100.0	52	100.0

Chief complaints are statistically similar between two groups with p=0.389.

Table 4: Comparison of Pulse rate

Pulse rate/min	Group I (n=26)	Group II (n=26)	p value
Before anaesthesia	79.62±7.22	77.00±7.02	t=1.326;p=0.191
After anaesthesia	78.08±5.73	79.31±5.79	t=0.770;p=0.445
During surgery	77.46±4.85	77.31±4.59	t=0.118;p=0.907
After surgery	82.92±4.81	80.38±5.43	t=1.785;p=0.080

Table 5: Comparison of Systolic and Diastolic blood pressure (SBP/DBP) in mm Hg between the two groups

BP (mmHg)	Group I (n=26)	Group II (n=26)	p value	
SBP / DBP	Before anaesthesia	119.85±11.81	121.38±2.18	t=0.484;p=0.631
		77.31±8.91	80.62±7.81	t=1.423;p=0.161
	After anaesthesia	112.77±9.22	115.77±7.03	t=1.318;p=0.193
		76.23±5.94	76.69±5.77	t=0.900;p=0.777
	During surgery	112.77±6.44	114.08±6.58	t=0.713;p=0.479
		74.08±6.80	76.85±6.09	t=1.546;p=0.128
	After surgery	123.96±8.31	119.00±8.58	t=2.118;p=0.039*
		79.85±6.74	80.08±6.49	t=0.126;p=0.900

Table 6: Comparison of respiratory rate

RR/ min	Group I (n=26)	Group II (n=26)	p value
Before anaesthesia	20.00±1.60	19.92±1.32	t=0.189;p=0.851
After anaesthesia	18.69±1.87	19.23±1.39	t=1.176;p=0.245
During surgery	18.46±1.17	18.54±1.07	t=0.246;p=0.806
After surgery	19.85±1.49	19.00±1.41	t=2.101;p=0.041*

Patients in Group II had no urinary retention and voided urine earlier (5.69 ± 2.09 hrs) compared to patients in Group I (6.96 ± 1.31 hrs) which was statistically significant. Patients in Group II were able to walk early (8.50 ± 3.77 hrs vs. 13.12 ± 6.11 hrs) and had shorter duration of hospitalization (1.69 ± 0.68 days Vs. 2.19 ± 0.98 days), which was also statistically significant. Duration of surgery between the study groups were similar (66.15 ± 9.31 min vs. 64.04 ± 8.02 min) (Table 8).

Thirteen (13) patients had VAS score 0, remaining had score between 5-15. Patients in Group II had statistically significant lower pain scores in 2 to 24 hours postoperative period, although patients in Group I had lower scores in first hour, possibly due to the residual effect of regional anaesthesia. 12 (46.2%) patients in Group I complained of pain at site of regional (spinal/ epidural) anaesthesia (Table 9).

Discussion

The present study shows that patients in group II had less pain scores compared to those in group I in the 2 to 24 hr time intervals, which were statistically significant (< 0.001). This finding compares well with those of Ayca Gultekin et al. [9], Nordin P et al. [10] and Van Veen et al. [11]. However, patients in group I had less pain at the end of first hour which was due to the residual regional anesthetic effect.

Nauseas was present in few patients in both the groups but in different time intervals. 5 patients in group I complained of nausea in the 2nd postoperative hour whereas none complained in group II in the same time interval, suggesting a statistical significance, which is due to the anti-emetic property of Propofol. Patients in group II complained of nausea in different time interval but were not statistically significant. Similar results have been observed in the study by Nordin P et al¹⁰ and Henrik Kehlet et al¹²

Vomiting was not present in patients of both the groups, a parameter which was insignificant in the previous literatures also.

Statistically significant number of patients in group I complained of headaches against those in group II. These match well with studies by Ayca Gultekin et al⁹, Henrik Kehlet et al¹², David et al¹³ and Sultana et al¹⁴

Urinary retention occurred among patients operated under regional anesthesia and is well documented by Ayca Gultekin et al. [9], Nordin P et al. [10], Van Veen et al. [11], Henrik Kehlet et al. [12], David [13], Sultana et al. [14] and Kark et al. [15]. These findings correlate well with our study, where patients operated under TIVA+ local infiltration passed urine much earlier than those operated under regional anesthesia ($p=0.012$). None of the patients in both the groups required interventions like catheterization, whereas

Table 7: Comparison of Light headedness in two groups of patients

Light headedness	Group I (n=26)	Group II (n=26)	P value
15-30 min	0	0	-
30 min-1 hour	6 (23.1%)	2(7.7%)	0.248
1-2 hour	13(50.0%)	0	<0.001**
2-4 hour	13(50.0%)	0	<0.001**
4-6 hour	2(7.7%)	1(3.8%)	1.000
6-8 hour	0	0	-
8-12 hour	0	0	-
12-24 hour	0	0	-

Table 8: Comparison of outcome in patients of both the groups

Outcome	Group I (n=26)	Group II (n=26)	p value
Passed urine at (hours)	6.96 ± 1.31	5.69 ± 2.09	$t=2.620; p=0.012^*$
Able to walk (hours)	13.12 ± 6.11	8.50 ± 3.77	$t=3.279; p=0.002^{**}$
Duration of surgery (minutes)	66.15 ± 9.31	64.04 ± 8.02	$t=0.878; p=0.382$
Duration of Post-op stay (days)	2.19 ± 0.98	1.69 ± 0.68	$t=2.137; p=0.037^*$

Table 9: Comparison of Visual analogue scale in two groups of patients

VAS	Group I (n=26)	Group II (n=26)	p value
1 hour*	3.85 ± 4.48	33.46 ± 12.04	<0.001**
2 hour	57.65 ± 14.47	38.92 ± 8.12	<0.001**
4 hour	49.35 ± 8.34	45.65 ± 10.67	0.171
6 hour	46.19 ± 9.84	36.73 ± 9.65	0.001**
8 hour	42.36 ± 6.76	34.42 ± 8.88	0.001**
12 hour	38.15 ± 8.32	25.54 ± 7.67	<0.001**
24 hour	28.88 ± 5.64	21.50 ± 5.96	<0.001**

Nordin et al. [10] showed in their study that 29% of those operated under regional anesthesia required catheterization.

Patients in group II showed early ambulation compared to group I in the postoperative period (strongly significant). Similar findings of delayed ambulation in patients operated under regional anesthesia were also noted by Ayca Gultekin et al. [9], Van Veen et al. [11], Kark E et al. [15]. Early ambulation with less postoperative pain will help patients to resume work early, this has been observed in studies conducted by Nordin et al. [10] and Sultana et al. [15].

Duration of hospitalization was found to be less among patients in group II, 1.69 ± 0.68 days, compared to 2.19 ± 0.98 days in group I, a finding which is statistically significant. Similar observations were documented in studies by Ayca Gultekin et al. [9], Nordin et al. [10], Van Veen et al. [11], Henrik Kehlet et al. [12]. This was due to increased postoperative pain, delay in passing urine, headache and delayed ambulation in patients of group I.

In our study, none of the patients in both groups suffered from early postoperative pulmonary complications, whereas, David et al. [13] in their study reported pulmonary complications in both regional and local anesthesia group, however there were fewer cases in the local than the regional group. This variation in findings with our study might be because of differences in the ages of patients selected, where patients up to 89 years were included in their study.

Intraoperative variations in vital parameters like blood pressure, pulse and respiratory rate among patients in both the study groups were within normal physiological range. Also these parameters have not been given importance in international literature. Our study did not show much difference in the mean duration of operation, thus concurring with finding by Ayca Gultekin et al. [9].

Conclusion

Lichtenstein inguinal hernia tension free mesh repair operated under TIVA using Propofol with local infiltration is associated with less postoperative pain, lower analgesic requirement, lower incidence of postoperative nausea, no vomiting, less incidence of postoperative headache, no urinary retention, early ambulation and shorter stay in hospital with early return to work. It is suggested that Lichtenstein mesh repair under local anaesthesia with total intravenous anaesthesia should be considered for all primary uncomplicated inguinal hernias.

References

1. Gandhi C et al. observational study of inguinal hernia under local anaesthesia in rural set-up. *International J of Healthcare and Biomedical Research* 2015 Oct;4(1): 67-70.
2. Martinez LV et al. general anesthesia plus ilioinguinal nerve block versus spinal anesthesia for ambulatory inguinal herniorrhaphy. *Saudi J Anaesth* 2014 Oct-Dec;8(4) 523-28.
3. Wilson S, Deans GT, Brough WA. Prospective trial comparing Lichtenstein with laparoscopic tension-free mesh repair of inguinal hernia. *Br J Surg* 1994;83: 274-77.
4. Grant AM. Repair of groin hernia with synthetic mesh: Meta-analysis of randomized control trials. *Ann Surg* 2002;235:322-32.
5. Neumayer L, Giobbie-Hurder A, Jonasson O et al. Open mesh versus Laparoscopic mesh repair of inguinal hernia. *N Engl J Med* 2004;350:1819-27.
6. Sakorafas GH et al. Open tension free repair of inguinal hernias; the Lichtenstein technique. *BMC Surgery* oct 2001;1(3): doi: 10.1186/1471-2482-1-1.
7. Martin Kurzer, Philip A. Belsham, Allan E. Kark. The Lichtenstein repair. *SurgClin North Am* 1998 Dec;78 (6):1025-1046.
8. Parwiz K. Amid. Lichtenstein tension-free hernioplasty. In: Bland KI, Fischer JE (eds). *Mastery of surgery* 5th edition, Philadelphia: Lippincott Williams and Wilkins, 2007. pp.1932-39.
9. Ayca Gultekin F, Osman Kuruahvecioglu, Ahmet Karamercan, Bahadir Ege, Emin Ersoy and Ertan Tatlicioglu. A prospective comparison of local and spinal anaesthesia for inguinal hernia repair. *Hernia*, 2007 Apr; 11(2):153-56.
10. Nordin P, Zetterstrom H, Gunnarsson U, Nillson R. Local, regional general Anaesthesia in groin hernia repair: multicentre randomized trial: *Lancet* 2003;362 (Issue 9387):853-58.
11. Van Veen, Ruben. N, Mahabier, Chander et al. Spinal or local anaesthesia in Lichtenstein hernia repair: a randomized control study. *Ann Surg* 2008 March;247 (3):428-33.
12. Henrik Kehlet, Paul F. White. Optimizing anaesthesia for inguinal herniorrhaphy: general, regional or local anaesthesia. *AnesthAnalg* 2001;93:1367-69.
13. David V. Young. Comparison of local, spinal and general anaesthesia for inguinal Herniorrhaphy. *Am J Surg* 1987 June;153:560-63.
14. Sultana A, Jagdish S, Pai D, Rajendiran KM. Inguinal herniorrhaphy under local anaesthesia and spinal anaesthesia: A comparative study. *J Indian Med Assoc* 1999 May;97(5):169-70,175.
15. Kark AE, Kurzer MN, Belsham PA. Primary inguinal hernia repairs: Advantages of ambulatory open mesh repair using local anaesthesia. *J Am CollSurg* 1998 Apr; 186(4):447-55, Discussion 456.