



**EFFICACY AND UTILIZATION OF LOCAL ANESTHESIA IN PATIENTS
UNDERGOING INGUINAL HERNIA SURGERY AT UDAIPUR, RAJASTHAN- A
INTERVENTION STUDY**

Dr. Prakash Chandra Audichya*¹ and Dr. Sameer Goyal²

¹Associate Professor, Department of Anesthesiology, Pacific Medical College & Hospital, Udaipur.

²Assistant Professor, Department of Anesthesiology, Pacific Medical College & Hospital, Udaipur.

***Corresponding Author: Dr. Prakash Chandra Audichya**

Associate Professor, Department of Anesthesiology, Pacific Medical College & Hospital, Udaipur.

Article Received on 21/04/2016

Article Revised on 12/05/2016

Article Accepted on 31/05/2016

ABSTRACT

Aim: To study how local anesthesia can be effectively used in inguinal hernia surgery and to measure patients satisfaction undergoing inguinal hernia surgery with local anesthesia and at Udaipur, Rajasthan, India. **Methods:** The present study was carried out at Pacific medical college and hospital, Udaipur, Rajasthan, India. In present study, 25 cases of inguinal hernia repair under local anesthesia were taken into consideration which was operated. All patients were adult and male. For all cases details (preoperative, preoperative and postoperative) were collected. Results were compared with standard series of hernia repair done under local anesthesia performed previously. **Results:** The mean age of the all the patients in the study was 51.84. Ninety six percentage patient required 2-3 mg/kg lignocaine and 96% patients required 1.01- 1.50 mg/kg bupivacaine. One patient developed dysarrhythmia in form of sinus bradycardia. most of the patients (56%) required 40 -60 min for surgery. Maximum duration of surgery was 102 min and minimum duration was 45 min. Average hospital stay in present series was 3 days which was more than other similar standard series by 1 day. **Conclusion:** Inguinal hernia under local nerve block is a very safe and cost effective procedure especially for the very high risk patient who cannot undergo general, spinal or epidural anesthesia.

KEYWORDS: Anesthesia, Bupivacaine, Inguinal hernia, Lignocaine, Udaipur.

INTRODUCTION

Inguinal hernias are one of the most common problems encountered by the surgeon accounting for about 10 – 12 % of all patients.^[1] A hernia is the protrusion of tissue, structure, or part of an organ through the bone, muscular tissue, or the membrane by which it is normally contained. Hernias may be internal, external, congenital, or acquired.

Inguinal hernia is one of the commonest varieties of hernia found in any age group but mainly found in elderly age group. Elective surgical repair of the inguinal hernia is also one of the most common surgical procedures done in any surgical operation theater.^[2] General, regional and local all anesthesia modalities are used for patients under going hernia repair surgery. Here the choice of the anesthesia not only depends on not only the physical status of patient but also the choice of surgeon and also sometime patient. These patients requiring hernia repair always have some chronic factor which leads to formation of hernia in them.^[3] Also these are the very patients having associated systemic disease like IHD, DM Hypertension, COPD, chronic respiratory failure, chronic cough, chronic malnutrition and

weakness. Also age related changes in various systems are also present like low volume of distribution, chronic hypovolemia, hypo or hypernatremia, decreased drug metabolizing capacity.^[4] Due to all these factors patients under going hernia repair surgery have higher chances of being in the ASA class II/III. This is why most of the times it is of higher risk, operating these patients under general, epidural or spinal anesthesia. Also the post anesthetic side effects with these anesthesia modalities are very high in these old age patients. Spinal anesthesia and epidural anesthesia has no documented benefits for this small surgery and should be avoided owing to the risk of rare neurologic side effects and high rates of urinary retention. General anesthesia on the other hand with short acting agents may be a valid alternative but it unnecessarily puts patients at higher risk of other metabolic and systemic derangements particularly pulmonary and cardiovascular complications.

While on the contrary local nerve block can be easily given to these patients due to their higher pain tolerance and higher cooperation. And as the local nerve block gives rise to least physiological disturbance in patient's internal milieu, local anesthesia offers many advantages

like safety, less cost, prolonged postoperative analgesia, reduced incidence of nausea and vomiting, less hospital stay, rapid return to normal activity, more patient acceptability.

The aim of present study to study how local anesthesia can be effectively used in inguinal hernia surgery and to measure patients satisfaction undergoing inguinal hernia surgery with local anesthesia and at Udaipur, Rajasthan, India.

MATERIAL AND METHODS

The present study was carried out at Pacific medical college and hospital, Udaipur, Rajasthan, India. Standard Performa was prepared and thorough preoperative evaluation including complete present and past history, complete general, systemic and local examination with relevant investigation was carried out as per outlined in Performa. Ethical approval is taken from the institution and written informed consent was taken from the participants.

In present study, 25 cases of inguinal hernia repair under local anesthesia were taken into consideration which was operated. All patients were adult and male. For all cases details (preoperative, preoperative and postoperative) were collected. Results were compared with standard series of hernia repair done under local anesthesia performed previously.

Patient lied supine on operation table. Intra venous line is secured with appropriate gauze intracath and intra venous fluid according to the patient started (ringer's lactate if patient had no diabetes and normal saline if patient had diabetes) Pulse oxymeter, NIBP and ECG monitors were applied and vitals were noted. •Inj. Glycopyrrolate 0.2 mg was given intravenously. Under all aseptic condition solution was prepared Which contains 4 mg of lignocaine and 2 mg of bupivacaine each. Maximum amount that can be injected into the patient was calculated by patient's weight. At the following points local anesthetic solution was injected. At each pinot local anesthetic was injected after doing negative aspiration test so that intravenous deliveries of drugs are minimized. A point 1 cm medial and 1 cm above to the anterior superior iliac spine was marked. At this point 23 gauze 3 inch needle with attached syringe filled with local anesthetic solution, was inserted

perpendicular to the skin. 2 resistances were felt suggestive of external oblique aponeurosis and internal oblique muscle respectively. 5-7 ml of local anesthetic solution was injected between internal oblique and transverses abdominis muscle i.e. after second resistance. 5-7 ml of local anesthetic was injected between internal oblique and external oblique i.e. after the second resistance is felt needle is withdrawn 1-2 mm. 2-3 ml also injected in fan shape manner in subcutaneous tissue. At this point ilioinguinal, iliohypogastric and lower thoracic nerves are blocked. A point 1 cm above the pubic tubercle on the side to be operated was marked. With 23 gauze 1.5 inch needle with attached syringe inserted towards anterior superior iliac spine and 5-7 ml of local anesthetic solution was injected in subcutaneous tissue. At this point ilioinguinal nerves from same and opposite side are blocked 5-7 ml of local anesthetic solution was injected with 23 gauze 1.5 inch needle subcutaneously along the proposed incision line and a stripe of 2 cm was raised. This blocks the subcutaneous nerves.

In male patient, at root of the scrotum, spermatic cord was palpated and 2-3 ml of local anesthetic solution was injected in both front and back of the cord. This blocks ilioinguinal and genital branch of genitofemoral nerves. In case of female patient this point is omitted. Patient was given inj midazolam 1 mg intravenously after completion of the block. Surgeon was allowed to begin surgery after checking the paresthesia at the incision site.

After opening inguinal canal, when sac of the hernia was held by surgeon, patient sometimes complaints of pulling or dragging type sensation. At this point local anesthetic solution can be injected around the neck of the sac. Also if during anytime of surgery patient complaints of pain, surgeon can infiltrate the local anesthetic solution within the calculated dose limits.

EXCLUSION CRITERIA WERE

- Patient having infection at local site to be injected.
- Patient having allergy to local anesthetic solution.

Statistical analysis

Data were presented as mean values and mean + S.D and analyzed using SPSS software version 15.

RESULTS

TABLE 1 AVERAGE AGE OF OPERATED PATIENT

Age in years	Numbers of patients	Percentage
18 – 30	3	12%
31 – 40	4	16%
41 – 50	5	20%
51 – 60	5	20%
61 – 70	5	20%
71 – 80	3	12%
Total	25	100%

Table 1 shows that maximum age of operated patient were 76 and minimum age was 18. 60% of hernias occurred in older (i.e. 41-80 years). 40% of hernias occurred in 21-40 years age group.

TABLE: 2 WEIGHT DISTRIBUTIONS OF THE PATIENTS

Weight of the patient (Kgs)	Number of patients	PERCENTAGE
41 – 60	13	52%
61 – 80	10	40%
81 – 100	2	8%

The mean weight of all patients in my study was 64.08 Kgs with a STD deviation of 12.96.

TABLE: 3 ASA GARDING CLASSIFICATIONS OF THE PATIENTS

ASA grade	Number of the patients	PERCENTAGE
ASA grade I	7	28%
ASA grade II	18	72%
ASA grade III	0	0
ASA grade IV	0	0

Out of 25 patients 4 Patients had Diabetes, 14 patients had Hypertension while 6 patients had Ischemic heart disease and 3 patients COPD. 5 patients had Hypertension and IHD, 3 patients had Hypertension and Diabetes, and 1 patient had Hypertension and COPD while 1 patient had Hypertension + IHD + COPD. Out of 25 patients 6 had left sided inguinal hernia while 19 had right sided inguinal hernia. This was in correlation that

inguinal hernias are more common on right side. Out of 25 patients, 21 patients had direct hernia while 4 had indirect hernia. Out of 25 patients, all patients took Tab Diazepam + Tab Ranitidine as premedication on previous night.

All the patients received Inj Glycopyrrolate and Inj Midazolam during the procedure.

TABLE 4: SAFE CALCULATED DOSES ACCORDING TO WEIGHT OF THE PATIENTS

Weight of patients (Kgs)	Safe dose (ml)	Dose given in this study (ml)
41 – 50	32 – 37	32 – 35
51 – 60	38 – 45	32 – 40
61 – 70	46 – 52	36 – 45
71 – 80	53 – 60	36 – 46
81 – 90	61 – 67	45
91 – 100	68 – 75	48

Table 4 shows that in all patients total amount of local anesthetic solution used were within safe dose calculated according to weight.

TABLE 5: TOTAL REQUIREMENT OF SOLUTION

Total requirement of solution (ml)	Number of patients	PERCENTAGE
31 – 35	9	36%
36 – 40	9	36%
41 – 45	5	20%
46 – 60	2	8%
Total	25	100%

Table 5 shows that maximum requirement was 46- 50 ml (48 ml). Minimum requirement was 31-35 ml (32 ml).average requirement was 38 ml.

TABLE 6 AVERAGE LIGNOCAINE REQUIREMENTS OF THE PATIENTS

Lignocaine 2% (mg/kg)	Number of patients	PERCENTAGE
1 – 1.50	0	0
1.51 – 2	1	4%
2.01 – 2.50	12	48%

2.51 – 3.0	12	48%
Total	25	100%

Table 6 shows that 96% patient required 2-3 mg/kg lignocaine. Maximum dose of lignocaine was 2.84 mg/kg. Minimum dose of lignocaine was 1.89 mg/kg. Average dose of lignocaine was 2.47 mg/kg.

96% patients required 1.01- 1.50 mg/kg bupivacaine. Maximum dose of bupivacaine was 1.42 mg/kg. Minimum dose of bupivacaine was 0.94 mg/kg. Average dose of bupivacaine was 1.23 mg/kg. 4 patients (16%) complained pain and 1 patient (4%) complained of discomfort. No other complains were noted. Pain and discomfort were treated with intravenous fentanyl 1-2 mcg/kg. 1 patients (4%) developed dysarrhythmia in form of sinus bradycardia. Which were treated with inj atropine 0.6 mg intravenously. No other complications were noted. Most of the patients (56%) required 40 -60 min for surgery. Maximum duration of surgery was 102 min and minimum duration was 45 min. average duration was 64.8 min. mixture of bupivacaine and lignocaine is particularly useful even if duration of surgery is long and it also helps in postoperative analgesia. Duration of the block according to the number of the patients As 4 patients had preoperative complains of pain during the surgical procedure they had duration of the block below 60 min i.e. even before the completion of the surgical procedure. While most of the other patients had duration of the block or the pain free period more then 120 min or 1 hour even after completion of the surgery. Therefore local anesthesia effectively provides postoperative analgesia. Average duration of the block was 205.2 min (about 3.5 hours).

Average hospital stay in present series was 3 days which was more then other similar standard series by 1 day the reason for this results was that around 72% patients were suffering from systemic disease like hypertension, COPD and diabetes. Discharge was given after taking care of stabilizing these conditions. Each patient in present series was asked, "Would they like to have local anesthesia for inguinal hernia repair again?" 21 out of 25 patients gave positive answer, which shows that patient's acceptability was 84% which was well comparable to previous series data. 4 patients who answered no were due to pain, which was then treated with systemic analgesic.

DISCUSSION

Ever since introduction of anesthesia and surgery for inguinal hernia, various type of anesthesia are employed for various type of surgical repair of inguinal hernia.

In present study we used the four point method for local anesthesia for repair of inguinal hernia repair. In present study as shown in observation and the result, out of 25 patients, 4 patients (16%) had complain of pain during surgery and 1 patient (4%) had complain of discomfort. This occurred mainly at the time of cord handling and

dissection. These patients were given Inj fentanyl and further local anesthetic around the cord by surgeon. After 10 min patients were assessed again for pain and all were comfortable with no further complain of pain or discomfort so the surgeon was allowed to proceed further. In a study by Tobren Collensen in 2001 done in 940 patients revealed that 74 patients (8%) had intraoperative pain.^[5]

In present study the rate of intraoperative complain of pain was higher this could be due to requirement of more rigorous training in technique of block and also could be due to inadequate patients preparation and counseling about the procedure.

In this study only 1 patient (4%) had a preoperative complication in the form of sinus bradycardia and was subsequently successfully treated with inj Atropine. And no other postoperative complication was noted in any of the patients. This result was very well comparable to the results of the other study.^[6,7,8]

In my study patients' acceptability was 84% as 21 out of 25 patients reported that they would like to have the local anesthesia for the hernia repair surgery. The 4 patients that did not replied positively were due to complaint of intraoperative pain. Even these patients did not require conversion to any other anesthesia modality and further local and intravenous supplementation was effective for them. Same way the surgeon's acceptability was 84% (21 out of 25). In 4 cases where surgeon did accept local anesthesia as preferable mode were the same cases where patients complained of pain intraoperatively. Therefore I conclude that local anesthesia has high acceptability by both patients and surgeons.

Collensen T in his study of 215 patients found patients' acceptability to be 86% (185 out of 215).^[9] Abdu et al in his study of 400 patients found the patients' acceptability to be 100% and surgeon's acceptability to be 100%.^[10]

Uma Srivastava et al in a study of 92 adult male patients found that 87% of surgeons and 90% of patients were satisfied with the local anesthesia.^[11]

In my study average duration of hospital stay was 2.64 days with a maximum of 4 and minimum of 2 days. Abdu et al found duration of hospital stay to be 1 day (n = 400 patients). Collensen T found the hospital stay to be 1 day in 1000 patients. In my study duration of the hospital stay was more as the more patients were in ASA grade II and had systemic disease, many of whom had been diagnosed for the first time. Therefore they were not discharged until all the necessary investigations were done and their systemic diseases were stabilized. Also the norms of the surgical units were found to play a role in this point. As the surgical units in this centre were

trained to do the hernia repair under spinal anesthesia usual discharge of these patients are after 2 to 3 days. This affected the result of duration of hospital stay.

In current study average requirement for local anesthetic mixture was 38.28 ml, average requirement of lignocaine 2% was 2.43 mg/kg while average requirement of bupivacaine 0.5% was 1.21 mg/kg.

Kulacoglu H in a study of 300 patients found mean requirement of local anesthetic solution to be 19.8 ml with lignocaine requirement to be 101.79 mg and bupivacaine requirement to be 48.12 mg^[12].

Also when we compare the cost for general and spinal/epidural anesthesia with local anesthesia, we can conclude that in contrast to general anesthesia and spinal/epidural anesthesia; local anesthesia require less amount of intravenous fluid for infusion as maintenance fluid. As spinal anesthesia requires costlier spinal needles or epidural anesthesia require epidural set, while local anesthesia requires simple block needles. Also general anesthesia requires various drugs for induction, maintenance and premedication, it is well understood that local anesthesia is very cost effective compared to other anesthesia.

CONCLUSION

It is concluded that inguinal hernia repair under local nerve block provides good and reliable anesthesia for hernia repair surgery and is less associated with any cardiac, respiratory or other system complications, so high risk patients who cannot undergo surgery in general, spinal or epidural anesthesia can be very well be operated with this method. Inguinal hernia under local nerve block is a very safe and cost effective procedure especially for the very high risk patient who can not under go general, spinal or epidural anesthesia.

REFERENCES

1. McVay CB, Read RC, Ravitch MM.; Inguinal hernia; *Curr Probl Surg Oct*, 1967; 1-50.
2. Kurzer M, Kark A, Hussain T.; inguinal hernia repair; *J Perioper Pract*, 2007; 17(7): 318-21, 323-6, 328-30.
3. Vinci A; Inguinal hernia: contribution to its etiopathogenesis, 31, 1987; 42(15-16): 1259-66.
4. Z Arztl Fortbild; General medicine aspects of the operated inguinal- and femoral hernia in adolescents and adults, 1970; 1964(7): 346-8.
5. Collensen et al; feasibility of local infiltration anesthesia for recurrent groin hernia repair; *Eng Surg*, 2001; 167: 851-4.
6. Nienhuijs SW, Remijn EE, Rosman C.; Hernia repair in elderly patients under unmonitored local anaesthesia is feasible; *Australas J Ageing*, 2011 Jun; 30(2): 93-7.
7. De Sá Ribeiro FA et al; Inguinal hernia repair with local anesthesia in the outpatient. *Rev Col Bras Cir*, 2010; 37(6): 397-402.
8. Donati M, Brancato G, Donati A.; Open incisional hernia repair under local anaesthesia.; *Int J Clin Pract*, 2009; 63(12): 1739-42.
9. Callesen T, Bech K, Kehlet H.; Feasibility of local infiltration anaesthesia for recurrent groin hernia repair.; *Anaesthesia*, 1998; 53(1): 31-5.
10. Rashid Abdu; ambulatory herniorrhapy under local anesthesia in a community hospital; *American journal of surgery*, 1983; 145: 353-57.
11. U Srivastava, A Kumar, S Saxena.; Comparison of local, spinal and general anaesthesia for inguinal hernia repair. *J of anesthesiology*, 2007; 23(2): 151-154.
12. Kulacoglu H, Ozyaylali I, Yazicioglu D.; Factors determining the doses of local anesthetic agents in unilateral inguinal hernia repair. *Hernia*, 2009; 13(5): 511-6.