

Effect of Intraoperative Bupivacaine Infiltration for Post-Operative Pain Relief in Open Inguinal Hernia Repair

Tanay N. Shah¹, Pratham R. Bysani², Nikhil Sharma³

¹M.S. General Surgery, Baroda University,
Assistant Professor, Department of General Surgery, B.J. Medical College, Asarwa, Ahmedabad, Gujarat, India

^{2,3}Third Year Resident, M.S. General Surgery, Gujarat University, B.J. Medical College,
Asarwa, Ahmedabad, Gujarat, India

Abstract: *A single blind RCT to evaluate the effect of intraoperative bupivacaine infiltration for post operative pain relief was conducted. Observations based on the VAS and mean duration for requirement of 1st analgesic dose post operatively. Results compared with other similar studies and found that there is significant reduction in the VAS of post operative pain and increase in the duration for requirement for the 1st dose of the analgesic postoperatively*

Keywords: Hernioplasty, bupivacaine, pain relief, intraoperative bupivacaine

1. Introduction

Inguinal herniorrhaphy is the most common operation done for adult men today, and postoperative pain remains a formidable problem. The ability to reduce this pain might lead to shorter hospital stay, less reliance on postoperative analgesics, and faster return to work and normal activity. Analgesic regimens are being designed to provide pre-operative or intra-operative local anaesthetics to reduce the incidence of this post-operative pain. These regimens are based on the hypothesis that the most effective way to eliminate or reduce postoperative pain is to prevent the development of pain rather than simply to treat it. The basis of this hypothesis is a neurological principle known as “the wind-up phenomenon” first described by Mendell. During an operation, the central nervous system (CNS) receives input from pain fibres peripherally or at the operative site. The continuous stimulation of the CNS in this manner may lead to hyperexcitable or “wind-up” nerve activity. As a result, it is thought that patients have an increased perception of pain.

Local anaesthetic-induced neural blockade is the most effective method of providing pain relief after a procedure and the analgesia from a single application of a local anaesthetic agent may persist for longer than the pain itself. However, intermittent intramuscular opiates remain the usual method of providing analgesia, despite widely accepted disadvantages. Subcostal wound infusion of local anaesthetic (either continuously or intermittently via an indwelling catheter) or wound infiltration are techniques which have all been shown to significantly reduce postoperative pain, opioid requirements and respiratory complications. Wound infiltration has been compared to ilio-inguinal nerve block after herniorrhaphy and hernioplasty, both methods providing excellent postoperative analgesia, as does intermittent herniorrhaphy wound infusion.

No evidence of delay in wound healing, increase in wound infection or signs of skin sensitivity have been found in any of these studies. (Correspondence to: Dr M J Spittal FCAnaes, Anaesthetic Department, Princess Alexandra Hospital, RAF Wroughton, Sweden)

2. Aims and Objectives

This is a single-blinded prospective type of experimental study.

a) **Aim:** To test the efficacy of intra-operative bupivacaine infiltration for post-operative pain relief in open inguinal hernia repair.

b) Objectives

- To compare the post-operative pain in patients with intra-operative bupivacaine and saline infiltration.
- To compare duration for requirement of analgesics between 2 groups.

3. Materials and Methods

3.1 Inclusion Criteria

- Age > 18yrs
- Unilateral direct/indirect inguinal hernia
- Those who are to undergo planned surgery

3.2 Exclusion Criteria

- Bilateral direct/indirect inguinal hernia
- Irreducible hernia
- Obstructed/strangulated hernia
- Patients with presence or history of active malignancy or systemic diseases
- Under immunosuppressive treatment
- Patients with systemic or severe local inflammation or infection, wound healing disorders

- Starting from November 2010 to October 2011, 80 patients over the age 18 years, who presented for elective unilateral inguinal hernia repair were entered into the study.

- All were seen preoperatively by an anaesthetist, the trial and assessment explained, and informed consent obtained.

- Then the patients were randomly allocated (by lottery method) in either of the following groups.

Group-A- to receive intra-operative infiltration of 20ml 0.25% bupivacaine after herniorrhaphy.

Group-B- to receive intra-operative 20ml saline infiltration after herniorrhaphy.

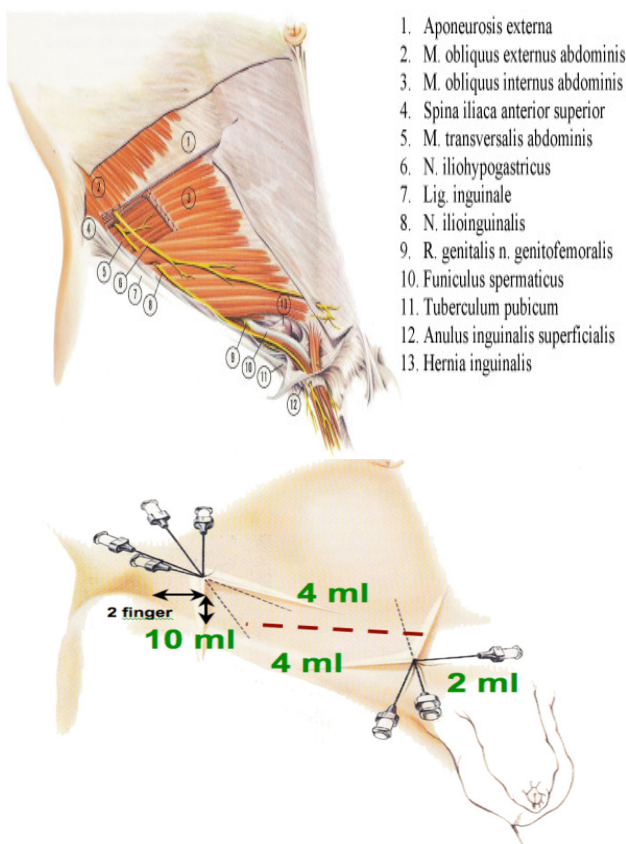
- Bupivacaine or saline infiltration was done in the ilio-inguinal and ilio-hypogastric nerve fields

10cc-medial to pubic tubercle

4cc –lateral to pubic tubercle

4cc –medial to lateral point of incision

2cc –lateral to lateral point of incision



All patients were induced under spinal anaesthesia. It was taken care of that none of the patients received analgesic drug in pre-anaesthetic medication.

- Lignocaine 5% 2ml with 1:10000 Adrenaline 5 microgram/ml was used for each patient. None of the patients received bupivacaine for spinal anaesthesia.

Herniorrhaphy was performed by modified Bassini's technique and hernioplasty by Lichtenstein's tension free repair using prolene mesh. For the group-A patients, after the ligation of the hernia sac and repair of the posterior inguinal wall, but before putting a mesh and closure of the wound layers, 20 ml of 0.25% plain bupivacaine was instilled (or 'squirted') into the wound. The tissues were bathed with the local anaesthetic for 1min and then the wound closed as

normal. Same procedure was carried out on group-b patients, the only difference being the use of 20 cc saline instead of bupivacaine for infiltration. All patients were prescribed intramuscular or oral Diclofenac and/or Tramadol as required for pain. When the patients were fit to return to the ward the recovery nurse (blind to the method of analgesia) presented them with a 100 mm visual analogue pain scale.

- The pain was recorded on a visual analogue scale (VAS) on a 1 to 10 score with 10 indicating the worst pain ever experienced by the patient.

- VAS scoring was performed at 3, 6 and 12 hours post-operatively for both the groups.

- Time taken for the request of first analgesic dose was noted and the subsequent analgesics were given as and when required.

- Any complications during the post-operative period were also noted.

- After discharge the patient was prescribed analgesics on as and when required basis.

- Suture removal was performed between 8th to 10th day and till then the patients underwent alternate day dressing.

4. Results and Data Analysis

4.1 Randomization of the Patients

Group-A:Patients With Intra-Operative Bupivacaine Infiltration	43
Group-B:Patients With Saline Infiltration	37

Randomization was done using lottery method.

4.2 Visual Analogue Score (After 3 Hours)

Group-A	2.2
Group-B	4.3

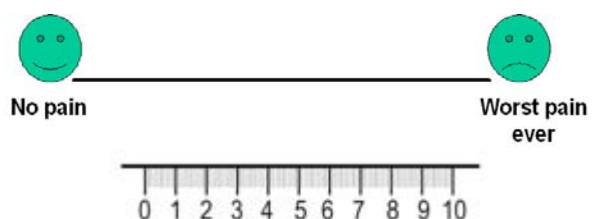
4.3 Visual Analogue Score (After 6 Hours)

Group-A	3.0
Group-B	6.2

However it is notable that by 6 hrs all the patients in group-B had received a single dose of analgesic. Diclofenac 50 mg orally/intramuscularly. The difference between VAS score was statistically significant at p value of 0.001 even when the control group patients had received single dose of analgesic.

4.4 Visual Analogue Score (After 12 Hours)

Group-A	4.3
Group-B	7.3



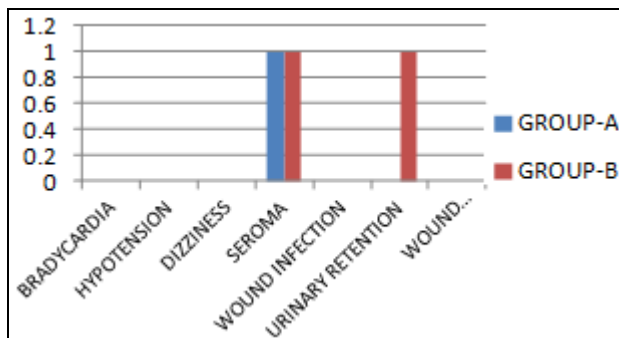
4.5 Other Details of the Patients

	Age	Weight	Type of Hernia		
			Direct	Indirect	Pantaloon
Group-A	45.4	57.32	17	25	1
Group-B	46.8	60	22	15	0

- Mean age of group-A patients was 43.96years whereas it was 47.82 in control group patients.
- The difference in age was not found to be clinically significant at p value of 0.05.

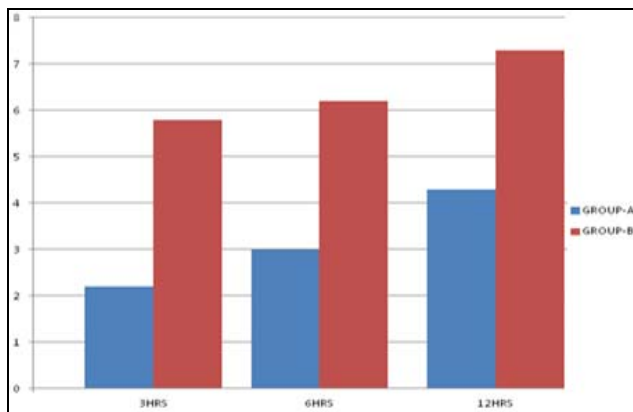
So age was not found as a confounding factor between these 2 groups.

5. Complications

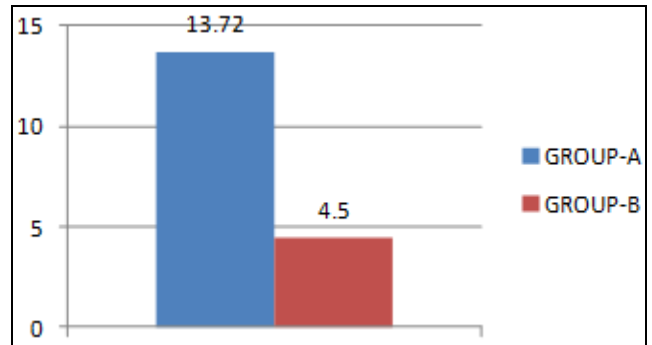


6. Discussion

6.1 Comparison of Mean VAS at 3, 6, 12 hours between both groups



6.2 Mean Time for First Demand of Analgesics



- The results of this study showed that intra-operative use of bupivacaine was associated with
- Decrease in intensity of post-operative pain
- Decrease in consumption of the analgesics.
- Bupivacaine instillation has numerous advantages.
- As it is carried out by the surgeon towards the conclusion of the operation, the anaesthetist is not distracted from his care of the patient.
- A smaller dose of local anaesthetic is used, so toxicity and cost implications, and the possibility of disturbing tissue planes, haemorrhage and infective sequelae are reduced.

Related findings of Visual analogue score after 6 hours in Nehra and Gamell study and present study

	Bupivacaine alone	Saline alone
VAS-6(n=100)	2.75(n=50)	4.8(n=50)
VAS-6(n=66)	2.7(n=33)	5.7(n=29)

- So, findings of both the studies are comparable in terms of VAS score at 6 hours of post-operative period.
- In spittal and hunter study, during first 12 hours out of 25 none of the patients required analgesics, which is comparable to mean duration of first analgesic requirement (13.71hours) in the present study.
- Mean VAS score on the day of surgery was 1.28 whereas in present study VAS score at 3, 6 and 12 hours were 2.2, 2.7 and 3.8 respectively.
- The study technique is associated with minimal complications and is relatively easy to perform.
- No patient suffered from potential adverse reactions of bupivacaine- nausea, hypotension and bradycardia.
- The occurrence of seroma was also observed with only 1 patient.

7. Study Limitations

- Study is not double blinded.
- As perception of pain is subjective, chance of fluctuation in VAS score is a possibility.
- If during surgery, if there is accidental division of ilio-inguinal or ilio-hypogastric nerves, it may lead to false positive results.
- A larger patient population would have given us a better assessment of the advantage

8. Conclusion

- Intra-operative Bupivacaine instillation during open inguinal hernia repair provides good pain relief in early post-operative period.
- Time for demand of an analgesic and requirement of analgesic in the post-operative period decreased significantly with the intra-operative Bupivacaine instillation.

References

- [1] Nehra D, Gemmell L, Pye J.K, Pain relief after inguinal hernia repair: A randomized double blind study (p 1245-1247)-vol.82 issue 9 British journal of surgery
- [2] Prospective double-blind randomized study of a new regimen of pre-emptive analgesia for inguinal hernia repair: evaluation of postoperative pain course
Stefan Fischer, Hans Troidl, Alexandra A. MacLean, Lothar Koehler and Andreas Paul, From the Department of Surgery, University of Cologne, Cologne Merheim Hospital, Cologne, Germany and Department of Surgery, New York University Medical Center, New York, New York, USA, Eur J Surg 2000; 166: 545–551
- [3] Spittal M.J. and Hunter S.J. performed a single blind randomized trial, in which 50 consecutive adult patients for inguinal herniorrhaphy received either an inguinal field block pre-operatively or bupivacaine instilled into the wound intra-operatively to provide post-operative analgesia.
- [4] A study carried out by Dierking GW et al on The effects of wound infiltration with bupivacaine versus saline on post-operative pain and opioid requirements after herniorrhaphy at Dept. of Anaesthesiology, Silkeborg county hospital, Denmark.