Comparison of Postoperative Pain Scores In Patients With Preincisional Versus Postincisional Local Anesthesia Infiltration At Surgical Site

Mairam Imran,[1*] Zahid Mehmood,[1] Fizzah Khalid [1]

ABSTRACT

Objective *To compare the pain scores after local anesthesia infiltration before and after incision at the surgical site.*

Study design *Comparative study.*

Place & Duration of study *Department of General Surgery Ward 25, Jinnah Postgraduate Medical Center (JPMC) Karachi, from January 2020 to December 2020.*

Methodology *Patients who underwent acute appendicitis were included in the study. After getting written informed consent by lottery method they were divided into two groups. The patients who received preincisional infiltration anesthesia were in Group 1 (study group) and Group II (control group) had postincisional anesthesia at the surgical site. Visual Analogue Scale (VAS) scores were calculated to assess the intensity of postoperative pain at 4, 8 and 24 hours.*

Results *A total of 60 patients with acute appendicitis were included. They were divided equally between the two groups (n=30). The mean pain score at 4, 8 and 24 hours in Group I was 4.73+0.78, 3.86+0.68 and 2.33+0.54 respectively while in Group II it was 5.62+1.29, 5.00+0.78 and 3.66+0.66 respectively. The p values at 4-hours was 0.01, at 8-hours 0. 03 and at 24-hours 0.03. These were statistically significant.*

Conclusion *Postoperative pain control was better with preincisional infiltration of local anesthetic than with postincisional infiltration.*

Key words *Postoperative pain, Lidocaine, Bupivacaine, Appendicitis, Local anesthesia.*

INTRODUCTION:

Postoperative pain control has been a crucial aspect in adequate management of surgical patients. Pain after surgery not only affects postoperative recovery of the patient but also influences restoration to normal physiology and time of hospital stay. Various techniques have been introduced to efficiently manage this cumbersome issue for early postoperative recovery and satisfaction of both the surgeon and the patient. Local anesthetic drugs infiltration around the wound before or after surgery has been recommended and lidocaine and bupivacaine are commonly used drugs.[1]

Pain causes neuromodulation at local, spinal and brain level. To prevent this neuromodulation emerged the term pre-emptive analgesia.[2,3] Putta published his study which showed significant benefit of preincisional local anesthesia infiltration in terms of

[1] Department of General Surgery JPMC, Karachi.

Correspondence:
Dr. Mariam Imran [1*]
Department of General Surgery, Ward 25
Jinnah Postgraduate Medical Centre (JPMC), Karachi
E mail: mariam.imran93@gmail.com

shoulder pain and early mobilization and discharge from the hospital.[4] Liang and Cantore also reported similar results in their studies but Turner and Gluck found no significant difference between preincision and postincision local anesthesia infiltration.[5-8]

This generated the idea of infiltration of local anesthesia at the site of surgery before incision and compare it with postincisional local anesthesia infiltration by assessing postoperative pain scores in patient populations.[1,3,9] Although various studies have shown that local anesthetic bupivacaine and lidocaine infiltration at the surgical site reduce postoperative pain, but literature regarding advantages and use of bupivacaine and lidocaine in terms of preincisional versus postincisonal infiltration is still under consideration. This study was conducted to find out advantages of preincisional versus postincisional local anesthesia infiltration for postoperative pain management.

METHODOLOGY:

This comparative study was conducted in the Department of General Surgery Ward 25, JPMC Karachi from January 2020 to December 2020. Keeping mean+SD of postoperative pain score in study group as compared to control group (26.37+16.24 versus 38.30+ 9.51, p<0.01), confidence interval 95%, power test 90% the estimated sample size was 30 in each group and total sample size of 60. Consecutive sampling technique was used to enroll patients.

Patients with the diagnosis of acute appendicitis who underwent open appendectomy under general anesthesia were enrolled in this study. Patients with perforated appendix and those converted to open appendicectomy or laparotomy were excluded. Patients using opioids were also excluded from the study.

Patients were explained the nature of study and written and informed consent taken. Two groups of 30 patients each with lottery method were made. In Group I (study group) patients received preincisional lidocaine and bupivacaine at the surgical site, while Group II (control group) patients received lidocaine and bupivacaine at the end of procedure. Patients were assessed for mean postoperative pain score via VAS. Patients were assessed at 4, 8 and 24 hours postoperatively and data was collected on predesign form.

Data were entered on SPSS version-20. Mean and SD were calculated for postoperative pain score, BMI and age. Frequency and percentages were calculated for gender and outcome variable (mean postoperative pain score). The two groups were compared for mean postoperative pain score by applying student t test. A p value <0.05 was taken as significant.

RESULTS:

A total 60 patients with acute appendicitis were included. The age of the patients was from 18 years to 40 years. Group I included 30 subjects with 21 (35%) male and 9 (15%) female patients, with the mean age of 23.80+2.52 year. Group II also included 30 patients, with 18 (30%) males and 12 (20%) females with the mean age of 24.93+3.08 year. The overall mean age was 24.36+2.85 year. The mean height in Group I was 1.52+0.16 meters while in Group II 1.67+0.19 meters with overall mean height of 1.65+0.27 meters. The mean weight in Group I was 50.78+5.16 kg while in group II it was 67.16+19.54 kg with overall mean weight of 58.97+16.40 kg. The mean BMI in Group I was 20.71+2.57 kg/m^2 while in Group II 24.93+4.43 kg/m^2 with overall mean BMI of 22.82+4.17 kg/m^2.

In Group I the mean pain score at 4-hours was 4.73+0.78 while in Group II 5.62+1.29. The overall mean pain score at 4-hours was 5.31+0.92. Details are given in table I. In this study the mean pain score at 4, 8 and 24 hours was less in the age group of > 25 years in both the groups. It was slightly less in male gender in both the groups and also less in BMI of 17-24 kg/m^2 range in both the groups.

DISCUSSION:

Pain is unpleasant sensation that occurs in all surgeries and may be of mild to severe intensity. The goal of the surgeon is to minimize the pain for better patient outcome. To achieve this various techniques and number of analgesics are used. Every technique and analgesic drugs has pros and

Table I: Mean Postoperative Pain Scores

Groups	Pain Score at 4-hours	Pain Score at 8-hours	Pain Score at 24-hours
Group I	4.7333+0.78492	3.8667+0.68145	2.3333+0.54667
Group II	5.62+1.292	5.000+0.78784	3.6667+0.66089
P value *	0.01*	0.03*	0.03*

cons. In this study we used local anesthesia infiltration at wound site before and after the incision. The results of this study indicate that preincisional surgical site infiltration using both bupivacaine and lidocaine can provide adequate postoperative pain relief up to 24 hours postoperatively following appedicectomy under general anesthesia. Both drugs were found safe.

The concept of preemptive or preincisional analgesia focuses on prevention of central sensitization triggered by surgical incision; however, other factors have been advocated that exaggerate and prolong pain after surgery due to hypersensitization of higher centers in central nervous system. These include noxious intraoperative stimuli as retraction, postoperative inflammatory processes, and ectopic neural activity.[10]

In this study the mean pain score at 4, 8 and 24 hours in study group I was less than control group. A study by Goettsch et al comparing effect on pain control of preincisional versus postincisional local anesthesia the mean pain score was significantly lower in the preincision cohort compared to postincisional group.[11] Putta, Liang and Cantore also reported similar outcome in their comparative study for postoperative pain management.[4-6] Pain control helped in early mobilization and early discharge from the hospital. Same results are not duplicated in other studies.[7,8,12,13]

Lidocaine is amide group local anesthetic drug which blocks sodium channels on neuronal tissue that plays vital role in conduction of pain signals from surgical wound site to brain. Its starts its action within 1-2 minutes and duration of action is 10-20 minutes while using IV or 30 minutes to 3-hours when infiltrated locally into the wound site. Bupivacaine is another drug commonly used as analgesia because of its longer duration of action but in large doses can cause cardiac problems. To overcome this issue new long acting drugs ropivacaine and levobupivacaine are developed for the safety of patients.[14-16]

In this study we used combination of lidocaine and bupivacaine that showed decrease in pain scores and analgesic requirement Postoperatively in preincision group it helped early mobilization and discharge from the hospital. Ko et al also used the same combination of drugs but could not find any advantage in terms of hospital stay and analgesic requirement while Lohsiriwat used bupivacaine into skin, subcutaneous tissue and muscular layer and reported significant pain reduction in postoperative period up to 48 hours.[17,18] Edward et al conducted study on pediatric population and reported no benefit of local anesthesia infiltration in appendicectomy.[19] The results of this study provide evidence based data on the subject of postoperative pain control and may set standards for others to implement in their clinical practices.

CONCLUSION:

Postoperative pain control was better with preincisional infiltration of bupivacaine and lidocaine than with postincisional infiltration. The combination of drugs used was found safe.

REFERENCES:

1. Labrum JT, Ilyas AM. Preemptive analgesia in thumb basal joint arthroplasty: Immediate postoperative pain with preincision versus postincision local anesthesia. J Hand Microsurg. 2017;9:80-3.

2. Ejlersen E, Andersen HB, Eliasen K, Mogensen T. A comparison between preincisional and postincisional lidocaine infiltration and postoperative pain. Anesth Analg.1992;74:495-8.

3. Olanipekun SO, Adekola OO, Desalu I, Kushimo OT. The effect of pre-incision field block versus post-incision inguinal wound infiltration on postoperative pain after paediatric herniotomy. Maced J Med Sci. 2015;3:666-71.

4. Putta PG, Pasupuleti H, Samantaray A, Natham H, Rao MH. A comparative evaluation of pre-emptive versus post-surgery intraperitoneal local anaesthetic instillation for postoperative pain relief after laparoscopic cholecystectomy: A prospective, randomised, double blind and placebo controlled study. Indian J Anaesth. 2019;63:205-11.

5. Liang SS, Ying AJ, Affan ET, Kakala BF, Strippoli GF, Bullingham A, et al. Continuous local anaesthetic wound infusion for postoperative pain after midline laparotomy for colorectal resection in adults. Cochrane Database Syst Rev. 2019;10(10):CD012310. doi: 10.1002/14651858.CD012310.pub2.

6. Cantore F, Boni L, Di Giuseppe M, Giavarini L, Rovera F, Dionigi G. Pre-incision local infiltration with levobupivacaine reduces pain and analgesic consumption after laparoscopic cholecystectomy: a new device for day-case procedure. Int J Surg. 2008;6 Suppl 1:S89-92. doi: 10.1016/j.ijsu.2008.12.033.

7. Turner GA, Chalkiadis G. Comparison of preoperative with postoperative lignocaine infiltration on postoperative analgesic requirements. BJA: British J Anaesth. 1994;72:541-3.

8. Gluck O, Barber E, Feldstein O, Tal O, Kerner R, Keidar R, et al. The effect of subcutaneous and intraperitoneal anesthesia on post laparoscopic pain: a randomized controlled trial. Sci Rep. 2021;11(1):81. doi: 10.1038/s41598-020-80130-6.

9. Èustovic S, Pandža H, Delibegovic S. Effect of local anesthesia on the postoperative pain after laparoscopic appendectomy. J Laparoendosc Adv Surg Tech A. 2019;29:65-71. doi: 10.1089/lap.2018.0452.

10. Barletta JF, Asgeirsson T, Senagore AJ. Influence of intravenous opioid dose on postoperative ileus. Ann Pharmacother.2011;45:916-23.

11. Goettsch WG, Sukel MP, van der Peet DL, van Riemsdijk MM, Herings RM. In-hospital use of opioids increases rate of coded postoperative paralytic ileus. Pharmacoepidemiol Drug Saf. 2007;16:668-74.

12. Molliex S, Haond P, Baylot D, Prades JM, Navez M, Elkhoury Z, et al. Effect of pre- vs postoperative tonsillar infiltration with local anesthetics on postoperative pain after tonsillectomy. Acta Anaesthesiol Scand. 1996;40:1210-5.

13. Dahl V, Raeder JC, Erno PE, Kovdal A. Pre-emptive effect of pre-incisional versus post-incisional infiltration of local anaesthesia on children undergoing hernioplasty. Acta Anaesthesiol Scand. 1996;40:847-51.

14. Virlos I, Clements D, Beynon J, Ratnalikar V, Khot U. Short-term outcomes with intrathecal versus epidural analgesia in laparoscopic colorectal surgery.Br J Surg.2010;97:1401-6.

15. Levy BF, Scott MJ, Fawcett W, Fry C, Rockall TA. Randomized clinical trial of epidural, spinal or patient-controlled analgesia for patients undergoing laparoscopic colorectal surgery. Br J Surg. 2011;98:1068-78.

16. Wongyingsinn M, Baldini G, Stein B, Charlebois P, Liberman S, Carli F. Spinal analgesia for laparoscopic colonic resection using an enhanced recovery after surgery programme: better analgesia, but no benefits on postoperative recovery: a randomized controlled trial. Br J Anaesth.2012;108:850-6.

17. Ko CY, Thompson JE Jr, Alcantara A, Hiyama D. Preemptive analgesia in patients undergoing appendectomy. Arch Surg. 1997;132:874-7.

18. Lohsiriwat V, Lert-akyamanee N, Rushatamukayanunt W. Efficacy of pre-incisional bupivacaine infiltration on postoperative pain relief after appendectomy: prospective double-blind randomized trial. World J Surg. 2004;28:947-50.

19. Edwards TJ, Carty SJ, Carr AS, Lambert AW. Local anaesthetic wound infiltration following paediatric appendicectomy: a randomised controlled trial: time to stop using local anaesthetic wound infiltration following paediatric appendicectomy? Int J Surg. 2011;9:314-7.

Received for publication: 09-08-2021

Accepted after revision: 01-12-2021

Author's Contributions:
Mariam Imran: Concept, data collection, literature search and manuscript writing
Zahid Mehmood: Data analysis and manuscript writing.
Fizzah Khalid: Data Collection, literature search and manuscript writing.

All authors approved final version of the manuscript.

Ethical statement: Institution review board permission was obtained prior to the study and informad consent taken.

Competing interest:
The authors declare that they have no competing interest.

Source of Funding: None

How to cite this article:
Imran M, Mehmood Z, Khalid F. Comparison of postoperative pain scores in patients with preincisional versus postincisional local anesthesia infiltration at surgical site. J Surg Pakistan. 2022;27 (1):11-15. Doi:10.21699/jsp.27.1.4.