SUBCUTANEOUS VERSUS SUBCUTANEOUS AND INTRAPERITONEAL LOCAL ANAESTHETIC IN THE MANAGEMENT OF POST APPENDICECTOMY PAIN

Khalid Zulfiqar Qureshi, Zafar Iqbal Gondal*, Ahmed Raza*

Hand & Upper Limb Surgery Centre Lahore, *Combined Military Hospital Rawalpindi

ABSTRACT

Objective: To compare the efficacy of subcutaneous only and combined subcutaneous and peritoneal infiltration of 0.5% bupivacaine during appendicectomy for the management of early post operative pain.

Study Design: Randomized controlled study.

Place and Duration of Study: Department of Surgery, CMH Kohat from 13th December 2007 to 20th December 2008.

Patients and Methods: Sixty patients of acute appendicitis, divided into two groups of 30 each, were included in the study. Group A was given 0.5% bupivacaine subcutaneously, whereas group B was given the anaesthetic subcutaneously as well as intraperitoneally during appendectomy.

Results: In group A, 24 (80%) were VAS (visual analogue scoring) 3 (uncomfortable) and 6 (20%) were VAS 2 (mild pain) whereas in study group B, 11 (36.6%) were VAS 3, 19 (63.3%) were VAS 2 and 19 (63.3%) were VAS 2 during 1st 12 hrs postoperatively (p=0.001). In 12-24 hrs post operatively, 15 (50%) patients were VAS 3 in group A and same number was VAS 2 and in group B, only 3 (10%) were in VAS 3 and 27 (90%) were VAS 2 (p=0.001).

Conclusion: A combination of subcutaneous and peritoneal infiltration with bupivacaine is superior in relieving post appendectomy pain so patients require less dosage of analgesics in early post operative period along with early mobilization.

Keywords*:* Appendicectomy, Bupivacaine, Post operative pain.

INTRODUCTION

Post operative pain is the most undesirable and threatening experience for surgical patients. Poor pain control can slow the recovery or contribute to complications in post operative patients[1].

Appendicectomy is the commonest surgical procedure being encountered in surgical wards. Management of post operative pain in appendectomy is gaining attention in order to reduce hospital stay and early mobilization. Peritoneal inflammation is an important feature in many patients presenting with appendicitis[2,3].

Bupivacaine is a potent agent capable of producing prolonged anesthesia. Its long duration of action plus its tendency to provide more sensory than motor block has made it a popular drug for providing prolonged analgesia during labour or the post operative period[4].

The purpose of this study was to show that early post operative pain after appendectomy can be reduced more effectively by 0.5% bupivacaine given subcutaneously as well as intraperitoneally compared with 0.5% bupivacaine given subcutaneoulsy alone. So not only our patients will benefit but dependency on nursing staff for analgesia during this period can be curtailed.

MATERIAL AND METHODS

The study was conducted at Department of Surgery, CMH Kohat over a period of one year from 13 December 2007 to 20 December 2008 after approval from the hospital ethical committee. Sixty patients of acute appendicitis were included in this study and divided in two groups of 30 each. Patients were counseled and informed written consent was obtained.

Non probability consective sampling was employed and all ASA I and II patients (both sex) of age more than 10 years, diagnosed with acute appendicitis, were included in the study. Patients with known diabetes mellitus, bleeding

Correspondence: Maj Khalid Zulfiqar Qureshi, Classified Surgical Specialist, Hand & Upper Limb Surgery (HULS) Centre, Abdul Rehman Road Lahore.
Email: drkzqureshi@gmail.com
Received: 18 May 2011; Accepted: 04 June 2013

disorders, cardiac arrhythmias, seizures and pregnant and lactating ladies were excluded from the study.

After careful physical examination and basic investigations, 60 patients of acute appendicitis, who fulfilled the inclusion criteria, were recruited from surgical outpatient and emergency department of CMH Kohat. Patients were randomly divided into two groups.

Appendicectomy was performed in main operation theatre under general anesthesia (GA) without any premedication. A Grid Iron skin incision was used in both the groups and approximate time of surgery was 45-60 minutes. A dose of 1.5 mg/kg bupivacaine 0.5% was used after dilution into a 20 ml bolus for each patient. In group 'A' patients, entire dose of bupivacaine was given subcutaneously after approximating the aponeurosis of external oblique muscle and group 'B' patients received half of this dose subcutaneously and half of the dose into the incised edges of peritoneum and adjacent muscles below the external oblique aponeurosis.

Pain scores were assessed at 12 and 24 hrs post-operatively using a visual analogue scoring (VAS) system ranging from 0 (no pain) to 5 (worst pain), while patients were lying supine and as they moved to a sitting position. Total analgesia requirements, in term of total number of doses, in the first 24 hrs were also recorded. Intramuscular diclofenac sodium (75 mg) was used as analgesic during this period when required at score 2 or above according to VAS.

Data were recorded on a proforma and was analyzed using SPSS version 13. Variables of study were age, gender, weight, pain and analgesic requirement during 1st 12 hours post operatively and then in next 12 hours (12-24 hours post operatively). Mean and standard deviation (SD) was calculated for age and weight. Frequency and percentages were calculated for gender, pain scores and analgesia requirement. Results included comparison of pain relief and total early post op analgesia requirement with subcutaneous only and combined subcutaneous and peritoneal infiltration with bupivacaine 0.5% using chi square test. *p* value of <0.05 was considered as significant.

Table-1: Pain scoring in 1st 12 hours post operatively.

Pain in 1st 12 post op hours VAS	Group A (n=30)	Group B (n=30)
	Frequency (%)	Frequency (%)
No pain	0	0
Mild pain	6 (20)	19 (63.3)
Uncomfortable	24 (80)	11 (36.6)
Distressing	0	0
Intense	0	0

p = 0.001

Table-2: Pain scoring in 12 – 24 hours post operatively

Pain in 12-24 post op hours VAS	Group A (n=30)	Group B (n=30)
	Frequency (%)	Frequency (%)
No pain	0	0
Mild pain	15 (50)	27 (90)
Uncomfortable	15 (50)	3 (10)
Distressing	0	0
Intense	0	0

p = 0.001

RESULTS

The mean age in group A was 29.63±16.88 years while the mean age in group B was 24.77 ± 11.14 years. In group A, there were 24 (80.0%) male and 6 (20.0%) female patients while in group B, there were 25 (83.3%) male and 5 (16.7%) female patients. In group A, 16 (53.3%) patients were more than 50 kgs of weight and 14 (46.7%) were less than 50 kgs of weight whereas in group B, they were 20 (66.7%) and 10 (33.3%) respectively.

In group A, out of 30 patients, 24 (80%) were VAS 3 (uncomfortable) and 6 (20%) were VAS 2 (mild pain) whereas in study group B, 19 (63.3%) were VAS 2 and 11 (36.6%) were VAS 3 during 1st 12 hours post operatively. Twenty two (73%) patients in group A and 9 (30%) in group B

required single dose NSAID injection during this period. (Table 1 and Fig 1).

During 12-24 hours post operatively, 15 (50%) patients were VAS 2 in group A and same number was VAS 3 and in group B, 27 (90%) were VAS 2 and only 3 (10%) were in VAS 3. During this period, 1 (3.33%), 27 (90%) and 2 (6.66%) patients from group A required 0, 1 and 2 doses of analgesic respectively whereas in group B, 6 (20%) patients required no and 24 (80%) needed only 1 dose of analgesic. (Table 2 and Fig 2).

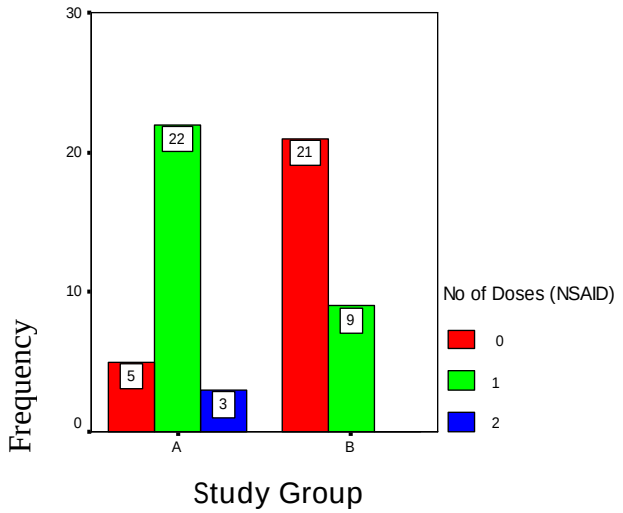

Figure-1: Analgesic (NSAID) requirement in 1st 12 hours post operatively (*p*=0.0001).

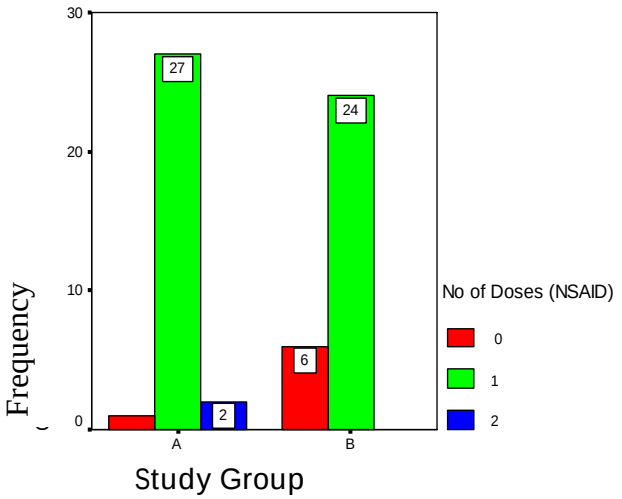

Figure-2: Analgesic (NSAID) requirement in 12-24 hours post operatively (*p*=0.05).

DISCUSSION

One of the most significant changes in surgical practice during the last two decades has been the growth of ambulatory surgery. Adequate postoperative (post op) analgesia is a prerequisite for successful ambulatory surgery. Recent studies have shown that large number of patients suffer from moderate to severe pain during the first 24-48 hours[5].

Bupivacaine is indicated for local anaesthesia including infiltration, nerve block, epidural, and intrathecal anaesthesia. It is also commonly injected into surgical wound sites to reduce pain for up to 20 hours after the surgery. Compared to other local anaesthetics, bupivacaine is markedly cardio toxic. However, adverse drug reactions (ADRs) are rare when it is administered correctly[6].

In a double-blinded and randomised controlled study, it was shown by Jensen and his colleagues that incisional bupivacaine infiltrated into the subcutaneous after wound closure, in 68 children undergoing open appendicectomy, was better in relieving pain for a longer period of time compared with the placebo group. However, the difference was not significant[7].

Effect of direct local wound perfusion of bupivacaine 0.5% on pain relief after cholecystectomy was studied by and confirmed the reduction in requirements of post op parenteral narcotic analgesia with no major side effect. (p = 0.03)[8] .

Topical bupivacaine has a role in reducing post-tonsillectomy pain and facilitates early eating and drinking during the post-operative period[9].

The efficacy of pre-incisional bupivacaine infiltration (pre-emptive analgesia) on postoperative pain relief after appendicectomy was studied in another prospective randomized double-blinded study at Siriraj Hospital, Bangkok, from January to May 2002. The pain score during the first 6, 12, 24, and 48 hours, including the score while sitting up, were all

significantly lower ($p < 0.001$) in the pre-emptive group[10] .

A study done in the past revealed that subfascial combined with subcutaneous infiltration of bupivacaine during wound closure prolongs the first time to analgesia, reduces early postoperative opioid requirements and lowers pain in males undergoing open hernia repair[11].

Intraperitoneal bupivacaine may be a good option to relieve immediate postoperative pain, reducing analgesic doses in women after laparoscopic surgery which is likely to be cost-effective because it decreases resource utilization for treatment of postoperative pain and emesis. Also it is free of side effects like gastritis due to NSAIDs and fear of drug dependence as in morphine derivatives[12].

Intraperitoneal injection of 0.5% bupivacaine has been tried during laparoscopic cholecystectomy as well. The study was conducted in 40 ASA I and 2 patients of sex, undergoing laparoscopic cholecystectomy under general anaesthesia in a double blind, randomised controlled trial. They confirmed that this method is easy, with no adverse effects and may become a routine practice[13].

The contribution of peritoneal nerve fibres to pain experienced after appendectomy has received little attention. Keeping this feature in view, it has already been observed that combined (subcutaneous and intraperitoneal) infiltration of 0.5% bupivacaine is superior to subcutaneous only infiltration during appendectomy, in a study conducted at department of Anaesthesia, University College Hospital, Galway, Ireland[14] .

CONCLUSION

A combination of subcutaneous and intraperitoneal infiltration with bupivacaine is superior in the relief of post appendicectomy pain so patients require less dosage of analgesics in early post operative period along with early mobilization. By this way, we can not only avoid the painful aftermath of cost effective repeated intramuscular oil based NSAIDs injections like Diclofenac sodium but can also reduce the dependency over opioid drugs which are notorious for dependency.

REFERENCES

1. Richard M L. Anaesthesia and pain management. In: Russell RC, William NS, Bulstrode CJ. Bailey and Love's Short Practice of Surgery. 24th Ed. London: Arnold, a member of Hodder Headline Group 2004;42–54.
2. Ko CY, Thompson JE , Alcantara A, Hiyama D. Pre-emptive analgesia in patients undergoing appendectomy. Arch Surg 1997;132:874-7.
3. Colbert S, O'Hanlon DM, Courtney DF, Quill DS, Flynn N. Analgesia following appendectomy-the value of peritoneal Bupivacaine. Can J Anaesth 1998;45:729-34.
4. Catterall W, Mackie K. Drugs acting on CNS. In: Hardman JG, Limbird LE. Goodman and Gilman's. The pharmacological basis of therapeutics. 9th Ed. New York: Churchill Livingstone 1996;273-345.
5. Rawal N. Postoperative pain treatment for ambulatory surgery. Best Pract Res Clin Anaesthesiol 2007;21:129-48.
6. Rossi S. Australian Medicines Handbook 2006. Adelaide: Australian Medicines Handbook; 2006.
7. Jensen SI, Andersen M, Nielsen J, Qvist N. Incisional local anesthesia versus placebo for pain relief after appendectomy in children -- a double blinded controlled randomized trial. Eur J Pediatr Surg. 2004;14:410-3.
8. Aman Z, Qayum A, Khan K. A study of effectiveness of local Bupivacaine infiltration of the wound in reducing the post operative parenteral narcotic analgesic requirement. J Postgrad Med Inst. 2004; 18: 7-11.
9. Khan SA, Zaman J. Effect of topical Bupivacaine on postoperative pain after tonsillectomy. Med Channel 2005;11:30-3.
10. 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. 2005 ;29:936.
11. El-Radaideh KM, Al-Ghazo MA, Bani-Hani KE. Combined Subfascial and subcutaneous Bupivacaine instillation for inguinal hernia wounds. Asian J Surg. 2006;29:242-6.
12. Shaw IC. Stevens J, Krishnamurthy S. The influence of intraperitoneal Bupivacaine on pain following major laparoscopic gynaecological procedures. Anaesthesia 2001;56:1041-44.
13. Bhardwaj N, Sharma V, Chari P. Intraperitoneal Bupivacaine instillation for post operative pain relief after cholecystectomy. Indian J. Anaesth 2002;46: 49-52.
14. Colbert S, O'Hanlon DM, Courtney DF, Quill DS, Flynn N. Analgesia following appendectomy - the value of peritoneal Bupivacaine. Can J Anaesth 1998;45:729-34.