

Post-Operative Pain Comparison between Peri-Operative Bupivacaine Infiltration Vs Post-Operative Opioids Analgesics in Patient Undergoing Abdominal Surgery in First 6 Hours

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Abstract:

Background: To compare between opioids and wound infiltration to reduce post-operative pain in abdominal surgery in first 6 hours, in appropriate treatment, contraindications of treatment and increase mortality of patients. This article presents novel approach to surgical site infiltration techniques and intravenous opioids for abdominal surgery to reduce pain. The main aim of this study is optimal patient comfort rather than reduce pain intensity, reduction of side effects is also an important goal in pain management.

Methodology: Data was collected from surgical department of Gulab Devi Chest Hospital. During abdominal surgery bupivacaine was given to some patients while other were managed by post-operative opioids and by using designed formula it is concluded that which one of them is better method for post-operative pain management.

Results: This is the descriptive study conducted in Gulab Devi Hospital Lahore. In this study, in this study minimum age of the patients was 14 and maximum age of the patients was 80. The mean age was 32.16 ± 12.32 years. In this study out of total 100 patients, 18(18.00%) were male patients and 82(82.00%) were females. Female gender predominated in this study. In this study, p-value is 0.00 (<0.05%) so pain relieving chances of bupivacaine infiltration as moderate pain scale were 84% and in distracting pain scale chances in bupivacaine infiltration were 16%. But pain relieving chances of opioids as moderate pain scale were 12.24% and in distracting pain scale chances in opioids were 87.75%. So peri-operative pain management by bupivacaine infiltration is better than post-operative opioids management in patients undergoing abdominal surgery.

Conclusion: According to my research bupivacaine wound infiltration is better method for post-operative pain management in abdominal surgeries. Our study was conducted at Gulab Devi Hospital and Services Hospital in an area of pain management by opioids and infiltration, which may limit the applications of our findings in area of pain management by opioids and infiltration prevalence.

Key words:

Bupivacaine, opioids, analogue pain scale, abdominal surgery

Introduction:

Abdominal surgery is defined as surgery pertaining to the contents of the abdominal cavity, its walls and orifices. Pain is a

distressing feeling often caused by intense or damaging stimuli, such as stubbing a toe, burning a finger, putting alcohol on a cut, or bumping the "bone". Postoperative pain is

defined as a condition of tissue injury together with muscle spasm after surgery (1). There are two types of post-operative pain, acute pain and chronic pain. The overall prevalence of moderate to severe postoperative pain reported is 17% to 40%, with one study revealing an incidence of up to 60% in the first 24 hours (2).

There are different methods of post-operative pain management like non-steroidal anti-inflammatory drugs, opioids, wound infiltration, regional techniques combined with various drug regimens including (a) peripheral nerve blockade alone; (b) peripheral nerve blocks combined with general anaesthesia; (c) neuraxial blockade; (d) neuraxial blockade with general anaesthesia; and (e) neuraxial combined with peripheral nerve blockade (3).

Wound infiltration with local anaesthetics is a simple, effective and inexpensive means of providing good analgesia for a variety of surgical procedures without any major side effects (4). Local anaesthesia may be accomplished by infiltration of the wound with lidocaine and bupivacaine. Onset of action is rapid after subcutaneous administration. Wound infiltration may be as effective as central and proximal peripheral blocks in ensuring a safe postoperative recovery. Although untreated postsurgical pain may cause chronic pain. The administration of local anaesthetics into the wound before the incision or during the procedure (pre-emptive analgesia) has been demonstrated to reduce postoperative pain in many kinds of surgeries such as inguinal herniorrhaphy, cholecystectomy, tonsillectomy, diagnostic laparoscopic procedures, gynaecological procedures and

some orthopaedic procedures. Bupivacaine is often administered by epidural injection during spinal anaesthesia. It is also commonly injected into surgical wound sites for the relief of postoperative pain. Despite years of advances in pain management, the mainstay of postoperative pain therapy in many settings is still opioids. Opioids bind to receptors in the central nervous system and peripheral tissues and modulate the effect of the nociceptors.(5) The most commonly used intravenous opioids for postoperative pain are morphine, hydromorphone (dilaudid), and fentanyl.

Rationale of this research is that investigating the management of post-operative pain following day surgery in first 6 hours by comparison between different medications. The objective of the study is to compare the bupivacaine wound infiltration with intravenous opioids to reduce the post-operative pain in abdominal surgeries. The main aim of this study is provide patient comfort and reduce pain intensity, reduction of side effects is also an important goal in pain management. Additional goals may include improved quality of life, reduce morbidity, timely discharge, quick recovery and return of function. It can be achieved by the comparison of peri op bupivacaine infiltration and post-operative opioids intravenously.

Material and Methods:

Study Design: This was a descriptive study.

Settings: Surgical department of Gulab Devi Chest Hospital.

Sample Size: This study involved 100 patients fulfilling inclusion criteria. Sample

was calculated using $p=0.05\%$, $d=3\%$ using the following formula:

$$n = \frac{Z^2_{1-\alpha/2} P(1-P)}{d^2}$$

Sampling Techniques: Data was collected through purposive sampling technique.

Study Groups:

Group 1: Effects of bupivacaine

Group 2: Effects of opioids

Sample Selection Criteria:

Inclusion criteria: Patients who were undergoing abdominal surgeries under general anaesthesia and having no other complain except surgical site pain and patients who had pain management through bupivacaine infiltration and post-operative opioids.

Exclusion criteria: Use of NSAIDS in Patients for pain management were excluded for current study.

Methodology: Data was collected from surgical department of Gulab Devi Chest Hospital. During abdominal surgery bupivacaine was given to some patients while other were managed by post-operative opioids and by using designed performa it was concluded that which one of them is better method for post-operative pain management.

Statistical Analysis: The quantitative values were discussed as mean \pm standard deviation like in age. While the qualitative data like effects of bupivacaine and opioids were presented in the form of charts and tables along its percentage.

Operational Definitions:

Pain: An unpleasant sensation that can range from mild, localized, discomfort to agony.

Post-operative pain: Post-operative pain was defined as a condition of tissue injury together with muscle spasm after surgery.

Abdominal cavity: The space bounded by abdominal walls, diaphragm and pelvis and containing most of the organs like spleen, kidneys and adrenal glands.

Abdominal surgery: It is defined as surgery pertaining to contains of the abdominal cavity, its wall and orifices.

Acute pain: It is a temporary, related to injury and that resolves during the appropriate healing period.

Chronic post-operative pain: Pain persisting at least three months after surgery

Infiltration of wound: It is defined as infiltration of a local anaesthetic in to a surgical wound to aid in pain management.

Opioids: These are substances that act opioid receptors to produce morphine like effects.

General anaesthesia: It is the induction of a state of unconsciousness with absence of pain sensation over the entire body through the administration of anaesthetic drugs.

Nociceptors: A receptor of pain stimulated by various kinds of tissue injury.

Central block: Lack of sensation caused by disease of the nerve centre.

Visual analogue scale: It is a measurement instrument that tries to measure a characteristic, attitude i.e., believed to range across a continuum of values and can't easily be directly measured.

Results:

Age distribution: In this study minimum age of the patients was 14 and maximum age of the patients was 80. The mean age was 32.16 ± 12.32 years.

Gender distribution: In current study out of total 100 patients, 18 (18%) were male patients and 82 (82%) were females. Female gender predominated in this study.

Drug Distribution: Out of 100 patients in this study, 50 (50%) patients received opioids and 50 (50%) patients were infiltrated bupivacaine.

Pain Distribution using pain scale showed 48 (48.48%) patients were on moderate pain level and 51 (51.52%) patients were on distracting pain level. And 91 (91.92%) patients had pain on operated area and 2 (2.02%) patients had pain on surrounding area.

Distribution of procedure related to this study is explained in Figure.

Comparison of Pain Between Bupivacaine Infiltration and Opioids Chi-square value is 51.01. p-value is 0.00 (<0.05%) so pain relieving chances of bupivacaine infiltration as moderate pain scale were 84% and in distracting pain scale chances in bupivacaine infiltration were 16%. But pain-relieving chances of opioids as moderate pain scale were 12.24 % and in distracting pain scale chances in opioids were 87.75%. So, peri-operative pain management by bupivacaine infiltration is better than post-operative opioids management in patients undergoing abdominal surgery, its tabulated explanation is shown in Table.

Discussion:

Wound infiltration with bupivacaine is an effective method of minimizing postoperative pain. With the advancement in surgical techniques, there have also been new development in post-operative pain care. One of these is infiltration of wounds at the time

of closure, with a long acting anaesthetic agent. Wound analgesic sparing effect has the major influence on patient ability to resume their normal activities or daily living (6).

Another study was performed to investigate if wound infiltration with 20 ml of 0.5% bupivacaine after abdominal hysterectomy improved analgesia and reduced morphine requirements from a patient-controlled analgesia system during the first 6 h after operation. Forty patients undergoing abdominal hysterectomy were allocated randomly to one of two groups. The study was performed in a double-blind controlled manner. Morphine requirements in the first 6 hours after operation were similar in both the control (30.3 mg) and bupivacaine (29.0 mg) groups. Cumulative hourly morphine requirements did not differ significantly between the two groups. Pain scores assessed by visual analogue were similar in both groups (6).

Bupivacaine infiltration is simple, safe and effective method of alleviating post-operative pain and is especially appropriate for the day case surgery (7).

It has been observed in another study from Pakistan that average pain relief of 4 to 5 hours is beneficial in early post-operative treatment. Due to the limited number of patients, a significant difference in the incidence of pain related post-operative complications could not be established, however, the delay in the analgesic demand and early mobilization of patients clearly recommend the application of this procedure in routine surgical procedure (7).

Although opioids have played a prominent role in postoperative analgesia for centuries and are still often administered as a matter of

routine, their frequent minor side effects and the increasing availability of suitable alternatives may limit their future use in some situations. Thus, the recent emphasis on ambulatory surgery and accelerated surgical stay programs, both with a focus on early recovery of organ function and provision of functional analgesia [i.e., pain relief that allows normal function] (8).

Postoperative analgesia is usually inadequate, perhaps because conventional approaches to pain relief do not take account of underlying mechanisms. Pre-emptive analgesia may prevent nociceptive inputs generated during surgery from sensitizing central neurons and, therefore, may reduce postoperative pain. In this study, we compared the effect of parenteral opioids when given before or after total abdominal hysterectomy in 60 patients. 10 mg of opioids were given intramuscularly 1 hour before operation (I/M pre), intravenously at induction of anaesthesia (I/V pre), or intravenously at closure of the peritoneum (I/V post). Response was assessed by opioids consumption from patient-controlled analgesia machines which was found to be significantly reduced in the I/V pre-group for 24 hours after operation compared with the I/V post group. Pain sensitivity around the wound was reduced in both preoperative treatment groups compared with the IV post group. We conclude that analgesia with intravenous opioids, by preventing the establishment of central sensitization during surgery, reduces postoperative pain, analgesic requirements, and secondary hyperalgesia (9).

This study also has several limitations, firstly the sample size was small, however, study of

large population would not significantly alter post-operative pain management by infiltration and opioids in abdominal surgery. Secondly our study was conducted at a single institution in an area of pain management by opioids and infiltration which may limit the applications of our findings in area of pain management by opioids and infiltration prevalence.

Conclusion:

According to this study, bupivacaine wound infiltration is better method for post-operative pain management in abdominal surgeries.

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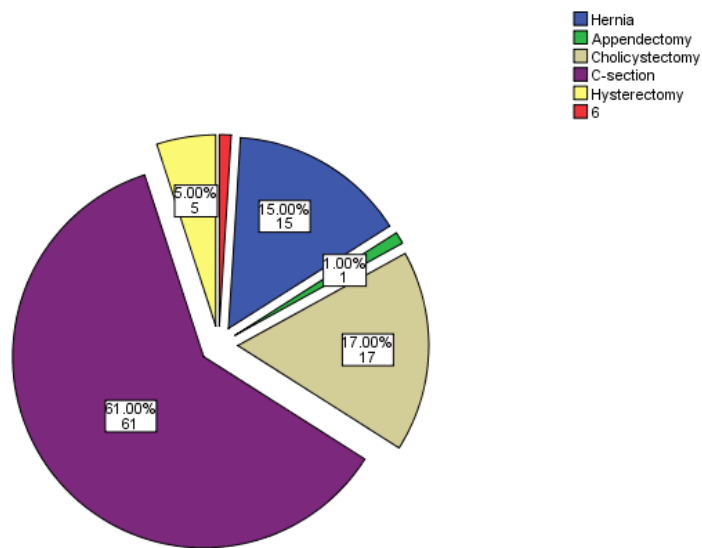


Figure 1. Distribution of procedure

Table 1. Comparison of Pain between Bupicaine Infiltration and Opioids

	Unable to move, Severe, Intense, Unmanageable, Distressing, Distracting, Moderate, Uncomfortable, Mild, Minimal, No pain		Total
	Moderate	Distracting	
Bupivacaine Infiltration	42	8	50
Opioids	6	43	49
Total	48	51	99

Supplementary File 1:

Study Questionnaire

Patient Name: _____

S/O, D/O, W/O: _____

Age: _____ years

Gender: Male

Female

Weight: _____ Kg

Hospital Name: _____

Department Name: G. Surgery

Gy. Surgery

Procedure Name: _____

Operation time: : AM/PM

Drug administration:

Bupivacaine infiltration Opioids

Pain:

10. Unable to move

9. Severe

8. Intense

7. Unmanageable

6. Distressing

5. Distracting

4. Moderate

3. Uncomfortable

2. Mild

1. Minimal

0. No pain

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Area of pain:

Operated area

surrounding operating area