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# Management post-operative pain by comparative assessment of morphine, Butorphanol and fentanyl along with local aesthetics

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**Abstract**
The most common method of postoperative pain relief is the traditional use of 'on demand' intramuscular opioid injections. Better pain relief can be obtained with newer techniques such as epidural opioids and patient controlled analgesia. The current study was conducted to evaluate the safety and efficacy of opioid analgesics, Morphine, Butorphanol and Fentanyl along with local Anaesthetic Bupivacaine, when given epidurally, for postoperative pain management in lower abdominal surgeries.
The maximum patients in the included study groups are from age 20 to 30 years. The Control group administered showed slow onset and Fentanyl administered group shows fastest onset. The duration of the analgesia is seen maximum in morphine administered patients. The duration of sedation is seen maximum in morphine administered patients. The Bupivacaine administered patients observed immediate onset of sedation. The maximum number of patients had seen the nausea and vomiting side effects in morphine group patients. In Bupivacaine administered patients are observed with hypotension as side effects prominently.
In conclusion, Morphine or Butorphanol along with Bupivacaine can be safely given epidurally to obtain effective post-operative analgesia after lower abdominal surgeries. While epidural Fentanyl and Bupivacaine combination can also be safely and effectively used for post-operative analgesia in lower abdominal surgeries but repeated administrations may be required.

**Keywords:** morphine, butorphanol, bupivacaine, fentanyl, epidural, pain etc

## Introduction
Postoperative pain is defined as a condition of tissue injury together with muscle spasm after surgery. Recently, peripheral and central sensitization has been shown within the mechanisms of postoperative pain generation. The most common method of postoperative pain relief is the traditional use of 'on demand' intramuscular opioid injections. Better pain relief can be obtained with newer techniques such as epidural opioids and patient controlled analgesia.
Managing acute postoperative pain is a major challenge for practitioners, given that more than 80% of patients report pain after surgery, and 75% report the pain as moderate, severe, or even extreme [1, 2]. In more than half of cases, patients report not receiving adequate pain management following their procedure, which raises concerns over the development of chronic pain down the line.
To address these issues, the American Pain Society (APS) has published a new set of guidelines for managing postoperative pain. A collaboration with the American Society of Anesthesiologists (ASA), these guidelines are the first postoperative guideline published by the APS, designed to promote more evidence-based pain management for both children and adult.
Morphine is used primarily to treat both acute and chronic severe pain. It is also used for pain due to myocardial infarction and for labor pains. Its duration of analgesia is about three to seven hours.
However, concerns exist that morphine may increase mortality in the setting of non ST elevation myocardial infarction [3]. Morphine has also traditionally been used in the treatment of acute pulmonary edema [4]. A 2006 review, though, found little evidence to support this practice [5]. A 2016 Cochrane review concluded that morphine is effective in relieving cancer pain. Side-effects of nausea and constipation are rarely severe enough to warrant stopping treatment [6].
Bupivacaine is used by injecting it into the area, around a nerve that supplies the area, or into the spinal canal's epidural space. It is available mixed with a small amount of epinephrine to make it last longer. It typically begins working within 15 minutes and lasts for 2 to 8 hours. Possible side effects include sleepiness, muscle twitching, ringing in the ears, changes in vision, low blood pressure, and an irregular heart rate. Concerns exist that injecting it into a joint can cause problems with the cartilage. Concentrated bupivacaine is not recommended for epidural freezing. Epidural freezing may also increase the length of labor. It is a local anaesthetic of the amide group [7].
Fentanyl, also known as fentanil, is an opioid pain medication with a rapid onset and short duration of action [8]. It is a potent agonist of μ-opioid receptors. Fentanyl is 50 to 100 times more potent than morphine [9], but some fentanyl analogues, which are designed to mimic the pharmacological effects of the original drug, may be as much as 10,000 times more potent than morphine.
The current study was conducted to evaluate the safety and efficacy of opioid analgesics, Morphine, Butorphanol and Fentanyl along with local Anaesthetic Bupivacaine, when given epidurally, for postoperative pain management in lower abdominal surgeries.

## Methodology
The study is conducted in Lord Buddha Koshi Medical College and Hospital in Surgery department, From Dec 2015 to Dec 2016. The approval of ethical committee had been taken along with the consent from the patients were also taken. Total 80 patients having are group of 20-50 year were enrolled in to the

study. The patients undergoing lower abdominal surgery and suitable for the epidural anaesthesia were included in the study.

**Dosage**

- Group A: Control group: 1ml Normal saline (0.9%) + 9 ml (0.125%) Bupivacaine
- Group B: Morphine group: 1 ml Morphine sulphate (3mg) preservative free + 9 ml (0.125%) Bupivacaine
- Group C: Bupivacaine group: 1 ml Butorphanol tartrate (2 mg) + 9 ml(0.125%) Bupivacaine
- Group D:Fentanyl group: 1 ml Fentanyl citrate (50 mg) + 9 ml (0.125%) Bupivacaine

The other drugs given to all the patients in common were 0.5% Bupivacaine 2-3 ml – for spinal Anaesthesia and Inj. Midazolam (2-3mg) –Intravenously as pre- Anaesthetic medication.

**Results & Discussion**

The data from the 80 patients were collected in 4 group is presented as below.

**Table 1:** Age distribution

| Age | Group A: Control group | Group B: Morphine group | Group C: Bupivacaine group | Group D: Fentanyl group | Total |
|---|---|---|---|---|---|
| 20-30 years | 12 | 14 | 13 | 14 | 53 |
| 31-40 years | 4 | 4 | 4 | 5 | 17 |
| 41-50 years | 4 | 2 | 3 | 1 | 10 |
| Total | 20 | 20 | 20 | 20 | 80 |

The maximum patients in the included study groups are from age 20 to 30 years.

**Table 2:** Onset & Duration of Analgesia

| Age | Group A: Control group | Group B: Morphine group | Group C: Bupivacaine group | Group D: Fentanyl group |
|---|---|---|---|---|
| Onset (mins) | 15.3 ± 3.9 | 8.9 ± 1.1 | 5.1 ± 0.5 | 2.9 ± 0.7 |
| Duration (mins) | 125.5 ± 18.7 | 1340.2 ± 128.2 | 590.2 ± 110.5 | 320.8 ± 53.8 |

The Control group administered showed slow onset and Fentanyl administered group shows fastest onset. The duration of the analgesia is seen maximum in morphine administered patients.

**Table 3:** Onset & Duration of Sedation

| Age | Group A: Control group | Group B: Morphine group | Group C: Bupivacaine group | Group D: Fentanyl group |
|---|---|---|---|---|
| Onset (mins) | 28.2 ± 1.5 | 14.5 ± 3.8 | 8.9 ± 1.9 | 9.8 ± 2.1 |
| Duration (mins) | 97.3 ± 8.1 | 286.8 ± 45.1 | 173.1 ± 30.1 | 128.4 ± 31.6 |

The duration of sedation is seen maximum in morphine administered patients. The Bupivacaine administered patients observed immediate onset of sedation. The maximum number of patients had seen the nausea and vomiting side effects in morphine group patients. In Bupivacaine administered patients are observed with hypotension as side effects prominently.

**Table 4:** Side Effects

| Age | Group A: Control group | Group B: Morphine group | Group C: Bupivacaine group | Group D: Fentanyl group | Total |
|---|---|---|---|---|---|
| Nausea & Vomiting | 1 | 3 | 1 | 1 | 6 |
| Respiratory depression | 0 | 0 | 0 | 0 | 0 |
| Hypotension | 1 | 2 | 3 | 1 | 7 |

The effective and adequate post-operative pain management is important, not only for humanitarian reasons but because of the deleterious effects of post-operative pain on various organ systems and the negative impact on post-operative recovery. Effective post-operative analgesia decreases morbidity, which allows early ambulation and discharge. Pain relief may involve administration of analgesic drugs by various routes and/or non-pharmacological techniques. Out of all these measures, epidural administration of local Anaesthetics, combination of local Anaesthetics and opioids or combination of local Anaesthetics and other adjuvants are proved to be very effective in providing good post-operative analgesia. The discovery of spinal opioid receptors has paved a new way to extend the duration of analgesia offered by spinal analgesics in the post- operative period with reduced doses of local Anaesthetics and avoiding prolonged residual motor paralysis. The addition of small doses of opioids has made this possible, at the same time avoiding their potential side effects which are commonly seen with their use by other routes i.e. IM, IV for post operative pain relief. Thus combination of Local Anaesthetics and Opioids enables to give both the drugs in doses with the advantages of very low incidence of side effects and better pain relief than when either is used alone.

So, to compare the efficacy and safety of different types of opioids, given epidurally, a small study comprising 80 patients scheduled for lower abdominal surgeries was done.

**Conclusion**

In conclusion, Morphine or Butorphanol along with Bupivacaine can be safely given epidurally to obtain effective post-operative analgesia after lower abdominal surgeries. While epidural Fentanyl and Bupivacaine combination can also be safely and effectively used for post-operative analgesia in lower abdominal surgeries but repeated administrations may be required.

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